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END Independent Verification & Validation (IV&V) Team
Draft Report

Redactions in this copy of the IV&V Report were made to mask the identities of the specific postal mail processing facilities from which commercially sensitive and privileged volumes and mail processing data were obtained for purposes of the analysis.

Evolutionary Network Development

Independent Verification and Validation (IV & V) Team

DRAFT REPORT

January 10, 2005

UNITED STATES
POSTAL SERVICE

January 18, 2005

JOHN RAPP
SENIOR VP OPERATIONS

SUBJECT: Evolutionary Network Development IV&V Draft Report

The Independent Verification and Validation (IV&V) team has completed the initial verification and validation of the assumptions, inputs, calculations, and outputs associated with the optimization and simulation models produced by the Evolutionary Network Design (END) team. The results of that review are in the attached draft report. There are three outstanding model scenarios that the Headquarters (HQ) sub-group requested from the Development team. The results of these scenarios will be reviewed and analyzed when they are made available. A subsequent task to recommend policy and procedures that IV&V teams can follow with respect to future postal modeling efforts will be addressed in March of this year.

As you know, the IV&V team comprises two groups: the Operations sub-group, which is composed of Field managers with extensive operational expertise; and the HQ sub-group, which is made up of HQ staff with extensive experience in postal databases, cost analysis, and rate cases. None of the members of either the HQ or the Operations sub-groups was involved in the development of the network optimization model. Additionally, a member of the Office of Inspector General served in an advisory role for the team. His suggestions have helped the IV&V team formulate its process for conducting this verification and validation effort, and his benchmarking research has contributed to the team's understanding of its role. We would also like to thank the END Development team for their patience while the IV&V team was brought up to speed on their modeling efforts and their full cooperation throughout our review.

Finally, we would like to recognize our team members who brought their expertise to bear on this project while simultaneously dealing with their normal everyday responsibilities. Their professionalism, dedication and knowledge of postal operations and finance are reflected in this comprehensive draft report and in the hundreds of detailed work papers which are currently stored in Program Performance, Capital and Program Evaluation.

Let us know if you have any questions regarding this report. We are available to brief you and/or others if needed.

David C. Fields, Sr.
District Manager/Lead Executive
Greensboro District

William Batterton
Manager, Program Performance
Capital and Program Evaluation

Attachment

Evolutionary Network Development

Independent Verification & Validation Team

Draft Report

January 10, 2005

Evolutionary Network Development IV&V Team
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EXECUTIVE SUMMARY

Evolutionary Network Development IV&V Team
Draft Report
January 10, 2005

Executive Summary

I. Mission

At the direction of the Senior Vice President, Operations, and in response to recommendations made by the Office of Inspector General (OIG) in a draft audit report dated December 30, 2003, the Postal Service's internal Independent Verification and Validation (IV&V) team was formed in February 2004 to perform the following tasks with respect to the Evolutionary Network Development (END) project:

1. verify / validate the assumptions, inputs, calculations, and outputs associated with the optimization and simulation models produced by the END Development team; and

2. as a result of this effort, recommend policies and procedures that IV&V teams can follow with respect to verifying and validating future postal modeling efforts (these recommendations will be issued in March 2005 in a separate report).

II. Background

According to the 2002 Transformation Plan, a key strategy for improving the Postal Service's efficiency is the redesign of "the postal logistics network so that the number and location of processing centers, processing strategies for mail, and transportation modes and routes are optimized to meet customer service requirements at minimal total system costs." For this network optimization effort, an Evolutionary Network Development team (known originally as the Network Integration and Alignment or NIA team) was formed to develop the optimal logistics network while simultaneously balancing distribution strategies against service needs and logistics costs. To accomplish this objective, the team used an Optimization Model to identify solutions and Simulation Models to test the feasibility of those solutions. Underlying the Optimization Model at the time the IV&V team was organized was a distribution concept known as the NCP (or network consolidation point) concept. Several characteristics define this concept: shape-based processing; standardized and simplified mail flows; minimization of piece handlings; hub and spoke transportation; and an extended reach of surface transportation. The specific Optimization Model run (March 2003 v3.7) whose inputs were verified for accuracy and outputs were validated for feasibility by the IV&V team was based on this NCP concept.

III. IV&V Team's Members and Responsibilities

The team comprises two groups: the Operations sub-group, which is composed of Field managers with extensive operational expertise; and the HQ sub-group, which is made up of headquarters staff with postal database, cost analysis, and rate case experience. None of the members of either the HQ or the Operations sub-groups was involved in the development of the network optimization model. A member of the OIG is serving in an advisory, ex officio role for the team. His suggestions have helped the IV&V team formulate its process for conducting this verification and validation effort, and his benchmarking research has contributed to the team's understanding of its role.

The tasks faced by the IV&V team followed a logical sequence: verify the inputs to the Optimization Model; validate the Optimization Model itself; and validate the outputs of the Optimization Model and the Simulation Model; thus, the two sub-groups divided up the workload accordingly:

1. The HQ sub-group verified the strategic level inputs (raw inputs, pre-processors, and assumptions) to the Optimization Model.

2. The HQ sub-group validated the Optimization Model (a commercial off the shelf (COTS) program named LogicNet Plus) performance.

3. The Operations sub-group validated the accuracy and operational "reasonability" of the Optimization and Simulation Model inputs/outputs.

The cooperation of the END Development team was crucial to this IV&V effort. Development team members unhesitatingly responded to information requests, answered questions, met to discuss issues, made model runs, and explained model-run results. Without their willing assistance, this validation would have been impossible. In fact, the Development team welcomed an impartial review of the assumptions and models and has already begun incorporating many of the findings of the IV&V effort during the review process rather than waiting for this report to be finalized.

IV. Results of Verification of Inputs to Optimization Model by HQ Sub-Group

After reviewing all the raw inputs, the data transformation steps, and the intermediate outputs that resulted in the direct inputs to the Optimization Model, the HQ sub-group concluded that, overall, the END Development team has done what it planned to do, using data and data processing routines that supported their intended methodology. The results of re-running the model after errors found by the IV&V team were corrected support the conclusion that the errors had only an insignificant impact on the model's results. The HQ sub-group recognizes that there are situations where the Development team was forced to make assumptions when data were not available; in such cases, the sub-group found the Development team's assumptions to be defensible. The HQ sub-group concluded that the Optimization Model's construction and data inputs accurately represent the Development team's conceptual descriptions and specifications.

V. Results of Validation Of Optimization Model by HQ Sub-Group

The HQ sub-group validated the performance of the Optimization Model (a COTS program named LogicNet Plus) in three ways:

1. It took advantage of the Development team's own validation efforts by reviewing the documentation that supported the Postal Service's original decision to use the model;

2. It researched the experience of other users of the model to see whether there had been complaints about its functionality or dissatisfaction with its results;

3. It reviewed the results obtained from stressing the models with scenarios designed to illuminate whether the model behaved as expected (were its results intuitively reasonable?)

Based on the results of the above validation efforts, the HQ sub-group concluded that the core Optimization Model does perform as it is supposed to perform. Finding the Model fit for the purpose of developing a preliminary network design that would give senior management a geographical layout of an optimized network, provide management with an estimate of how many nodes would be required in this network, and estimate the degree of savings that could be expected from implementation of a new network, the IV&V team agrees that it is sufficient for the purposes of making a decision to revamp the Postal Service's distribution system. The Optimization Model is a high level strategic tool designed to produce the most efficient and cost effective network. Because its inputs include national-average productivities and volumes estimated by distribution keys, it was always understood by the Development team and the IV&V team that the facility-specific outputs of the Optimization Model would not match up with actual productivities, actual volumes, and actual equipment requirements on a site-specific basis. For that reason, the Development team designed a Simulation Model to test and refine the feasibility of the solutions provided by the Optimization Model.

The HQ sub-group believes that, if and when a determination is made to proceed with the implementation of a redesigned mail processing network, the risks associated with the use of macro-level model results and the risks raised in the next section will be mitigated with adoption of an approach similar to the one that was successfully used when the Postal Service transitioned to an automated letter processing environment. That approach included an implementation team to oversee the process and to ensure that local input is considered and site-specific issues are addressed.

VI. Areas of Risk Noted by HQ Sub-Group

Below is a list of areas of risk that the Optimization Model does not address. The Development team and senior management are certainly aware of them, but these are issues that will have to be faced with the implementation of a network redesigned along the lines of the END project reviewed by the IV&V team.

Mailing Requirements – A change of the scope envisioned for the network will entail significant classification changes. Changes in labeling, required make-ups, sort levels, drop points, and pricing incentives will require a comprehensive plan and organization similar to that required for postal reclassification in the 1990's.

Cross-Class Effects of Decisions – The Optimization Model is designed to find the lowest-cost solution. In reviewing the results of stressing the Model, the HQ sub-group found that one of the by-products of lowering the cost of the whole network could be unexpected cost increases in individual products. For example, when the model was run assuming a 20 percent volume increase in Standard Mail and a 20 percent volume decrease in First-Class Mail, the results unexpectedly included a nine percent increase in Priority Mail costs. The lesson is that management needs to be aware of the ripple effect of decisions on other operations, classes of mail, and rates.

Data Issues – Out of necessity the models use historical data. The fact that the IV&V team has verified these data does not mean they are the only data upon which a decision to redesign a network should rest. Historical data will become less useful should a rapid decrease in volume or a drastic change in the mail mix occur. Thus, the relevance of historical data (no matter how current those data may be) in a redesigned network should be carefully assessed in light of future volume and mail-mix projections.

The IV&V team found the use of national averages to be appropriate for the strategic-level Optimization Model, which is meant to provide senior management with a geographical layout of an optimized distribution system; however, the Optimization Model was not designed as a tactical roadmap for determining the specific facilities to be included in a revamped network. Those decisions must be made based on site-specific data and with the input of managers familiar with local realities.

Reliability of Volume Flows between 3-D ZIP Codes – The Development team relied heavily on Origin Destination Information System (ODIS) data to formulate a distribution key for its volume matrix in the Optimization Model. The HQ sub-group has no complaint with this decision because better data are not available and because ODIS data are appropriate for the strategic level of the model. Ironically, ODIS was originally designed in the 1960's to provide consistent and statistically reliable information about the mail volumes originating and destinating between over 900 3-digit ZIP Codes. As such, its primary purpose was considered to be that of a network- and facility-sizing tool. Over the years, its role has gradually changed, and its usefulness as a network-sizing tool has eroded. More robust 3-digit-to-3-digit volume data are required to support data-based network decisions at the granular level.

Post-Processors – The IV&V team had several concerns about issues that are not addressed by the Optimization Model including the assumption of unlimited dock space, dock doors, and vehicle staging areas; and the assumption of readily available transportation in any quantity without price effect. The team realizes that the Development team has been designing post-processors such as the Dock Door Optimizer to deal with these issues, but the results of these post-processors have not been validated.

Investment Risk – Other 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.

Human Resources – Every scenario used to stress the model, even the one that assumed a 20 percent increase in volume and the one that assumed a 20 percent decrease in productivity,

generated 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.

VII. Results of Validation, Conclusions, and Recommendations by the Operations Sub-Group

The team agrees the transformation of our network is imperative to the continued success of the organization. Current forecasts and business trends clearly indicate the need for a completely revamped network approach. The proposals and consolidations provided as a result of the optimization of existing networks are sound. We further agree with the approach to expand surface reach, to reduce reliance on air transportation, and consolidation of our existing processing and distribution facility network. Transition to a shape-based processing strategy will provide efficiencies in equipment, facilities and transportation. To ensure its success, all key stakeholders should continue to be involved in the design, refinement, validation and implementation of this process. Critical to implementation will be a comprehensive human resources strategy. Due to the strategic nature of the modeling and complexities involved, site-specific validations similar to those already occurring must continue throughout planning and implementation.

The development process relies on a series of models - each designed to further refine and validate the results provided by the initial optimization modeling. The Optimization Model itself is a high level strategic tool designed to produce the most efficient and cost effective network. We found the results of this model to be reasonable at the aggregate level. The Simulation Model is designed to test and refine the feasibility of the solutions provided by the Optimization Model. During our validation, we found the Simulation Model did not always respond the way one expects when variables in volume and throughput are introduced. The team recommends further analysis of specific locations tested during our validation to gain a better understanding of why this occurs. We recommend the mileage used in the modeling be updated to reflect the actual distance between the physical addresses of facilities. The team strongly believes additional models presently under development designed to further test solutions at the facility level should continue; these include: DPS, Flats, and Dock Door Optimizers, as well as the Integrated HASP Network Model.

After completion of modeling, 3,180 overnight pairs are downgraded from overnight to two-day service. At the same time, 2,532 two-day service pairs are upgraded to an overnight commitment. This constitutes a net change of -7.4% (648) in overnight pairs. Continued validation of the net volume change associated with these service pair adjustments should occur. It should be stressed that the success of the optimized network relies on these service changes. Exceptions to the upgrades and downgrades created from feasible path assignments would seem to be a concept change and could have a detrimental effect on the overall outcome of the modeling. Earlier clearance times are a key factor in the expanded reach and processing responsibilities of the consolidated facilities. Exceptions creating later flows of committed volumes to a given facility will require adjustments to the model itself.

In the majority of facilities and products examined by our team, the Optimization Model appears to utilize volumes that reasonably mimic those actually processed in today's environment. The concept of using a 30% increase to average daily volume is generally adequate for contingencies in the products sampled. Though representative at the aggregate level, specific facility level modeling will be necessary during implementation planning. Attempts to validate Simulation Model workloads were unsuccessful due to wide variances between facilities, products, and as compared to the Optimization Model volumes. Since the Simulation Model is designed to test the optimized environment, it is important that workloads and volumes in the two models correspond to one another. We highly recommend continued evaluation and modification of Regional Simulation results at the tactical level with local management during planning and implementation.

We have concerns with the use of ODIS as a means for establishing flows between 3-digit pairs. Subject matter experts consulted indicate 3-digit to 3-digit ODIS data does not always represent "real" volume flows between communities. We recommend a means for determining the density flows between 3-digit pairs for all product types be developed. The model implies arrival profiles and available volume for processing from these flows. For example, current ODIS testing of stamped letter mail is based on the postmark of the ID city/plant, although it often represents multiple 3-digit ZIP Codes.

The modeling used national average throughputs to design a global network. A wide range of variance exists in all equipment types between wall-clock, run-time, and modeled throughputs. Use of a single throughput number, while appropriate in national level modeling, should be evaluated at each facility.

At this point, the models assume a standardized fleet of equipment throughout the network. Though the best operational scenario may be elimination of all older equipment types, it is likely that integration with existing equipment will be necessary for the foreseeable future. Adjustments to the model will be required.

While we recognize the future state will not necessarily include the same classes and types of products as today, the package and bundle processing concepts embedded in the model are not fully developed at this time. For example, if there is integration of old and new equipment types (i.e. PSM, APPS, SPBS), it will not be possible to commingle packages and bundles throughout the network. We encourage the continued development of an integrated package/bundle sorting platform. Absent development of a total package sortation system (TPSS) and/or retention of PSMs, the depth of sort provided by the APPS solution would appear to be inadequate. Multiple handlings or sorts to scheme by mailers and other facilities would be required with the limited depth of sort provided by APPS. Additionally, current APPS configurations do not provide for the use of large mail transport equipment, (OTRs, IMHS, ERMCs). This coupled with the loss of surge and feed capacity, increased material handling, potential for increased damage to parcels (no loader/unloader capability) and overall staging implications would seem to make a multi-APPS environment difficult to manage.

Present planning implies that Regional Distribution Centers (RDCs) will perform many of the functions of a HASP, BMC, PMPC, and P&DC.[1] Trailers arriving at these facilities with commingled products will require immediate unloading. These large complex operations will likely incur significant material handling and transport needs.

A complete and itemized report of critical assumptions and inputs reviewed during our validation has been provided to the Senior Vice President, Operations.

[1] Regional Distribution Center has replaced NCP as the term used by the END Development team for the role played by facilities serving as network consolidation points in a revised distribution network.

DRAFT REPORT

Evolutionary Network Development IV&V Team
Draft Report
January 10, 2005

I. Mission

At the direction of the Senior Vice President, Operations, the Postal Service's internal Independent Verification and Validation (IV&V) team was formed in February 2004 to perform the following tasks with respect to the Network Integration and Alignment (NIA) project (since the team's formation, NIA has been renamed END (Evolutionary Network Development); the terms END and NIA are used interchangeably in this document):

1) verify and validate the assumptions, inputs, calculations, and outputs associated with the optimization and simulation models produced by the END development team; and

2) as a result of this effort, recommend policies and procedures that IV&V teams can follow with respect to verifying and validating future postal modeling efforts (these recommendations will be issued in March 2005 in a separate report).

II. Objectives of Report

The objectives of this document are threefold:

1) provide the Senior Vice President, Operations, with the results of the IV&V team's verification and validation efforts (with respect to the optimization model, the team verified only the inputs and assumptions that were used in the last model run (version 3.7 dated March 2003) made prior to Area review; however, in validating the feasibility of that model run's outputs at the facility level, the IV&V team used refined simulation models and updated post-processors, such as the DPS (delivery point sequencing) optimizer, to stay current with adjustments that have been made in the END central concept since model run v3.7 was executed);

2) give the team's assessment as to whether the models are, or are not, sufficient for the purposes of making a decision to revamp the Postal Service's distribution and transportation networks; and

3) illuminate the risks inherent in the models' results.

III. Background

According to the 2002 Transformation Plan, a key strategy for improving the Postal Service's efficiency is the redesign of "the postal logistics network so that the number and location of processing centers, processing strategies for mail, and transportation modes and routes are optimized to meet customer service requirements at minimal total system costs." For this network optimization effort, a Network Integration and Alignment team was formed to develop an optimization model to identify solutions and simulation models to test the feasibility of those solutions. The team's ultimate objective was to produce the optimal logistics network while simultaneously balancing distribution strategies against service needs and logistics costs. At the time the IV&V effort commenced, the optimization model itself had been completed, but the NIA (now known as END) Development team was still building or refining the simulation models and various post-processors.

After considerable experimentation and refinement the Development team came up with the distribution concept that underlay the Optimization Model at the time the IV&V team started its verification/validation. Several characteristics define this concept: shape-based processing; standardized and simplified mail flows; minimization of piece handlings; hub and spoke transportation; and an extended reach of surface transportation.

This distribution concept identifies three basic types of facilities – the Network Consolidation Point (NCP), the Origin/Destination Facility (OFDF), and the Delivery Unit (DU). (Since the IV&V team was formed, the term Regional Distribution Center (RDC) has replaced NCP as the descriptor for the consolidation points in the network.) In some cases the NCP and OFDF roles may be combined in the same facility; these are referred to as co-located facilities in the model (COLOCs). On the originating leg, mail is collected by the DUs and transported to the OFDF where it is entered into operations. At this point in the process mail is either identified as mail destinating at the DUs in the OFDF service area or as mail to be exported to the network. OFDF service area mail is sorted to delivery point and transported to the DUs while the mail exported to the network is transported to the OFDF's parent NCP.

In its role as an originator, the NCP sorts to all OFDFs; mail that destinates in OFDFs within the NCP's service area is dispatched to those OFDFs while the mail destinating outside that NCP's service area is dispatched to other NCPs in the network. In its role as a destinator, the NCP crossdocks all mail incoming from the network to its own OFDFs. At the OFDF this mail is sorted to delivery point and transported to the OFDF's DUs. The crucial constraint is that no mail moves directly between OFDFs.

The IV&V team was tasked with validating the inputs to and outputs of the Optimization Model's March 2003 v3.7 Final Model run (this run was generated prior to Area reviews and was based on the distribution concept described above). The key results of this model run were as follows:

- The network comprised 120 OFDFs, 43 NCPs, and 24 COLOCs
- 85 percent of available square feet was utilized
- Total costs of the network in the modeled environment were projected to be $14 billion
- Savings compared to the baseline were projected at $3 billion

IV. Office of Inspector General Recommendations

The Office of Inspector General (OIG), concerned that the Postal Service had not established adequate controls to ensure the credibility of the NIA models, transmitted a draft audit report to the Senior Vice President, Operations, on December 30, 2003. This report contained two recommendations:

> 1) the Postal Service should use either a separate contractor or an independent Postal Service team outside the developer group to conduct verification and validation of the NIA models; and
>
> 2) the Postal Service should establish policies and procedures for determining independent verification and validation requirements for the network optimization models.

In a February 12, 2004 letter, the Senior Vice President, Operations, agreed to both recommendations and announced his intention to form an independent, internal group headed by a functional organization outside of the NIA developer group.

V. IV&V Team's Members and Responsibilities

The IV&V team (Appendix A contains a list of members) is headed by Bill Batterton, Manager, Program Performance/Finance, and David Fields, District Manager, Greensboro NC. The team comprises two groups: Field managers with operational expertise and Headquarters (HQ) staff with postal database, cost analysis, and rate case experience. The Field managers (referred to in this report as the Operations sub-group), who have made several on-site visits, focused their attention on the reasonableness of the operational and transportation assumptions underlying the optimization model and on the feasibility of the outputs from both the optimization and the facility-level simulation models. The HQ members (referred to in this draft report as the HQ sub-group) concentrated on verifying the data inputs (volume, workload, costs, etc.) to the Optimization Model, and on validating that the Optimization Model operates the way it is supposed to (i.e., fit

for its purpose). None of the members of either the HQ or the Field sub-groups was involved in the development of the network optimization model.

A member of the OIG is serving in an advisory, ex officio role for the team. His suggestions and research that he conducted as part of a benchmarking effort helped the IV&V team formulate its process for conducting this verification and validation effort.

The cooperation of the END Development Team was crucial to this IV&V effort. The Development team members responded unhesitatingly to fulfill the IV&V team's many information requests, were always receptive to its concerns, and worked proactively to find solutions or to develop specific modeling tools to deal with issues as they were identified. Without their assistance, this validation would have been impossible. In fact, the Development team welcomed an impartial review of the assumptions and models and began incorporating many of the findings of the IV&V effort during the review process rather than waiting for this report to be finalized.

VI. Sources of Information on the IV&V Process

In order to familiarize themselves with the IV&V process, HQ members of the IV&V team followed the suggestion of the OIG and met with the Verification, Validation, and Accreditation Technical Director from the Defense Modeling and Simulation Office (DMSO). As an expert and a developer of policy and guidance in the IV&V area, she generously offered advice to the team with respect to its planned methodology for verifying and validating the END models. Among her recommendations were the following:

- When resources are not infinite, the team should concentrate on the areas where there is the most risk and where the consequences of a mistake would be most significant.
- The team should leverage, as much as possible, the validation efforts already undertaken by the END Development team.
- The team should focus its efforts on the areas of the model with the highest risks and perform sensitivity analyses (stress the model) to measure the impact of different scenarios.
- The team should give special attention to trigger points such as pre-processors, hard-coded data, and any modifications that might have been made to the commercial of-the-shelf (COTS) package used for this project.
- Since an IV&V report is a risk management tool, it should identify the areas where the team has high confidence, point out the areas where it has less confidence, and assess the risks associated with the lower-confidence areas.

For additional research, some members of the IV&V team attended an all-day Verification, Validation, and Accreditation Technical Working Group Meeting at DMSO and a two-day IV&V training workshop sponsored by the Potomac Forum, Ltd.

VII. Scope of the IV&V Effort

The primary focus of the IV&V team was on answering two questions:

1. Did the Evolutionary Network Development team build the models correctly (verification)?
2. Did the team build the correct models and do their outputs appear to be reasonable (validation)?

The answer to the first question required a determination of whether the Optimization Model's construction and data inputs accurately represent the Development team's conceptual descriptions and specifications. The answer to the second entailed a determination of the degree to which the models and their associated data accurately represent the real world from the perspective of the intended users of the models.

The makeup of the team lent itself to a natural division of labor with respect to answering these two questions. The HQ sub-group, whose members are familiar with postal databases and proficient at developing and reviewing models used in rate case proceedings, were tasked with verifying the inputs to the model. These inputs comprised both raw inputs and the outputs of intermediate data transformation steps that were required by the model (the Optimization Model is a COTS product, meaning that no efforts were made to customize it to suit the Development team's needs; consequently, the inputs had to be customized to fit the model). In addition to verifying the inputs to the model, the HQ sub-group was responsible for validating the model (Did the model work as it was designed to work?). This validation effort entailed reviewing the results of prior runs of the model by the Development team; requesting that the model be run for specific scenarios and then analyzing the results; reviewing the documentation relied upon by the Development team when it acquired the COTS package; and researching the experience of other users of the COTS package.

The Operations sub-group was composed of managers with extensive field experience in both operations management and support functions. Their primary focus was to assess whether or not the respective outputs of various levels of modeling generated by the Development team accurately calculated and correctly forecast an optimized network. The development process relies on a series of models - each designed to further refine and validate the results provided by the initial optimization modeling. The Optimization Model itself is a high level strategic tool designed to produce the most efficient and cost effective network. The Simulation Model is designed to test and refine the feasibility of the solutions provided by the Optimization Model. Additional models presently under development are designed to further test solutions at the facility level, which presently include the DPS, Flats, Dock Door Optimizers, and the Integrated HASP (Hub and Spoke) Network Model. Even if the inputs to the Optimization Model have been verified as correct and the model has been validated as operating the way it is supposed to operate, if the output does not accurately predict an optimized future environment, then these issues become essentially irrelevant. The Operations sub-group directed most of its efforts and expertise at assessing the operational feasibility of the model's outputs at the facility level. Through a succession of briefings and discussions with the Development team, they identified 20 critical assumptions and 11 key operational inputs for validation. The Development team was provided input and agreed with the validation methods developed by the Operations sub-group.

In the face of the sheer volume of data to review and of finite resources with respect to manpower and time, both the HQ and the Operations sub-groups found it necessary to employ sampling techniques. (In recognition of the importance that sampling would play in the IV&V process, a senior statistician from Statistical Programs was added to the original IV&V team in March 2004.) Sampling has served two purposes in the independent verification and validation of the Optimization Model's inputs and outputs:

1. To limit the cost of reviewing data associated with locations, records, or other documents associated with the development of the optimum model solution and with the simulation of that model. For this purpose, an Excel procedure involving the use of the RAND () function to select a random sample from a list was proposed. Also, the team has used skip-sampling procedures in the selection of various hard-copy documents (or sections thereof) for review.

2. To provide a means to assess the effect of sampling uncertainty in Origin Destination Information System (ODIS) volume estimates on the optimum model solution. For this purpose, a re-sampling technique called "bootstrap sampling" was used to create two new versions of the ODIS Universal Data Set (UDS) quarterly files covering PQ (postal quarter) 1 of FY 2000 through PQ 4 of FY 2002. The intent was to re-run the Optimization Model using the original files from that time period, then two more re-runs (using the two bootstrap versions) to see if substantive variation in the optimum model solution occurred.

A crucial requirement for this IV&V effort was the need to develop consistent methods and procedures for conducting verifications and validations of sample components. To that end, a standard data collection form was designed for team members to use whether they were verifying inputs of national data to the Optimization Model or the model's outputs at the facility level. These forms were used by the HQ sub-group to document all raw inputs, all intermediate steps that were employed by pre-processors to manipulate data for use by the Optimization Model, and all outputs of those pre-processors. The Operations sub-group used the same data collection form to document the 20 critical assumptions and 11 key operational inputs mentioned above, as well as several on-site reviews of implementation planning activities.

VIII. Overview of Process Followed by the IV&V Team

The IV&V team divided its workload into three main tasks:

- Verifying the strategic level inputs to the Optimization Model (HQ sub-group)
- Validating the Optimization Model performance (HQ sub-group)
- Validating the accuracy and operational "reasonability" of the Optimization and Simulation Model inputs/outputs (Operations sub-group)

Below is a description of the general approach taken for each of the three tasks.

A. Verifying the Strategic Level Inputs to the Optimization Model

The HQ sub-group of the IV&V team focused its attention on two tasks: verifying the inputs, pre-processors, and assumptions associated with the Optimization Model; and validating the model itself (see the next section).

Following the presentations given by the Development team in March and April 2004, the HQ sub-group initially had difficulty determining the scope of the inputs that needed to be verified and the degree of manipulation that these inputs underwent in pre-processors prior to their induction into the model. To alleviate this uncertainty, the HQ sub-group met daily for an entire week in April to discuss among themselves their understanding of how the model worked. Out of these discussions came a series of 34 interrogatories designed to fill in gaps in their knowledge; however, even after the Development team answered the interrogatories, the HQ sub-group still was concerned in mid-May that it had neither a complete list of all model inputs nor a full understanding of the intermediate steps that had to occur in order to convert certain inputs into a format required by the Optimization Model (as a COTS product, the model was not modified to accommodate available inputs; instead, the inputs themselves typically had to be modified in order to be processed by the model). These misgivings were finally mitigated after the Development team assembled flow charts (Appendix B contains miniaturized versions of these flow charts) that documented the Optimization Model input development process.

These flow charts illustrated the raw inputs, the data transformation steps, and the intermediate outputs for seven different categories of data - volume, transportation, facilities, ZIP Codes, costs, capacity, and feasible paths - prior to being transformed into direct inputs to the Optimization Model. They gave structure to the overall verification task and provided a reasonable basis upon which to divide up the workload among the team members (each member was responsible for verifying the steps in his assigned flow chart(s)). The team worked from June through December 2004 verifying the individual steps in the charts as well as the assumptions underlying them. Wherever possible, the group followed DMSO's advice by leveraging information already available and concentrating its efforts on areas where the Development team had not already performed its own extensive validation.

B. Validating the Optimization Model Performance

The HQ sub-group's second task was to validate the Optimization Model – a commercial off the shelf program named LogicNet Plus (version 3.1). Again, the sub-group followed DMSO's advice by taking advantage of the Development team's own validation efforts, the product of which was a 36-page assessment by IBM Business Consulting Services entitled "NIA Optimization Software Assessment and Recommendation Report." In this report IBM compared eight potential vendors on the basis of their ability to meet several critical criteria and recommended LogicNet Plus as the software application that best fit the USPS's requirements.

In addition, the HQ sub-group researched the experience of other organizations that have used this model to see whether there had been complaints about its functionality or dissatisfaction with its results. The clients interviewed were nationally prominent companies with internationally recognized brands. The sub-group also dialogued with the software vendor, LogicTools, Inc., to determine what, if any, independent verification and validation techniques were employed during their software development life cycle.

Finally, the HQ sub-group stressed the model in two ways: 1) It reviewed scenarios that the Development team had run on its own to see how the output compared to the results being validated; and 2) it had the Development team run a series of nine additional scenarios designed to illuminate whether the model obtained results that would be expected (the results of three of those scenarios were not available in time for this draft).

C. Validating the Accuracy and Operational "Reasonability" of the Optimization and Simulation Model Inputs/Outputs

The members of the Operations sub-group first identified a "vital few" areas (20 specific or implied Assumptions and 11 Inputs) on which to concentrate their efforts. The sub-group reached consensus that these constituted the greatest potential impact or "risk" to the organization and the modeling efforts. A methodology was developed for validation of each Assumption and Input. The Development team was consulted regarding validation methodologies and agreed with the approach taken by the Operations sub-group.

These Assumptions and Inputs were validated in a number of different ways, depending upon the specific item being evaluated. In many cases, side by side comparisons were made utilizing different data sources (e.g., different ODIS data, facility-specific PC Miler data, WebEOR (end of run), Management Operating Data System (MODS), etc.). 10 NCPs, along with their feeder OFDFs, were randomly selected for volume and workload comparisons. Actual daily volumes were developed utilizing data independent from that used in the modeling. These volumes were compared to modeled workloads and volumes to test both their "reasonability" and to determine if contingency reserve capacity was adequate.

The sub-group also provided the Development team additional input variations to "stress" the sensitivities of the Simulation Model. Using a different random sample of 12 sites, the operations group examined the impact of the throughputs used in the models for the Automated Flats Sorting Machine (AFSM) secondary, the Automated Facer-Canceller System (AFCS) and DPS processing. The Optimization and Simulation Models used national average run-time throughputs for these operations, and general assumptions about staffing and allied activities. The sub-group tested the models' sensitivity to the use of other throughput variations for the 12 sites.

As suggested by the DSMO, the group took advantage of validation efforts previously undertaken by the Development team. Sensitivity analyses that the team had performed on the model were closely examined to further understand how it reacted to changes in key inputs. At the same time, it compared runs of both optimized baseline and NCP scenarios (e.g., number of machines required to meet each facility's service standards) through the facility-level simulation models.

As it validated the feasibility of the optimization model's outputs, the Operations sub-group stayed abreast of refinements and enhancements to the modeling by the development team in response to input received from different stakeholders in the implementation process. An important part of the operations validation process was confirming the existence of an internal self-validation that should logically occur throughout implementation planning. Members of the sub-group made several site visits to observe planning meetings in the [redacted] and [redacted] Areas. They observed the Development team incorporate several changes to the model's output based on feedback received at Area validation meetings, from the IV&V team, and in response to changes requested by other stakeholders and senior management.

IX. Detailed Description of IV&V Results

Below is a detailed summary of the steps taken by the IV&V team to

1. verify the model inputs (these descriptions are subdivided into seven input-development processes, each of which consists of from 8 to 130 process steps),
2. validate the optimization model, and
3. validate the feasibility of the model's outputs at the facility level (this section documents the Operations sub-group's findings for 20 critical assumptions and 11 key operational inputs on data input sheets)

A. Verification of Model Inputs

As mentioned above, the Development team assembled flow charts (Appendix B) that illustrated the raw inputs, the data transformation steps, and the intermediate outputs for seven different categories of data - facilities, ZIP Codes, costs, capacity, feasible paths, volume, and transportation - prior to being transformed into direct inputs to the Optimization Model for its March 2003 v3.7 run. Below is a description of the process followed by the Development team to develop direct inputs for each of the seven categories and a brief review of the verification efforts conducted by the IV&V team. The HQ sub-group filled out a data input sheet for every step shown on the flow chats; over 200 data input sheets are available for review in binders kept at USPS HQ.

1. Facility Verification Process

Generally, the process followed to verify the steps associated with developing the pre-processors for the facility files required by the LogicTools model included the review of input data, SAS logs, Excel files, and output files. The review confirmed that the NIA Development team had developed the data and associated calculations in the manner they described in the documentation they provided.

The Development team's efforts to develop a verifiable list of facilities were stymied by a fundamental inconsistency in the data available from various sources within the Postal Service. This failing led to the development of an Excel-based survey completed by Area analysts. The survey was initially populated with available data; the Area analysts were then asked to verify, update, and add additional information where appropriate. The Area analysts

also validated the initial Campus mapping and made adjustments where necessary. The Development team analyzed the results of the facility surveys and checked for anomalies that might result from mistypes, etc. The team worked with the Field to resolve these issues and ensure the accuracy of the information contained within the surveys. No issues were identified during the IV&V review. In fact, as a result of this very well executed process, the NIA Development team's facility data are now considered by many to be the most comprehensive single source of postal facility information available.

The optimization model was subdivided into four geographic regions in order to achieve a solution. Facilities were assigned to one of the four geographic regions based on the 3-digit ZIP Code of the facility. The assignment to four regions was reviewed and found to be without issue (that is, no facility was included in more than one region).

The optimization model applies different cost functions for different size operations (small, medium, and large). The IV&V team confirmed that, during the first iteration of the optimization model, all operations were set to "large" at every facility. As a result, these cost functions yielded the lowest cost per piece for large operations and provided an incentive to consolidate as many facilities as possible by avoiding the large operational core costs associated with each additional mail processing facility.

2. ZIP-Code Verification Process

As was the case with Facilities verification, the process followed to verify the steps associated with developing the pre-processors for the ZIP-Code files required by the LogicTools model included the review of input data, SAS logs, Excel files, and output files. The review confirmed that the NIA Development team had developed the data and associated calculations in the manner they described in the documentation they provided.

The Development team used USPS Labeling Lists to determine the set of all valid 3-digit ZIP Codes. From this input an Excel-based survey was developed. Area Analysts completed the ZIP Code assignment survey during a two-day workshop at Headquarters. The IV&V team reviewed the workshop process and results; however, the input labeling list itself was not reviewed since it was only the starting point from which the Area analysts generated the final product for input into the optimization model. This process was thoroughly reviewed, and no discrepancies were noted.

Three-digit ZIP Code centroids were developed by averaging the latitude and longitude for all 5-digit ZIP Codes within a 3-digit ZIP Code area. A database from ZIP Code Download (www.zipcodedownload.com) supplied the latitude and longitude for each 5-digit ZIP Code. This website defines the latitude/longitude in degrees of the center (centroid) of the ZIP Code. These data were taken as provided for the purposes of the verification.

Three-digit ZIP Codes that must be treated as a group for the purposes of mail processing assignment were identified through various means; for each ZIP Code under review, a group was created that included all 3-digit ZIP Codes associated with that group. These assignments were reviewed and found to be problem-free.

The optimization model was subdivided into four geographic regions in order to achieve a solution. The assignment to four regions was reviewed and found to be without issue (that is, no ZIP Code was included in more than one region).

3. Cost Verification Process

One of the Development team's major requirements was to develop shape-based mail processing cost functions that had a number of desirable properties. First, the cost function needed to include all direct costs of each relevant mail processing operation, such as delivery point barcode sorters or AFSM100 flat sorters. Second, the cost functions needed to account for indirect (allied) labor costs. Third, these direct and indirect cost functions needed to take economies of scale into account. Fourth, the cost functions needed to include the costs of all ancillary activities (so-called piggyback costs) so that the overall costs reconciled to the Postal Service Financial Report (PSFR). And, finally, in order not to overwhelm the optimization model with mathematical complexity, the cost models needed to be linear. The resulting cost functions comprised three elements: volume variable costs per 100 pieces by product and size, core (non-volume variable) costs by product and size, and facility-specific fixed costs.

The Development team developed linear direct and indirect cost functions for small, medium, and large mail processing operations based on Cost and Revenue Analysis (CRA) costing methodologies. Direct cost functions for Processing and Distribution Center (P&DC) operations were developed from multivariate regressions of MODS workload and workhour panel data in accord with CRA practices. Ad hoc linear equations for Bulk Mail Centers (BMCs) were developed based on analogous Productivity Information Management System (PIMS) data. Linear regressions for allied labor were also developed. The curvilinear functions were translated into three linear functions for small, medium, and large operations. Likewise the allied labor equations were transformed into small, medium, and large allied labor operations. These cost functions were then aggregated by operation, operations size, and processing environment (baseline or NCP).

The verification process included the following tasks: confirming the appropriate use of PIMS and MODS data; reviewing SAS and Excel regression results; reviewing the linearization of the curvilinear models; confirming that the correct coefficients were carried forward to the aggregation process; and verifying that baseline and NCP environments contained the appropriate operations. Two anomalies were found: 1) The linearization process of the manual letters cost function did not follow the procedure outlined by the development team (the deviation was minor, and the Development team provided corrected small, medium, and large manual letter linear cost functions); and
2) the model used the wrong variable cost coefficient (0.2933 instead of the correct value of 0.2929) for large AFSM100 operations. Overall, the verification process confirmed that the Development team constructed mail processing, direct and indirect cost functions in accord with the procedures they intended.

With respect to the development of the pre-processors used to generate Baseline mail processing costs, the IV&V team verified the steps followed by the NIA Development Team through a systematic examination of input data, relevant SAS logs, Excel files, and output files. The review confirmed that the NIA Development team developed the data and associated calculations in the manner described in the documentation that they provided to the IV&V team.

The NIA Development Team developed and applied a piggyback factor to the modeled costs to account for non-modeled overhead costs in order to match actual PSFR costs. A national average wage rate was applied to the modeled work hours to develop modeled dollars. PSFR expenses were identified to labor and non-labor categories. The labor and non-labor piggyback factors were determined by dividing the actual PSFR costs by the "modeled" costs. These piggyback factors and the average wage rate were then applied to each of the cost functions to produce piggybacked cost functions. These same methodological steps were applied separately for the P&DCs and BMCs, resulting in two different sets of piggyback factors. Baseline operational core costs were aggregated across operations to produce core costs by shape and role (the baseline core costs for a given shape were assumed to be the same for all roles). Baseline unit costs (dollars per piece) were calculated by multiplying the baseline workload-to-volume ratios (sorts per piece) by the piggybacked cost functions (dollars per sort). This calculation was made separately for each operation and then aggregated to the shape level.

As it did for the baseline, the IV&V team verified the steps followed by the Development team in constructing the pre-processors for the NCP Concept mail processing cost files required by the LogicTools model. Verification included the review of input data, SAS logs, Excel files, and output files. The review confirmed that the Development team had developed the data and associated calculations in the manner described in the documentation that they provided to the IV&V team.

Based on the NCP-concept definition, the Development team concluded that the operations within an OFDF would most closely resemble those in P&DCs and the operations within an NCP would most closely resemble those in BMCs. The baseline P&DC piggyback factors were applied to both the baseline direct cost functions and the OFDF indirect cost functions to develop the OFDF-piggybacked cost functions. The baseline BMC piggyback factors were applied to the baseline direct and indirect cost functions to develop the NCP-piggybacked cost functions.

The NCP-concept operational core costs were aggregated across operations to produce core costs by shape and role. The NCP concept core costs were developed at the operation level using the P&DC piggyback factors for the OFDF core costs and the BMC piggyback factors for the NCP core costs. These costs differ by role.

NCP concept unit costs (dollars per piece) are calculated by multiplying the NCP concept workload-to-volume ratios (sorts per piece) by the NCP concept piggybacked cost functions (dollars per sort). This step is done separately for each operation and then aggregated to the shape level.

4. Capacity Verification Process

As part of the feasible path development process, a set of feasible paths subject to drive-time constraints has to be generated for each three-digit ZIP Code as an input to the optimization model. Because each 3-digit ZIP Code assignment is also subject to capacity constraints, the calculation of square feet required for each three-digit ZIP Code and role (OFDF or NCP) is likewise necessary as an input to the model. As the model examines all potential ZIP Code-to-facility assignments based on the feasible paths, the total square feet required among all ZIP Codes assigned to a facility must be less than the available square footage at that facility. If additional square footage is required at a facility to

accommodate a set of ZIP Codes, an additional cost must be incurred for expanding that facility beyond the available workroom. Thus, in its simplest terms, the capacity pre-processors have two objectives: 1) to calculate the square feet required by 3-digit ZIP Code and Role, and 2) to calculate square feet available by Campus, Role, and Capacity type.

To calculate square feet requirements, the Development team first constructed a baseline capacity model based on data from a variety of sources including postal operations subject matter experts (SMEs), the AS-504, MODS, volumes from the Volume pre-processor, and cost functions from the Cost pre-processor. This information was combined to produce square feet required for the baseline period, and these baseline calculations were used by the Development team as a tool to validate its capacity methodology (the overall result equated to results obtained separately by Cost Attribution). The baseline model was then adjusted to calculate the square feet required in the projected OFDF-NCP environment. To calculate square feet available, the Development team relied upon the results of a survey that was filled out by the field for 467 facilities. These results were turned into a spreadsheet that calculates how much space is available for each of the 336 campuses depending on its role and capacity type.

The IV&V effort entailed verifying that the inputs to both the square-feet-required and the square-feet-available pre-processors were correct, and that the calculations using those inputs were done properly. In virtually all the steps of the Capacity development process, the IV&V team verified that the Development team had done what it said it had done. Much of the verification was conducted by having a postal expert review the SAS programs that the Development team had used and by tracing the math through the steps of a process for a sample of records. The key assumption made by the Development team was that the risk of a facility's not having the capacity to process all of its mail at peak periods could be mitigated by inflating the median quarterly TPH (total pieces handled) by 30 percent for each mail processing operation. This was one of the assumptions that the Operations sub-group tested at the facility level.

The verification of the Capacity pre-processor turned up a few minor problems: 1) the average throughput and footprint of the Automated Package and Processing System (APPS) machine were miscalculated; 2) the average throughput per labor hour for Non Machinable Outsides (NMO) equipment was not calculated from data for the same time period as the other equipment; and 3) the square feet required for manual parcel and Priority Mail sortation was miscalculated. For the purposes of a strategic level modeling exercise, the risks associated with the use of the above information were considered low since site-specific reviews will verify whether the operational assumptions used in the model will work at the local level.

5. Feasible Path Verification Process

The rationale for developing a list of feasible paths as an input to the optimization model was to limit the overall solution set to those solutions that would be practical to implement. By confining possible solutions to those deemed practical, the overall computational complexity of the model was then significantly reduced. Thus, the objective of the feasible path pre-processor (which comprised a 12-step development process) was to winnow the universe of possible combinations of 3-digit ZIP Code to Campus, and Campus to Campus paths to a list of "feasible" or practical paths. The starting point for the pre-processor was to generate all possible combinations of 3-digit ZIP Code to Campus, and Campus to Campus paths using as inputs a list of campuses

(produced by the Facilities pre-processor) and baseline ZIP Code assignments (generated by the ZIP Codes pre-processor). The universe of combinations was then reduced to feasible paths on the basis of two general criteria: 1) mileage band rules (with exceptions for special circumstances) that equate to approximately two to three hours drive time; and 2) restrictions on the roles that certain campuses could serve in.

The verification process generally confirmed that the Development team did what it said it did in terms of having the final list of feasible paths comply with the constraints that had been established; however, the verification task was hindered by two problems: 1) absence of support for the mileage bands that equate to the assumed drive times; and 2) incorrect latitude/longitudes (lat/lons) for numerous five-digit offices, which resulted in incorrect distances for 200+ paths (the errors ranged from 37 to .01 miles – three quarters of the errors involved distances less than five miles). The Development team had no files to support the mileages that it used as breakpoints for categorizing 3-digit ZIP Codes as Non-Metro, Metro, and Mega-Metro because all the supporting files were lost when the team moved its offices. Thus, the IV&V team could not verify that all ZIP Codes were correctly categorized in terms of drive time; however, it was able to confirm that the distances used for the paths did, in fact, fall into the mileage bands that had been established by the Development team. As for the incorrect distances, they by definition could not be verified; however, Mapquest was used to compare distances and drive times for two 3-digit ZIP Codes, and, in those cases, no significant difference was found between Mapquest's times and distances and those used by the model (although an incorrect distance did result in one feasible path being eliminated from consideration by the model). For the purposes of a strategic level modeling exercise, the risks associated with the use of certain incorrect distances and unsupported mileage bands are low since site-specific local reviews will verify whether the drive times assumed by the model are in fact reasonable.

6. Volume Verification Process

The basic problem faced by the Development team was to come up with a distribution key that would estimate the proportion of each type of mail that travels between every pair of three-digit ZIP Codes. To do so, the Development team used data from the ODIS, the Revenue, Pieces and Weight System (RPW), Permit System, the Drop Ship Assignment System (DSAS), Labeling Lists, and the mail characteristics contained in a rate case filing (USPS Library Reference USPS-LR-J-112) as source data by which to verify volume for the various mail types. At the end of the data transformation process, these mail types were categorized into eleven mail products as required by the model.

The optimization model required volume inputs at the 3-digit ZIP Code area level to estimate point-to-point transportation requirements across lanes. Unfortunately, the ODIS sampling program was changed in FY 2000 to generate statistically valid samples to support reporting at the destination performance cluster level instead of the historical destination 3-digit ZIP Code area. To get around this problem, the Development team developed an approach that used ODIS files from 1997 – 1999, for which valid 3-digit destination ODIS data still existed. IBM consultants also designed post-stratification processes in an attempt to improve volume estimates for 3-digit ZIP destinations, for mail of both known and unknown origin.

The verification consisted of: (1) study of documentation and discussions with the development team to ascertain their intentions and methods, (2) desktop

study of SAS programs – their logic and how they related to each other, (3) checking input data formats with the SAS code that reads the data, (4) cross-checking hard-coded macro variables against source data, and 5) writing FOCUS programs that read copies of the original ODIS source volume and sample frame data to replicate the indicated sample selection or OD (origin-destination)-pair volume attribution for mail classes and shapes.

Overall, the verification confirmed that the development team obtained their intended product volume distributions. Details for the various mail types follow.

a) First-Class and Priority Mail

Historically, unknown origin mail has averaged 5.4% for stamped and metered First-Class Mail and 5% for stamped and metered Priority Mail. Mail for which postage has been paid with permit indicia is recorded with unknown origins for ODIS. This represents 26% of all FCM and roughly 20% of Priority Mail, respectively. The Permit System provides 100% known origins for permit indicia mail, but provides no clue as to the intended destinations. The IBM approach addressed both deficiencies in the ODIS data, and the processes are described at length on the First-Class and Priority Mail volume data input sheets.

The known origin mail origin-destination distribution is a straightforward calculation. Unknown origin stamped and metered volume was assumed to originate in direct proportion to the rate in which known origin volume was created for each origin-destination ZIP Code pair (OD Pair) in the 916 x 932 cell OD pair matrix. By way of explanation, if OD pair 100-021 contained 0.00256789 of the known origin FCM, the same density of unknown origin volume would be apportioned to OD pair 100-021.

The Development team used an identical process, in reverse, to apportion unknown volume from permit indicia mailings. The PERMIT system provided the known origin matrix, and ODIS provided the destinating matrix of known destination ZIPs; permit indicia volume was assumed to exit the system in the relative proportion at which non-permit indicia mail was distributed to DZIPs. The resulting origin-destination relative volume distributions, in terms of proportions of mail, could then be converted to straight volume distributions using national RPW volumes by class and shape.

Finally, the volume distributions were categorized into the five FCM and two PM NIA product distributions required by the model.

b) Periodicals, Standard and Package Services

The Development team used data from ODIS, the RPW system, the Permit System, DSAS, and Labeling Lists to develop volumes for every OD pair, for Periodicals, Standard Mail and Package Services.

ODIS was used to split mail into "Known Origin" and "Unknown Origin." All Periodicals were assumed to be of unknown origin to begin with. Conceptually, all known-origin mail is non-dropship mail, and unknown-origin mail can be resolved into dropship mail and non-dropship mail of unknown origin.

The known-origin mail origin-destination distribution was a straightforward calculation. For dropship mail, "pseudo-origins" consisting of the labels DDU (dropped at destination delivery units), DSCF (dropped at destination sectional center facilities) and DBMC (dropped at destination BMCs) were assigned based on national RPW percentages by entry level (DU, BMC, SCF) and shape, Labeling Lists (mapping of destination ZIPs to BMCs and SCFs as drop points), DSAS truck appointments (distribution of volume across drop points), and DSAS drop point data (percent of mail by class and shape for each drop point). For non-dropship mail of unknown origin, origins were assigned to a class and shape based on the distribution of Permit mail by origin and shape for that class from the Permit System. The resulting origin-destination relative volume distributions, in terms of proportions of mail, could then be converted to straight volume distributions using national RPW volumes by class and shape.

Finally, the volume distributions were categorized into the four product distributions, Periodical Flats, Other Letters, Other Flats, and Other Parcels, required by the model.

c) Converting Pieces to Pounds

Once volumes had been calculated for each of the eleven products, the Development team used data from RPW, a rate case Mail Characteristics Study, and a density (weight per cubic foot) study to develop factors for converting pieces into pounds and cubic feet for each product.

In a separate series of processes, RPW and Mail characteristics data were used to develop volumes by presort and entry level for various aggregations of RPW data.

The verification cross-walked the source data to the Excel spreadsheets used by the Development team. This involved verifying that each of the hundreds of manual inputs to the spreadsheets was performed correctly. The verification process also reviewed data manipulations that aggregated source data. The verification process discovered a number of apparently minor anomalies in the aggregation of the density study data. Overall the verification process confirmed that the Development team processed source volume data in accord with the procedures they intended.

7. Transportation Verification Process

In the transportation pre-processing stage, the Development Team used five data sources to construct four input files to the Optimization Model. The input sources were highway contract route (HCR) data from the Highway Contract Support System (HCSS), cost per mile data for Postal Vehicle Service (PVS), vehicle utilization data from the Transportation Cost System (TRACS), and an operational assumption about vehicle height utilization. The Development team constructed highway costs per mile for five mileage blocks (e.g., 0 – 50 miles) and multiple service types (e.g., inter-NCP). These cost per mile measures were applied to the roster of feasible paths to construct three output Access files: inter-NCP costs, ZIP to OFDF Costs, and OFDF to NCP costs. These three files contain cost per mile for each feasible path. Separately, the Development team

developed a usable vehicle cube for each service type. This was entered into the Transportation Capacity Access file used in the Optimization Model.

The verification process involved verifying data sources, reviewing SAS computer logs, and checking data inputs and manipulations in Excel workbooks. Moreover, the verification process confirmed technical adjustments described by the Development team such as the merging of PVS and HCR costs per mile and the construction of the costs per mile by mileage blocks. The final step involved confirming that the Access files contained the data as developed in the Excel workbooks. The verification process identified three anomalies: (1) the inter-NCP Access file could not be verified as its development did not result in an verifiable audit trail, (2) some HCR data was double counted, and (3) one of the Access files used a cost per mile in a single mileage block that was slightly incorrect (due to an apparent transposition error in data entry).

B. Validation of Model

As recommended by DMSO, the HQ group took several different approaches to validating the LogicNet Plus 3.1 optimization model. Since the model was a commercial off-the-shelf program that had not been modified by the Development team, the HQ group weighed the risks of the program containing a software error and decided that the risks and consequences of such an error did not justify the time and resources that would have been required to hire experts to review the model's underlying software code. Had the software had been developed specifically for this project or if lives were at stake should the code contain a mistake, the risks would likely have necessitated a different decision. Instead, the IV&V team followed three different approaches in an effort to assure itself that the model did, in fact, run the way it was supposed to run (input sheets documenting the team's validation efforts are available at Postal HQ).

First of all, it took advantage of the Development team's own validation efforts, which were documented in a 36-page assessment by IBM Business Consulting Services entitled "NIA Optimization Software Assessment and Recommendation Report." In this confidential report IBM employed an eight-step optimization assessment methodology to advise the Postal Service on which of the available applications was best suited to meet the NIA modeling requirements. Using this methodology IBM compared eight potential vendors on the basis of their ability to meet several critical criteria and concluded that two of them had applications that could address those requirements. On the basis of several assessment criteria IBM recommended LogicNet Plus as the software application that best fits the USPS's requirements. The IV&V team reviewed this document and found that the LogicTools product has met the requirements laid out by the NIA Development team.

Second, the HQ sub-group researched the experience of other organizations that have used this model to see whether there had been complaints about its functionality or dissatisfaction with its results. The organizations contacted were nationally prominent companies with internationally recognized brands. These clients were asked a series of questions to ascertain their satisfaction with the product and to determine whether the application was used to provide a local, regional or national solution. From the responses it was learned that these companies purchased the LogicNet Plus optimization application with the objective of minimizing the cost of their national supply chain; i.e., from producers/suppliers to distribution centers to customers. One company said they it adopted the application for use in their North American operations and was later embraced by its European operations. The clients stated that the model behaved as expected, although one company told the sub-group that, because of the complexities of their operation and data inputs, there were some performance issues with an earlier 2.0 version of the software. That problem was solved with the release of version 3.0. One

client said that data validity is critical and noted the importance of carefully reviewing and analyzing model results. This client also observed that data collection efforts and "massaging" data for input to the model was time consuming. In each case the client expressed satisfaction with the model and LogicTools, especially their customer support. The HQ sub-group also discussed with LogicTools what type of independent verification and validation efforts they employ. In addition to their internal quality control process, LogicTools will give an application to their consulting group (independent from the developers) to stress an application before it is released for public consumption. This is what one officer of the company referred to as "Eating your own dog food." The company also works informally with some clients who are willing to test a product prior to general release.

The final method used by the HQ sub-group to validate the model was to evaluate the results of stressing it under different scenarios (for example, by increasing mail volume by a large percentage and then by decreasing volume by the same percentage); if the results of these scenarios were reasonable, and what one would intuitively expect (or could be explained if they were not), the HQ sub-group felt the risk that the model was not operating as it was supposed to would be significantly mitigated. The results from two types of scenarios were reviewed and assessed by the team:

1) those scenarios that the Development team ran prior to the formation of the IV&V team to see how the output compared to the results being validated; and

2) nine additional scenarios proposed by the IV&V team and designed to illuminate whether the model obtained results that would be expected.

The HQ sub-group reviewed selected scenarios that had been run by the Development team in the course of its own validation efforts. In addition to preparing a summary of the various scenarios (including a general description of the model formulation, inputs, and outputs) that it had analyzed in the process of developing the NCP concept, the Development team provided the IV&V team with the specific outputs (number of facilities, square feet utilized, and costs) for four pairs of scenarios:

1. A comparison of the difference in model outputs when fixed costs for co-located facilities are equivalent to that of OFDFs;

2. A comparison of model run v3.7 - the scenario that the IV&V team is validating (this scenario permits exceptions to the original mileage bands in order to provide each ZIP Code and OFDF with a minimum number feasible paths) - and a scenario that used only feasible paths that satisfied the original mileage bands;

3. A comparison of two scenarios where one's Standard Mail and FCM volumes are 20 percent higher and 20 percent lower, respectively, than the other's; and

4. A comparison of model run v3.7 and a scenario in which a particular facility is fixed as an OFDF.

The HQ sub-group compared the results of these scenarios to see whether they were reasonable and what one would intuitively expect. For example, total savings decreased by $54 million when a specific facility was assigned a fixed role for which it had not been originally chosen by the model; such a decrease would be expected if the model was actually seeking the lowest-cost solution. In those cases where the results were not intuitively reasonable, the sub-group prepared written questions for the Development team. For example, the sub-group wanted to know why Priority Mail costs increased in the scenario (#3 above) where only Standard Mail and FCM volumes changed; the

answer was this scenario resulted in an increase in COLOCs (whose Priority Mail core costs are much higher than those of OFDFs) and a decrease in OFDFs (whose eliminated Priority core costs are more than offset by the increased Priority costs of the added COLOCs). The Development team answered all of the HQ sub-group's questions in writing and then met with the members to discuss the scenarios. The sub-group was satisfied with the explanations and concluded that the results from the four pairs of comparative scenarios indicated that the optimization model was behaving as expected.

In addition to reviewing and analyzing the results of scenarios that had originally been run by the Development team, the HQ sub-group wanted to further stress the model with additional scenarios of its own choosing. The purpose of these scenarios was to 1) assess the workings of the optimization model by comparing changes in input data values to trends in the model's output; 2) determine the materiality of any data input "errors" identified by the IV&V team; and 3) address any concern regarding the uncertainty in ODIS estimates due to sampling. By comparing the results of the following nine scenarios to a baseline, the sub-group hoped to gather further evidence that the model works the way it is supposed to:

1) One scenario to correct "errors" discovered during verification process
2) Increase productivity by 20% (by equipment type)
3) Decrease productivity by 20% (by equipment type)
4) Increase letter mail volume by 20% (regardless of class)
5) Decrease letter mail volume by 20% (regardless of class)
6) Decrease letter mail volume by 20% and increase flat mail volume by 20% (regardless of class)

7-9) These three scenarios are designed to address the variation among ODIS tests (baseline plus two re-samples). Due to workload constraints, the Development team was unable to run these tests in time for their results to be included in this draft.

The HQ sub-group analyzed the outputs (number of facilities, square feet utilized, and costs) for the first six scenarios listed above, compared them to a baseline (model run v3.7 or the corrected model run), and assessed whether the differences were explainable, consistent, and symmetrical (when symmetry would be expected). The first of the six scenarios was a run containing the following 10 corrections of errors noted by the HQ sub-group as of November 2004:

1. Corrected pounds-per-piece and cubic-feet-per-piece conversion factors for periodicals.

2. Changed the weighting process for cubic feet conversion factors from pounds to inverse of pounds.

3. Changed value for cubic feet per piece for standard flats from hard-coded value to appropriate formula.

4. Changed Manual Letter costs based on new linearization.

5. Corrected latitude/longitude values for ZIP codes.

6. Revised throughput and square feet for APPS.

7. Revised throughput for NMO.

8. Changed number of bins on Delivery Bar Code Sorter (DBCS) from 190 to 206.

9. Corrected ZIP-to-OFDF cost per mile rate for distances over 500 miles.

10. Corrected square feet required for manual parcel and Priority Mail sortation.

A comparison of the corrected run and run v3.7 showed that correcting the 10 errors resulted in the addition of one facility to the network (188 facilities rather than 187) and decreased annual costs of $42 million (.03 percent lower than v3.7). These results permitted a tentative conclusion that the optimization results being validated were not materially affected by the errors found in the model inputs. A comparison of the results obtained by increasing and decreasing letter mail volume by 20 percent (scenarios chosen not for their plausibility but for their ability to stress the model) indicated that the model was behaving as expected: with the volume increase, there was an increase of 13 facilities with respect to the baseline, and overall costs rose by 9 percent; with the volume decrease, there was a reduction of ten facilities compared to the baseline, and overall costs decreased 9 percent. A similar symmetry of results was obtained when the model was run with a 20 percent increase in productivity and a 20 percent decrease: with the productivity increase, there was a decrease of 9 facilities with respect to the baseline, and overall costs declined by 15 percent; with the productivity decrease, there was an increase of 15 facilities compared to the baseline, and overall costs increased 16 percent. The sixth test of the model – a realistic scenario whereby letter mail volume is decreased by 20% and flat mail is increased by the same percentage – produced results that one would expect and could explain: Core costs for letters went down, and core costs for flats went up; however, the increase in flat core costs was relatively small (less than seven percent), presumably due to the high workshare characteristics of flats. None of the results of this scenario caused the IV&V team to doubt that the optimization model was behaving as one would expect.

Following its perusal of the results from the first run of six requested scenarios, the HQ sub-group again put into writing several questions that it had about some seemingly anomalous results with respect to Priority Mail and Transportation costs. In researching its responses the Development team discovered errors that had caused those anomalies. After the errors were corrected, the revised transportation and Priority Mail costs were no longer counter-intuitive (for example, prior to the correction, increasing letter mail volume by 20 percent had resulted in decreased transportation costs; after the correction, those costs had increased relative to the baseline, as one would expect with more volume and more nodes in the network). Thus, the HQ sub-group was satisfied that the results obtained under the six scenarios were consistent with expectations and lent credence to the underlying model methodology.

In addition to answering the HQ sub-group's questions about the anomalous results, the Development team provided the group with a list of the facilities that composed the network before and after the corrected-input-error run. Although the total number of facilities differed little for the two scenarios, the group was interested in examining the degree to which facilities changed roles and the extent of geographical shifts. A comparison of the lists showed the following results of correcting the 10 errors: there was no change in the role of 130 of the facilities; 20 facilities changed roles; 37 facilities from the original scenario were dropped and replaced by 38 other facilities. As a general rule, when certain facilities in a geographic region were dropped, they were replaced by a different set of facilities in that same region (the differential between added and subtracted facilities for each Area never exceeded two). These results would support a conclusion that the overall network structure of a new distribution system would not change significantly in different scenarios, even if the makeup of the facilities in geographic areas does. The fact that none of the ten scenarios reviewed by the HQ sub-group generated fewer than 66 concentration points (NCPs plus COLOCs) supports the notion that there is a critical mass of concentration points needed to form the backbone of the NCP concept; regardless of changes in volume or productivity, the network requires a minimum number of these concentration points to serve each area of the country. Although the role of certain facilities in a geographic area may change depending on the

scenario, the results of the 10 scenarios reviewed by the sub-group demonstrate a consistency in the minimum number of NCPs and OFDFs required to process and transport the mail under the network concept generated by the Optimization Model.

C. Validation of Outputs of the Optimization and Simulation Models

In Appendix C, the Operations sub-group documents the process it followed in validating the outputs of the Optimization and Simulation Models. Appendix C presents the sub-group's findings with respect to the "vital few" areas (20 specific or implied assumptions and 11 inputs) on which it focused its efforts.

X. Conclusion

At the beginning of this report, the following objectives were laid out:

1. provide the Senior Vice President, Operations, with the results of the IV&V team's verification and validation efforts

2. give the team's assessment as to whether the models are, or are not, sufficient for the purposes of making a decision to revamp the Postal Service's distribution and transportation networks; and

3. illuminate the risks inherent in the models' results.

Below is a summary of each sub-group's response to the above objectives.

A. Headquarters Sub-Group

1. Results of IV&V

a) Verification of Inputs

After reviewing all raw inputs, the data transformation steps, and the intermediate outputs that resulted in the direct inputs to the Optimization Model, the HQ sub-group concluded that, overall, the END Development team has done what it planned to do, using data and data processing routines that supported their intended methodology. The results of re-running the model after errors found by the IV&V team were corrected support the conclusion that the errors had only an insignificant impact on the model's results. The HQ sub-group recognizes that there are situations where the Development team was forced to make assumptions when data were not available; in such cases the sub-group asked the following question: Was the assumption defensible for the purposes of a strategic model subject to subsequent local adjustment? If it was, then the sub-group did not second-guess it; if it wasn't, then the sub-group felt it was obligated to recommend a better way. In the final analysis, the HQ sub-group did find the Development team's assumptions to be defensible, and it concluded that the team had done what it said it had done.

b) Validation of Optimization Model

After reviewing the Development team's own validation efforts, researching the experience of other users of the model, and reviewing the results of scenarios that stressed the model, the HQ sub-group concluded that the core Optimization Model does perform as it is supposed to perform. Since the model is a COTS product, that is no

surprise. However, it should be noted that the use of a COTS product does not, in and of itself, simplify the task at hand. That is because much of the workload, instead of being handled by the model, is transferred to the pre-processors, increasing the data-preparation steps necessary to convert raw inputs into the format required for processing by the model. Thus, when new scenarios and/or distribution concepts are tested in the model, careful attention must be paid to ensure that the pre-processors have been adjusted accordingly.

2. Assessment of Models

The HQ sub-group team agrees that the END models are sufficient for the purposes of making a decision to revamp the Postal Service's distribution system (the Optimization Model was designed to produce an optimal mail processing solution, not an optimal transportation solution). As stated above, the Optimization Model is a high level strategic tool designed to produce the most efficient and cost effective network. Because its inputs include national-average productivities and volumes estimated by distribution keys, it was always understood by the Development team and the IV&V team that the facility specific outputs of the Optimization Model would not match up with actual productivities, actual volumes and actual equipment requirements on a site-specific basis. For that reason, the Development team designed a Simulation Model to test and refine the feasibility of the solutions provided by the Optimization Model.

The HQ sub-group found the results of the Optimization Model to be reasonable at the aggregate level; that is, the Model did its job of developing a preliminary network design that would give senior management a geographical layout of an optimized network, provide management with an estimate of how many NCPs and OFDFs would be required in this network, and estimate the degree of savings that could be expected from replacing the current distribution system with the new network. What the Optimization Model was not intended to do was give senior management a tactical roadmap as to what facilities should compose the final network. To help with that decision, the Development team designed the Simulation Model and several post-processors to test and refine the feasibility of the solutions provided by the Optimization Model.

3. Assessment of Risk

Although there is a significant amount of risk associated with any change in the status quo (see below for a list of such risks), the risks of implementing the results of the Optimization Model are heavily mitigated by the use of the Simulation Models and Area reviews, the availability of site-specific data, and the input of experienced local managers familiar with micro-level issues. The presence of all those safeguards should combine to limit the risk that the Postal Service would mistakenly use/discard a node selected by the Optimization Model when another facility might be the better candidate due to factors not accounted for by the Model. As long as the outputs of the Optimization Model are regarded solely as a macro view of which geographic areas will require nodes and how many will be required in an area, the risks of using its results should be regarded as manageable. If the Model were to be used tactically – that is, to select facilities without regard for dock space, transportation concerns, and equipment availability – the risks of using its outputs would increase exponentially.

The HQ sub-group believes that, if and when a determination is made to proceed with the implementation of a redesigned mail processing network, the risks

associated with the use of macro-level model results and the risks raised on pages 21-22 will be mitigated with adoption of an approach similar to the one that was successfully used when the Postal Service transitioned to an automated letter processing environment. That approach included an implementation team to oversee the process and to ensure that local input is considered and site-specific issues are addressed.

After verifying the inputs to the Optimization Model and validating that the Model behaves the way one would expect, the HQ sub-group is satisfied that the Development team built the model correctly and that it built the correct model. That the outputs of the Optimization Model often do not appear reasonable at the facility level is no surprise because, in some cases due to management decision and in others due to lack of data, some crucial inputs to the model were in the form of national averages. It was never expected that those averages would be correct at the facility level.

The HQ sub-group concludes this section on risk by listing areas of risk that the Optimization Model does not address. The Development team and senior management are certainly aware of them, but these are issues that will have to be faced with the implementation of a network redesigned along the lines of the END project reviewed by the IV&V team.

Mailing Requirements – A change of the scope envisioned for the network will entail significant classification changes. Changes in labeling, required make-ups, sort levels, drop points, and pricing incentives will require a comprehensive plan and organization similar to that required for postal reclassification in the 1990's.

Cross-Class Effects of Decisions – The Optimization Model is designed to find the lowest-cost solution. In reviewing the results of stressing the Model, the HQ sub-group found that one of the by-products of lowering the cost of the whole network could be unexpected cost increases in individual products. For example, when the model was run assuming a 20 percent volume increase in Standard Mail and a 20 percent volume decrease in FCM, the results unexpectedly included a nine percent increase in Priority Mail costs. The lesson is that management needs to be aware of the ripple effect of decisions on other operations, classes of mail, and rates.

Data Issues – Out of necessity the models use historical data. The fact that the IV&V team has verified these data does not mean they are the only data upon which a decision to redesign a network should rest. Historical data will become less useful should a rapid decrease in volume or a drastic change in the mail mix occur. Thus, the relevance of historical data (no matter how current those data may be) in a redesigned network should be carefully assessed in light of future volume and mail-mix projections.

The IV&V team found the use of national averages to be appropriate for the strategic-level Optimization Model, which is meant to provide senior management with a geographical layout of an optimized distribution system; however, the Optimization Model was not designed as a tactical roadmap for determining the specific facilities to be included in a revamped network. Those decisions must be made based on site-specific data and with the input of managers familiar with local realities.

Reliability of Volume Flows between 3-D ZIP Codes – The Development team relied heavily on ODIS data to formulate a distribution key for its volume matrix in the Optimization Model. The HQ sub-group has no complaint with this decision because better data are not available and because ODIS data are appropriate for the strategic level of the model.

Ironically, ODIS was originally designed in the 1960's to provide consistent and statistically reliable information about the mail volumes originating and destinating between over 900 3-digit ZIP Codes. As such, its primary purpose was considered to be that of a network- and facility-sizing tool. Over the years, its role has gradually changed, and its usefulness as a network-sizing tool has eroded. More robust 3-digit-to-3-digit volume data are required to support data-based network decisions at the granular level.

Post-Processors – The IV&V team had several concerns about issues that are not addressed by the Optimization Model including the assumption of unlimited dock space, dock doors, and vehicle staging areas; and the assumption of readily available transportation in any quantity without price effect. The team realizes that the Development team has been designing post-processors such as the Dock Door Optimizer to deal with these issues, but the results of these post-processors have not been validated.

Investment Risk – Other 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.

Human Resources – Every scenario used to stress the model, even the one that assumed a 20 percent increase in volume and the one that assumed a 20 percent decrease in productivity, generated 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.

B. Operations Sub-Group

1. Results of Validation, Conclusions, and Recommendations

The team agrees the transformation of our network is imperative to the continued success of the organization. Current forecasts and business trends clearly indicate the need for a completely revamped network approach. The proposals and consolidations provided as a result of the optimization of existing networks are sound. We further agree with the approach to expand surface reach, to reduce reliance on air transportation, and consolidation of our existing processing and distribution facility network. Transition to a shape-based processing strategy will provide efficiencies in equipment, facilities and transportation. To ensure its success, all key stakeholders should continue to be involved in the design, refinement, validation and implementation of this process. Critical to implementation will be a comprehensive human resources strategy. Due to the strategic nature of the modeling and complexities involved, site-specific

validations similar to those already occurring must continue throughout planning and implementation.

The development process relies on a series of models - each designed to further refine and validate the results provided by the initial optimization modeling. The Optimization Model itself is a high level strategic tool designed to produce the most efficient and cost effective network. We found the results of this model to be reasonable at the aggregate level. The Simulation Model is designed to test and refine the feasibility of the solutions provided by the Optimization Model. During our validation, we found the Simulation Model did not always respond the way one expects when variables in volume and throughput are introduced. The team recommends further analysis of specific locations tested during our validation to gain a better understanding of why this occurs. We recommend the mileage used in the modeling be updated to reflect the actual distance between the physical addresses of facilities. The team strongly believes additional models presently under development designed to further test solutions at the facility level should continue; these include: DPS, Flats, and Dock Door Optimizers, as well as the Integrated HASP Network Model.

After completion of modeling, 3,180 overnight pairs are downgraded from overnight to two-day service. At the same time, 2,532 two-day service pairs are upgraded to an overnight commitment. This constitutes a net change of -7.4 percent (648) in overnight pairs. Continued validation of the net volume change associated with these service pair adjustments should occur. It should be stressed that the success of the optimized network relies on these service changes. Exceptions to the upgrades and downgrades created from feasible path assignments would seem to be a concept change and could have a detrimental effect on the overall outcome of the modeling. Earlier clearance times are a key factor in the expanded reach and processing responsibilities of the consolidated facilities. Exceptions creating later flows of committed volumes to a given facility will require adjustments to the model itself.

In the majority of facilities and products examined by our team, the Optimization Model appears to utilize volumes that reasonably mimic those actually processed in today's environment. The concept of using a 30 percent increase to average daily volume is generally adequate for contingencies in the products sampled. Though representative at the aggregate level, specific facility level modeling will be necessary during implementation planning. Attempts to validate Simulation Model workloads were unsuccessful due to wide variances between facilities, products, and as compared to the Optimization Model volumes. Since the Simulation Model is designed to test the optimized environment, it is important that workloads and volumes in the two models correspond to one another. We highly recommend continued evaluation and modification of Regional Simulation results at the tactical level with local management during planning and implementation.

We have concerns with the use of ODIS as a means for establishing flows between 3-digit pairs. Subject matter experts consulted indicate 3-digit to 3-digit ODIS data does not always represent "real" volume flows between communities. We recommend a means for determining the density flows between 3-digit pairs for all product types be developed. The model implies arrival profiles and available volume for processing from these flows. For example, current ODIS testing of stamped letter mail is based on the postmark of the ID city/plant, although it often represents multiple 3-digit ZIP Codes.

The modeling used national average throughputs to design a global network. A wide range of variance exists in all equipment types between wall-clock, run-

time, and modeled throughputs. Use of a single throughput number, while appropriate in national level modeling, should be evaluated at each facility.

At this point, the models assume a standardized fleet of equipment throughout the network. Though the best operational scenario may be elimination of all older equipment types, it is likely that integration with existing equipment will be necessary for the foreseeable future. Adjustments to the model will be required.

While we recognize the future state will not necessarily include the same classes and types of products as today, the package and bundle processing concepts embedded in the model are not fully developed at this time. For example, if there is integration of old and new equipment types (i.e. PSM (Parcel Sorting Machine), APPS, SPBS (Small Parcel and Bundle Sorter)), it will not be possible to commingle packages and bundles throughout the network. We encourage the continued development of an integrated package/bundle sorting platform. Absent development of a total package sortation system (TPSS) and/or retention of PSMs, the depth of sort provided by the APPS solution would appear to be inadequate. Multiple handlings or sorts to scheme by mailers and other facilities would be required with the limited depth of sort provided by APPS. Additionally, current APPS configurations do not provide for the use of large mail transport equipment, (Over-The-Road Containers (OTRs), Integrated Mail Handling System (IMHS), Eastern Region Mail Containers (ERMCs)). This coupled with the loss of surge and feed capacity, increased material handling, potential for increased damage to parcels (no loader/unloader capability) and overall staging implications would seem to make a multi-APPS environment difficult to manage.

Present planning implies that Regional Distribution Centers (RDCs) will perform many of the functions of a HASP, BMC, PMPC, and P&DC.[1] Trailers arriving at these facilities with commingled products will require immediate unloading. These large complex operations will likely incur significant material handling and transport needs.

A comprehensive plan for implementation of the necessary mailing requirement changes should be developed. The sub-group recommends a process for mapping entry points for products and sort levels in a well-defined way. A number of labeling changes and pricing incentives will be required to redirect mailers to an expanded number of entry points. A team of rates, classification and mail entry subject matter experts should be identified to begin this process early. The plan should specifically identify required make-ups, labeling changes, sort levels, drop points, and other entry issues.

A complete and itemized report of critical assumptions and inputs reviewed during our validation has been provided to the Senior Vice President, Operations.

[1] Regional Distribution Center has replaced NCP as the term used by the END Development team for the role played by facilities serving as network consolidation points in a revised distribution network.

APPENDICES

APPENDIX A

LIST OF IV&V TEAM MEMBERS

Leaders:

William Batterton	Manager, Program Performance		Washington DC
David C. Fields	District Manager / Lead Executive	Greensboro District	Greensboro NC

Members of Operations Sub-Group:

Kenneth Billings	Manager, Seattle Bulk Mail Center	Seattle WA
Leslie Johnson-Frick	Postmaster	Mt. Gilead NC
Robert Wszolek	Industrial Engineer, Hartford P&DC	Hartford CT

Members of Headquarters Sub-Group:

Nicholas Acheson	Program Performance Specialist	Washington DC
Dominick Caridi	Economist	Washington DC
Glenn McDonald	Operations Specialist	Washington DC
John Pickett	Economist	Washington DC
Mike Strand	Mathematical Statistician	Washington DC

APPENDIX B

OPTIMIZATION MODEL INPUT DEVELOPMENT PROCESS

Data Transformation and Intermediate Outputs

(Two Fold-Out Pages)

APPENDIX C

EVOLUTIONARY NETWORK DEVELOPMENT

IV & V OPERATIONS SUB-GROUP REPORT

Table of Contents

Evolutionary Network Development
IV & V Operations Sub-Group Report

Tab 1: Overview
Team Member List
IV & V Team Responsibilities/Approach/Process

Tab 2: Assumption 1
Each 3-digit Zip Code is modeled on the population centroid

Tab 3: Assumption 2
Overnight Service is limited to intra OF/DF only (FCM/PRI)

Tab 4: Assumption 3
Zip Code assignments in the NCP concept were not subject to USPS Area, District, or State Boundaries

Tab 5: Assumption 4
Feasible path were based on mileage bands to reduce the complexity of the optimization model (used to approximate travel times). PC Miler/TTI data sufficiently addresses travel time anomalies associated with traffic congestion, road conditions, and/or multiple stop needs etc.

Tab 6: Assumption 5
NCP and OF/DF operating plans are standardized based on critical path travel times

Tab 7: Assumption 6 A-F
Derivation of volume methodologies and workload
a. National volumes are RPW totals
b. Three year average of ODIS volume
c. Quarterly volume for any originating/destinating Zip mail class combination not contained in ODIS sample = 0 volume between those zip pairs
d. Finance number associated with each permit was used to determine Origin Zip
e. National origin distribution from permit system to all unknown origin volume was flowed using ODIS as a distribution key
f. Number of truck appointments: DSAS was used to allocate destination entry volume to BMC or SCF

Tab 8: Assumption 6 G
All PSM volume migrated to APPS

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Tab 9: Assumption 6 H

All non-turnaround machinable Priority parcels will be processed on APPS

Tab 10: Assumption 6 I-J

Derivation of Volume methodologies and workload

i. 50% of current manual letter workload will be automated in NCP
j. 85% of current manual flat workload will be automated in NCP concept

Tab 11: Assumption 6 K-L

Derivation of Volume methodologies and workload

k. 25% reduction of MMP and IC primary workload fro letters and flats will result from elimination of ADC/AADC network
l. OG Secondary and IC Primary in PF/DFs eliminated for manual letters and flats

Tab 12: Assumption 6 M

All F-4 automated workload is recentralized. Manual secondaries are not centralized

Tab 13: Assumption 6 N

Bundle/package flow methodology (e.g., 3+5 digit pallet flows, bundle and package separations, OF/DF entry): These go to the NCP

Tab 14: Assumption 7

Used national average productivities from MODS/EOR. Utilized national average run time throughputs

Tab 15: Assumption 8

Used current national average truck utilizations from TRACS. Used ERMCs place holder as MTE device for capacity calculations

Tab 16: Assumption 9

All mail that moves by Air flies direct (FEDEX or similar hub systems are considered direct for assumption purposed)

Tab 17: Assumption 10

Allowed a maximum of one intermediate NCP between an originating and destinating NCP

Tab 18: Assumption 11

AS-504 provided the standard machine footprint

Tab 19: Assumption 12

Every truck may contain mixed products

Tab 20: Assumption 13, 14, 15

Mailers (or USPS employees) separate turnaround volume from non-turnaround volume before induction at the OF.
Mailers change to new drop times and locations to accommodate changes in processing locations.
Mailing requirements and changes necessary to accommodate the new network are assumed to all take place prior to implementation (mailer make-up and drop location methodologies)

Tab 21: Assumption 16

Only FCM overnight and OND Priority is captured as turnaround at OF/DF

Tab 22: Assumption 17

All mail transported to NCP will arrive shape based in containers

Tab 23: Assumption 18

Necessary dock door capacity, at the right height, will be in place (either existing or through expansion) in all locations. We must also consider maneuvering area as it relates to new transportation equipment requirements in the future state

Tab 24: Assumption 19

Current processing plants can be modified/expanded subject to space constraints identified in data gathered at each site

Tab 25: Assumption 20

Variation and unpredictability in flows is sufficiently guarded against by ADV volume plus 30% modeling

Tab 26: Input 1

467 Facilities were assigned to 336 campuses (campus assignment/facility locations)

Tab 27: Input 2

Square footage inputs: Do these inputs consider any and all anomalies with column widths/doors, ceiling heights, floor layouts, tray line systems, etc.

Tab 28: Input 3
Volume/Volume Sources/Down flows: Are these sources and flows representative of the actual volumes?

Tab 29: Input 4
Productivity/Throughput: Do the productivities/throughputs used in the model actually represent what the assumptions stated? Do they represent actual productivity/throughput?

Tab 30: Input 5
Operating Times

Tab 31: Input 6
Volume Arrival Profiles

Tab 32: Input 7
Equipment Inventory: Is the total required equipment inventory accurate? (e.g., right size, right numbers)

Tab 33: Input 8
Transportation Trip Times: Is the source accurate? Reasonable?

Tab 34: Input 9
Associate Office Arrival Times

Tab 35: Input 10
Flexibility/contingency percentages/adjustments

Tab 36: Input 11
Facility expansion capability

Tab 37: Supporting Documentation
Site Implementation 1
Site Implementation 2

Evolutionary Network Development
IV &V Operations Sub-Group

Team Members:

Name: David C Fields
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Name: Kenneth R Billings
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Name: Robert F Wszolek
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Phone: 860-524-6487

UNITED STATES POSTAL SERVICE

NIA Verification & Validation Team

Suggested division of responsibilities between sub-groups

Finance Team

Operations Team

UNITED STATES POSTAL SERVICE

NIA Verification & Validation Team

Finance Team:

Verify/Validate volume/workload projection methodologies, cost assumptions, calculations, efficacy of optimization model, Zip optimization methodology, baseline costs, new facility and equipment costs, transportation costs.

UNITED STATES POSTAL SERVICE

NIA Verification & Validation Team

Operations Team:

Verify/Validate volume/workload inputs/outputs, facility/space inputs/outputs, Zip assignment accuracy, throughput/capacity assumptions, operational feasibility, transit times, facility selection/requirements, service impacts

UNITED STATES POSTAL SERVICE

Suggested Approach

NIA Verification & Validation Elements

Operations Sub-Group

- Optimization Model Inputs:

  Verify volume/workload inputs
  Verify facility/space inputs
  Verify machine throughput/capacity inputs
  Verify accuracy of Zip assignments used in model
  Verify volume arrival profile data
  Verify operating plan input reflects operating conditions

UNITED STATES POSTAL SERVICE

Suggested Approach

NIA Verification & Validation Elements

Operations Sub-Group

- Optimization Model Output:

Validate projected dock/maneuvering area requirements
Verify Zip assignments to OF/DF "families"
Validate ZIP optimization process (distance/population)
Validate methodology used to determine OF/DF & NCP equipment capacity
Verify usable space (Sq. Ft.) for new required equipment
Verify new estimated volume arrival profile data

UNITED STATES POSTAL SERVICE

Suggested Approach

NIA Verification & Validation Elements

Operations Sub-Group

- Simulation Model input:

Validate projected transit times
Verify Zip assignments to OF/DF facilities
Verify equipment capacities will meet operational and service commitments
Verify usable space (Sq. Ft.) for required equipment
Verify new volume arrival profile data
Validate projected OF/DF volume/workload
Validate projected NCP volume/workload

UNITED STATES POSTAL SERVICE

Suggested Approach

NIA Verification & Validation Elements

Operations Sub-Group

- Simulation Model output:

Validate sufficiency of equipment capacity to meet new operating plan requirements
Validate projected facility requirements
Validate of selected O/D & NCP facilities
Validate proposed transportation requirements (capacity and service responsiveness)

UNITED STATES POSTAL SERVICE

Suggested NIA Verification & Validation Process

Operations Sub-Group Methodology:

- Identify key input/output elements of both the Optimization and Simulation Models requiring validation
- Develop consistent methods and procedures for verification/validation
- Assure sufficient records are maintained to document the validation process

Assumption Data Sheet

Assumption #1: Each 3-digit Zip Code is modeled on the population centroid

Source of Data to be utilized/methodology used for IV & V (as appropriate):

100% validation of this item is not possible. The IV & V Finance group will develop a process to determine whether a population centroid correctly reflects what it is represented to be. Do they actually reflect the population centroid for the 3 digit Zip area? Evaluate the source of data that established the centroid for each three digit. Obtain a listing of the population centroids for the entire nation, and then evaluate a random sampling of that listing.
Second issue: are there any significant model impacts associated with the use of the population centroid? The IV & V Operations sub-group will use a random sampling of the centroids, evaluate outlier associate offices to determine whether or not anomalies exist between actual and modeled travel patterns, and to ensure anomalies are not so wide spread as to effect the overall representation of travel time to and from OF/DFs. Does this assumption adversely impact mail arrival profiles at OF/DFs and arrival of DOVs in the morning to the associate offices?

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of reviewing data utilized, documentation, and may include field site visits. The development group estimates they will need three (3) days preparation time, and the primary contact is Luke Grossmann (contractor).

Observations: | ***Dates:*** *10-13-2004*

The operations sub-group met with the development team to review the data associated with this assumption.

It would appear the centroid as defined in the optimization model is not necessarily a true representation of the population density. Rather, it is a geographic (longitude/latitude) average of the five digit Zip codes within a three digit area. The development team performed an analysis on 5 digit outliers. Of 70 5 digit sites reviewed, 6 could not be served within operating plan constraints based on the "reach". This results in CET/CT anomalies and therefore in some instances expanded processing windows. There are other instances where these outliers require earlier than CT dispatch. The centroid approach relates only to original Zip assignments in the optimization model. This in turn, establishes the arrival profile at the destination office.

Approximately 50% of the three digit Zip codes remain in the plants where they are processed today. The centroid Zip assignments only affect those 3 digits that change from a strategic perspective. The centroids are a reasonable approach to Zip assignment. Outliers consist of those offices which can't reach (or be reached by) the OF/DF within the standardized operating plan. The Pacific, Western and Southwest Areas show more sensitivity because they have larger 3-digit Zip codes.

Attachments: National Centroid Listing, Dock Door and Centroid Overview, Simulation Sensitivity: DF to Furthest 5-digit ZIP Code, Furthest 5-Digit List,

Assumption 1-continued

Travel times were developed based on direct transportation to each 5-digit office. It should be noted that direct trucks to every 5 digit office will not be feasible. While the population centroid concept is a reasonable approach to strategic modeling, extensive validation will be necessary at the tactical level. During site specific implementation and simulation, distances, transportation and processing requirements must be validated. This process can ensure anomalies are addressed prior to implementation.

Assumption Data Sheet

Assumption #2 Overnight Service is limited to intra OF/DF only (FCM/PRI)

Source of Data to be utilized/methodology used for IV & V (as appropriate):

This should be reasonably easy to validate at 100%. The Evolutionary Network Development group will provide a listing of any exceptions that exist to their original assumptions as a result of changes made in area validation meetings. IV&V group requests that the development team identify all 3 digit pairs that will change as a result and the average daily volume for each 3-digit pair. We can then compare that to the existing overnight average daily volume to determine nationwide impacts.

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development team consists of reviewing data utilized, documentation, and may include field site visits. The development team estimates they will need two (2) days preparation time, and the primary contact is Dave Strohecker (USPS).

Observations: | ***Dates:*** *10-2004*

The total overnight pair's baseline is 8,780. After completion of optimization modeling, 3,180 or 36.22% of these pairs are planned to be downgraded to two day. 2,532 pairs are planned to be upgraded to overnight. 5,600 remain unchanged as a result of the modeling. In the future state, there will be 648 less pairs in overnight than in the present state. This net change constitutes a 7.4% reduction in the number of overnight three digit pairs. The development team summary level data comparing total percent volume before and after modeling is based on first class single piece letters. The baseline of FCSL (48.07%) represents the portion of FCSL that presently has an overnight commitment. After optimization modeling and validation by the field, total overnight FCSL is 44.96% for a net change of -3.11%.

The operations sub-group would encourage the development team to continue to review the method of calculation of total volume in each three digit pair used to determine the before and after analysis. The issue of the reliability of 3 digit ODIS data, the impact of postmarking in plants with a single three digit zip representing the entire plant service area, permit origin versus true entry point of the mail, and finally impacts of AMP's on Saturdays and holidays may skew the true three digit origin. It is generally agreed by all parties that these issues may have a tendency to distort volume allocation by 3 digit, and thus distort the analysis itself. Over 400 pairs in the analysis do not show any overnight FCSL volume. It is assumed this is due to testing methods and is not a true representation of flows. Some other means for evaluating flows of volume between 3 digits should be considered to ensure consistency and accuracy, i.e. national density test.

Attachments: ***Area VP Meeting Presentation (11/20/03); Overnight Service Standard Changes summary document-J. Williamson 12-1-04; Listing of Exceptions to model by COO; J. Williamson Excel file Phase 2 Preliminary findings, 1st class overnight relationships, G McDonald ODIS Data Spreadsheets***

Assumption 2-continued

Both the operations sub-group and the development team acknowledge that any exceptions to the original assumption made after the model has been run will have a detrimental effect on the overall optimization results. As an example, the optimized network is built on the premise that outgoing operations will be cleared and DPS processing will begin much earlier than presently experienced. This allows for more efficient use of facilities and equipment and for the expanded reach of DPS processing from DF to delivery unit in the future state. Exceptions that create later flows of overnight committed volumes than presently modeled will require the re-running of the appropriate models with modified assumptions to ensure cost, capacity, equipment needs, and clearance time performance are at the level expected.

Evolutionary Network Development
Phase II Preliminary Findings - Version 7.3.7
First Class Overnight Relationship Analysis Summary

	Total Pairs	Annual Volume (in thousands)	% of Total FCSL Volume	Total Zero Volume Pairs
SAME	5,600	20,052,219.392	43.59%	250
UPGRADE	2,532	630,191.867	1.37%	159
DOWNGRADE	3,180	2,061,686.154	4.48%	222
Total Overnight RDC	8,132	20,682,411.259	[illegible]	
Total Overnight Baseline	8,780	22,113,905.557	48.07%	
Total FCSL Volume		46,002,775.192		

AFFECTED OVERNIGHT RANKING OF VOLUME:

Ranking		Number of Pairs Downgrade	Cumulative Pairs Downgrade	Volume of Pairs Downgrade	Cumulative Volume Downgrade	Number of Pairs Same	Cumulative Pairs Same	Volume Same	Cumulative Volume Same
0 - 100	100	1	1	43,354	43,354	99	99	6,176,077	6,176,077
101 - 200	200	1	2	23,045	66,400	99	198	2,764,893	8,940,970
201 - 300	300	4	6	71,775	138,175	96	294	1,854,801	10,795,772
301 - 400	400	16	22	208,499	346,674	183	477	2,494,625	13,290,396
401 - 500	500	10	32	97,848	444,522	90	567	888,040	14,178,436
501 - 600	600	4	36	32,524	477,045	96	663	792,413	14,970,849
601 - 700	700	20	56	139,563	616,608	80	743	558,114	15,528,963
701 - 800	800	16	72	97,476	714,084	84	827	506,189	16,035,152
801 - 900	900	13	85	67,731	781,816	87	914	457,277	16,492,429
901 - 1000	1000	20	105	93,254	875,070	80	994	370,797	16,863,226
1001 - 1500	1500	86	191	286,244	1,161,314	314	1,308	1,062,389	17,925,615
1501 - 2000	2000	119	310	249,598	1,410,912	382	1,690	800,177	18,725,792
2001 - 2500	2500	141	451	185,026	1,595,938	359	2,049	475,005	19,200,797
2501 - 3000	3000	152	603	129,418	1,725,356	348	2,397	298,842	19,499,639
3001 - 3500	3500	161	764	92,415	1,817,771	339	2,736	195,896	19,695,535
3501 - 4000	4000	190	954	74,158	1,891,929	310	3,046	121,911	19,817,446
4001 - 4500	4500	194	1,148	52,282	1,944,210	306	3,352	82,680	19,900,126
4501 - 5000	5000	208	1,356	38,818	1,983,029	292	3,644	54,672	19,954,798
5001 - 5500	5500	202	1,558	25,837	2,008,866	298	3,942	38,894	19,993,692
5501 - 6000	6000	238	1,796	21,659	2,030,525	262	4,204	23,809	20,017,502
6001 - 6500	6500	221	2,017	13,627	2,044,152	279	4,483	17,408	20,034,910
6501 - 7000	7000	255	2,272	9,992	2,054,144	245	4,728	9,784	20,044,694
7001 - 7500	7500	247	2,519	5,238	2,059,381	253	4,981	5,436	20,050,131
7501 - 8000	8000	261	2,780	2,077	2,061,458	239	5,220	1,931	20,052,062
8001 - 8500	8500	178	2,958	228	2,061,686	322	5,542	158	20,052,219
8501 - 8780	8780	222	3,180	-	2,061,686	58	5,600	-	20,052,219

Contact: Leslie Frick
Source: Development Team
11/22/04
Assumption ?

Evolutionary Network Development
Independent Validation and Verification
Facility Overnight Relationships

	OF ID	OF NAME	DF ID	DF NAME
1	333	SUBURBAN MD (MD) P&DC	329	NORTHERN VA (VA) PDC
2	329	NORTHERN VA (VA) PDC	332	SOUTHERN MD (MD) P&DC
3	333	SUBURBAN MD (MD) P&DC	332	SOUTHERN MD (MD) P&DC
4	322	BALTIMORE (MD) P&DC	332	SOUTHERN MD (MD) P&DC
5	322	BALTIMORE (MD) P&DC	333	SUBURBAN MD (MD) P&DC
6	44	PHILADELPHIA (PA) P&DC	33	LEHIGH VALLEY (PA) P&DC
7	44	PHILADELPHIA (PA) P&DC	96	KILMER (NJ) P&DC
8	286	DETROIT (MI) P&DC	371	PONTIAC (MI) NEW OFDF
9	101	MORGAN STATION (NY) P&DC	93	BROOKLYN (NY) P&DC
10	111	WESTCHESTER (NY) P&DC	87	STAMFORD (CT) P&DC
11	96	KILMER (NJ) P&DC	94	DOMINICK V DANIELS (NJ) P&DC
12	96	KILMER (NJ) P&DC	44	PHILADELPHIA (PA) P&DC
13	87	STAMFORD (CT) P&DC	111	WESTCHESTER (NY) P&DC
14	64	BOSTON (MA) P&DC	80	PROVIDENCE (RI) P&DC
15	64	BOSTON (MA) P&DC	74	MANCHESTER (NH) P&DC
16	148	ATLANTA (GA) P&DC	175	NORTH METRO (GA) P&DC
17	122	LOS ANGELES (CA) P&DC	118	INDUSTRY (CA) P&DC
18	122	LOS ANGELES (CA) P&DC	142	SANTA CLARITA (CA) P&DC
19	140	SANTA ANA (CA) P&DC	118	INDUSTRY (CA) P&DC
20	140	SANTA ANA (CA) P&DC	122	LOS ANGELES (CA) P&DC
21	139	SAN JOSE (CA) P&DC	127	OAKLAND (CA) P&DC
22	142	SANTA CLARITA (CA) P&DC	118	INDUSTRY (CA) P&DC
23	140	SANTA ANA (CA) P&DC	142	SANTA CLARITA (CA) P&DC

Contact: Leslie Frick
Source: Jeff Williamson
10/2004
Assumption 2

FYs 95, 96 & 97 ODIS Data			FYs 03 & 04 ODIS Data		
# of O/N Pairs	% of Total O/N Pairs	% of Total O/N Volume	# of O/N Pairs	% of Total O/N Pairs	% of Total O/N Volume
81	0.9%	25.09%	89	1.0%	25.00%
331	3.8%	50.00%	341	3.9%	50.01%
975	11.1%	75.01%	1,005	11.4%	75.01%
2,053	23.4%	90.00%	2,072	23.6%	90.01%
2,944	33.6%	95.00%	2,935	33.4%	95.00%
8,768	100.0%	100.00%	8,780	100.0%	100.00%

[redacted]	[redacted]
212	212
802	602

FYs 95, 96 & 97 ODIS Data			FYs 03 & 04 ODIS Data		
# of O/N Pairs	% of Total O/N Pairs	% of Total O/N Volume	# of O/N Pairs	% of Total O/N Pairs	% of Total O/N Volume
81	0.9%	25.09%	89	1.0%	25.00%
331	3.8%	50.00%	341	3.9%	50.01%
975	11.1%	75.01%	1,005	11.4%	75.01%
2,053	23.4%	90.00%	2,072	23.6%	90.01%
2,944	33.6%	95.00%	2,935	33.4%	95.00%
8,768	100.0%	100.00%	8,780	100.0%	100.00%

212	212
202	202

Assumption Data Sheet	
Assumption #3: Zip Code assignments in the NCP were not subject to USPS Area, District, or State Boundaries	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
This may be an item can be validated through discussion within the team based on operational expertise. No real sampling or testing of this assumption should be necessary. Refer to concerns list #9.	
Source Data Used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development team consists of meetings and discussions. No preparation is needed, it may be scheduled at anytime. The primary contact is Dale Biersteker (USPS).	
Observations:	***Dates:*** *7-20-2004*

Eliminating geographic constraint parameters was determined as the best way to develop a true optimized network. Zip code assignments in the NCP concept were not subject to USPS Area, District, or State Boundaries. The main goal of this model was to identify the most cost efficient assignments based on operational costs and capacity constraints. USPS Area, District, and State boundaries do not represent operational constraints, but rather, they represent management or legislative constraints. When developing the list of feasible ZIP assignment paths, the modeling team discussed the possibility of crossing area, district, or state boundaries with USPS senior management. Senior management instructed the team to run the model without regard to these constraints in order to identify the least cost opportunity.

The development team has validated this assumption has been used in the modeling design and implementation. Ultimately the responsibility for decisions relative to present management boundaries is one for senior management. The operations sub-group believes some realignment of responsibilities will be necessary. Operational performance measures could be sub-optimized if line of sight and management control is blurred by a lack of accountability. As an example if a three digit Zip code is moved to another district or area for efficiency purposes, the team would recommend realignment of that Zip code to the district/area where processing will occur.

Attachments: NONE

Assumption Data Sheet

Assumption #4 Feasible paths were based on mileage bands to reduce the complexity of the optimization model (used to approximate travel times). PC Miler/TTI data sufficiently

Source of Data to be utilized/methodology used for IV & V (as appropriate):

100% validation of this assumption is not possible. Sample validation of this item will be extremely work-intensive. The IV & V Finance sub-group will verify the derived information is actually what was used. A random sampling of select "feasible paths" from across the nation will be developed based on statistical sampling methodology. The operations sub-group will validate, based on HCR and PVS transportation data and through observation whether modeled times are representative of the actual travel time between locations. Also, the group will review, through random sampling, whether the times and mileage associated with selected"feasible paths" are accurately represented in the model.

Source Data Used or Facility Observed (as appropriate):

The development team recommended the IV & V team validate the use of mileage bands to approximate travel times as part of the development of feasible paths. As part of Input #8, the IV & V team should evaluate the use of PC Miler to determine drive times between facilities. The validation process with the development group consists of reviewing data utilized, documentation, and may include field site visits. The development team estimates they will need two (2) days preparation time, and the primary contact is Andy Louis (contractor).

Observations: ***Dates:*** *10-2004*

In essence, feasible paths were used to simplify and/or limit the number of possible solutions the Optimization Model needed to evaluate. Secondly, it was used for the overnight assumption to ensure a reasonable distance for associate offices to and from the OF/DF. It was used to evaluate the maximum 3 hour travel time.

For the purposes of validation, the operations sub-group randomly selected 6 RDC's and the subordinate OF/DFs for each (total of 79 pair relationships). The most current PC Miler distance and travel time was extracted for each of these pairs, and then compared to the mileage from the optimization model provided by the development team. The PC Miler mileage used reflects the actual shortest practical (not necessarily the shortest physical) driving path, with USPS contracted transportation speeds and one way streets accounted for. Shortest physical path can use side streets and country back roads to automatically find an actual physical shortest driving distance between two map coordinates. The data is included as an attachment. The findings in summary reflect a range of variation between current PC miler data and the data used in the original optimization model from -89% to as high as +100% variations. This variation is believed to be caused by the use of a physical centroid within the five digit Zip code as opposed to the physical street address of the facility in question. To ensure the accuracy of the modeled results the operations sub-group recommends that the feasible paths be modified to take in to consideration the actual physical street addresses of the facilities modeled. Total aggregate change in the random selected 79 locations was +6.48% greater mileage than the modeled mileage. While on surface this may seem inconsequential, it would only seem

Attachments: Transportation Statistics, Feasible Paths-Baseline Zip Code Assignments Data table comparing Optimization model mileage to PC Miler mileage with variance and over 3 hour sites highlighted

appropriate to update to actual data to guard against errors caused by this variation.

Of the 79 sites closely examined, 6 of the pairs marginally exceeded the 3 hour window established by the development team to ensure all mail arrived prior to CET of 2115. We are not able to clearly examine the impact on the model of this deviation. The operations sub-group recommends that after the aforementioned adjustment of actual mileage, all pairs exceeding the three hour time frame should be closely examined for impacts on arrival profiles.

The classification of OF/DFs and RDCs as metro, mega-metro, or non-metro, which was based on a study from the Texas Traffic Institute, appears on surface to be reasonable. The sub-group does however recommend that pair travel times be evaluated at the site specific level during site level simulation modeling and validation.

TRANSPORTATION MILEAGE AND TRAVEL TIMES

ORIGINATING FACILITY	DESTINATING FACILITY	OPTIMIZATION MODEL MILEAGE	V &V PC Miler	DIFFERENCE	Drive Time	PERCENT VARIATION
DELAWARE P&DC	PHILADELPHIA BMC	43.5	54.2	10.7	1:08	24.60%
LANCASTER P&DC	PHILADELPHIA BMC	81.6	87.5	5.9	1:48	7.23%
LEHIGH VALLEY P&DC	PHILADELPHIA BMC	52.2	71.3	19.1	1:36	36.59%
PHILADELPHIA (NJ) L&DC	PHILADELPHIA BMC	38.1	44.3	6.2	0:58	16.27%
PHILADELPHIA (PA) P&DC	PHILADELPHIA BMC	16.3	19.6	3.3	0:26	20.25%
READING P&DF	PHILADELPHIA BMC	67.1	78.9	11.8	1:33	17.69%
SOUTH JERSEY P&DC	PHILADELPHIA BMC	24.9	26.4	1.5	0:36	6.02%
SOUTHEASTERN P&DC	PHILADELPHIA BMC	41.9	31.4	-10.5	0:41	-25.06%
KILMER P&DC	PHILADELPHIA BMC	47.8	55.1	7.3	1:05	15.27%
TRENTON P&DC	PHILADELPHIA BMC	18	28.7	10.7	0:35	59.44%
LEHIGH VALLEY P&DC	N JERSEY PMPC	77.7	80.6	2.9	1:36	3.73%
PHILADELPHIA P&DC	N JERSEY PMPC	87	96.0	9.0	1:57	10.34%
SCRANTON P&DF	N JERSEY PMPC	113.8	113.0	-0.8	2:15	-0.70%
SOUTH JERSEY P&DC	N JERSEY PMPC	86.3	87.5	1.2	1:47	1.39%
WILKES BARRE P&DC	N JERSEY PMPC	119.4	130.5	11.1	2:28	9.30%
BRIDGEPORT P&DF	N JERSEY PMPC	66.5	69.3	2.8	1:22	4.21%
STAMFORD P&DC	N JERSEY PMPC	44.6	45.7	1.1	0:56	2.47%
BRONX P&DC	N JERSEY PMPC	18	18.9	0.9	0:26	5.00%
BROOKLYN P&DC	N JERSEY PMPC	30.9	38.3	7.4	0:51	23.95%
DOMINICK V DANIELS P&DC	N JERSEY PMPC	5.9	0.6	-5.3	0:01	-89.83%
HACKENSACK P&DC	N JERSEY PMPC	12.2	11.1	-1.1	0:18	-9.02%
KILMER P&DC	N JERSEY PMPC	24.7	28.0	3.3	0:38	13.36%
METRO NY PMPC	N JERSEY PMPC	49.4	50.7	1.3	1:02	2.63%
MID-HUDSON P&DC	N JERSEY PMPC	64.5	78.4	13.9	1:32	21.55%
MID-ISLAND P&DC	N JERSEY PMPC	48.7	50.7	2.0	1:02	4.11%
MONMOUTH P&DC	N JERSEY PMPC	40.4	55.4	15.0	1:22	37.13%
MORGAN STATION P&DC	N JERSEY PMPC	24.3	23.8	-0.5	0:35	-2.06%
NEWARK P&DC	N JERSEY PMPC	4.4	2.7	-1.7	0:05	-38.64%
PATERSON P&DC	N JERSEY PMPC	16.8	15.9	-0.9	0:26	-5.36%
QUEENS P&DC	N JERSEY PMPC	28.4	25.3	-3.1	0:32	-10.92%
STATEN ISLAND P&DC	N JERSEY PMPC	15	17.5	2.5	0:27	16.67%
TRENTON P&DC	N JERSEY PMPC	52.9	53.0	0.1	1:07	0.19%
WEST JERSEY P&DC	N JERSEY PMPC	16.5	20.9	4.4	0:27	26.67%
WESTCHESTER P&DC	N JERSEY PMPC	42.3	37.5	-4.8	0:48	-11.35%
WESTERN NASSAU P&DC	N JERSEY PMPC	41.6	43.4	1.8	0:56	4.33%
JFK ISC AMF	N JERSEY PMPC	35.4	36.1	0.7	0:48	1.98%

Contact:Leslie Frick
Source: PC Miler, Glenn McDonald,
10/12/04

TRANSPORTATION MILEAGE AND TRAVEL TIMES

PHILADELPHIA BMC	N JERSEY PMPC	76.5	76.3	-0.2	1:33	-0.26%
NJI BMC	N JERSEY PMPC	5.1	7.2	2.1	0:08	41.18%
ANAHEIM P&DF	SANTA CLARITA P&DC	69.4	71.1	1.7	1:38	2.45%
BAKERSFIELD P&DC	SANTA CLARITA P&DC	80.4	81.5	1.1	1:56	1.37%
INDUSTRY P&DC	SANTA CLARITA P&DC	40.3	54.8	14.5	1:17	35.98%
LONG BEACH P&DC	SANTA CLARITA P&DC	59.3	61.8	2.5	1:26	4.22%
LOS ANGELES P&DC	SANTA CLARITA P&DC	35.7	45.1	9.4	1:05	26.33%
MARINA P&DC	SANTA CLARITA P&DC	35.3	42.3	7.0	1:01	19.83%
OXNARD P&DF	SANTA CLARITA P&DC	43.6	67.4	23.8	1:16	54.59%
PASADENA P&DC	SANTA CLARITA P&DC	36.6	37.8	1.2	0:55	3.28%
SAN DERNADINO P&DC	SANTA CLARITA P&DC	101.2	96.2	-5.0	2:11	-4.94%
SANTA ANA P&DC	SANTA CLARITA P&DC	67.5	77.9	10.4	1:48	15.41%
SANTA BARBARA P&DC	SANTA CLARITA P&DC	93.5	114.4	20.9	2:07	22.35%
MOJAVE MPO	SANTA CLARITA P&DC	70.3	80.1	9.8	1:48	13.94%
LOS ANGELES BMC	SANTA CLARITA P&DC	45.1	44.8	-0.3	1:03	-0.67%
M.L. SELLERS P&DC	SANTA CLARITA P&DC	149.1	149.9	0.8		0.54%
NORTH BAY P&DC	SAN FRANCISCO P&DC	39.9	54.5	14.6	1:11	36.59%
OAKLAND P&DC	SAN FRANCISCO P&DC	10.6	13.4	2.8	0:21	26.42%
SACRAMENTO P&DC	SAN FRANCISCO P&DC	85.1	84.4	-0.7	1:57	-0.82%
SALINAS P&DF	SAN FRANCISCO P&DC	99.3	102.0	2.7	2:22	2.72%
SAN FRANCISCO BMC	SAN FRANCISCO P&DC	16.3	16.4	0.1	0:23	0.61%
SAN JOSE P&DC	SAN FRANCISCO P&DC	48.2	45.8	-2.4	1:06	-4.98%
STOCKTON P&DC	SAN FRANCISCO P&DC	86.3	88.4	2.1	2:08	2.43%
ABILENE DIST. ANNEX	MIDLAND P&DC	154.5	166.1	11.6		7.51%
LUBBOCK P&DF	MIDLAND P&DC	117.5	157.4	39.9		33.96%
AUSTIN P&DC	NORTH HOUSON P&DC	142.8	164.5	21.7		15.20%
DEAUMONT P&DC	NORTH HOUSTON P&DC	101.2	89.3	-11.9	1:42	-11.76%
HOUSTON P&DC	NORTH HOUSTON P&DC	17.4	17.9	0.5	0:21	2.87%
CEDAR RAPIDS P&DF	DES MOINES BMC	128.7	127.9	-0.8	2:30	-0.62%
DES MOINES P&DC	DES MOINES BMC	0.3	0.6	0.3	0:01	100.00%
WATERLOO P&DF	DES MOINES BMC	133.9	122.0	-11.9	2:50	-8.89%
EAU CLAIRE P&DF	SAINT PAUL P&DC	79.3	90.9	11.6	1:41	14.63%
MANKATO P&DF	SAINT PAUL P&DC	95.9	84.2	-11.7	2:01	-12.20%
MINNEAPOLIS P&DC	SAINT PAUL P&DC	11.6	15.2	3.6	0:23	31.03%
ROCHESTER (MN) P&DF	SAINT PAUL P&DC	74.4	74.7	0.3	1:50	0.40%
SAINT CLOUD P&DF	SAINT PAUL P&DC	76.6	81.9	5.3	1:30	6.92%
ST PAUL BMC	SAINT PAUL P&DC	11	9.7	-1.3	0:15	-11.82%
EVERETT P&DF	SEATTLE BMC	53.9	53.0	-0.9	1:12	-1.67%
OLYMPIA P&DF	SEATTLE BMC	44.3	42.7	-1.6	0:55	-3.61%
PORTLAND (OR) P&DC	SEATTLE BMC	151.2	150.3	-0.9		-0.60%
SEATTLE P&DC	SEATTLE BMC	16.6	18.3	1.7	0:25	10.24%

Contact:Leslie Frick
Source: PC Miler, Glenn McDonald,
10/12/04

TRANSPORTATION MILEAGE AND TRAVEL TIMES

TACOMA P&DC	SEATTLE BMC	10.7	12.1	1.4	0:18	13.08%
WENATCHEE PO	SEATTLE BMC	158.3	149.7	-8.6		5.43%
	AGGREGATE CHANGE	**4573.7**	**4870.1**	**296.4**		**6.48%**

Contact:Leslie Frick
Source: PC Miler, Glenn McDonald,
10/12/04

Assumption Data Sheet

Assumption #5: RDC and OF/DF operating plans are standardized based on critical path travel times

Source of Data to be utilized/methodology used for IV & V (as appropriate):

100% validation is not possible on this item. The IV & V Finance su-bgroup will check to ensure data is input correctly into model. The operations sub-group will determine whether operating plans are identical throughout the country as stated. Is it realistic to have standardized CET and CTs for the entire country? Review the process used by the Evolutionary Network Development group to determine CTs and CETs. For a randomly selected number of locations, observe the simulation model to determine the effectiveness of clearance and impact on service standard achievement. This will require observing the impacts within key product flows. Identify approximately six down flow destinations from randomly selected origin facilities. Follow the flow of the mail piece from origin to delivery unit for 2 overnight, 2 two day, and 2 three day locations. The validation of this assumption will be conducted simultaneously with others since it involves observation of the simulation model in action. In essence, we will observe mail pieces flow from an origin plant, through the origin RDC, to the destination RDC, to the DF, and on to the delivery unit. Are service standards achieved for this particular product?

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of meetings, discussions, and observing the model. No preparation is needed; it may be scheduled at anytime. The primary contact is Dave Strohecker (USPS).

Observations: | ***Dates:*** *8/24-26/2004*

As a starting point in modeling, an operating plan was established. The development team started with basic assumptions on drive times from OF's to RDC's and Zip codes to OF's. "Critical Path" is defined as the furthest point between OF's and RDC's and Zip codes and OF's. The longest time was approximately 3 hours. The model was based on the longest drive time and adjusted based on actual time and proximity. In July the operations sub-group reviewed outputs from the simulation model. In August the operations sub-group reviewed Seattle (WA) OFDF/RDC, Santa Clarita (CA) OFDF/RDC, Santa Barbara (CA) OFDF, Bakersfield (CA) OFDF, Oakland (CA)OFDF, San Jose (CA) OFDF, Eureka (CA) OFDF, Philadelphia (PA) OFDF/RDC, Des Moines (IA) OFDF/RDC, San Francisco (CA) RDC, Lehigh Valley (PA) OFDF and Cedar Rapids (IA) OFDF, from a randomly selected group. Four sensitivity analyses were compared to the baseline simulation (a) 100% ADV, (b) 130% ADV, (c) 130 % ADV, updated overnight service standards aggressive service OFDF, volume arrival profiles pushed up sixty minutes and (d) 130% adv, updated overnight service standards aggressive OFDF, volume arrival profiles pushed back sixty minutes. In general the sub-group concluded the regional simulation model responded reasonably when variables are adjusted.

Attachments: Reference Assumption 6 and Simulation Model Section

Assumption 5-continued

CET's and CT's have been confirmed as being standard in the modeling.

The organization continues to shift toward standardized CT & CET's as we speak. This should not be a barrier to the success of the networks evolution to its future state. The development group has committed to further site specific modeling as well. The operations sub-group believes this site specific modeling will be extremely valuable in determining the local OF/DF and/or RDC's ability to clear and dispatch as modeled. The use of the DPS optimizer, dock door optimizer and customized local/area planning and validation will also ensure success of this item. The END group should continue to validate and develop SOP's for responding to operational anomalies, i.e. transportation failures; weather delays etc. to ensure these anomalies do not compromise the effectiveness of the total network.

The development team has established a means for measuring the networks effectiveness in each region as it relates to service. Operational managers should be encouraged to review these results for their specific region during continued implementation, planning and development.

Assumption Data Sheet

Assumption #6: Derivation of volume methodologies and workload

Source of Data to be utilized/methodology used for IV & V (as appropriate):

The IV & V Finance sub-group will be responsible for ensuring that the assumptions below (at the aggregate level) are what they are represented to be. As an example, the total national volume from the optimization model will be examined to validate that it does actually match the RPW totals. The operations sub-group will validate that these data sources at the granular level represent "real world", examining actual volumes and workloads in randomly selected facilities. 100% verification of the first six items below is not possible. Operationally, the key issue is whether or not the assumptions used to create the modeling foundation accurately represent reality. Only random processes are possible at the granular level, while at the aggregate level the headquarters group may be able to achieve 100% validation. A number of origin/destination pairs will be randomly selected for each product line. This random grouping must include BMCs, as well as origin and destination facilities. Utilize other data sources, i.e. EOR density data, SWYB, electronic verification system (EVS), 8125's, to ascertain whether or not the flow created in the model for the pair is truly representative of what is occurring today.

a. National volumes are RPW totals
b. Three year average of ODIS volume
c. Quarterly volume for any originating/destinating Zip mail class combinations not contained in ODIS sample = 0 volume between those zip pairs.
d. Finance number associated with each permit was used to determine Origin Zip.
e. National origin distribution from permit system to all unknown origin volume was flowed using ODIS as a distribution key.
f. Number of truck appointments: DSAS was used to allocate destination entry volume to BMC or SCF.

Source Data Used or Facility observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of reviewing data utilized, documentation, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The primary contact is Andy Louis (contractor).

Observations: | ***Dates:*** *10-2004*

Validation of aggregate volumes at the National level was performed by the finance sub-group. The operations sub-group focused on validating the reasonableness of the volume/workload data by comparing modeled volumes with actual volumes retrieved from other sources.

In general, the optimization model volume allocates MODS workload to each 3-digit Zip code using ODIS as a distribution key. Based on discussions with and documentation provided by the development group, this workload is a primary determinant of capacity requirements (facilities, equipment, etc) within the new network, and drives total calculated processing costs.

Attachments: Volume file-CD, DOIS data, Optimization Workload

Assumption 6-continued

In the simulation model, workload is calculated based on the 3-digit to 3-digit volumes (data sources include RPW, DSAS, etc, using ODIS as a distribution key), arrival, processing and dispatch profiles and the processing capacity defined within each facility. The regional simulation model is also used to refine equipment requirements at a more granular level.

Ten future Regional Distribution Centers (RDCs), along with their feeder Originating and Destinating Facilities (OF/DFs) were initially identified using a random number generator. It was necessary to reduce this group of sampled facilities to achieve parallel (apples to apples) comparisons. In facilities where 3-digit Zip Code responsibilities changed in the new operating environment, no comparable data exists. In the remaining facilities we were able to directly compare modeled volumes with alternate data sources for selected operations. Sampled operations included AFCS, Secondary Flats, 2nd Pass DPS, Incoming Priority (RDC) and Outgoing Priority (RDC). Data was reviewed for the facilities listed below:

Regional Distribution Centers:

Philadelphia, PA RDC
Des Moines, IA RDC
St Paul, MN RDC
Midland, TX RDC
North Houston, TX RDC
Anchorage, AK (Combined RDC and OF/DF)
San Francisco, CA RDC
Santa Clarita, CA (Combined RDC and OF/DF)
Seattle, WA RDC

Originating/Destinating Facilities:

Santa Barbara, CA, including Oxnard P&D, Zips 930, 931, 936
Santa Clarita, CA, including Mojave MPO, Zips 913, 914, 915, 916 and 935
Anchorage, AK, Zips 995, 996, 997
Eau Claire, WI, including La Crosse P&D, Zips 546, 547, 548
Bakersfield, CA, including Fresno P&D, Zips 932, 933, 936, 937, 938

6A-E: A more in-depth review at the aggregate level was conducted by the finance sub-group. The volume sources and data were validated as being what they were represented to be. They reported that National RPW and 3-year ODIS data was utilized, and origin volumes were flowed utilizing ODIS as a distribution key.

6F: Time constraints prevented the operations sub-group from validating whether or not DSAS truck appointments were used to allocate destination entry volumes. It was noted, however, that such an allocation process may be representative at the aggregate level but not at the granular level. Mailer products, containerization, truck sizes and loads may vary substantially by geographic area. However, several reviews of the implementation process (e.g., BMC Offload planning meetings) were conducted, and the operations sub-group believes such anomalies would be addressed within that process.

Assumption 6-continued

Regional Simulation Volumes: The calculated volumes in the simulation model were compared to actual volumes (from MODS or Web FAST EOR) in five product lines: AFCS, Secondary Flats Processing, 2nd Pass DPS, Incoming Priority and Outgoing Priority.

Optimization Volume Workload: The calculated workload for selected facilities in the optimization model was compared to actual volumes (from MODS or WebFAST EOR) in the same five product lines. In addition, aggregate National AFCS Optimization workload (125,926,238) was compared to National aggregate AFCS simulation volumes (ADV 108,537,468). The difference (ADV 17,388,770) constitutes a 13.8% discrepency. Though this variance is less than half the planned 30% contingency on an aggregate basis, this was not the case in 4 of the 5 facilities reviewed.

AFCS: Optimization workload and regional simulation average daily volume was provided by development team (See Attachment). In the 5 sites selected, Regional simulation volumes could not be validated as representative of actual volumes. In all 5 sites the regional simulation volumes were considerably lower than the actual mean M-F ADVs from WebFAST EOR (Attachment). In 2 of the sites, the 30% contingency marginally accounted for the higher actual ADV. However, if you compare a 10-day peak average volume period (excluding Holidays and December) the volumes in the regional simulation model fall well short of peak average daily volumes. If the data reviewed is representative, simulation model volumes may be understated. It should be noted that in 4 out of 5 of the reviewed sites a disparity exists between simulation model volume and optimization model volume. The operations sub-group believes these numbers should be reasonably similar. The use of annualized volume/302 days (including Saturdays) could account for a portion of the difference between modeled volumes and the operations sub-group actual calculations. Another factor influencing the disparity is that a 55% cancelled/uncancelled ratio was assumed based on previous ODIS sampling.

[redacted] Simulation ADV represented 93.6% of optimization workload. Optimization workload was slightly less than actual ADV from EOR. With the 30% contingency, optimization workload was adequate to cover actual mean ADV and 10-day peak ADV. Regional Simulation ADV was slightly less than actual mean ADV. 30% contingency was sufficient to cover the actual mean ADV and close to the 10-day peak ADV.

[redacted] Simulation ADV represented 82.2% of optimization workload. Optimization workload was slightly less than actual ADV from EOR. With the 30% contingency, optimization workload was adequate to cover actual mean ADV and 10-day peak ADV. Regional simulation ADV was less than actual mean ADV. 30% contingency was sufficient to cover the actual mean ADV, but not the 10-day peak ADV.

[redacted] Simulation ADV represented 67.4% of optimization workload. Optimization workload was slightly more than actual ADV from EOR. With the 30% contingency, optimization workload was adequate to cover actual mean ADV and 10-day peak ADV. Regional simulation ADV was just over half actual mean ADV. 30% contingency was not sufficient to cover either the actual mean ADV or 10-day peak ADV.

[redacted] Simulation ADV represented 62.8% of optimization workload. Optimization workload was less than actual ADV from EOR. With the 30% contingency, optimization workload was adequate to cover actual mean ADV and 10-day peak ADV. Regional simulation ADV was just over half actual mean ADV. 30% contingency was not sufficient to cover either the actual mean ADV or 10-day peak ADV.

[redacted] Simulation ADV represented 76.8% of optimization workload. Optimization workload was slightly less than actual ADV from EOR. With the 30% contingency, optimization workload was adequate to cover actual mean ADV and 10-day peak ADV. Regional simulation ADV was just over half the actual mean ADV. 30% contingency was not sufficient to cover the actual mean ADV, nor the 10-day peak ADV.

We recommend the development team consider reviewing the data provided in this report for each specific site to understand and account for the disparity between simulation and optimization volumes. Additionally site specific implementation planning and modeling should further validate the true facility requirements.

OF/DF Secondary Flats: Optimization workload and regional simulation average daily volume was provided by Networks Optimization (See Attachment). In the 5 sites selected, regional simulation volumes could not be validated as representative of actual volumes. In all 5 sites the regional simulation volumes were considerably higher than the actual ADVs gathered from MODS (See Attachment).

[redacted] Simulation ADV represented 76.0% of optimization workload. Optimization workload was nearly three times the actual ADV from EOR. Note that current manual flat secondary is included in actual ADV. With the 30% contingency, optimization workload was 2 ½ to 3 times the actual mean ADV and 10-day peak ADV. Regional Simulation ADV was more than twice the actual mean ADV. With the 30% contingency, there was substantial excess capacity over requirements needed to cover the actual mean ADV and the 10-day peak ADV.

[redacted] Simulation ADV represented 61.7% of optimization workload. Optimization workload was more nearly six times the actual ADV from EOR. Note that current manual flat secondary is included in actual ADV. With the 30% contingency, optimization workload was more than 7 times the actual mean ADV and about 3 times the 10-day peak ADV. Regional simulation ADV was about 4 times the actual mean ADV. With the 30% contingency, there was substantial excess capacity over requirements needed to cover the actual mean ADV and the 10-day peak ADV.

[redacted] Simulation ADV represented 134.1% of optimization workload. Optimization workload was more than twice the actual ADV from EOR. Note that current manual flat secondary is included in actual ADV. With the 30% contingency, optimization workload was more than 3 times the actual mean ADV and over twice the 10-day peak ADV. Regional simulation ADV was over 3 times the actual mean ADV. With the 30% contingency, there was substantial excess capacity over requirements needed to cover the actual mean ADV and the 10-day peak ADV.

[redacted] Simulation ADV represented 97.2% of optimization workload. Optimization workload was nearly three times the actual ADV from EOR. Note that current manual flat secondary is included in actual ADV. With the 30% contingency, optimization workload was more than 3 times the actual mean ADV and 10-day peak ADV. Regional simulation ADV was also 3 times the actual mean ADV. With the 30% contingency, there was substantial excess capacity over requirements needed to cover the actual mean ADV and the 10-day peak ADV.

[redacted] Simulation ADV represented 83.0% of optimization workload. Optimization workload was more than twice the actual ADV from EOR. Note that current manual flat secondary is included in actual ADV. With the 30% contingency, optimization workload was more than twice the actual mean ADV and 10-day peak ADV. Regional simulation ADV was nearly twice the actual mean ADV. With the 30% contingency, there was substantial excess capacity over requirements needed to cover the actual mean ADV and the 10-day peak ADV.

If the data reviewed is representative, simulation model volumes could be overstated. The development sub-group indicated that the volume they provided may have included all DF flat volumes. They will review the data provided in this report for the specific sites to understand and account for the disparity. Site specific implementation planning and modeling should further validate the true facility requirements. A flat optimization tool is presently being developed to assist in validation at the facility/site level.

2nd Pass DPS: Regional simulation average daily volume was provided by the development team (See Attachment). Optimization volume was not available for specific 2nd pass workloads. In the 5 sites selected, regional simulation volumes were compared to actual volumes from Web FAST EOR (See Attachment). Actual volumes were increased from current DPS% (extracted from DOIS) to 95%. For 2 of the sites, current CSBCS volumes were incorporated for comparison purposes.

[redacted] Note that column 4 (Turquoise) represents actual ADV plus CSBCS volume. The regional simulation volume was reasonably close to EOR ADV. With the 30% contingency, regional simulation volume was sufficient to cover the actual mean ADV and the 10-day peak ADV.

[redacted] The regional simulation volume generally mirrored EOR ADV. With the 30% contingency, regional simulation volume was sufficient to cover the actual mean ADV and the 10-day peak ADV.

[redacted] The regional simulation volume generally mirrored EOR ADV. With the 30% contingency, regional simulation volume was sufficient to cover the actual

[redacted] The regional simulation volume was slightly lower than mean ADV and 10-peak day ADV. With the 30% contingency, regional simulation volume was sufficient to cover the actual mean ADV and the 10-day peak ADV.

[redacted] Note that column 4 (Turquoise) represents actual ADV plus CSBCS volume. The regional simulation volume was reasonably close to EOR ADV. With the 30% contingency, regional simulation volume was sufficient to cover the actual mean ADV and the 10-day peak ADV.

Generally, the regional simulation volumes effectively mirrored M-F Adds calculated from EOR data. The 30% contingency was also sufficient to cover 10-peak day average volumes. If the actual data reviewed is representative, the simulation model reasonably depicts anticipated 2nd pass DPS processing volumes.

Incoming (Destinating) Priority: Optimization workload and regional simulation average daily volume was provided by the development team (See Attachment). In the 9 selected RDCs, regional simulation volumes were compared to actual volumes from MODS (26 operation #s – See Attachment). Note that the RDC turnaround volumes were not extracted for the purposes of this analysis, since accurate data does not exist. However, for gross comparison purposes, the operations sub-group agreed that <10% of total volume would, on average, originate and destinate within an RDC area (See Attachment). After adjusting the actual ADV downward by 10%, volume modeled in 7 RDCs appeared to be substantially less than the volume extracted from MODS, while in two, volume was slightly higher. In one of these two RDCs [redacted] the actual ADV was artificially low due to the impact of destinating Priority (Air) packages being worked by the BMC. This volume is commingled with Parcel Post volumes. Since the data reviewed is influenced by several factors mentioned above, we could not validate whether or not the modeled volumes are representative of actual volumes.

Outgoing (Originating) Priority: Optimization workload and regional simulation average daily volume was provided by the development team (See Attachment). In the 9 selected RDCs, regional simulation volumes were compared to actual volumes from MODS (26 operation #s – See Attachment). Note that the RDC turnaround volumes were not extracted for the purposes of this analysis, since accurate data does not exist. However, for gross comparison purposes, the operations sub-group agreed that <10% of total volume would normally originate and destinate within an RDC area (See Attachment). After adjusting the actual ADV downward by 10%, volume modeled in 7 RDCs appeared to be substantially less than the volume extracted from MODS, while in two, volume was slightly higher. Since the data reviewed is influenced by several factors mentioned above, we could not validate whether or not the modeled volumes are representative of actual volumes.

Total APPS Volumes: The regional simulation volume was compared to optimization workload in sampled RDCs. The variances between the two ranged from a low of 11.1% in [redacted] to 45.5% in [redacted] In several cases, the optimization workload was higher than the regional simulation volume, but in [redacted] the reverse was indicated.

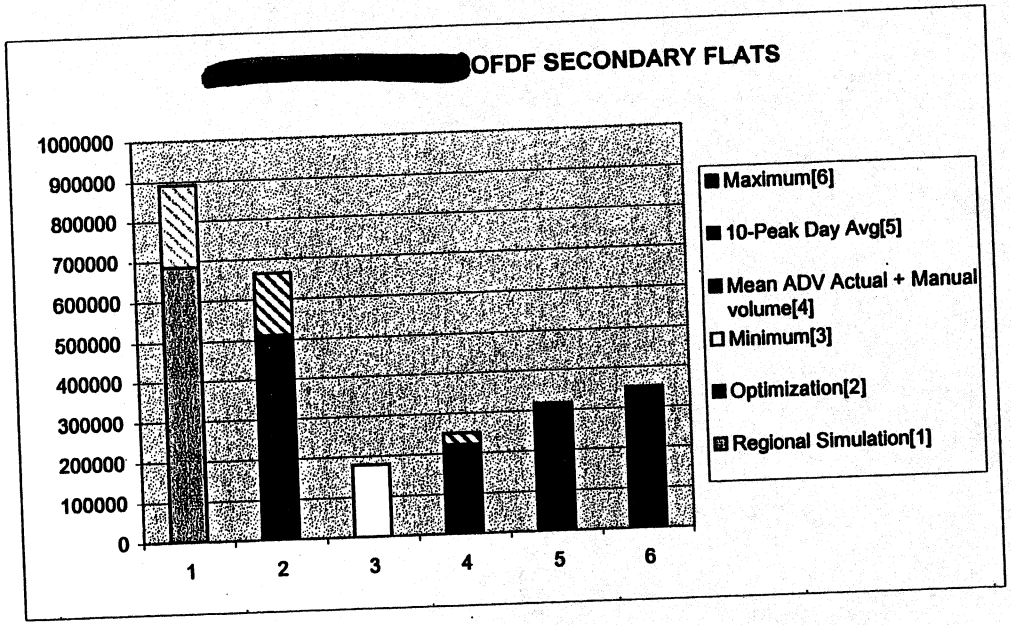
Assumption 6-continued

General Observations: The optimization model is the primary vehicle by which facility and equipment requirements are determined in the "optimized" environment of the future. In the majority of facilities and products examined, it appears to utilize volumes that reasonably mimic actual processed volumes in today's environment. The operations sub-group could not validate volumes in the regional simulation model(s). We highly recommend that the development team continue to evaluate and modify regional simulation results at the tactical level with local management during the implementation process. A more thorough discussion of equipment sets is contained in Input #7.

Operations Sub-Group
Independent Validation and Verification
Volume Verification Files
Ken Billings
Assumption 6 A-F

	Secondary Flats	Vol. +30%	Manual Vol.
Regional Simulation	684628	205389	
Optimization Model	510582	153174	
Minimum	179000		
Mean ADV Actual	222000		29000
10-Peak Day Avg	317000		
Maximum	351000		

890,017 Regional simulation @130%
684,628 Regional simulation

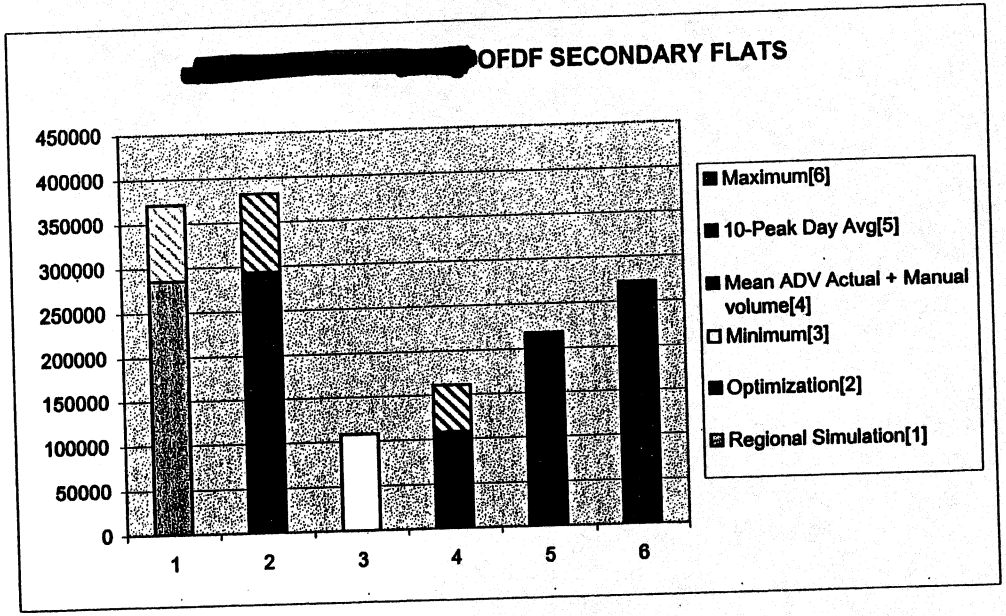


Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average, Minimum, Maximum,10-Peak Day avgerage includes: M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted]
Note 5: Volume worked at Delivery units is not included
Note 6: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] by facility and by following operation numbers:146,175,179,336,426,446,466,966,337,427,447,467,967

146 - MPFSM incoming secondary
175 - Manual Flat incoming secondary
179 - Manual Flat incoming secondary
336 - AFSM100 box section
426 - FSMOCR incoming secondary
446 - FSM100 incoming secondary
466 - FSM100 incoming secondary
966 - FMBCR incoming secondary
337 - AFSM100 incoming nonscheme
427 - FSMOCR box section
447 - FSM1000 box section
467 - FSM100 BCR boxed mail
967 - FMBCR box section

	Secondary Flats	Vol. +30%	Manual Vol.
Regional Simulation	285397	85619	
Optimization Model	293569	88071	
Minimum	108000		
Mean ADV Actual	108000		53000
10-Peak Day Avg	218000		
Maximum	272000		

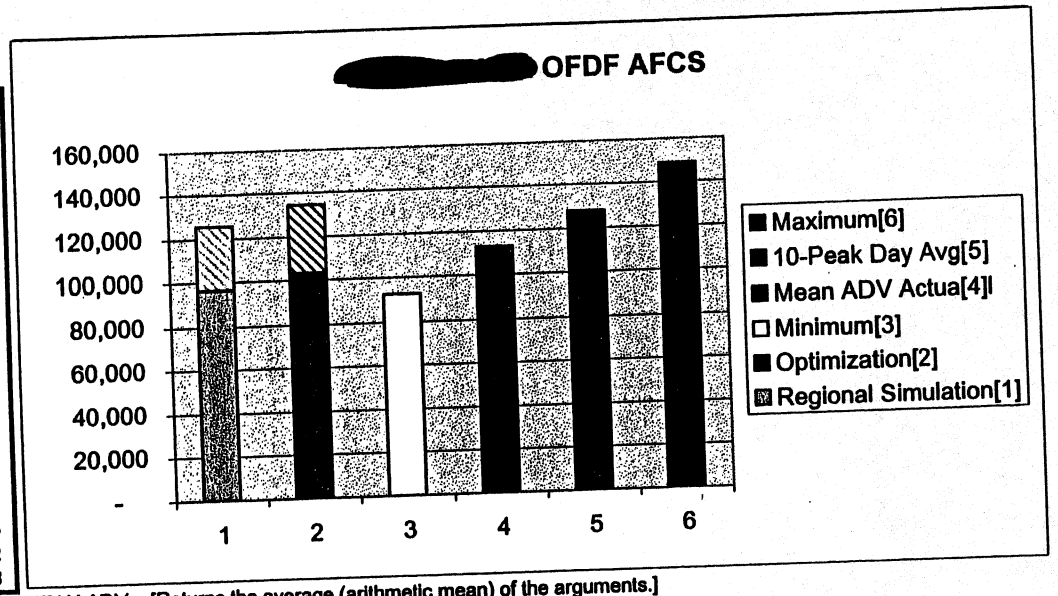
371,016 Regional simulation @130%
285,397 Regional simulation



Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average, Minimum, Maximum,10-Peak Day avgerage includes: M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted]
Note 5: Volume worked at Delivery units is not included
Note 6: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] by facility and by following operation numbers:146,175,179,336,426,446,466,966,337,427,447,467,967

146 - MPFSM incoming secondary
175 - Manual Flat incoming secondary
179 - Manual Flat incoming secondary
336 - AFSM100 box section
426 - FSMOCR incoming secondary
446 - FSM100 incoming secondary
466 - FSM100 incoming secondary
966 - FMBCR incoming secondary
337 - AFSM100 incoming nonscheme
427 - FSMOCR box section
447 - FSM1000 box section
467 - FSM100 BCR boxed mail
967 - FMBCR box section

*DAY OF AP	[redacted]	TOTAL
3 MON	136,926	136,926
4TUE	99,619	99,619
5WED	95,619	95,619
6THUR	97,351	97,351
7FRI	97,443	97,443
10MON	148,775	148,775
11TUE	128,748	128,748
12WED	103,103	103,103
13THUR	93,838	93,838
14FRI	97,409	97,409
17MON	139,967	139,967
18TUE	103,555	103,555
19WED	99,567	99,567
20THUR	92,668	92,668
21FRI	112,705	112,705
24MON	124,584	124,584
25TUE	126,091	126,091
26WED	123,635	123,635
27THUR	134,152	134,152
28FRI	101,928	101,928



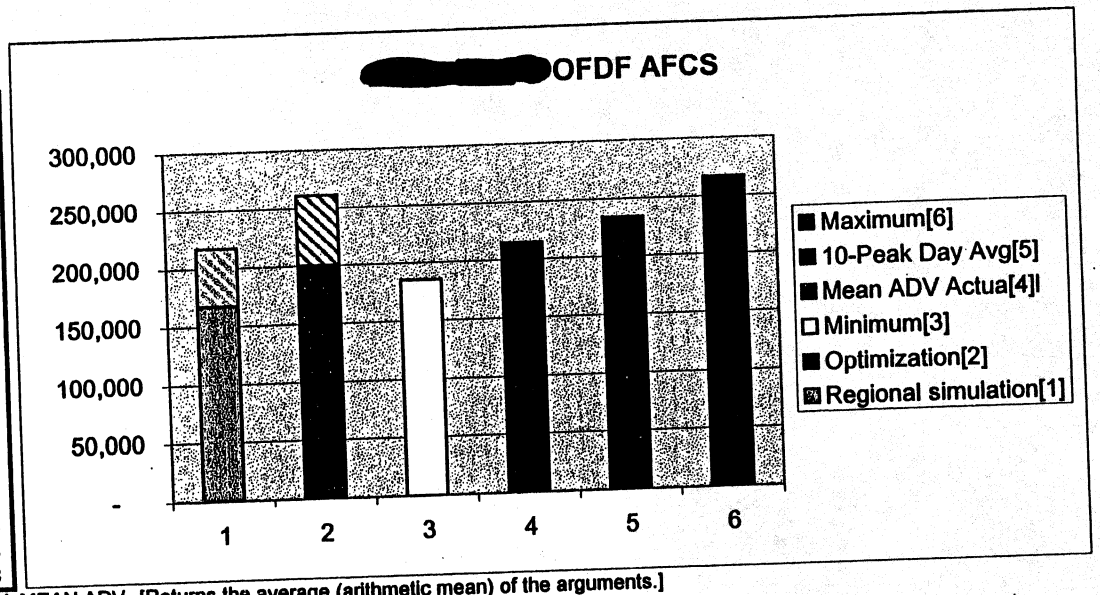
112,884 MEAN ADV [Returns the average (arithmetic mean) of the arguments.]

MEDIAN	103,329
MINIMUM	92,668
MAXIMUM	148,775
10-PEAK DAY AVG	127,914

103,260	Optimization model
134,238	Optimization model @130%
96,601	Regional simulation
125,581	Regional simulation @130%

Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Optimization Workload: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 5: Values of actual ADV from data provided by [redacted] FAST
Note 6: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted]) BY MACHINE TYPE
* These days represent the average volume for each specific day of all 12 APs. For example:
The first Monday is the average of <u>all</u> first mondays (excluding holidays) for all APs.

*DAY OF AP	[redacted]	[redacted]	TOTAL
3 MON	98,524	159,468	257,991
4TUE	76,426	124,957	201,383
5WED	69,614	115,443	185,057
6THUR	73,389	120,631	194,021
7FRI	72,904	124,852	197,755
10MON	96,785	149,117	245,902
11TUE	83,367	146,707	230,074
12WED	71,972	121,487	193,459
13THUR	73,276	120,945	194,221
14FRI	72,447	126,174	198,621
17MON	99,344	163,312	262,656
18TUE	77,465	131,946	209,411
19WED	75,350	121,315	196,665
20THUR	70,019	117,255	187,274
21FRI	75,165	132,765	207,930
24MON	93,665	173,141	266,806
25TUE	88,553	157,558	246,112
26WED	73,795	129,739	203,534
27THUR	71,919	128,964	200,883
28FRI	76,288	132,170	208,458
			214,411



MEAN ADV [Returns the average (arithmetic mean) of the arguments.]

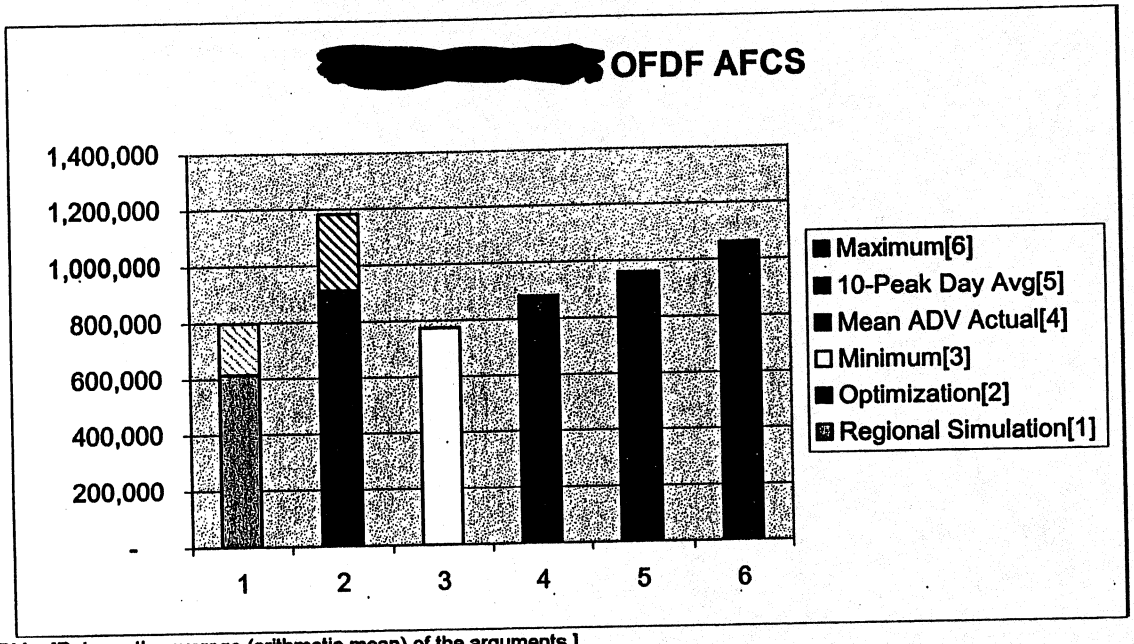
MEDIAN	202,458
MINIMUM	185,057
MAXIMUM	266,806
10-PEAK DAY AVG	233,887

200461 Optimization model
260599 Optimization model @130%
166837 Regional simulation
216888 Regional simulation @130%

Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Optimization Workload: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 5: Values of actual ADV from data provided by [redacted] FAST
Note 6: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] BY MACHINE TYPE
* These days represent the average volume for each specific day of all 12 APs. For example:
The first Monday is the average of all first mondays (excluding holidays) for all APs.

*DAY OF AP	[redacted]	[redacted]	TOTAL
3 MON	907,791	130,838	1,038,629
4TUE	754,459	110,818	865,277
5WED	693,370	99,259	792,629
6THUR	699,690	104,302	803,992
7FRI	723,060	108,733	831,793
10MON	913,402	145,419	1,058,821
11TUE	856,809	134,701	991,510
12WED	737,911	112,002	849,913
13THUR	695,508	101,731	797,239
14FRI	706,166	104,284	810,450
17MON	918,771	143,265	1,062,036
18TUE	735,546	113,774	849,321
19WED	699,114	103,430	802,544
20THUR	684,052	98,580	782,632
21FRI	732,816	99,211	832,027
24MON	875,101	144,164	1,019,265
25TUE	866,216	138,365	1,004,581
26WED	669,107	105,963	775,070
27THUR	690,705	100,892	791,597
28FRI	720,134	144,160	864,293

881,181 MEAN ADV [Returns the average (arithmetic mean) of the arguments.]



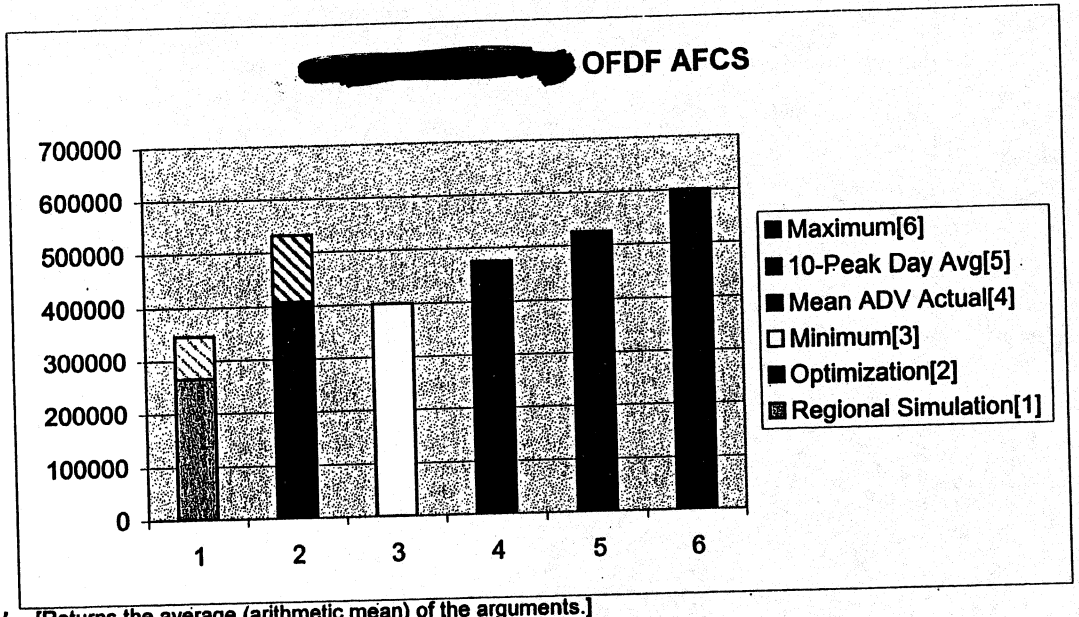
MEDIAN	840,674
MINIMUM	775,070
MAXIMUM	1,062,036
10-PEAK DAY AVG	960,365

910550 Optimization model
1183715 Optimization model @130%
613282 Regional simulation
797266 Regional simulation @130%

Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Optimization Workload: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 5: Values of actual ADV from data provided by [redacted] FAST
Note 6: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] BY MACHINE TYPE
* These days represent the average volume for each specific day of all 12 APs. For example:
The first Monday is the average of <u>all</u> first mondays (excluding holidays) for all APs.

*DAY OF AP	[redacted]	[redacted]	TOTAL
3 MON	247,561	339,559	587,120
4TUE		255,175	**
5WED	172,276	230,629	402,905
6THUR	175,074	247,319	422,393
7FRI	186,166	260,292	446,458
10MON	256,074	336,674	592,748
11TUE	224,782	315,022	539,804
12WED	182,109	248,557	430,665
13THUR	171,171	238,324	409,495
14FRI	183,979	248,598	432,577
17MON	249,762	325,257	575,018
18TUE	197,356	281,036	478,392
19WED	153,676	246,821	400,496
20THUR	169,640	242,567	412,207
21FRI	182,087	247,967	430,054
24MON		313,030	**
25TUE	240,995	315,292	556,287
26WED	184,926	253,429	438,356
27THUR	171,748	234,990	406,738
28FRI	251,414	349,287	600,701

475,690 MEAN ADV [Returns the average (arithmetic mean) of the arguments.]



MEDIAN	435,466
MINIMUM	400,496
MAXIMUM	600,701
10-PEAK DAY AVG	524,746

408417 Optimization model
530942 Optimization model @130%
265616 Regional simulation
345301 Regional simulation @130%

** Day 4 & 24 excluded due to no data

Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)

Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)

Note 3: Optimization Workload: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies

Note 4: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies

Note 5: Values of actual ADV from data provided by [redacted] FAST

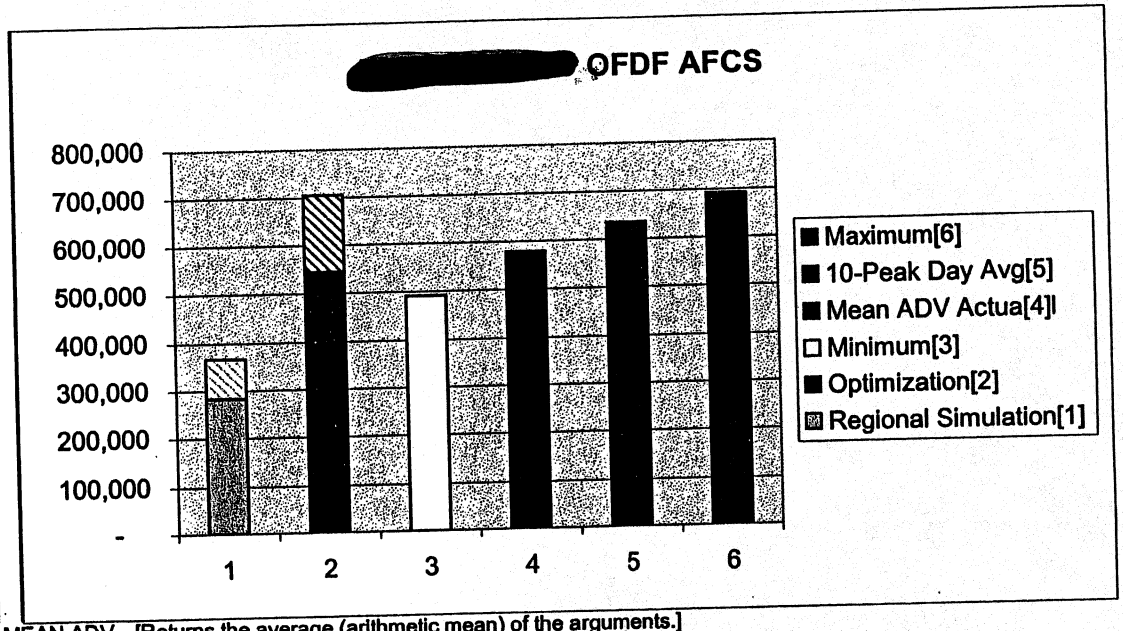
Note 6: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.

Data Source: [redacted] BY MACHINE TYPE

* These days represent the average volume for each specific day of all 12 APs. For example:
The first Monday is the average of all first mondays (excluding holidays) for all APs.

*DAY OF AP	[redacted]	[redacted]	TOTAL
3 MON	331,653	331,711	663,364
4TUE	275,090	264,973	540,063
5WED	255,912	241,732	497,644
6THUR	267,108	251,251	518,358
7FRI	285,856	275,226	561,081
10MON	307,910	356,507	664,417
11TUE	331,118	329,369	660,487
12WED	274,592	266,895	541,487
13THUR	261,530	255,382	516,911
14FRI	276,175	263,110	539,285
17MON	340,560	351,531	692,091
18TUE	288,716	279,757	568,473
19WED	271,098	265,285	536,383
20THUR	257,970	233,117	491,087
21FRI	275,646	269,842	545,488
24MON	328,616	350,702	679,317
25TUE	333,246	328,812	662,057
26WED	275,451	271,667	547,118
27THUR	261,406	240,554	501,960
28FRI	384,449	259,211	643,660

578,537 MEAN ADV [Returns the average (arithmetic mean) of the arguments.]



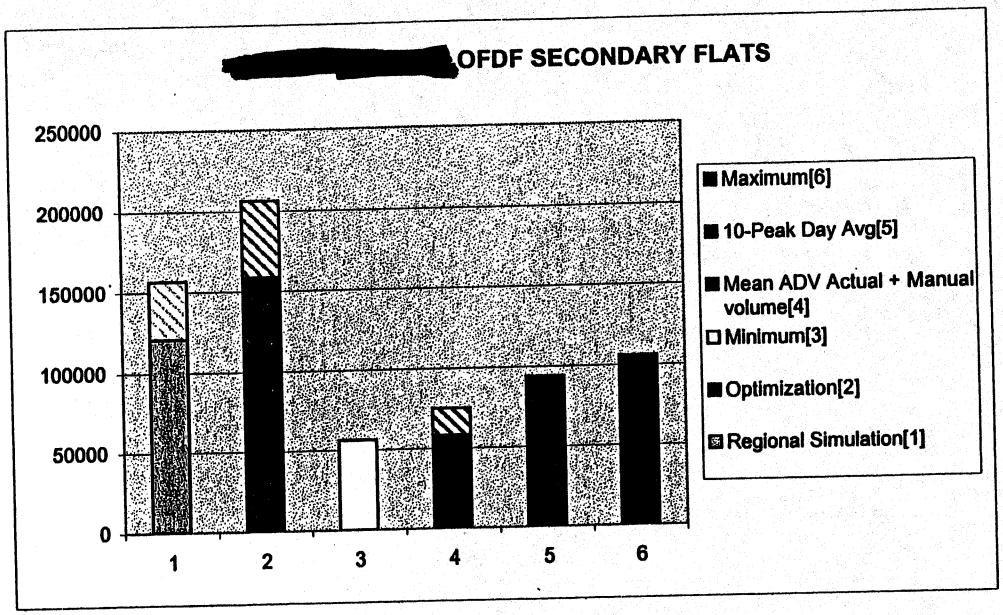
MEDIAN	546,303
MINIMUM	491,087
MAXIMUM	692,091
10-PEAK DAY AVG	634,206

543410 Optimization model
706433 Optimization model @130%
281870 Regional simulation
366431 Regional simulation @130%

Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Optimization Workload: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 5: Values of actual ADV from data provided by [redacted] FAST
Note 6: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted]) BY MACHINE TYPE
* These days represent the average volume for each specific day of all 12 APs. For example:
The first Monday is the average of <u>all</u> first mondays (excluding holidays) for all APs.

	Secondary Flats	Vol. +30%	Manual Vol.
Regional Simulation	120738	36221	
Optimization Model	158792	47637	
Minimum	56000		
Mean ADV Actual	58000		17000
10-Peak Day Avg	94000		
Maximum	106000		

159,959 Regional simulation @130%
120,738 Regional simulation

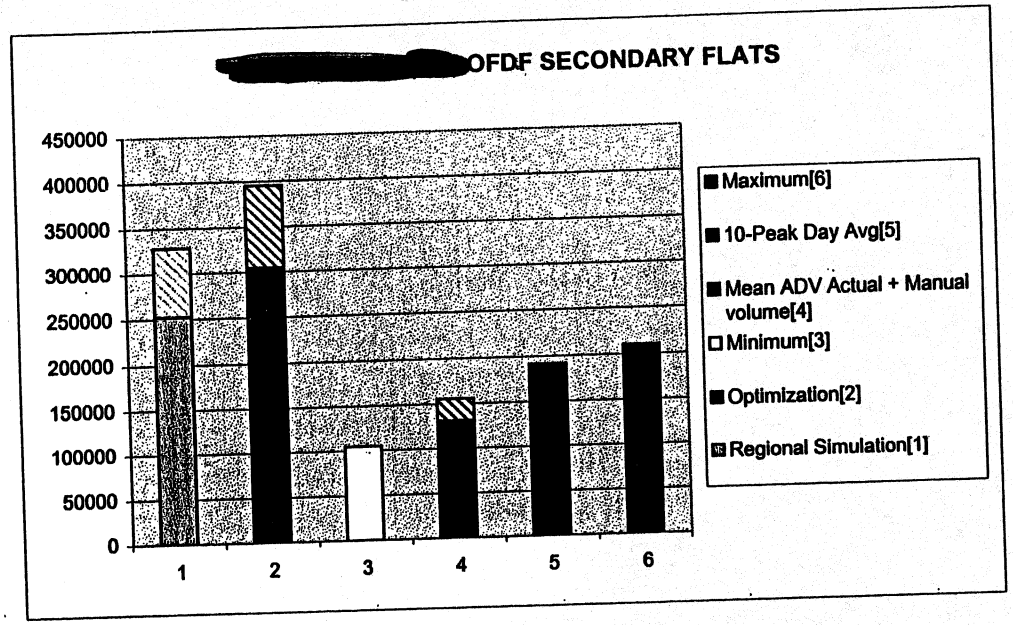


Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average, Minimum, Maximum,10-Peak Day avgerage includes: M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted]
Note 5: Volume worked at Delivery units is not included
Note 6: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] by facility and by following operation numbers:146,175,179,336,426,446,466,966,337,427,447,467,967

146 - MPFSM incoming secondary
175 - Manual Flat incoming secondary
179 - Manual Flat incoming secondary
336 - AFSM100 box section
426 - FSMOCR incoming secondary
446 - FSM100 incoming secondary
466 - FSM100 incoming secondary
966 - FMBCR incoming secondary
337 - AFSM100 incoming nonscheme
427 - FSMOCR box section
447 - FSM1000 box section
467 - FSM100 BCR boxed mail
967 - FMBCR box section

	Secondary Flats	Vol. +30%	Manual Vol.
Regional Simulation	252289	75687	
Optimization Model	304032	91209	
Minimum	105000		
Mean ADV Actual	131000		25000
10-Peak Day Avg	191000		
Maximum	210000		

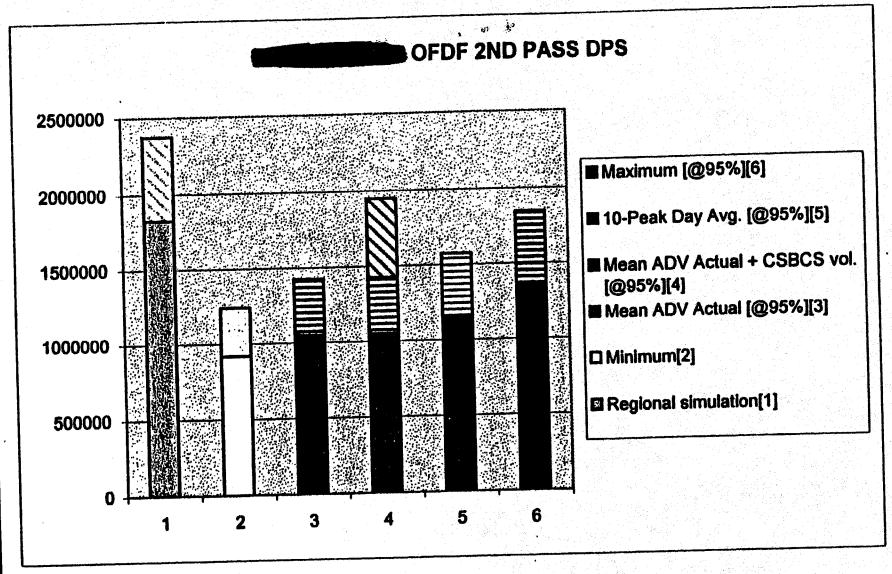
327,976 Regional simulation @130%
252,289 Regional simulation



Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average, Minimum, Maximum,10-Peak Day avgerage includes: M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted]
Note 5: Volume worked at Delivery units is not included
Note 6: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] by facility for the following operation numbers:146,175,179,336,426,446,466,966,337,427,447,467,967

146 - MPFSM incoming secondary
175 - Manual Flat incoming secondary
179 - Manual Flat incoming secondary
336 - AFSM100 box section
426 - FSMOCR incoming secondary
446 - FSM100 incoming secondary
466 - FSM100 incoming secondary
966 - FMBCR incoming secondary
337 - AFSM100 incoming nonscheme
427 - FSMOCR box section
447 - FSM1000 box section
467 - FSM100 BCR boxed mail
967 - FMBCR box section

*DAY OF AP	[redacted]	[redacted]	TOTAL	Total @95%
2SUN	581,668	778,046	1,359,714	1,845,326
3MON	413,544	509,738	923,282	1,253,026
4TUE	419,951	494,103	914,054	1,240,501
5WED	446,789	518,451	965,239	1,309,968
6THUR	446,909	549,195	996,105	1,351,856
7FRI	481,470	574,869	1,056,339	1,433,602
9SUN	584,152	594,950	1,179,102	1,600,210
10MON	467,165	555,724	1,022,889	1,388,207
11TUE	439,653	512,040	951,693	1,291,583
12WED	454,945	533,043	987,988	1,340,841
13THUR	473,060	574,452	1,047,512	1,421,624
14FRI	449,848	570,338	1,020,186	1,384,539
16SUN	602,893	741,734	1,344,627	1,824,851
17MON	415,857	538,884	954,742	1,295,721
18TUE	425,091	498,638	923,728	1,253,631
19WED	450,979	522,048	973,027	1,320,537
20THUR	485,306	559,154	1,044,460	1,417,482
21FRI	484,035	586,738	1,070,774	1,453,193
23SUN	594,599	556,902	1,151,501	1,562,751
24MON	473,846	564,269	1,038,114	1,408,869
25TUE	409,129	516,752	925,881	1,256,553
26WED	443,967	546,861	990,828	1,344,695
27THUR	472,819	570,747	1,043,565	1,416,267
28FRI	704,222	584,408	1,288,630	1,748,855
		MEAN ADV	1,048,916	1,423,529



MEAN ADV @ 95%RATE [Returns the average (arithmetic mean) of the arguments.]

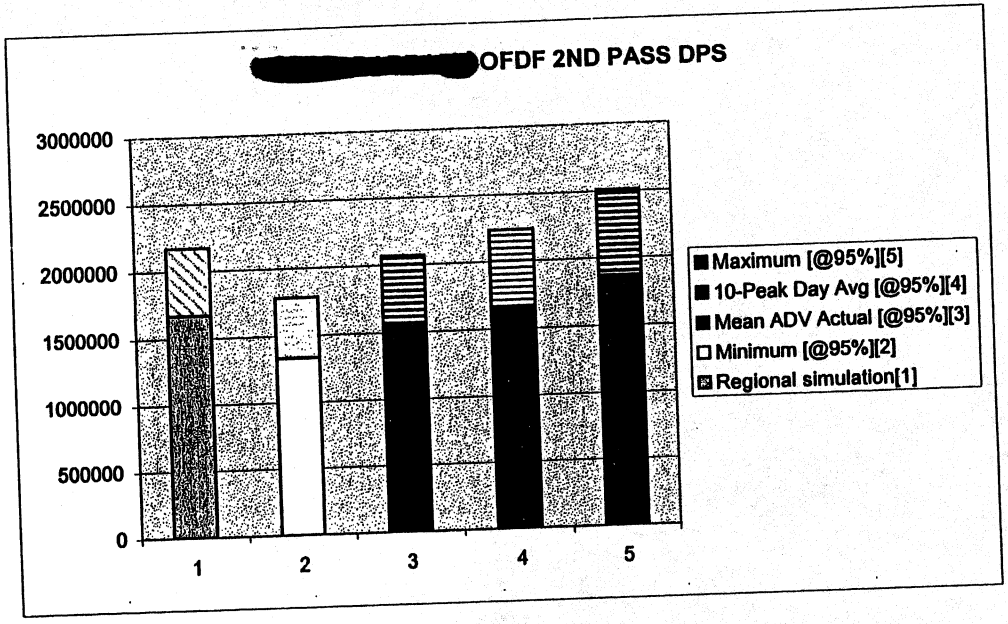
MEDIAN	1,021,538	MEDIAN @95%	1,386,373
MINIMUM	914,054	MINIMUM @95%	1,240,501
MAXIMUM	1,359,714	MAXIMUM @95%	1,845,326
10-PEAK DAY AVG	1,158,622	10-PEAK DAY AVG @95%	1,572,416

524225 CSBCS volume
1825035 Regional simulation
2372546 Regional simulation @130%

1573141 Mean ADV Actual + CSBCS VOL.
1947754 Mean ADV Actual + CSBCS VOL. @95%

Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted] FAST
Note 5: DPS volume was increased to 95% based on average DPS% volume from respective facilities [see DPS % (DOIS)]
Note 6: Optimization model is not included due to our inability to separate out DPS 2nd pass from other destinating facilities roles (ie: Incoming Secondary (INS), DPS 1st pass)
Note 7: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] by facility for the following operation number: 919 + CSBCS volume
* These days represent the average volume for each specific day of all 12 APs. For example: The first Monday is the average of all first mondays (excluding holidays) for all APs.

*DAY OF AP	[redacted]	[redacted]	TOTAL	Total @95%
2SUN	835,202	889344.0833	1,724,546	2,311,397
3MON	606,562	724516.5	1,331,078	1,784,035
4TUE	634,239	853690.4167	1,487,929	1,994,262
5WED	660,863	784381.2727	1,445,244	1,937,052
6THUR	669,877	776915.3333	1,446,792	1,939,126
7FRI	704,880	836964.3333	1,541,845	2,066,524
9SUN	865,008	905859.2222	1,770,867	2,373,481
10MON	688,393	811960.5455	1,500,353	2,010,914
11TUE	729,158	801202.9167	1,530,361	2,051,132
12WED	673,673	792925.8182	1,466,598	1,965,672
13THUR	684,275	843174.4167	1,527,449	2,047,230
14FRI	702,135	839309.1667	1,541,444	2,065,987
16SUN	887,588	984481.3333	1,872,069	2,509,122
17MON	621,016	755324.5455	1,376,341	1,844,700
18TUE	656,358	815558.4167	1,471,917	1,972,800
19WED	682,093	772032.3636	1,454,125	1,948,955
20THUR	664,443	769136.5455	1,433,580	1,921,418
21FRI	713,587	874270.5833	1,587,858	2,128,195
23SUN	855,454	951236.1111	1,806,690	2,421,495
24MON	646,728	861124.3	1,507,852	2,020,964
25TUE	666,469	852632.5833	1,519,102	2,036,042
26WED	699,750	715290.75	1,415,040	1,896,569
27THUR	701,833	844827.5833	1,546,661	2,072,980
28FRI	961,432	800105.8182	1,761,538	2,360,977
		MEAN ADV	1,544,470	2,070,043



MEAN ADV [Returns the average (arithmetic mean) of the arguments.]

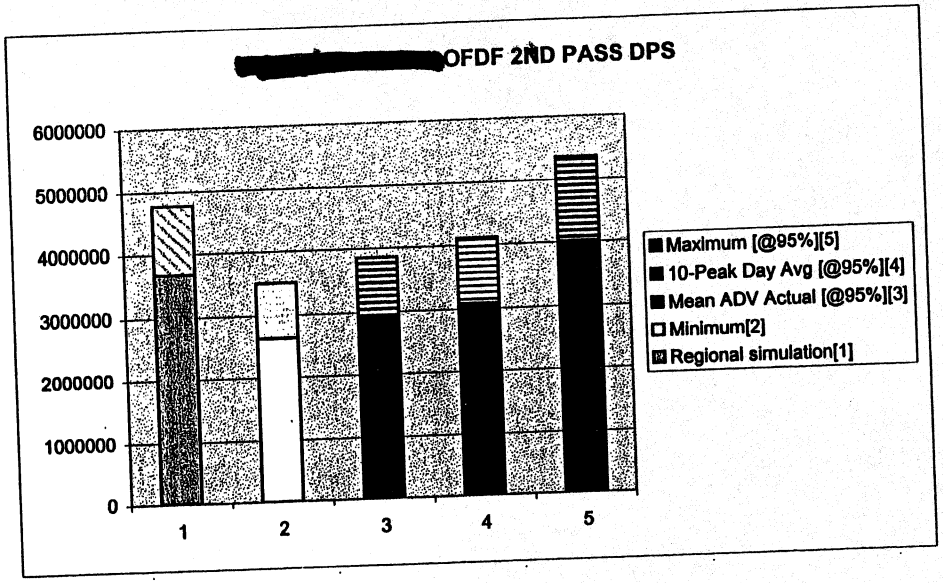
MEDIAN	1,513,477	MEDIAN @95%	2,028,503
MINIMUM	1,331,078	MINIMUM @95%	1,784,035
MAXIMUM	1,872,069	MAXIMUM @95%	2,509,122
10-PEAK DAY AVG	1,668,388	10-PEAK DAY AVG @95%	2,236,129

1670884 Regional simulation
2172149 Regional simulation @130%

1544470 Mean ADV Actual .
2070043 Mean ADV Actual @95%

Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted] FAST
Note 5: DPS volume was increased to 95% based on average DPS% volume from respective facilities [see DPS % (DOIS)]
Note 6: Optimization model is not included due to our inability to separate out DPS 2nd pass from other destinating facilities roles (ie: Incoming Secondary (INS), DPS 1st pass)
Note 7: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] by facility for the following operation number: 919
* These days represent the average volume for each specific day of all 12 APs. For example: The first Monday is the average of all first mondays (excluding holidays) for all APs.

*DAY OF AP	[redacted]	[redacted]	TOTAL	TOTAL @95%
2SUN	2,622,048	369,255	2,991,303	3,988,405
3MON	2,428,385	278,642	2,707,027	3,609,369
4TUE	2,592,410	320,827	2,913,237	3,884,315
5WED	2,418,585	292,350	2,710,936	3,614,581
6THUR	2,431,269	303,750	2,735,019	3,646,692
7FRI	2,487,743	302,274	2,790,017	3,720,022
9SUN	2,591,832	348,059	2,939,891	3,919,855
10MON	2,545,383	317,967	2,863,350	3,817,800
11TUE	2,754,746	327,428	3,082,174	4,109,566
12WED	2,433,046	323,992	2,757,038	3,676,050
13THUR	2,470,959	314,051	2,785,010	3,713,346
14FRI	2,495,886	308,526	2,804,412	3,739,216
16SUN	2,673,614	388,725	3,062,339	4,083,119
17MON	2,392,162	284,202	2,676,364	3,568,485
18TUE	2,606,904	330,371	2,937,274	3,916,366
19WED	2,375,285	297,157	2,672,442	3,563,255
20THUR	2,439,652	291,458	2,731,110	3,641,481
21FRI	2,582,502	315,927	2,898,429	3,864,572
23SUN	2,565,949	379,337	2,945,286	3,927,048
24MON	2,656,910	317,555	2,974,465	3,965,953
25TUE	2,659,655	347,836	3,007,491	4,009,988
26WED	2,320,686	306,654	2,627,340	3,503,119
27THUR	2,448,217	330,134	2,778,351	3,704,468
28FRI	3,593,084	419,413	4,012,497	5,349,995
		MEAN ADV	2,891,783	3,855,711



MEAN ADV ([Returns the average (arithmetic mean) of the arguments.]

MEDIAN	2,833,881	MEDIAN @95%	3,778,508
MINIMUM	2,627,340	MINIMUM @95%	3,503,119
MAXIMUM	4,012,497	MAXIMUM @95%	5,349,995
10-PEAK DAY AVG	3,086,596	10-PEAK DAY AVG @95%	4,115,461

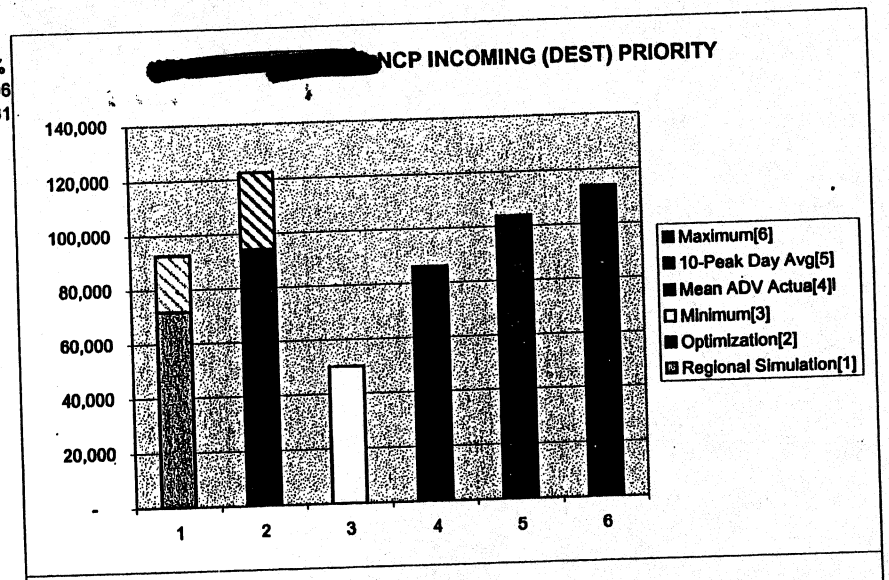
3674995 Regional simulation
4777494 Regional simulation @130%

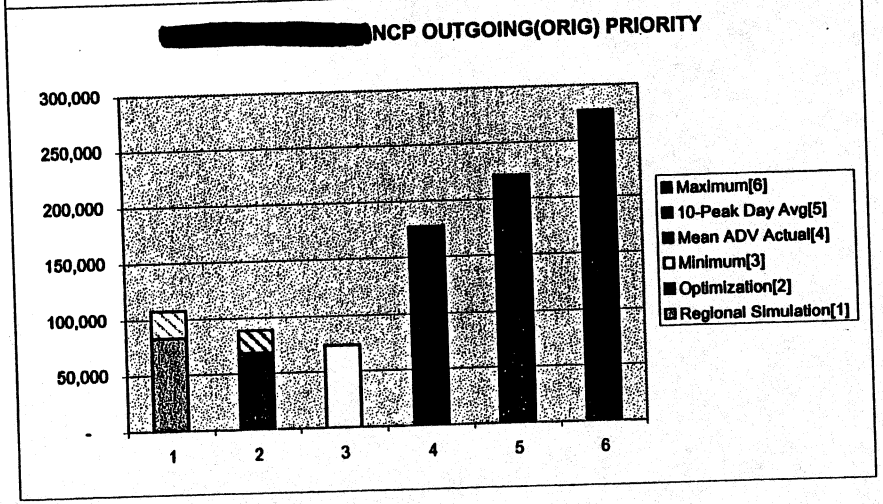
2891783 Mean ADV Actual .
3855711 Mean ADV Actual @95%

Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted] FAST
Note 5: DPS volume was increased to 95% based on average DPS% volume from respective facilities [see DPS % (DOIS)]
Note 6: Optimization model is not included due to our inability to separate out DPS 2nd pass from other destinating facilities roles (ie: Incoming Secondary (INS), DPS 1st pass)
Note 7: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] by facility for the following operation number: 919
* These days represent the average volume for each specific day of all 12 APs. For example: The first Monday is the average of all first mondays (excluding holidays) for all APs.

	Incoming Priority	Volume @30%	Outgoing Priority	Volume @30%
Regional Simulation	71,770	20751	82,687	24806
Optimization	94,153	28246	67,937	20381
Minimum	50,000		73,000	
Mean ADV Actual	86,000		177,000	
10-Peak Day Avg	104,000		221,000	
Maximum	114,000		277,000	

OPERATION NUMBER	OPERATION NAME
50	Priority-Manual Outgoing
51	Outgoing priority flats-priority
52	Outgoing secondary flats-priority
320	Outgoing primary parcels-priority
321	Outgoing primary parcels-priority
322	Outgoing secondary parcels-priority
138	SPBS-priority,outgoing
438	SPBS/BCR-priority outgoing
158	APPS priority-outgoing
258	Linear integrated parcel sorter-priority outgoing
450	FSM1000-priority,outgoing
818	UFSM 1000 OCR/priority-outgoing
328	Priority mail shape separation-originating
55	Priority-Manual incoming
53	Incoming primary flats-priority
54	Incoming secondary flats-priority
325	Incoming primary parcels-outsides
324	Incoming primary parcels-priority
326	Incoming secondary-priority
139	SPBS-priority,outgoing
159	APPS priority-incoming
439	SPBS/BCR-priority incoming
451	FSM1000-priority incoming
819	UFSM 1000 OCR/priority-incoming
259	Linear integrated parcel sorter-priority incoming
329	Priority mail shape separation-destinating





Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted]a(Priority turn-around volume appears to average 5% to 10% of Total volume, though no thorough analysis could be conducted)
Note 5: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] (050,051,052,320,321,322,138,438,158,258,450,818,328,055,053,054,325,324,326,139,159,439,451,819,259,329)

	Incoming Priority	Volume @30%	Outgoing Priority	Volume @30%
Regional Simulation	26,788	8037	42,845	12853
Optimization	28,068	8420	52,638	15792
Minimum	8,000		36,000	
Mean ADV Actual	23,000		49,000	
10-Peak Day Avg	40,000		67,000	
Maximum	50,000		120,000	

OPERATION NUMBER	OPERATION NAME
50	Priority-Manual Outgoing
51	Outgoing priority flats-priority
52	Outgoing secondary flats-priority
320	Outgoing primary parcels-priority
321	Outgoing primary parcels-priority
322	Outgoing secondary parcels-priority
138	SPBS-priority,outgoing
438	SPBS/BCR-priority outgoing
158	APPS priority-outgoing
258	Linear integrated parcel sorter-priority outgoing
450	FSM1000-priority,outgoing
818	UFSM 1000 OCR/priority-outgoing
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54	Incoming secondary flats-priority
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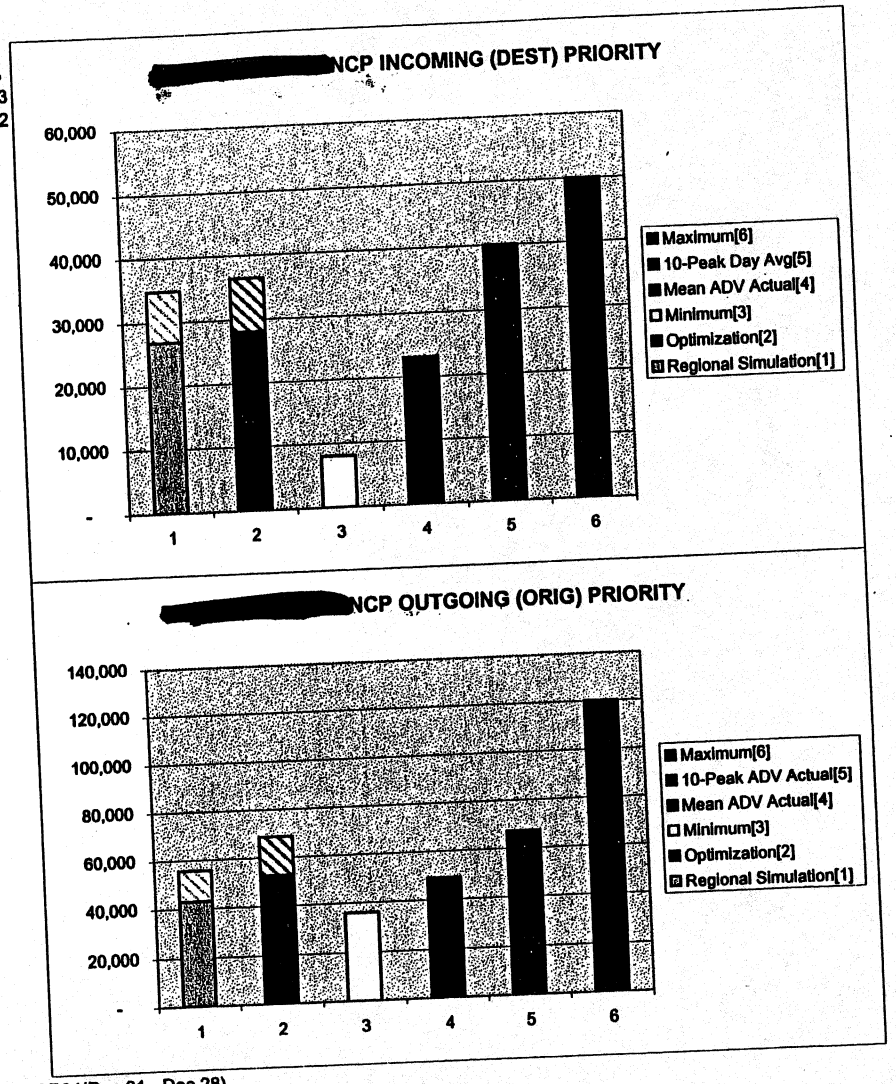
159	APPS priority-incoming
439	SPBS/BCR-priority incoming
451	FSM1000-priority incoming
819	UFSM 1000 OCR/priority-incoming
259	Linear integrated parcel sorter-priority incoming
329	Priority mail shape separation-destinating



Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
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Note 5: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted](050,051,052,320,321,322,138,438,158,258,450,818,328,055,053,054,325,324,326,139,159,439,451,819,259,329)

	Incoming Priority	Volume @30%	Outgoing Priority	Volume @30%
Regional Simulation	57,851	17355	54,225	16268
Optimization	114,952	34486	133,365	40010
Minimum	52,000		49,000	
Mean ADV Actual	81,000		95,000	
10-Peak Day Avg	103,000		116,000	
Maximum	125,000		126,000	

OPERATION NUMBER	OPERATION NAME
50	Priority-Manual Outgoing
51	Outgoing priority flats-priority
52	Outgoing secondary flats-priority
320	Outgoing primary parcels-priority
321	Outgoing primary parcels-priority
322	Outgoing secondary parcels-priority
138	SPBS-priority,outgoing
438	SPBS/BCR-priority outgoing
158	APPS priority-outgoing
258	Linear integrated parcel sorter-priority outgoing
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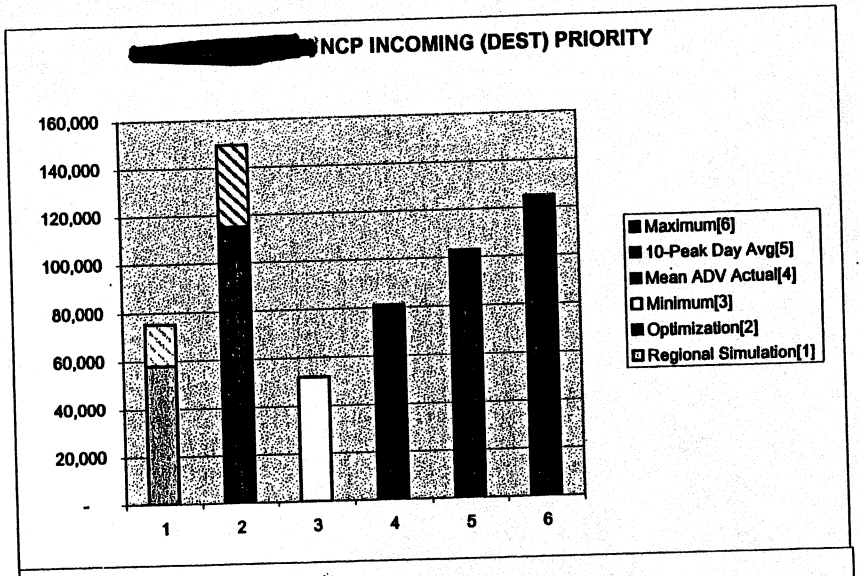
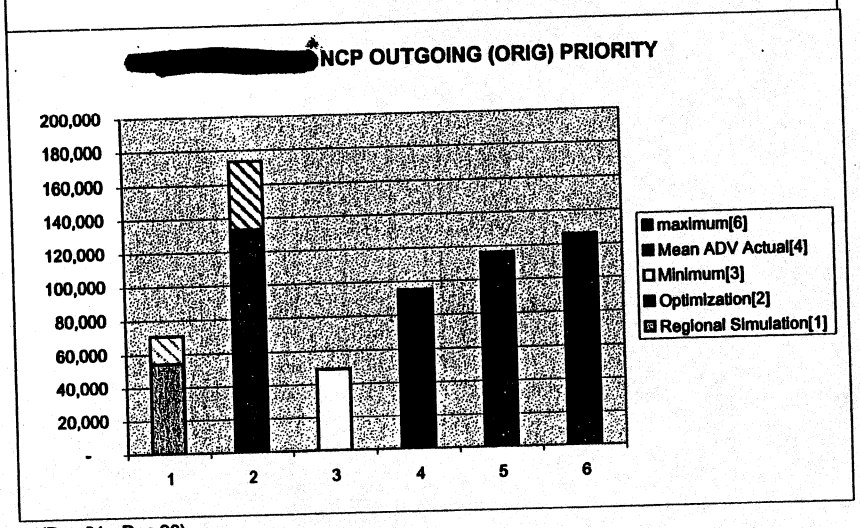
259	Linear integrated parcel sorter-priority incoming
329	Priority mail shape separation-destinating





Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
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Note 4: Values of actual ADV from data provided by [redacted] (Priority turn-around volume appears to average 5% to 10% of Total volume, though no thorough analysis could be conducted)
Note 5: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] (050,051,052,320,321,322,138,438,158,258,450,818,328,055,053,054,325,324,326,139,159,439,451,819,259,329)

	Incoming Priority	Volume @30%	Outgoing Priority	Volume @30%
Regional Simulation	6,506	1952	3,036	911
Optimization	17,525	5257	6,645	1993
Minimum	4,000		9,000	
Mean ADV Actual	14,000		14,000	
10-Peak Day Avg	18,000		18,000	
Maximum	20,000		35,000	

OPERATION NUMBER	OPERATION NAME
50	Priority-Manual Outgoing
51	Outgoing priority flats-priority
52	Outgoing secondary flats-priority
320	Outgoing primary parcels-priority
321	Outgoing primary parcels-priority
322	Outgoing secondary parcels-priority
138	SPBS-priority,outgoing
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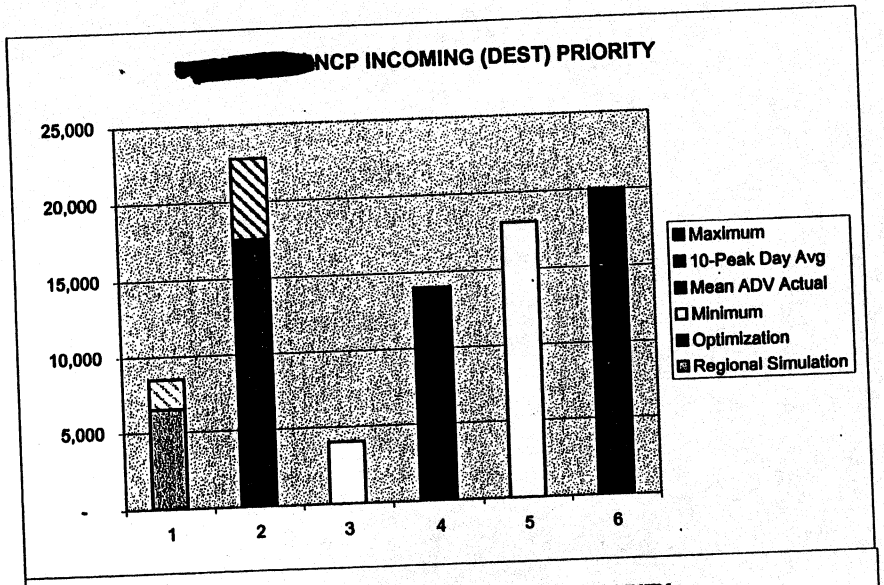
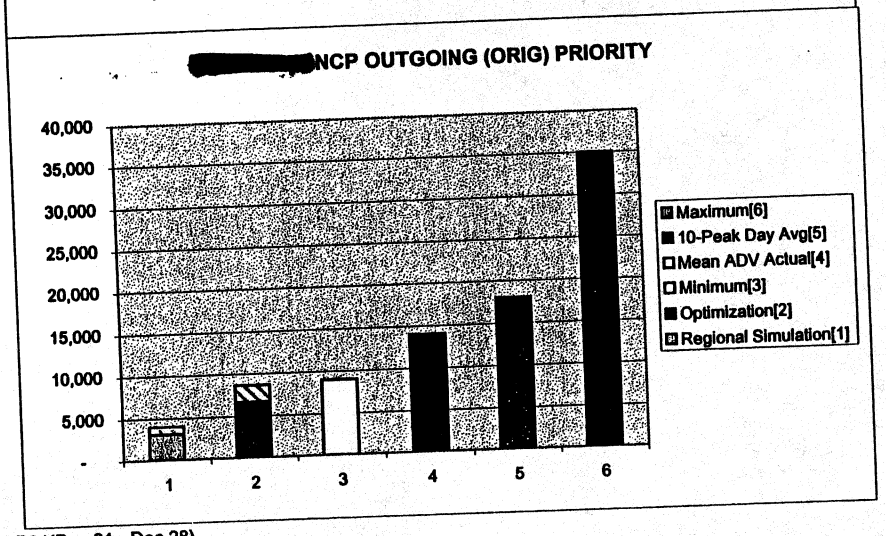
159	APPS priority-incoming
439	SPBS/BCR-priority incoming
451	FSM1000-priority incoming
819	UFSM 1000 OCR/priority-incoming
259	Linear integrated parcel sorter-priority incoming
329	Priority mail shape separation-destinating





Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
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Note 4: Values of actual ADV from data provided by [redacted](Priority turn-around volume appears to average 5% to 10% of Total volume, though no thorough analysis could be conducted)
Note 5: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted](050,051,052,320,321,322,138,438,158,258,450,818,328,055,053,054,325,324,326,139,159,439,451,819,259,329)

	Incoming Priority	Volume @30%	Outgoing Priority	Volume @30%
Regional Simulation	69,328	20799	44,055	13216
Optimization	245,263	73579	144,845	43453
Minimum	108,000		66,000	
Mean ADV Actual	168,000		115,000	
10-Peak Day Avg	202,000		138,000	
Maximum	242,000		144,000	

OPERATION NUMBER	OPERATION NAME
50	Priority-Manual Outgoing
51	Outgoing priority flats-priority
52	Outgoing secondary flats-priority
320	Outgoing primary parcels-priority
321	Outgoing primary parcels-priority
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138	SPBS-priority,outgoing
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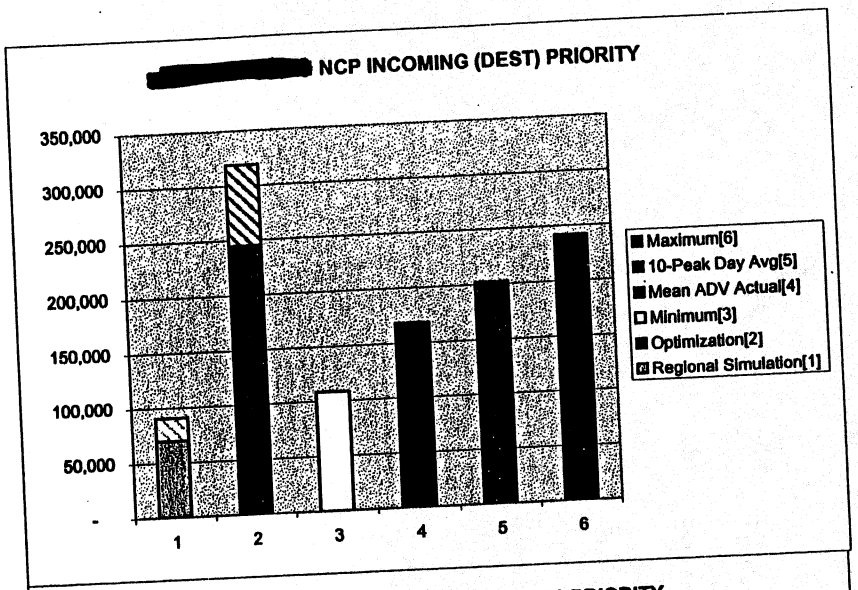

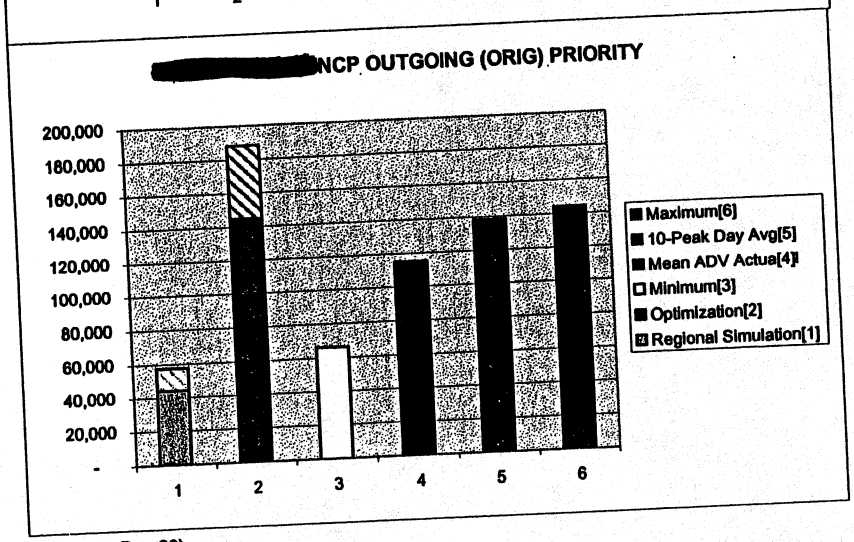

Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
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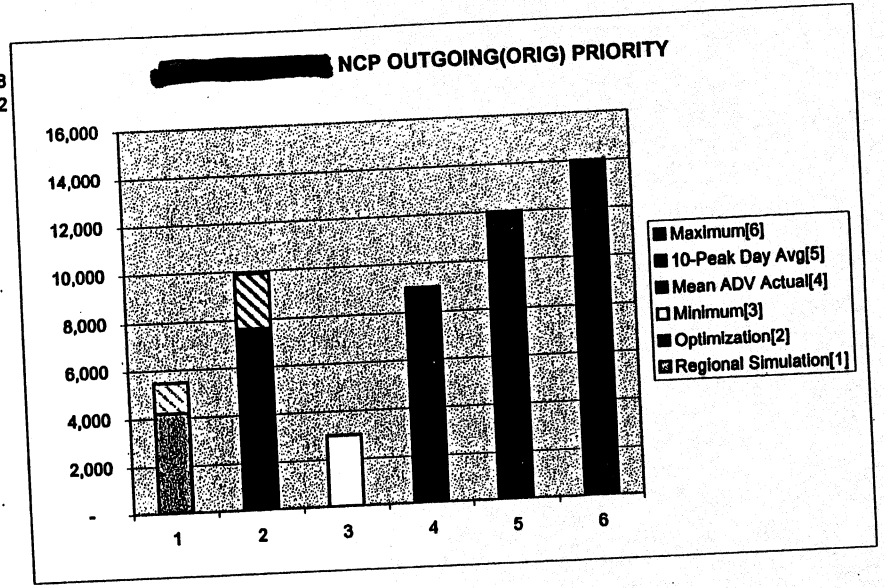
Note 4: Values of actual ADV from data provided by [redacted] Priority turn-around volume appears to average 5% to 10% of Total volume, though no thorough analysis could be conducted)
Note 5: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] (050,051,052,320,321,322,138,438,158,258,450,818,328,055,053,054,325,324,326,139,159,439,451,819,259,329)

	Incoming Priority	Outgoing Priority	Volume @30%
Regional Simulation	12,837	4,195	1258
Optimization	23,056	7,606	2282
Minimum	*	3,000	
Mean ADV Actual	*	9,000	
10-Peak Day Avg	*	12,000	
Maximum	*	14,000	



OPERATION NUMBER	OPERATION NAME
50	Priority-Manual Outgoing
51	Outgoing priority flats-priority
52	Outgoing secondary flats-priority
320	Outgoing primary parcels-priority
321	Outgoing primary parcels-priority
322	Outgoing secondary parcels-priority
138	SPBS-priority,outgoing
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158	APPS priority-outgoing
258	Linear integrated parcel sorter-priority outgoing
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328	Priority mail shape separation-originating
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53	Incoming primary flats-priority
54	Incoming secondary flats-priority
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159	APPS priority-incoming
439	SPBS/BCR-priority incoming
451	FSM1000-priority incoming
819	UFSM 1000 OCR/priority-incoming
259	Linear integrated parcel sorter-priority incoming
329	Priority mail shape separation-destinating

* = No data available for Incoming Priority

Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)

Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)

Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies

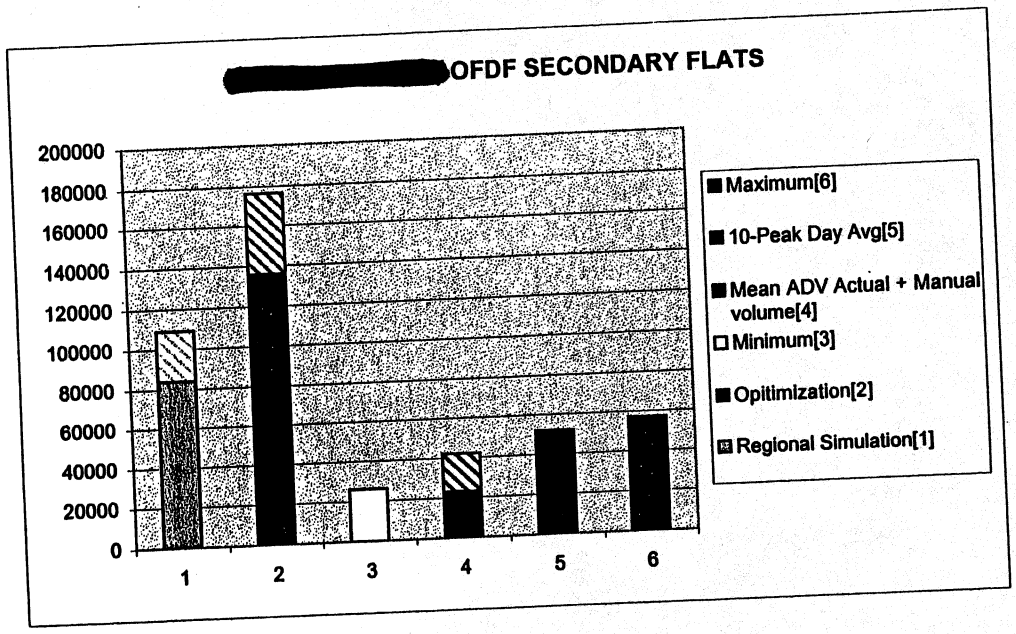
Note 4: Values of actual ADV from data provided by [redacted](Priority turn-around volume appears to average 5% to 10% of Total volume, though no thorough analysis could be conducted)

Note 5: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.

Data Source: [redacted](050,051,052,320,321,322,138,438,158,258,450,818,328,055
,053,054,325,324,326,139,159,439,451,819,259,329)

	Secondary Flats	Vol. +30%	Manual Vol.
Regional Simulation	83805	25141	
Optimization Model	135731	40719	
Minimum	26000		
Mean ADV Actual	23000		19000
10-Peak Day Avg	52000		
Maximum	57000		

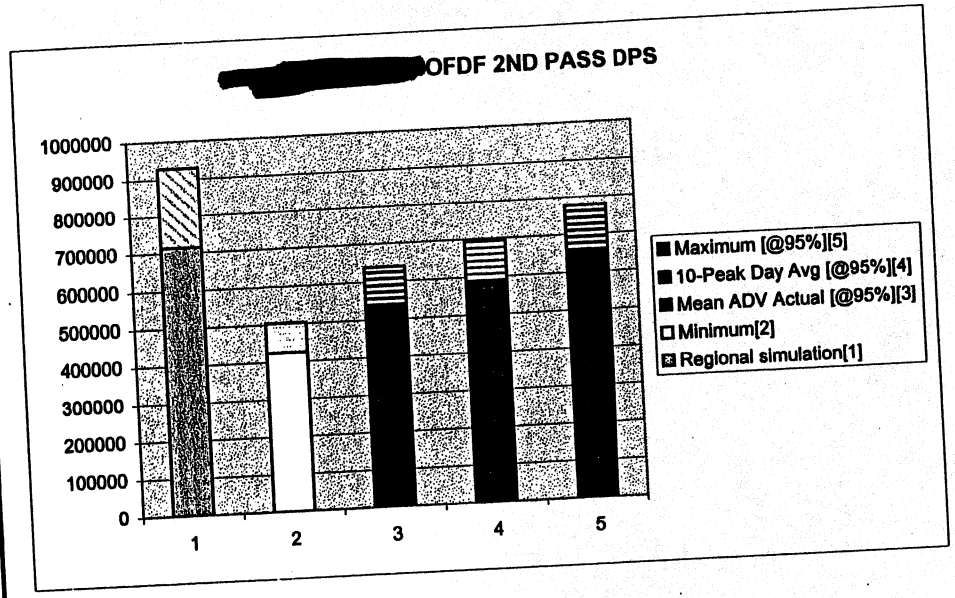
108,946 Regional simulation @130%
83,805 Regional simulation



Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average, Minimum, Maximum,10-Peak Day avgerage includes: M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted]
Note 5: Volume worked at Delivery units is not included
Note 6: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] by facility and by following operation numbers:146,175,179,336,426,446,466,966,337,427,447,467,967

146 - MPFSM incoming secondary
175 - Manual Flat incoming secondary
179 - Manual Flat incoming secondary
336 - AFSM100 box section
426 - FSMOCR incoming secondary
446 - FSM100 incoming secondary
466 - FSM100 incoming secondary
966 - FMBCR incoming secondary
337 - AFSM100 incoming nonscheme
427 - FSMOCR box section
447 - FSM1000 box section
467 - FSM100 BCR boxed mail
967 - FMBCR box section

*DAY OF AP	[redacted]	[redacted]	TOTAL	TOTAL @95%
2SUN	395,378	222,707	618,086	732,786
3MON	267,193	156,347	423,540	502,138
4TUE	301,579	174,279	475,858	564,165
5WED	326,248	184,628	510,876	605,681
6THUR	336,056	190,609	526,665	624,400
7FRI	346,962	203,424	550,386	652,523
9SUN	407,393	211,362	618,755	733,580
10MON	337,368	205,718	543,086	643,868
11TUE	321,747	187,308	509,055	603,523
12WED	338,331	194,780	533,111	632,042
13THUR	331,223	184,568	515,792	611,509
14FRI	346,602	201,868	548,470	650,252
16SUN	396,559	228,919	625,478	741,550
17MON	284,617	168,014	452,631	536,627
18TUE	301,171	170,060	471,231	558,679
19WED	327,233	188,926	516,158	611,944
20THUR	329,168	174,543	503,711	597,187
21FRI	344,891	221,080	565,971	671,000
23SUN	430,034	171,790	601,824	713,507
24MON	372,624	181,928	554,551	657,461
25TUE	326,158	180,906	507,063	601,161
26WED	369,852	175,516	545,368	646,573
27THUR	354,787	193,943	548,730	650,560
28FRI	364,809	291,843	656,651	778,508
		MEAN ADV	538,460	638,384



MEAN ADV @ 95%RATE [Returns the average (arithmetic mean) of the arguments.]

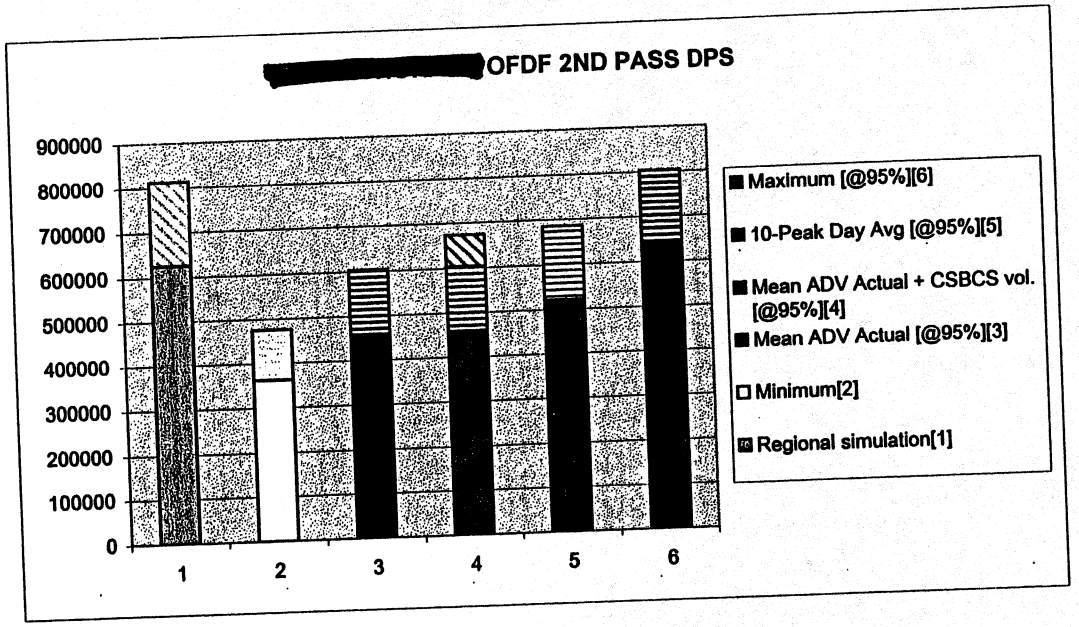
MEDIAN	538,098	MEDIAN @95%	637,955
MINIMUM	423,540	MINIMUM @95%	502,138
MAXIMUM	656,651	MAXIMUM @95%	778,508
10-PEAK DAY AVG	588,890	10-PEAK DAY AVG @95%	698,173

714087 Regional simulation
928313 Regional simulation @130%

538460 Mean ADV Actual .
638384 Mean ADV Actual @95%

Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted] FAST
Note 6: Optimization model is not included due to our inability to separate out DPS 2nd pass from other destinating facilities roles (ie: Incoming Secondary (INS), DPS 1st pass)
Note 5: DPS volume was increased to 95% based on average DPS% volume from respective facilities [see DPS % (DOIS)]
Note 6: Optimization model is not included due to our inability to separate out DPS 2nd pass from other destinating facilities roles (ie: Incoming Secondary (INS), DPS 1st pass)
Note 7: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted]y facility for the following operation number: 919
* These days represent the average volume for each specific day of all 12 APs. For example: The first Monday is the average of all first mondays (excluding holidays) for all APs.

*DAY OF AP	[redacted]	TOTAL	Total @95%
2SUN	635,378	635,378	835,445
3MON	380,901	380,901	500,839
4TUE	416,854	416,854	548,113
5WED	454,247	454,247	597,280
6THUR	461,247	461,247	606,484
7FRI	418,527	418,527	550,312
9SUN	444,509	444,509	584,476
10MON	421,914	421,914	554,765
11TUE	389,007	389,007	511,498
12WED	408,842	408,842	537,578
13THUR	429,782	429,782	565,111
14FRI	424,593	424,593	558,288
16SUN	534,451	534,451	702,738
17MON	361,918	361,918	475,879
18TUE	413,484	413,484	543,681
19WED	429,410	429,410	564,622
20THUR	451,373	451,373	593,501
21FRI	490,443	490,443	644,873
23SUN	483,888	483,888	636,254
24MON	432,201	432,201	568,292
25TUE	425,547	425,547	559,543
26WED	447,833	447,833	588,847
27THUR	639,224	639,224	840,502
28FRI	613,489	613,489	806,663
		458,711	603,149



MEAN ADV @ 95%RATE [Returns the average (arithmetic mean) of the arguments.]

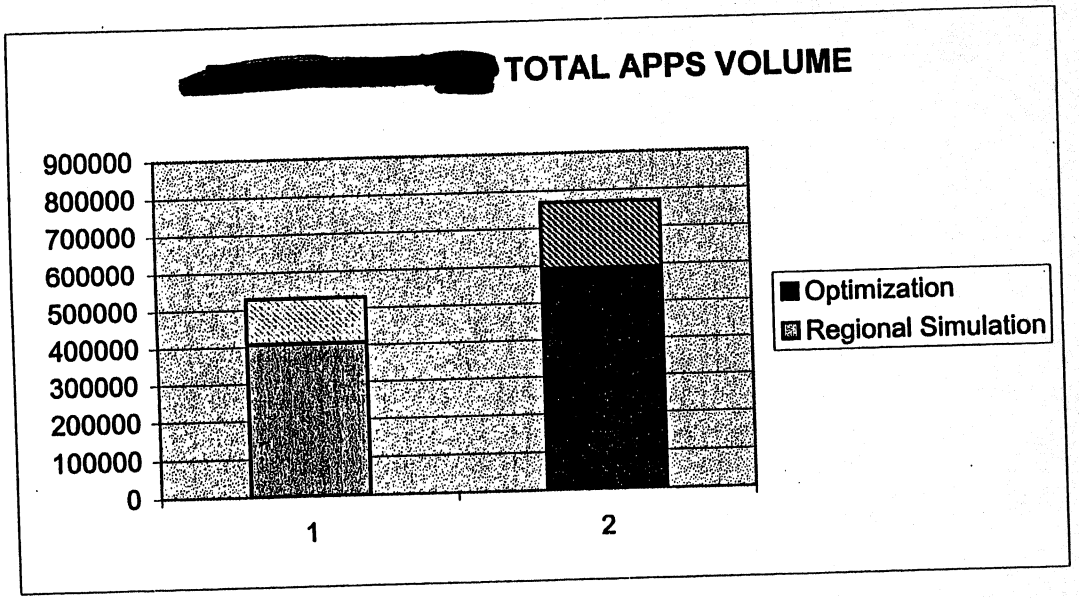
MEDIAN	430,991	MEDIAN @95%	566,701
MINIMUM	361,918	MINIMUM @95%	475,879
MAXIMUM	639,224	MAXIMUM @95%	840,502
10-PEAK DAY AVG	521,157	10-PEAK DAY AVG @95%	685,259

70123 CSBCS volume
625175 Regional simulation
812727 Regional simulation @130%

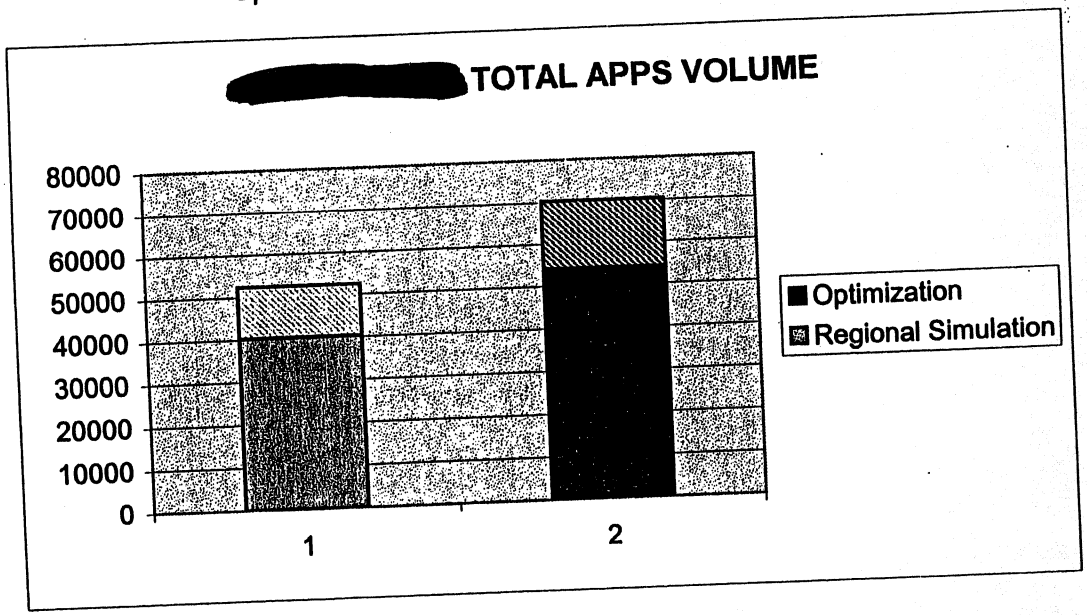
528,834 Mean ADV Actual + CSBCS VOL.
673,272 Mean ADV Actual + CSBCS VOL. @95%

Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average, Minimum, Maximum, 10-Peak Day average includes:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Avg 10 Peak Days:M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted] FAST
Note 5: DPS volume was increased to 95% based on average DPS% volume from respective facilities [see DPS % (DOIS)]
Note 6: Optimization model is not included due to our inability to separate out DPS 2nd pass from other destinating facilities roles (ie: Incoming,Secondary (INS), DPS 1st pass)
Note 7: Minimum/maximum days were established by averaging the total mean volume of each day of the AP, and identifying the lowest/highest day
For example, the third Thursday would represent all third Thursdays in each AP.
Data Source: [redacted] by facility for the following operation number: 919 + CSBCS volume
* These days represent the average volume for each specific day of all 12 APs. For example: The first Monday is the average of all first mondays (excluding holidays) for all APs.

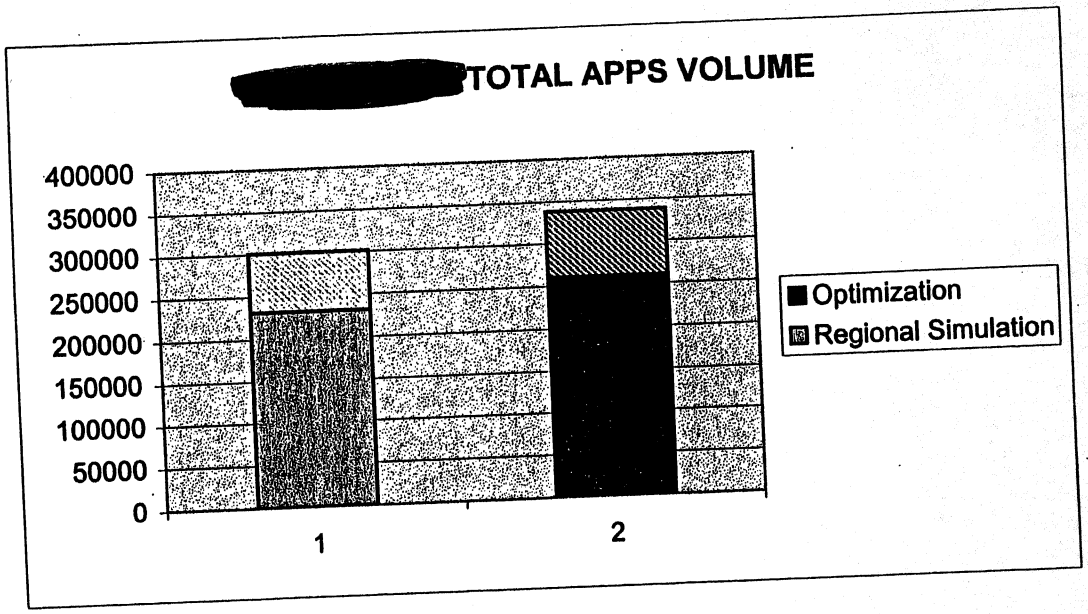
	Vol	Volume @ 30%
Regional Simulation	405981	121794
Optimization	591021	177306



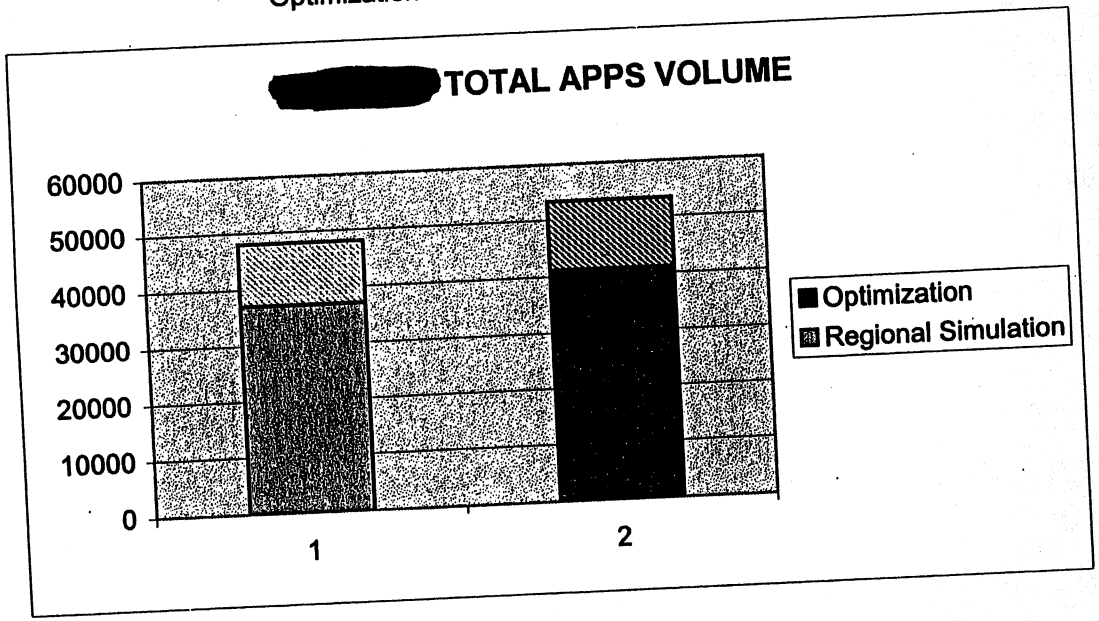
	Vol	Volume @ 30%
Regional Simulation	40227	12068
Optimization	54080	16224



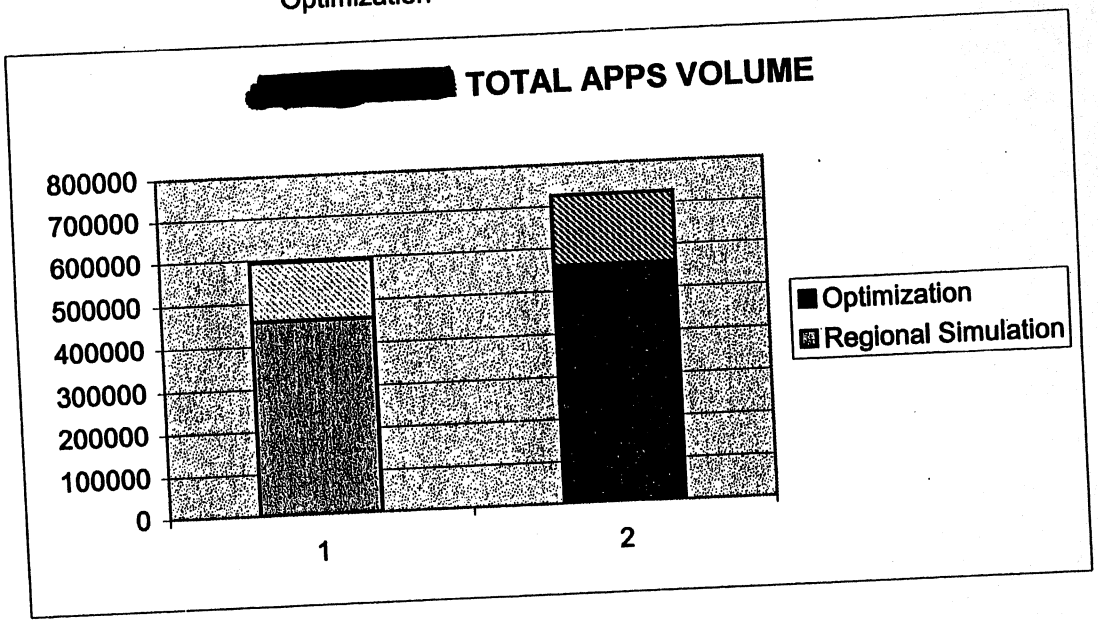
	Vol	Volume @ 30%
Regional Simulation	231306	69392
Optimization	260047	78014



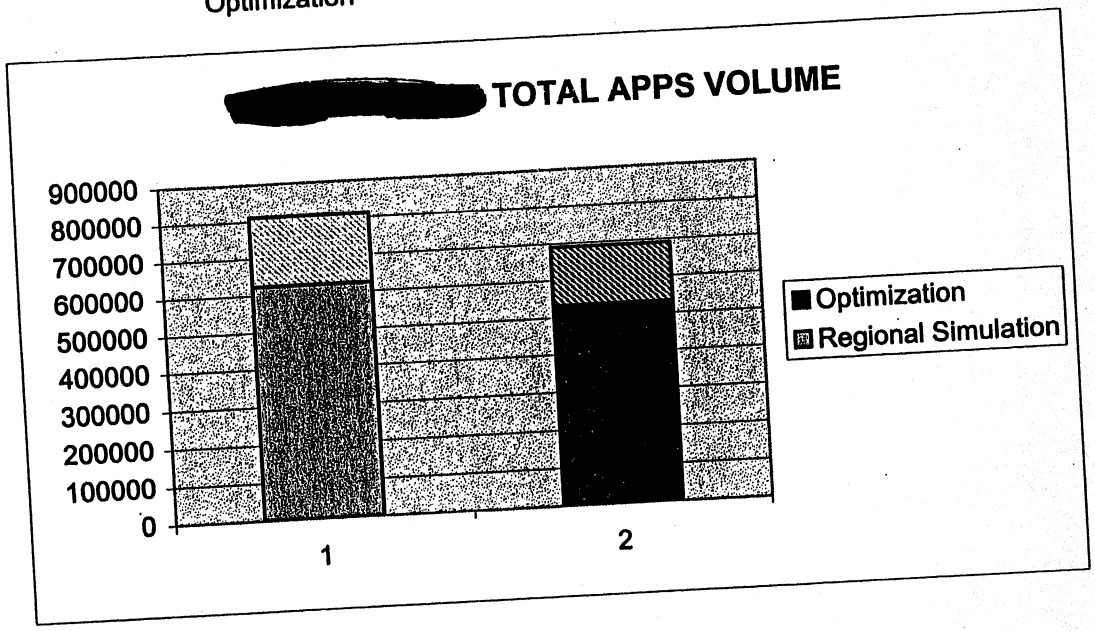
	Vol	Volume @ 30%
Regional Simulation	36956	11087
Optimization	41071	12321



	Vol	Volume @ 30%
Regional Simulation	456831	137049
Optimization	558158	167448



	Vol	Volume @ 30%
Regional Simulation	623042	186913
Optimization	530072	159021

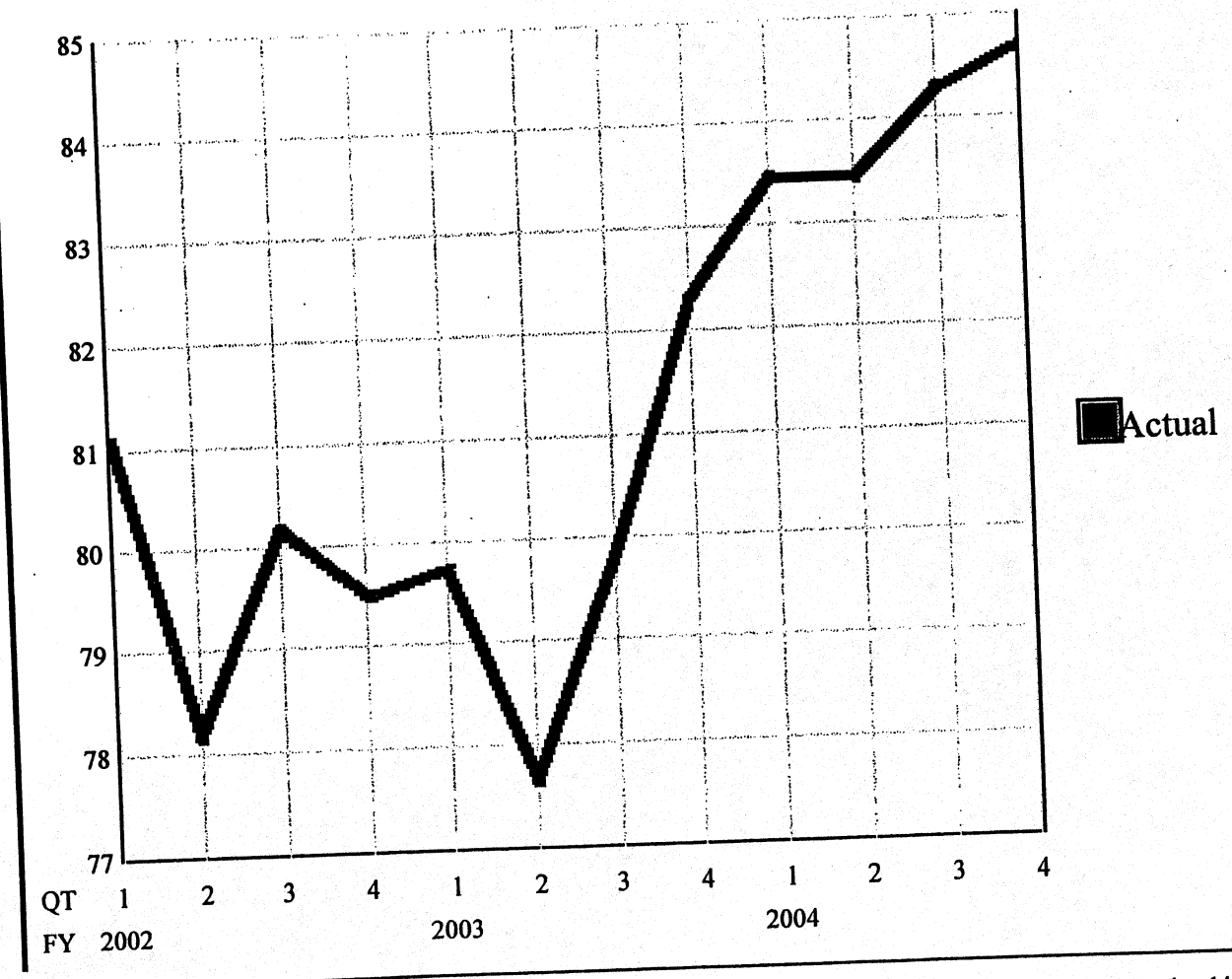


DPS % (DOIS)

Facilities [redacted]

Q4 FY2004

Time	Actual
Q4 FY2004	84.67
Q3 FY2004	84.29
Q2 FY2004	83.44
Q1 FY2004	83.47
Q4 FY2003	82.30
Q3 FY2003	79.83
Q2 FY2003	77.66
Q1 FY2003	79.76
Q4 FY2002	79.49
Q3 FY2002	80.16
Q2 FY2002	78.17
Q1 FY2002	81.11

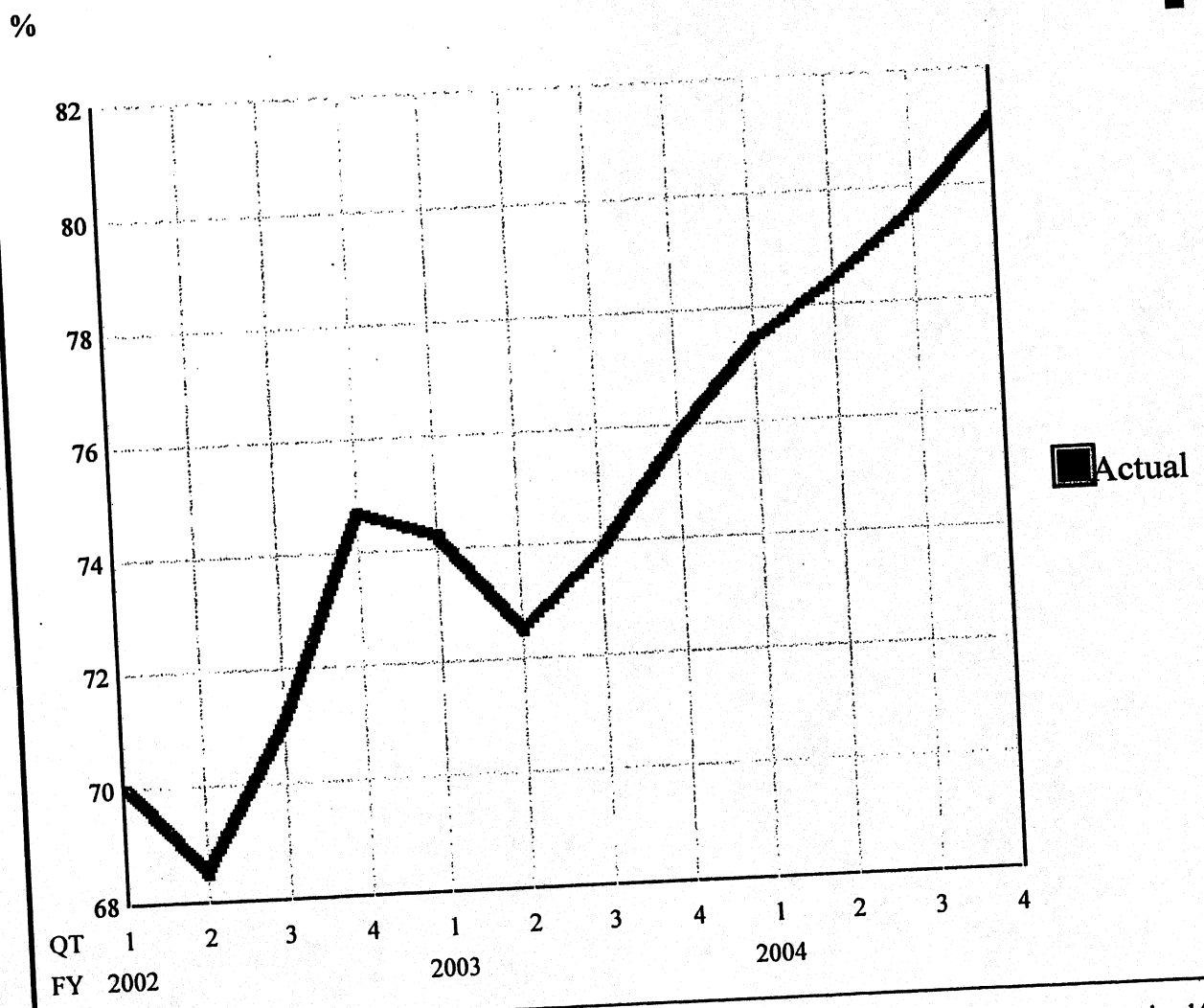


DPS % (DOIS)

[redacted]

Q4 FY2004

Time	Actual
Q4 FY2004	81.11
Q3 FY2004	79.61
Q2 FY2004	78.46
Q1 FY2004	77.47
Q4 FY2003	75.85
Q3 FY2003	73.84
Q2 FY2003	72.53
Q1 FY2003	74.19
Q4 FY2002	74.67
Q3 FY2002	71.03
Q2 FY2002	68.50
Q1 FY2002	70.05



December 14, 2004

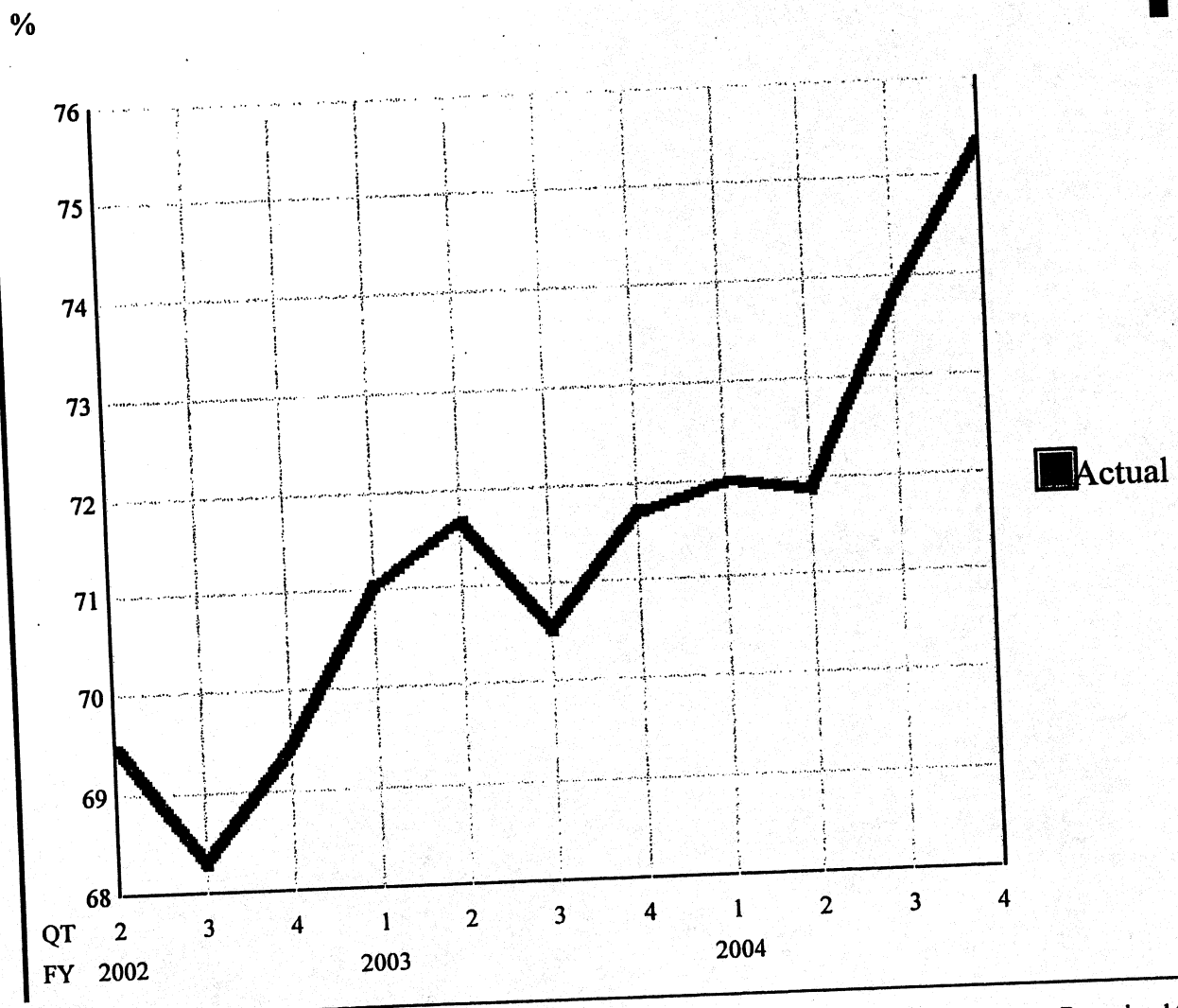
Webeis

DPS % (DOIS)

Installations [redacted]

Q4 FY2004

Time	Actual
Q4 FY2004	75.31
Q3 FY2004	73.79
Q2 FY2004	71.85
Q1 FY2004	71.99
Q4 FY2003	71.69
Q3 FY2003	70.53
Q2 FY2003	71.67
Q1 FY2003	71.02
Q4 FY2002	69.43
Q3 FY2002	68.29
Q2 FY2002	69.50

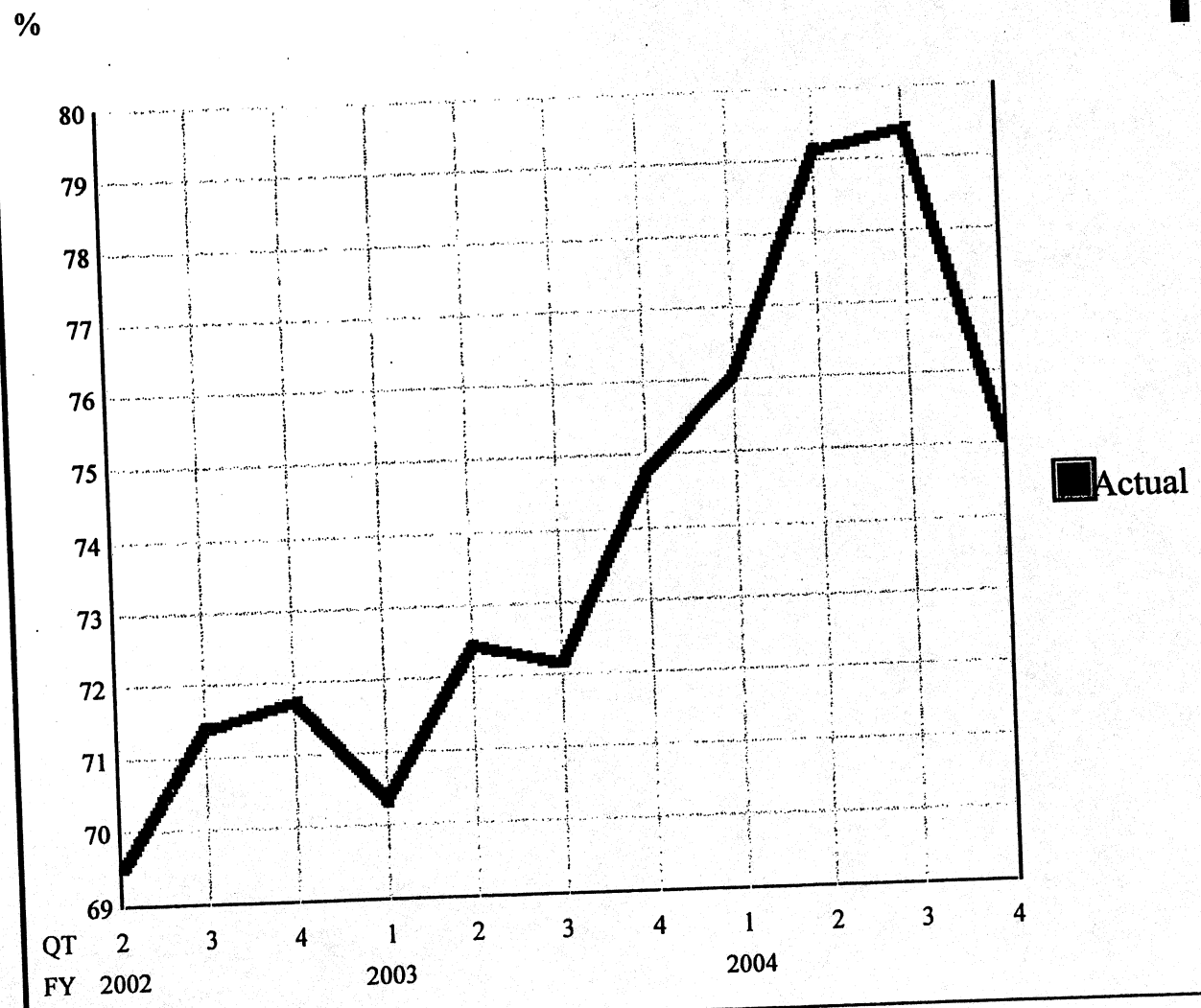


DPS % (DOIS)

Facilities [redacted]

Q4 FY2004

Time	Actual
Q4 FY2004	75.13
Q3 FY2004	79.40
Q2 FY2004	79.12
Q1 FY2004	76.07
Q4 FY2003	74.78
Q3 FY2003	72.15
Q2 FY2003	72.42
Q1 FY2003	70.37
Q4 FY2002	71.74
Q3 FY2002	71.41
Q2 FY2002	69.48

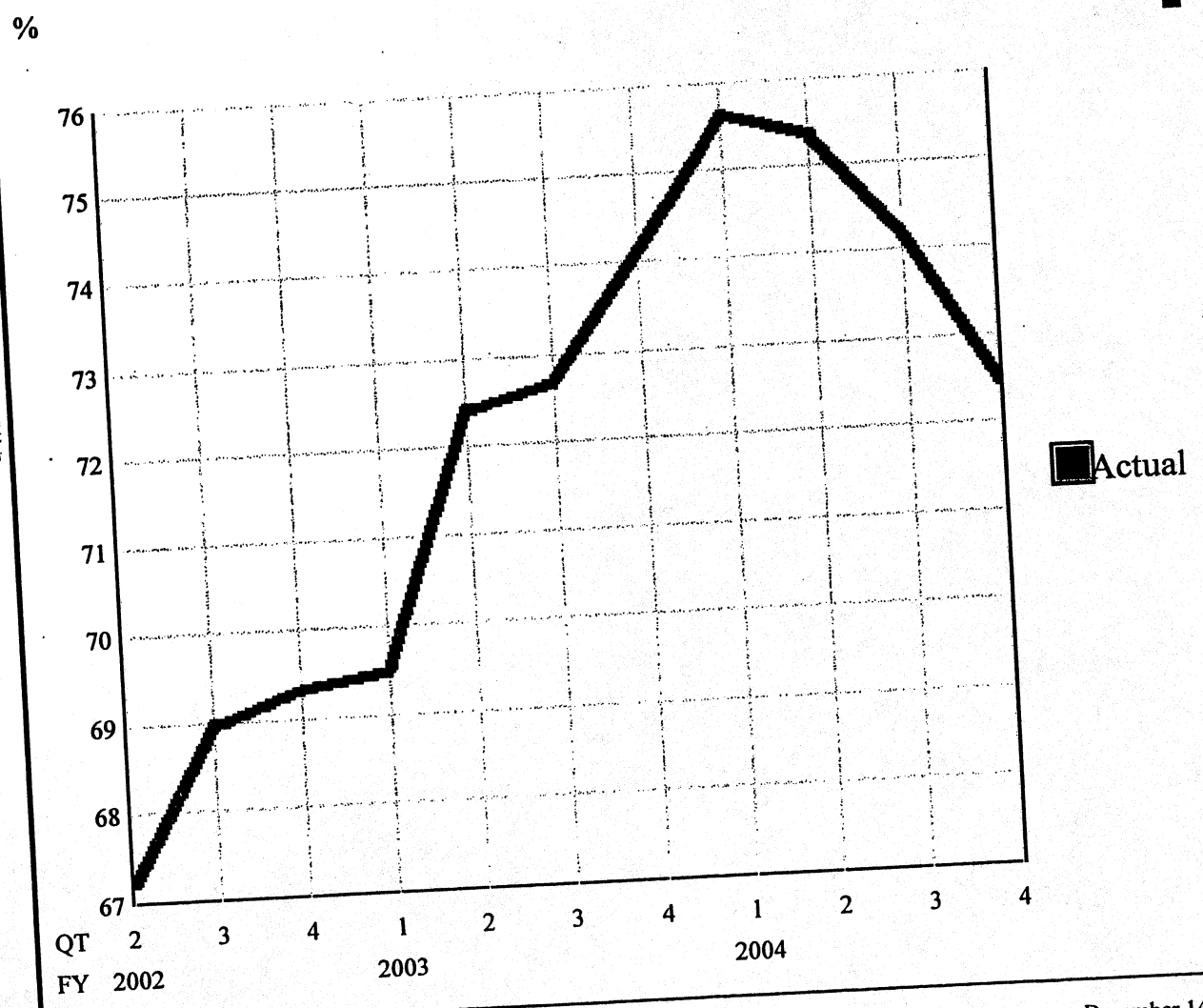


DPS % (DOIS)

Installations [redacted]

Q4 FY2004

Time	Actual
Q4 FY2004	72.50
Q3 FY2004	74.19
Q2 FY2004	75.35
Q1 FY2004	75.60
Q4 FY2003	74.12
Q3 FY2003	72.71
Q2 FY2003	72.40
Q1 FY2003	69.51
Q4 FY2002	69.34
Q3 FY2002	68.97
Q2 FY2002	67.18



December 14, 2004

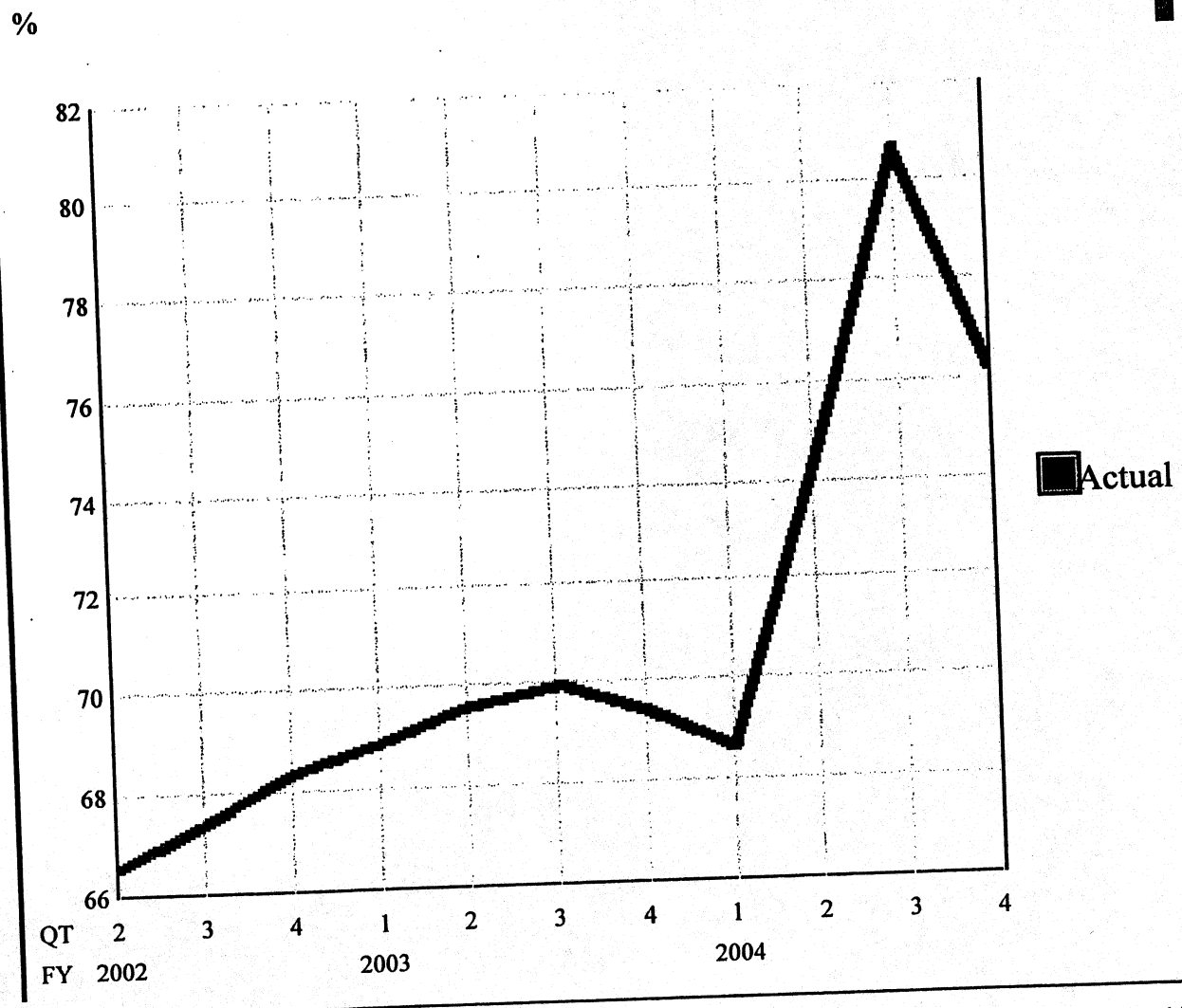
Webeis

DPS % (DOIS)

Facilities [redacted]

Q4 FY2004

Time	Actual
Q4 FY2004	76.30
Q3 FY2004	80.62
Q2 FY2004	74.22
Q1 FY2004	68.62
Q4 FY2003	69.38
Q3 FY2003	69.95
Q2 FY2003	69.60
Q1 FY2003	68.93
Q4 FY2002	68.35
Q3 FY2002	67.35
Q2 FY2002	66.57

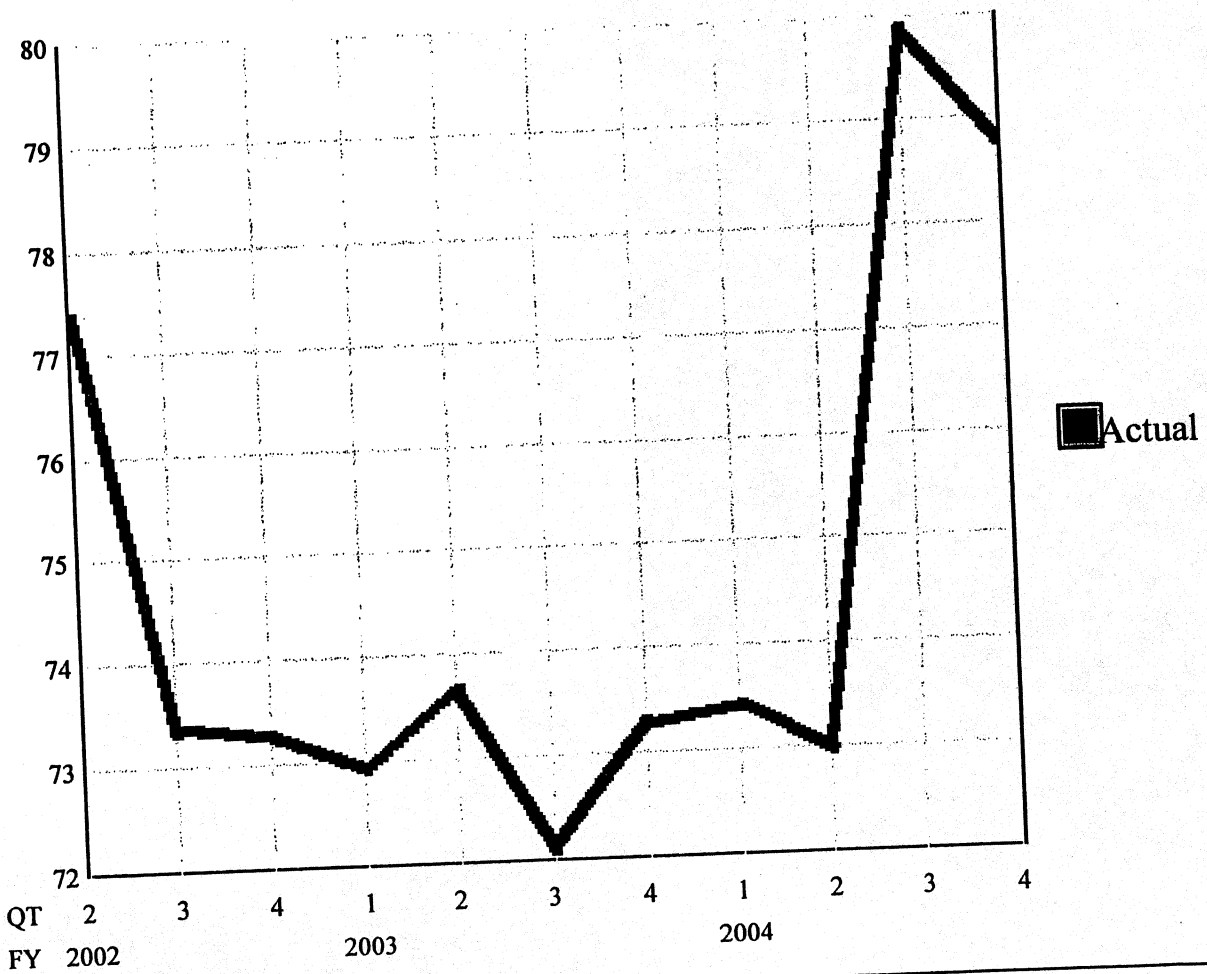


DPS % (DOIS)

Facilities [redacted]

Q4 FY2004

Time	Actual
Q4 FY2004	78.80
Q3 FY2004	79.85
Q2 FY2004	72.96
Q1 FY2004	73.43
Q4 FY2003	73.27
Q3 FY2003	72.11
Q2 FY2003	73.66
Q1 FY2003	72.91
Q4 FY2002	73.24
Q3 FY2002	73.36
Q2 FY2002	77.41

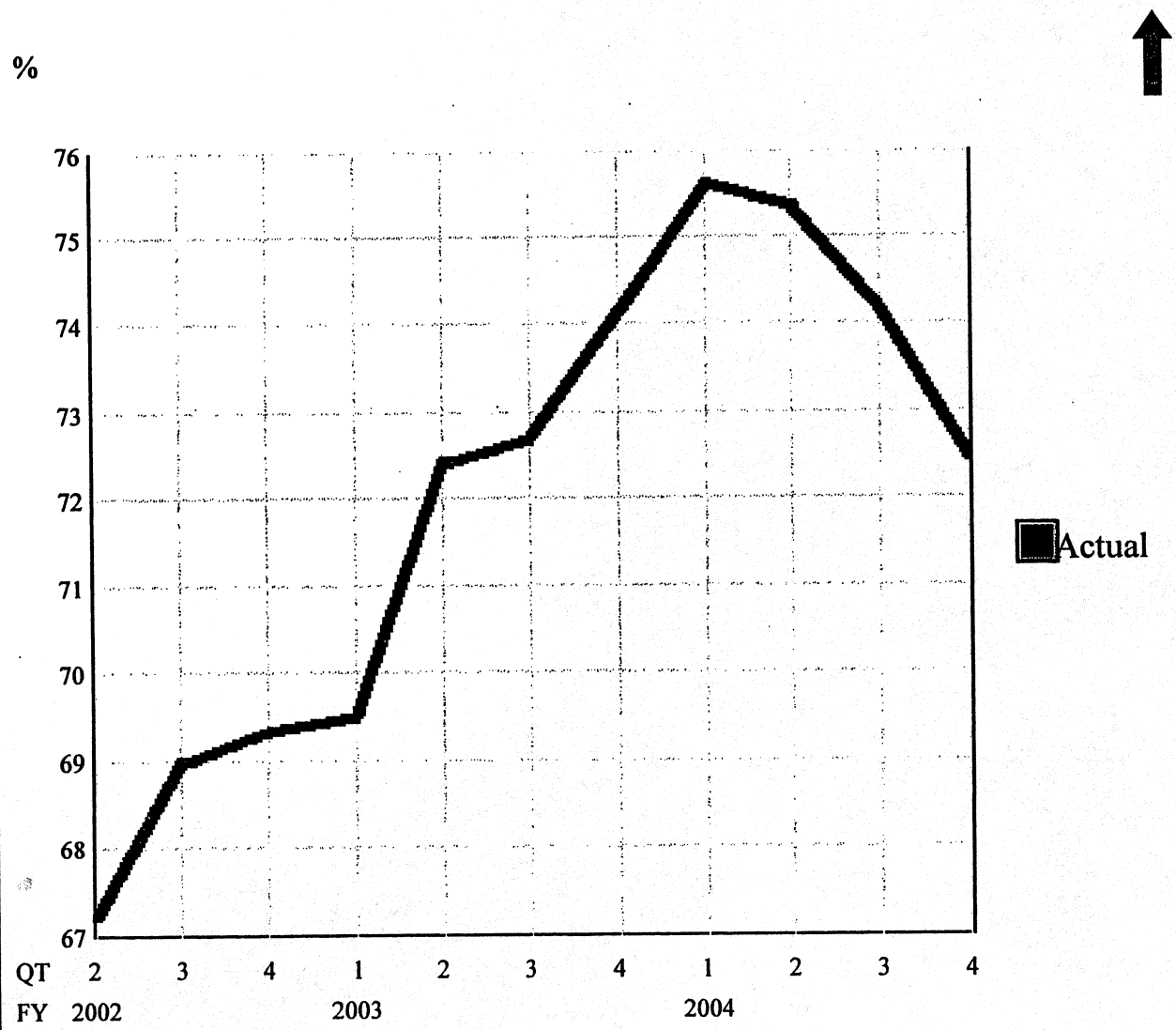


DPS % (DOIS)

Installations [redacted]

Q4 FY2004

Time	Actual
Q4 FY2004	72.50
Q3 FY2004	74.19
Q2 FY2004	75.35
Q1 FY2004	75.60
Q4 FY2003	74.12
Q3 FY2003	72.71
Q2 FY2003	72.40
Q1 FY2003	69.51
Q4 FY2002	69.34
Q3 FY2002	68.97
Q2 FY2002	67.18



Assumption Data Sheet

Assumption #6: Derivation of volume methodologies and workload – *cont'd*

g. All PSM volume migrated to APPS

Source of Data to be utilized/methodology used for IV & V (as appropriate):

Are there sufficient APPS in the planned inventory to accomplish this? What are the productivity implications? What is the depth of sort loss implications? 100% verification is not necessary. This validation will be partially intuitive based on operational experience. Randomly select 2-3 BMC/ASFs to determine the implications of shifting that parcel volume from PSMs to APPS. Identify the total workload at the national level between SPBSs and PSMs. What inventory of APPS does the Evolutionary Network Development group anticipate based on their modeling? With the combined volume presently available for this distribution method, is this inventory sufficient at the aggregate level and at the randomly selected RDC levels? What are the ramifications of the container requirements on existing APPS configuration? What are the ramifications of the losing the capability of the BMCs and their existing PSMs?

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The APPS was only used as a placeholder for future parcel sortation technology in the modeling process. Individual sites were identified in post-modeling analysis as having volume levels and/or separation requirements outside the range of the APPS. The validation process with the development group consists of reviewing data utilized, documentation, and may include field site visits. The development group estimates they will need two (2) days preparation time, and the primary contact is Dave Strohecker (USPS

Observations: | ***Dates:*** *10-14-2004*

Initial modeling did transfer all Parcel Sorting Machines (PSM) volumes to APPS equipment. However, according to the development group, APPS was only intended to be used as a "placeholder" in the optimization model until a long term strategic solution was developed. A potential replacement, the Total Package Sortation System (TPSS) is being considered. One alternative being considered is to leave much of this volume on secondary PSMs moderately upgraded with OCR and improved singulation capabilities. The operations sub-group members strongly agree that PSMs should continue to be utilized until TPSS or another suitable replacement is deployed. Remaining parcel and bundle volumes would be processed on APPS. Of the 74 APPS deployed to date, 67 will need to be relocated from facilities that will become OF/DFs in the new operating environment. The current contract allows for the purchase of 50 additional machines. At present, most BMCs make in excess of 1000 separations on existing PSMs. APPS are currently modeled at only 150 separations and even future development plans achieve no more than 300 separations.

Attachments: Overnight_TA_NonTA, APPS count by Campus, Package & Bundle Mail Flow and Mail Prep Presentation

Assumption 6 G -continued

In order to successfully process these volumes without multiple tertiary handlings, both internal and mailer make-up requirement changes would be necessary so that volumes entering a facility were separated or, "schemed" to a specific APPS sort program. This would increase both upstream internal and mailer handling costs, and would likely require new rate incentives. Initial modeling for APPS requirements was based on a single handling approach. The optimization model used a throughput of 6700 PPH, while the regional simulation model assumes 7800 PPH. After acceptance of the APPS, the development team should validate the above performance expectations against actual performance.

No adjustment in the modeling was incorporated to account for the depth of sort loss between the 1000 plus PSM separations and the 150 modeled APPS separations. The development team intends to revalidate APPS requirements based on capacity requirements of all remaining volumes that will not be processed on PSMs, or TPSS and projected tertiary handlings resulting from mixed volumes and cross-flows between sort plans. It should be noted that allied work hours and costs associated with APPS workload will increase as compared to the current environment, while maintenance costs are anticipated to decrease. APPS equipment is designed to be used with small containers that must be changed out at more than twice the frequency of the equipment now used on PSMs. Even if APPS were placed on a platform, there is no progressive loading system similar to the parcel loaders in BMCs. These parcel loaders prevent damage to parcels by gradually reducing the tilt of the container being loaded. In addition, depending on the configuration, motorized equipment cannot be used to pull or insert containers on APPS. Further, the elimination of existing towlines in BMCs will increase equipment operator costs to move containers within the facilities. We suggest these potential costs be quantified and incorporated in the model costing assumptions. Smaller containers used on APPS will also impact cube utilization on transportation and staging area requirements. Based on observations by the operations sub-group and data provided by the development team, modeled workload for APPS included all parcel volume from PIMS, non-turnaround Priority volume, and projected bundle volume based on DSAS receipts.

Assumption Data Sheet

Assumption #6: Derivation of volume methodologies and workload – *cont'd*

h. All non-turnaround machineable Priority parcels will be processed on APPS

Source of Data to be utilized/methodology used for IV & V (as appropriate):

100% verification is not possible. On a randomly selected group of OF/DFs the Evolutionary Network Development group will provide the volume that was identified as turnaround and the volume that is non-turnaround. Is the portion that is defined as turnaround to be manually worked accurately represented when compared to a randomly selected group of sites using other data sources, i.e. 5 day test, SPBS mods data, etc.? In some facilities, the Priority is commingled with SPRs, etc. We will need to have at a minimum an "intuitive" check on this. Secondly, with the volume that remains as non-turnaround, is there sufficient capacity at the RDC on the APPS to clear this volume within the parameters of the operating plan? Will there be pure shape sort flows in the future state? Is the assumption that the Priority flats are to be processed on the AFSM? Have they created sufficient sortation capacity to clear on time?

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of reviewing data utilized, documentation, and may include field site visits. The development team estimates they will need two (2) days preparation time, and the primary contact is Dave Strohecker (USPS).

Observations: | ***Dates:*** *10-14-2004*

The modeling approach by the development team is to utilize the APPS machine configuration at RDCs to process Priority (non-turnaround) parcels. The simulation model was configured with an APPS machine with dual induction, 150 separations and a planned throughput of 7,800 pieces per hour. Space allocation at each site was based on 40,000 square feet for each machine position.

In assessing the most productive, product flexible, machine capacity and long-term solution, the development team favored the TPSS processing system over the APPS machine. Extensive work was done on modeling TPSS as a solution.

The APPS machine is being revisited as an alternative for the RDCs. This would require redeployment of machines from P&DCs, modification, and the need to initiate a phase II purchase under the existing contract for additional machines. This would increase the inventory to a total of 124 machines. The development team projects the full up requirement for APPS to be 236 machines. Therefore an additional 92 machines will need to be purchased based on present END modeling.

For RDCs that presently function as BMCs, the feasibility of utilizing the secondary parcel sorting machine in combination with the APPS is presently under review. The operations sub-group supports this effort and encourages evaluation prior to a decision to remove the traditional parcel sorting systems in their entirety.

Attachments: Reference attachments 6 G, Audit team presentation 10/24/04

Assumption 6 H -continued

This will, however, leave many of the RDC's with a pure APPS configuration. Other low cost tray sorting systems should be evaluated as well.

The development team is presently reevaluating the implications of the decision to do the major portion of distribution on APPS. Originally APPS had been positioned as a short term "placeholder" in the modeling but was not envisioned as the optimal solution.'

A sort-to system approach is being evaluated to determine specific mail flow and network implications of a predominate APPS solution and the BMC secondary parcel sorting alternative. This would entail every facility using a scheme solution that would direct packages to a specific machine nationwide. Absent this, multiple handlings would be necessary given the number of required separations for destinations served by the DRDC.

A key assumption in the model is that mail prep and entry changes will be necessary to minimize system cross flows and additional handling. All originating Priority will be prepped at origin associate offices and OFs to remove all turnaround volume. Any overnight turnaround not removed prior to dispatch to the RDC will not receive overnight treatment. Mailers will also be required to separate overnight turnaround prior to depositing large mailings if they desire overnight handling. Otherwise volumes would be dispatched to the RDC and would require 2 days to delivery.

The need for site specific volume studies prior to a determination of equipment needs is imperative. Analysis of present volume data used in the optimization model leaves questions as to its validity. The development team acknowledges that sources for Priority volume are extremely unreliable and fully intends to do site specific validation. This analysis will be performed prior to a final determination of the number of APPS machines required by site to support the RDC concept.

A total APPS machine process, at least on surface would appear to require a large material handling process. In the present planning, it does not appear APPS will be connected to any conveyor/transport/storage system, thus increasing material re-handling and potential damage. The process is very labor intensive, when compared to the present BMC network. Given the size of many of the RDCs a proof of concept site is strongly encouraged.

Presently there are 23 RDCs planned with five or more APPS machines. On surface, these would seem to be complex, labor intensive operating environments with a large commitment to allied labor. Though not geographically ideal, complex facilities are, in many cases separable by parcel sorters in the existing 21 BMCs.

The need to further validate Priority volumes at the three digit RDC level for both originating and destinating mail flows is essential. An accurate workload assessment is needed to determine the proper machine (APPS) requirement and processing plan at each RDC. Some means for validating actual priority volumes by shape, turnaround vs. non-turnaround, should be developed for this purpose. This effort should aid in the identification of high volume manual turnaround OFs requiring an alternative solution.

Assumption Data Sheet

Assumption #6: Derivation of volume methodologies and workload – *cont'd*

i. 50% of current manual letter workload will be automated in RDC
j. 85% of current manual flat workload will be automated in RDC concept

Source of Data to be utilized/methodology used for IV & V (as appropriate):

Validation of this item will be for the most part intuitive. Review the data relied upon by the Evolutionary Network Development group to develop this assumption. Review historical incremental improvements that have occurred. Consult with HQ engineering regarding near term technology improvements and the projected impacts.

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of meetings and discussion. No preparation is needed; it may be scheduled at anytime. The primary contact is Dale Biersteker (USPS).

Observations: | ***Dates:*** *10-26-04*

The operations sub-group met on October 26 to review the data in support of items 6 i, 6 j, 6 k, and 6 l with Dale Biersteker from the development team. Manual percent trends for letters over the last three year period shows a decrease from 5.4% in FY 02 to 3.8% for FY 04. This represents 30% of the modeled 50%. Manual percent trends for flats for the last three years indicate a reduction from 11.8% in FY 02 to 8.7% in FY 04. This represents 26% of the planned 85% reduction. Manual flats are modeled at a reduction of 85%. Newly planned programs, equipment, and equipment modifications with anticipated impacts on reductions in manual volumes were reviewed and are included in attachment. Additionally, the revised network would appear to have a potential contribution in the number of handlings (reduction of TPH handlings of manual volumes). The impact of this assumption would appear to be inconsequential to the overall modeling. This item is closed.

Attachments: Manual Letter & Flat Workload Reductions in the Proposed Network (10-26-04, Dale Biersteker), National % Spreadsheet

NATIONAL 5 MANUAL LTRS FLATS AUTO LTRS FLATS

National Data

	FY01	FY02	FY03	FY04	TOTAL/AVG
% Man Ltrs	6.00%	5.40%	4.65%	3.87%	4.98%
% Auto Ltrs	94.00%	94.60%	95.35%	96.13%	95.02%
% Man Flats	17.63%	11.82%	9.92%	9.35%	12.18%
% Auto Flats	36.79%	71.11%	80.85%	84.13%	68.22%
% Mech Flats	45.58%	17.07%	9.23%	6.52%	19.60%

Contact: Leslie Frick
Source: Jason Dechambeau
10/12/04
Assumption 6 i, j, k, l

Assumption Data Sheet

Assumption #6: Derivation of volume methodologies and workload – *cont'd*

k. 25% reduction of MMP and IC primary workload for letters and flats will result from elimination of ADC/AADC network.

l. OG Secondary and IC Primary in OF/DFs eliminated for manual letters and flats

Source of Data to be utilized/methodology used for IV & V (as appropriate):

Review a randomly selected group of facilities. Review the data and logic relied upon by the Evolutionary Network Development group when the reduction percentages were developed. Is the number of ADC/AADC's eliminated large enough to effect an aggregate 25% reduction? How many separations are eliminated on a primary sortation as a result of the RDC distribution concept? The majority of this validation should be a paperwork exercise with the Evolutionary Network Development group. Randomly selected sites will only serve to validate the impact of the reconfiguration of sortation.

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of meetings and discussion. No preparation is needed; it may be scheduled at anytime. The primary contact is Dale Biersteker (USPS).

Observations: | ***Dates:*** *10-26-04*

The operations sub-group met with Dale Biersteker, from the development team on October 26. Present world manual distribution in a plant consists of OG Primary, OG Secondary, IC Primary and IC Secondary in some site specific configuration. The development team envisions a need for only an OG Primary sort in the future state. There are approximately 179 AADCs and 95 ADCs in the present network. The present concept would require a DF sort at the OF for manual outgoing. Since there are 160 DFs this would seem to imply that a 160 cell distribution along with some level of overnight turnaround distribution would require a sortation in excess of 175 bins at a minimum. While the development team has suggested a vertical flat arrangement that would allow for this level of sortation on the first pass, there is no prototype and the theory would seem to be unproven. Therefore, it would appear that the secondary handling flows in OG primary are not accounted for in the modeling. The operations sub-group would suggest a need to revisit this assumption and to account for all of the manual handlings needed in both models. On the incoming side, we do not see the opportunity for elimination of incoming primary manual sortation as well. The DF will receive mail from upstream facilities and mailers at the "DF" level of sortation. This volume will have to be distributed to the five digit level. Since the future state DF consists of a very large destinating territory, the possible five digits could range up to 500-600 separations.

Attachments: Reference attachments 6 I-J

Assumption 6 K & L -continued

Again, while the development team describes a VFC concept to accommodate the size of this distribution, there is no prototype and the theory would seem to be unproven. Therefore, we recommend the volumes/down flows associated with IC primary and secondary be revisited by the development team and these volumes accounted for in both models or a proof of concept of the large size single pass manual distribution arrangement be developed.

Assumption Data Sheet

Assumption #6: Derivation of volume methodologies and workload – *cont'd*

m. All F-4 automated workload is recentralized. Manual secondaries are not centralized.

Source of Data to be utilized/methodology used for IV & V (as appropriate):

How many F-4 DDC and secondary operations will be eliminated? Obtain the list from the Evolutionary Network Development group. Is the intention to totally eliminate all of these operations? Are there exceptions at this point? If so, where are they? This should be a 100% check item but is more judgmental. The centroid and transportation analysis should aid in this validation.

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of reviewing data utilized, documentation, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The primary contact is Andy Louis (contractor).

Observations: ***Dates:*** *11-9-04*

Originally, the development team planned for the consolidation of all automated secondaries from associate offices, DDCs, and CSBCS sites. At this time, no national initiative to eliminate CSBCS processing exists. Any closures/consolidations would be on a site by site basis.

The development team acknowledges the need to eliminate the portion of the DPS volume associated with these F-4 automated sites from the optimization and simulation models. Caution should be made with regard to the carrier route automated volume processing responsibility. In some sites this is performed at the plant and in other sites it is performed at the CSBCS site.

Attachments: 10/28/04 Shah Email, Baseline F4 Automated Workload Report

Johnson-Frick, Leslie - Greensboro, NC

From: Shah, Pranab M - Washington, DC
Sent: Thursday, October 28, 2004 11:07 AM
To: Johnson-Frick, Leslie - Greensboro, NC; Williamson, Jeffrey C - Washington, DC
Cc: Fields, David C - Greensboro, NC; Billings, Kenneth R - Federal Way, WA; Wszolek, Robert F - Hartford, CT
Subject: RE: Assumption 6m, IV & V effort

Based on the most recent directive from senior management, your statement would be accurate.

-----Original Message-----
From: Johnson-Frick, Leslie - Greensboro, NC
Sent: Thursday, October 28, 2004 10:33 AM
To: Williamson, Jeffrey C - Washington, DC; Shah, Pranab M - Washington, DC
Cc: Fields, David C - Greensboro, NC; Billings, Kenneth R - Federal Way, WA; Wszolek, Robert F - Hartford, CT
Subject: Assumption 6m, IV & V effort

Pranab/Jeff,

Assumption 6 m in our validation effort states: All F-4 automated workload is recentralized. Manual secondaries are not centralized.

Based on the END present thinking, is it correct to assume this assumption is no longer valid? If so, we see no reason to do any further analysis on it and will simply close the issue out with a basic statement.

Thanks

Leslie Johnson-Frick
Greensboro District
336-668-1232
336-317-0046 (cell)

Assumption Data Sheet

Assumption #6: Derivation of volume methodologies and workload – *cont'd*

n. Bundle/package flow methodology (e.g., 3+5 digit pallet flows, bundle and package separations, OF/DF entry): These go to the RDC

Source of Data to be utilized/methodology used for IV & V (as appropriate):

How many modifications to existing mailing requirement rules are necessary to accommodate the new flows? What are the key mailer deposit and drop locations and present work share rules that impact this item? Has Evolutionary Network Development identified all needed mailing requirement changes? What are they? Request that Evolutionary Network Development provide a narrative that explains the flows/deposit locations for major flows i.e., IPP, NMO, machineable parcels, 3/5 digit Standard A and periodical pallets. Have all flows been accounted for? What drop ship deposit rules are anticipated in the future state? Has Evolutionary Network Development identified the changes that will be necessary? Evaluate these changes for "reasonableness". Do they "intuitively" represent the majority of changes the operations team identifies?

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The mailing requirement implications need to be considered and the Evolutionary Network Development team held workshops with both mailers and USPS mailer preparation and entry experts to understand the necessary changes. At this time, a comprehensive set of mailing requirement changes have not been developed. The Evolutionary Network Development team can provide information regarding the proposed entry points and flows for the products of interest. The validation process with the development group consists of reviewing data utilized, documentation, and may include field site visits. The development group estimates they will need five (5) days preparation time, and the primary contact is Dave Strohecker (USPS).

Observations: | ***Dates:*** *10-14-2004*

To accommodate optimized flows, several changes will be required of mailers in the future environment. If APPS is utilized as the primary sorting equipment for bundles and parcels, depth of sort will be reduced as compared to today's environment. Unless mailers make sort program separations, tertiary handlings would be required by the USPS. If existing secondary parcel sorters are retained, the depth of sort issue for parcels is mitigated. However, bundles would still have to be sorted on APPS. Mailers would also be required to meet new (earlier) critical entry times, and would enter the mail at new locations. For example, 21 DBMC entry locations would shift to approximately 66 DRDCs; 400 DSCF entry points would change to 164 DDFs, etc. The Development group is considering other classification changes including:

- Elimination of 3-digit bundles
- A Destinating Facility (DF) sort by mailers
- Scheme/sort plan bundle make-up by mailers

Attachments: Reference Assumption 6 G Package/bundle mail flow and Mail Prep Analysis, 10/14/2004

Assumption 6 N -continued

Optimized processing would require Standard B, Priority and bundles to be commingled on the APPS. Containers of these mixed volumes would then require separation at delivery units. Note that TPSS is the preferred solution in large, complex RDCs where 5 or more APPS were indicated. Current considerations include both APPS and existing secondary parcel sorting machines as well. This will have a significant impact on flows and separating bundles from packages flowing to PSM-equipped RDCs.

We suggest the development team explore modifications to APPS and TPSS technology in order to provide better integration with existing transport equipment. Using IMHS containers, OTRs and other existing equipment will reduce staging area requirements, avoid potential increases in allied activities, and improve trailer cube efficiency in the future environment. The present buy of APPS are not engineered for the use of larger containers. This would require more allied resources than the present state.

The adaptive nature of the site specific implementation planning process observed by the operations sub-group appears to be self-validating.

Assumptions Data Sheet	
Assumption #7 Used national average productivities from MODS/EOR. Utilized national average run time throughputs.	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
The IV & V team views this as a critical assumption that requires comprehensive review, analysis and conclusions. These two assumptions impact the entire capacity of the network, from clearance to equipment inventory, space needs, flows, etc. Global validation of nationally available or centralized data will be performed by the IV & V Finance sub-group, including the review of the methodology for calculating average productivities; /throughputs for every equipment type. Do we agree this is representative of the anticipated national average productivity/throughputs? Evaluate differences in model impact between runtime and wall clock throughput? What are the extremes on this average? Secondly, review the level of variation from the average in each area by key equipment type defined below. This will be accomplished by reviewing a small, medium, and large existing facility in each area, then analyzing the variation around the average and drawing a national level conclusion. Lastly, the team will identify a randomly select group of outliers on both extremes of the productivity spectrum. Perform a simulation model validation exercise by having the END group rerun that select group with actual productivities currently experienced by those facilities. This may require making changes to the simulation exercise, i.e. DBCS adjusted to actual-review impact on model clearance, etc., AFSM adjusted to actual-review impact to model clearance, etc. Key equipment typed to be considered: AFSM, DBCS, and AFCS	
Source Data Used or Facility Observed (as appropriate):	
The operations sub-group reviewed average thru puts compared to actual throughputs for three key operations, DBCS 919, AFSM 336 and AFSM.	
Observations:	***Dates:*** *9-29-04/10-25-04*
The development team used national average productivities from MODS/EOR. National average run time throughputs were utilized for all operations in the simulation model. The operations sub-group made the decision to review three key operations; DBCS 919, AFSM 336 and AFCS and the down flows associated with these operations. These operations represent the most critical and service sensitive. The down flows from these three source operations, i.e. to the delivery unit, to the manual outgoing primary, etc give an adequate picture of the implications of changes in throughput to the simulation modeling. The operations sub-group gathered actual throughput numbers for ten facilities over the most recent one year period from the random facility list. This grouping was used as a comparison to the modeled throughputs. Three throughputs were calculated; wall clock, runtime and runtime + downtime. For DBCS 919, the average throughput used in the original modeling is 37895. The actual performance from the randomly selected sites varied depending on which throughput source was used. Wall clock throughput average was 31067(-18% to modeled). Runtime throughput was 40235 (+6% to modeled), and runtime/downtime throughput was 36125 (-4.7% to modeled).	
Attachments: Throughput Excel Spreadsheet, Random Site Throughput, Operational Impacts, Audit Team Presentation (10-25-04), MODS 015, Simulation Sensitivity Analysis	

Assumption 7-continued

For AFSM 336, the modeled throughput is actually lower than current actual performance. This is likely due to the BPI standardization initiatives and modifications to the feed area of the machine since the original modeling exercise. Wall clock throughput average was 14283 (+27% to modeled). Runtime throughput was 15583 (+38% to modeled). Runtime/downtime throughput was 14705 (+30% to modeled). For AFCS, the average throughput used in the original modeling is 33156. The actual performance from the randomly selected sites varied depending on which throughput was used. Wall clock throughput average was 14453 (-56% to modeled). Runtime throughput was 33936 (+2% to modeled) and Runtime/downtime throughput was 23836 (-28% to modeled).

After reviewing the results of these calculations for each facility the decision was made that wall clock throughput most accurately reflects the operational throughput achieved by the site for DBCS and AFSM operations in the current state. It is not necessarily the most reflective measure of AFCS operational throughput achieved when sufficient quantities of mail are available to keep the machines running. AFCS machines typically encounter significant idle time during start-up, end, and low volume periods. Based on the available data, runtime + downtime throughputs would seem to be more representative of peak AFCS performance on an average day with no lull in volume in today's environment. It should be noted that when a peak Christmas day was examined for the same ten sites, significant improvement in throughputs occurred. The conclusion from this examination is that facility throughputs are impacted by the availability of mail and consistency of flow. The concept of consolidation of outgoing cancellation volumes should improve this.

The development team was asked to re-run the simulation model using the average throughputs experienced in the ten sites as opposed to a single facility. Additionally, the operations sub-group has evaluated the national average wall clock, runtime+downtime, and runtime throughputs for the same one year period to compare to the modeled throughputs and to gain a confidence level in the validity of the number originally modeled.

Overall observations and conclusions regarding the simulation model's response to adjustments in variables and its overall processing methodology:

In general, the simulation model does not adequately represent the most efficient processing at the facility level. For example, if a DBCS and volume for a particular operation, i.e. DPS is available, the simulation model assumes operators are available and processes the mail. Since the simulation model does not directly take in to account the number of DPS zones that this volume may represent, it may be assuming a single zone when in reality it is made up of many zones and therefore would not be feasible. It is acknowledged by the development team that site specific modeling and use of the DPS optimizer are an imperative.

There is a concern that the lack of specific sort plan data in the simulation model may be causing incorrect assumptions about down flow volumes. It is highly recommended that the development team focus on the random selected sites and the changes that were reflected when throughputs were adjusted to determine the reason for anomalies that we see (i.e. total volume processed doesn't match between two independent runs when only a throughput variable is introduced).

Assumption 7-continued

The processing profile did not always change in the way one would anticipate it to change. For example, when the throughput variable was decreased as in the case of AFCS operations in Bakersfield CA (see attachment), the cancellation volume appears to have been cleared earlier. Intuitively, one would not expect to see earlier processing of volume when a lower throughput is introduced.

The model assumes full staffing of machines for lunches and breaks. In the present state, the operations sub-group agrees this is not necessarily occurring on a consistent basis.

EXAMPLE OF CHANGES THAT OCCUR WHE... ...LY A THROUGHPUT VARIABLE IS CHANGES

CANCELLATION		
130% adv	Adjusted Throughput	Change
[redacted]		
20577	21125	
126968	9398	
314982	103720	
314982	318641	
314982	339663	
216249	273579	
46390	222847	
3749	73512	
8428	6340	
9946	8428	
1377253	1377253	0
		0.000
[redacted]		
122740	189960	
3594	3594	
79296	70528	
113442	104648	
176720	178770	
288069	238360	
785861	785860	1
		0.000

OUTGOING PRIMARY		
130% adv	Adjusted Throughput	Change
82478	113997	
10558	15631	
21558	21128	
284	284	
128	128	
7998	7998	
10718	10718	
53049	50123	
95962	80981	
250334	281345	
567445	562435	
582932	692542	
700695	509639	
359951	475674	
2744088	2602623	-58535
		-0.020886
379333	376683	
0	2450	
10637	7096	
127105	168006	
193857	156497	
289437	376201	
625719	452961	
1626088	1,540,094.00	85,994.00
		0.0558369

DPS FIRST PASS		
130% adv	Adjusted Throughput	Change
112192	152935	
28624	29774	
3505	5194	
1024	1024	
88329	87889	
938393	255016	
2410239	2072957	
51338	1116483	
21641	21641	
63012	64072	
130521	167603	
957734	720504	
547309	844081	
1409920	1082761	
857775	926475	
543974	769638	
435668	404159	
8601198	8724206	-123008
		-0.0141
391518	229356	
111130	277668	
171764	181090	
372311	292203	
133576	132293	
396862	457091	
17466	16877	
5524	440	
22475	27815	
25781	32259	
161126	161602	
245175	308911	
744230	672929	
426977	462041	
337604	427231	
733351	689999	
256713	189995	
205530	374759	
4759313	4934559	-175246
		-0.03551

2ND PASS		
130% adv	Adjusted Throughput	Change
2785375	1944108	
3069495	2516427	
1534747	1258214	
1153004	1887320	
	881145	
8542621	8487214	55407
		0.006526
826929	541039	
2231703	1822023	
1139960	932010	
624429	1284097	
0	197730	
4823021	4756899	66122
		0.0139

OUTGOING FLATS		
130% adv	Adjusted Throughput	Change
8265	7302	
1171	1173	
437	437	
11	11	
13	13	
83	83	
299	299	
5324	5212	
6481	6593	
28976	28895	
47058	59639	
63372	45883	
44290	44442	
49418	53885	
255198	253867	1331
		0.005243
12479	5865	
0	2425	
1259	0	
1089	750	
14634	10579	
18123	23979	
33706	33004	
40485	52245	
121775	128847	-7072
		-0.05489

INCOMING SECONDARY FLATS		
130% adv	Adjusted Throughput	Change
126299	153943	
134820	160583	
134604	161786	
134649	161125	
134419	95547	
134419	0	
80227	4	
109801	136356	
93816	119243	
98933	107347	
54341	54681	
33601	109510	
86063	113192	
82452	104673	
42	42	
1438666	1478032	-39346
		-0.02662
3778	41432	
68990	82079	
65856	84224	
77231	97924	
84530	92112	
82109	106628	
90901	79325	
90991	8354	
90991	469	
26868	18878	
32397	58322	
46831	18080	
18104	71561	
40232	56066	
40158	57862	
30001	27375	
887968	900689	-12721
		-0.01412

Contact: Leslie Frick
Source: Development Team Simulation Sensitivity Analysis
10/2004
Assumption 7

Random site throughput Average

MODS Date: 10/01/2003 thru 09/07/2004

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Site	Operation	Fed	Oper Time	Run Time	Idle Time	Down Time	Model Thruput	Wallclock Thruput*	% to Model	Runtime Thruput	% to Model	Runtime+ Downtime Thruput**	% to Model	
[redacted]	DBCS 919	723,195,271	22,705	17,886	2,700	2,119	37,895	31,852	-15.95%	40,435	6.70%	36,151	-4.60%	
[redacted]	DBCS 919	205,865,564	5,729	5,004	408	317	37,895	35,933	-5.18%	41,137	8.56%	38,685	2.08%	
[redacted]	DBCS 919	905,815,362	28,436	22,163	3,606	2,667	37,895	31,855	-15.94%	40,870	7.85%	36,481	-3.73%	
[redacted]	DBCS 919	380,526,666	12,757	9,392	2,345	1,021	37,895	29,829	-21.29%	40,518	6.92%	36,546	-3.56%	
[redacted]	DBCS 919	222,970,336	8,375	5,941	1,594	841	37,895	26,623	-29.75%	37,532	-0.96%	32,880	-13.23%	
[redacted]	DBCS 919	65,062,356	2,202	1,655	340	206	37,895	29,547	-22.03%	39,303	3.72%	34,948	-7.78%	
[redacted]	DBCS 919	219,954,685	7,469	5,525	1,311	633	37,895	29,451	-22.28%	39,812	5.06%	35,721	-5.74%	
[redacted]	DBCS 919	44,577,307	1,911	1,141	650	120	37,895	23,327	-38.44%	39,069	3.10%	35,342	-6.74%	* Excessive Idle Time
[redacted]	DBCS 919	73,104,537	2,177	1,848	176	153	37,895	33,587	-11.37%	39,561	4.40%	36,537	-3.58%	
[redacted]	DBCS 919	222,027,288	6,837	5,576	676	586	37,895	32,473	-14.31%	39,821	5.08%	36,036	-4.90%	
TOTAL		3,063,099,372	98,597	76,130	13,805	8,662	37,895	31,067	-18.02%	40,235	6.18%	36,125	-4.67%	
[redacted]	AFSM 336	179,948,727	12,676	11,649	368	659	11,286	14,196	25.79%	15,448	36.88%	14,620	29.54%	
[redacted]	AFSM 336	41,333,709	2,752	2,537	85	131	11,286	15,018	33.06%	16,292	44.36%	15,494	37.29%	
[redacted]	AFSM 336	78,620,675	5,828	5,361	140	327	11,286	13,491	19.54%	14,664	29.93%	13,822	22.47%	
[redacted]	AFSM 336	101,456,539	8,042	7,243	328	471	11,286	12,615	11.78%	14,007	24.11%	13,152	16.53%	
[redacted]	AFSM 336	85,135,753	5,823	5,319	116	388	11,286	14,621	29.55%	16,006	41.82%	14,919	32.19%	
[redacted]	AFSM 336	0	0	0	0	0	11,286	N/A	N/A	N/A	N/A	N/A	N/A	
[redacted]	AFSM 336	58,245,565	4,002	3,623	189	190	11,286	14,556	28.97%	16,077	42.45%	15,276	35.35%	
[redacted]	AFSM 336	0	0	0	0	0	11,286	N/A	N/A	N/A	N/A	N/A	N/A	
[redacted]	AFSM 336	26,006,783	1,440	1,378	9	53	11,286	18,063	60.05%	18,876	67.25%	18,171	61.00%	
[redacted]	AFSM 336	67,994,568	4,158	3,879	51	228	11,286	16,352	44.89%	17,528	55.30%	16,556	46.69%	
TOTAL		638,742,319	44,721	40,989	1,285	2,446	11,286	14,283	26.55%	15,583	38.07%	14,705	30.30%	
[redacted]	AFCS	321,954,031	18,983	9,268	8,585	1,130	33,156	16,960	-48.85%	34,737	4.77%	30,962	-6.62%	
[redacted]	AFCS	54,101,818	2,488	1,552	587	348	33,156	21,746	-34.41%	34,856	5.13%	28,466	-14.14%	
[redacted]	AFCS	243,065,278	18,761	7,138	7,959	3,664	33,156	12,956	-60.93%	34,050	2.70%	22,502	-32.13%	* Excessive Downtime
[redacted]	AFCS	233,034,642	15,467	6,547	6,551	2,368	33,156	15,067	-54.56%	35,595	7.36%	26,139	-21.16%	
[redacted]	AFCS	143,132,498	11,563	4,886	2,678	3,998	33,156	12,379	-62.67%	29,294	-11.65%	16,110	-51.41%	* Excessive Downtime
[redacted]	AFCS	0	0	0	0	0	33,156	N/A	N/A	N/A	N/A	N/A	N/A	
[redacted]	AFCS	107,412,875	6,840	2,964	2,779	1,097	33,156	15,704	-52.64%	36,235	9.29%	26,448	-20.23%	
[redacted]	AFCS	0	0	0	0	0	33,156	N/A	N/A	N/A	N/A	N/A	N/A	
[redacted]	AFCS	39,271,797	2,998	1,250	1,076	672	33,156	13,099	-60.49%	31,414	-5.25%	20,433	-38.37%	* Excessive Downtime
[redacted]	AFCS	102,259,285	8,990	3,058	3,673	2,259	33,156	11,375	-65.69%	33,443	0.87%	19,233	-41.99%	* Excessive Downtime
TOTAL		1,244,232,224	86,090	36,664	33,890	15,536	33,156	14,453	-56.41%	33,936	2.35%	23,836	-28.11%	
[redacted]	AFCS (12/15/03	2,704,283	119	76	38	5	33,156	22,712	-31.50%	35,699	7.67%	33,446	0.87%	
[redacted]	AFCS (12/15/03	585,006	23	16	5	2	33,156	25,722	-22.42%	36,941	11.42%	33,094	-0.19%	
[redacted]	AFCS (12/15/03	585,006	23	16	5	2	33,156	25,722	-22.42%	36,941	11.42%	33,094	-0.19%	
[redacted]	AFCS (12/15/03	2,010,920	110	54	41	15	33,156	18,281	-44.86%	37,269	12.41%	29,082	-12.29%	
[redacted]	AFCS (12/15/03	1,630,220	69	50	7	13	33,156	23,498	-29.13%	32,638	-1.56%	25,966	-21.68%	
[redacted]	AFCS (12/15/03	0	0	0	0	0	33,156	N/A	N/A	N/A	N/A	N/A	N/A	
[redacted]	AFCS (12/15/03	994,521	43	26	15	2	33,156	23,172	-30.11%	37,889	14.28%	35,368	6.67%	
[redacted]	AFCS (12/15/03	0	0	0	0	0	33,156	N/A	N/A	N/A	N/A	N/A	N/A	
[redacted]	AFCS (12/15/03	395,228	20	12	4	4	33,156	20,263	-38.89%	33,056	-0.30%	25,432	-23.30%	
[redacted]	AFCS (12/15/03	1,177,082	61	34	17	10	33,156	19,317	-41.74%	34,803	4.97%	27,098	-18.27%	
TOTAL		10,082,266	467	283	132	52	33,156	21,576	-34.93%	35,582	7.32%	30,075	-9.29%	

Contact: Leslie frick
Source: MODS/Jim Zink, Raleigh P DC
Assumption 7

Random site throughput Average

* Wallclock Throughput is based on total hours that sortplan was loaded into the machine (includes runtime, idle time, and downtime. This most accurately represents the operational throughput achieved by the site for DBCS 2nd Pass and AFSM Secondary operations. However, it is not a reflective measure of AFCS operational throughput achieved when sufficient quantities of mail are available to keep the machines running as AFCS machines typically encounter significant idle time during start-up, end, and low volume periods during the night.

Contact: Leslie frick
Source: MODS/Jim Zink, Raleigh P DC
Assumption 7

Assumption Data Sheet

Assumption #8: Used current national average truck utilizations from TRACS. Used ERMCs as MTE device for capacity calculations

Source of Data to be utilized/methodology used for IV & V (as appropriate):

Evolutionary Network Development to provide a complete explanation of the calculation method for truck utilization. Evolutionary Network Development to provide a narrative on the future state MPE strategy, i.e. type, style, etc. Does this calculation appear to be representative of national transportation needs? Does the use of ERMCs as the container type create an over or understatement of equipment needs? Is the use of ERMCs expected to be the only national equipment type? Does the Evolutionary Network Development model consider new "universal" containers currently under development? What are the implications of this? What are the exceptions, i.e. APPS? What are the implications of this on equipment inventory? What is intended for OTRs and IMHS containers in the future system? How will geographic origin/destination imbalances in mail volumes be accounted for in equipment inventory? What are the floor staging implications of this? What is intended for pallets, gaylords, etc? Is bed loading anticipated or modeled? Will mailers bed load and will new facilities be capable of receiving and unloading bedloads?

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development team consists of meetings and discussions, reviewing data utilized, documentation, and may include field site visits. The development team estimates they will need two (2) days preparation time, and the primary contact is Jeff Williamson

Observations: | ***Dates:*** *11-08-2004*

The development team began by obtaining a data file containing the contract information and mileage for all relevant HCSS trips. Using the HCSS data the development team then calculated the average truck size for all trips in HCSS. Each type of trip was assigned to an RDC trip as follows:

Zip Code to OFDF used 1095 cu. Ft based on intra-SCF average; OFDF to RDC used 2793 cu. ft., RDC to RDC used an average of 2562 cu. ft. in the baseline. Next the development team determined the cubic feet available to use for mail. Normally headquarters uses 50% to represent how much of a trailer can be used (incorporates utilization of MTE). For the purposes of normalizing the data and subsequent cost analysis the team assumes only HCR transportation will be used – no PVS transportation. The national average truck utilization calculation affects both costing and arrival/departure profiles. The development team reported the total cost of the modeled transportation is within +/- 2% of current actual transportation costs. Given the complexities involved and the present development of a national HASP model which will replace the earlier transport modeling, no further analysis would be productive.

Attachments: Audit Team Presentation: END Project-11/08/04, Optimization Model Input Development description of data manipulation steps-6/14/04

Assumption 8 -continued

The development team used a number of assumptions that could undersize or oversize the required transportation network. In today's environment mail is generally separated by class and the networks are defined to move mail by class. In the new environment mail will move by shape which should reduce cube requirements. Both of these would generally require more capacity than the shape based future state. Since the transport model begins with a current state baseline, space should be more efficiently used. The model assumes every container, tray, tub, or sack will be 100% full. This could tend to understate cube requirements and costs. The model assumes no more than 50% cube utilization of any vehicle. Several equipment types will be utilized and as such, in some instances more than 50% of a truck can be used and in others less. While the operations sub-group is not aware of a comprehensive study of the implications of this, we must defer to the headquarters network group concerning truck cube utilization averages. The model does not account for the use of the new universal container under development. It further assumes for the sake of modeling the use of ERMC's as the standard container for all transport.

TRACS does not account for the transfer of empty mail transport equipment (MTE). This will tend to understate capacity requirements.

The operations sub-group acknowledges that TIMES data is not rich enough for the purpose of building a national transportation model, i.e. truck utilization and content.

No rounding process is used by the model to identify the number of trucks required between any two origins/destinations. For example, if the volume warrants 2.2 trucks the model derives costs based on the number 2.2.

Given the current development of the national HASP model, many of the above uncertainties associated with the original transport model should be addressed. Specific validation of lanes, transportation needs, cubic capacity requirements, service requirements, and arrival profiles should be validated at the local operating level to ensure they adequately represent and support transportation requirements. The development team should also ascertain the implications of customer bed loading to ensure facilities are properly equipped.

For the most part, the operations sub-group views this assumption and the transport model as a cost versus savings analysis tool. It does not appear nor was it designed to ensure a totally optimized transportation network. Tools such as HCAP, TOPPS, and local intervention will be necessary to ensure a totally optimized future transportation network.

Assumption Data Sheet

Assumption #9: All mail that moves by Air flies direct (FedEx or similar hub systems are considered direct for assumption purposes)

Source of Data to be utilized/methodology used for IV & V (as appropriate):

What is meant by this statement? The FedEx hub does not fly direct. Is it implied that this no longer exists in the future state? Obtain a narrative of the rationale applied to this item and its implications in the modeling from the Evolutionary Network Development group. How many destinations and what quantity of volume presently does not fly in a direct environment? This would most likely come from the networks and logistics group at the headquarters level. What implications does this have on the model and on mail arrival? What time frame does the Evolutionary Network Development group provide for in modeling for transit of mail that moves by air? Is there sufficient lift today from NCP city to NCP city? What are the implications of losing all of the OF airports in remote areas?

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of meetings and discussions. No preparation is needed; it may be scheduled at anytime. The primary contact is Jeff Williamson (contractor).

Observations: | ***Dates:*** *9-2004*

Actual transit times to/from USPS to/from FedEx were utilized to determine the transit time for a given origination/destination pair. This transit time was used to model the FedEx portion of air mail transport. The hubbing activities were, in effect, built into the process as a result and are considered in the transit time. This issue is therefore, irrelevant to the overall modeling. The SNET operating plan was used to develop departure and arrival times.

For the purposes of modeling, END established a "linear" arrangement for air transport. It is acknowledged by the development team that this does not necessarily represent today's network. For example, while all Priority that must be flown flies by FedEx or in limited cases other air cargo carriers; there remains a significant portion of the national FCM mail stream that is tendered to commercial passenger aircraft. A short term analysis of the ratio of FedEx to commercial passenger air for the past six months indicates 43.98% still flows by passenger aircraft. In many instances these routings are not direct routings as implied in the modeling. Over a 3 week period 39.45% of the 43.98% of FCM on commercial passenger aircraft traveled on CAIR transfer routes. Given the significant volume present on passenger air, if this assumption remains unchanged, it could impact the modeled arrival profiles.

The development team continues to work with the Shared Network group to stay abreast of future network developments. At the same time, the amount of mail flown commercially today will be significantly impacted by the expanded surface reach created by the RDC network

Attachments: Spreadsheets; FCM% assigned to FedEx and CAIR/FedEx-direct vs. transfer

Assumption 9, Cont.

A more tactical analysis will be necessary (and is planned) using TOPS to help identify the most efficient routing for all mail. Additionally, as the CAIR contract process continues to evolve, the networks group is demonstrating that mail will be removed from commercial routings that fail to live up to the service standard and commitment by the carrier.

In general, the mode of transportation does not appear to impact the node selection process. It will be necessary to evaluate site by site needs as the transition to the future state occurs to ensure sufficient lift is in place for the consolidated volumes. For example, in some instances multiple airports presently serve the area that will constitute an RDC service area for outgoing products of the future. Shared Networks will need to evaluate changes in FedEx (or the carrier in place in the future) tender locations to ensure these RDC sites have sufficient lift in proximity to their facility.

CAIR INDEX
Direct vs Transfer

Week of						
18-Sep	CGR D	7259648	53.30%	P&I D	1084232	7.96%
	CGR T	4202532	30.86%	P&I T	1073620	7.88%
	CGR is a CAIR Carrier Generated Route			P&I are Postal and Postal Immediate Routes		
	All Direct	**8343880**	**61.26%**			
	All Transfer	**5276152**	**38.74%**			
	Total	**13620032**				
11-Sep	CGR D	7171149	51.49%	P&I D	1165932	8.37%
	CGR T	4573155	32.83%	P&I T	1017598	7.31%
	All Direct	**8337081**	**59.86%**			
	All Transfer	**5590753**	**40.14%**			
	Total	**13927834**				
4-Sep	CGR D	6,599,447	52.06%	P&I D	1,073,607	8.47%
	CGR T	3,489,224	27.52%	P&I T	1,515,134	11.95%
	All Direct	**7,673,054**	**60.53%**			
	All Transfer	**5,004,358**	**39.47%**			
	Total	**12,677,412**				

MON Avg	TUE Avg	WED Avg	THU Avg	FRI Avg	SAT Avg	SUN Avg	Week Avg	
2,283,447	2,316,445	2,301,068	2,137,083	2,123,288	1,341,712	977,669	13,480,712	CAIR All
233,106	246,405	273,426	257,636	239,162	103,709	70,869	1,424,313	CAIR Pri
1,953,678	1,961,550	1,908,034	1,762,471	1,759,829	1,058,984	826,553	11,231,099	CAIR FCM

Contact: Leslie Frick
Source: Joseph Hilferty
Operations Specialist
Headquarters-USPS
10/05/04
Assumption 9

Total First Class Mail Volume

	Total FCM Volume (lbs)	FedEx FCM Volume (lbs)	Percent of FCM assigned to FedEx	CAIR FCM Volume (lbs)
March 2004	84,166,665	37,854,725	44.98%	46,311,940
April 2004	85,644,749	34,880,544	40.73%	50,764,205
May 2004	80,108,793	33,739,137	42.12%	46,369,656
June 2004	75,519,754	32,615,303	43.19%	42,904,451
July 2004	84,470,841	38,171,047	45.19%	46,299,794
August 2004	76,093,186	36,491,892	47.96%	39,601,294
TOTAL	486,003,988	213,752,648	43.98%	272,251,340

Source: Anthony Pajunas
Manager, Logistics
Headquarters-USPS
09/30/04

Assumption Data Sheet	
Assumption #10: Allowed a maximum of one intermediate RDC between an originating and destinating RDC	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
Is this parameter still in effect? This item cannot be a 100% validation. Prior randomly selected sites, i.e. centroid, transit times, will be reviewed to analyze the transit time allowed between specific RDCs. The simulation model will be evaluated to determine the impact of this assumption on overall mail flows and arrival times. What amount of time is provided for in the model for cross docking at intermediate stops?	
Source Data Used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development group consists of meetings, discussions, and observing the model. No preparation is needed; it may be scheduled at anytime. The primary contact is Dave Strohecker (USPS).	
Observations:	***Dates:*** *10-25-2004*
The original optimization model called for direct transportation between the 66 RDCs or a maximum of one RDC as a transfer point between origin and destination. This was done to reduce the cost of direct transportation. Up to two hours was allowed for the transfer of volume at the intermediate stop. The future RDC transportation model calls for the use of up to two intermediate transfer points between the ORDC and DRDC. The development team continues to design and develop the approach for creation of the most efficient surface transportation network. Current thinking is that 44 of the nation's 66 RDCs will serve as HASP sites. The operations team did not utilize the originally defined process for evaluation of this assumption. Since the original assumption is no longer valid and a new modeling approach of the surface transfer points is being developed, it would be an irrelevant exercise. Once the National HASP Model (NHM) is complete, a thorough analysis of the outputs should be conducted at the local operational level. Based on our observation of the implementation approach being used by the development team, it is obvious this is their intention. The operations sub-group feels confident the project includes a mechanism for validation at the site specific level.	
Attachments: Audit Team Presentation/ 10-25-04/ Dave Strohecker	

Assumption Data Sheet

Assumption #11: AS-504 provided the standard machine footprint

Source of Data to be utilized/methodology used for IV & V (as appropriate):

Review how many different machine configurations exist today. Is the intention to standardize the entire DBCS inventory to the same size/configuration? Examine the different configurations of DBCSs and compare to the standard footprint. How is the APPS addressed since there are multiple configurations of this machine? What are the implications of adding additional AFCSs where an existing system configuration doesn't provide for it, i.e. space, surge capacity, rough cull, in customized system? What are implications of TMS and fixed mech systems in the adding of machinery within a facility? In how many locations does Evolutionary Network Development anticipate adding equipment? Obtain list. What are the locations and how many additional pieces of equipment are planned for each facility where additions are anticipated?

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of reviewing data utilized, documentation, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The primary contact is Andy Louis (contractor).

Observations: | ***Dates:*** *10-2004*

The operations sub-group reviewed the different configurations of DBCS and how they compared to the standard footprint utilized in the model. The standard machine utilized in the model was a 190 bin DBCS, which equated to 2,250 square feet. The space allows for two racking systems and staging to support the mission.

Headquarters anticipates a concept change to standardize the configuration of DBCSs to 206 bin machines with the additional purchase of stackers. This would increase the square foot allocation by 99 square feet for each machine set modeled. The model would have to be re-run to generate new workroom space needs to accommodate the increase to 206 bin machines.

The operations sub-group reviewed the present and future space need for 10 OF/DF sites. They are the following: Reno, Nevada; Chicago, Illinois; Rochester, New York; Savannah, Georgia; Eugene, Oregon; Orlando, Florida; St. Louis, Missouri; Bakersfield, California; Southern, Connecticut and Detroit, Michigan. The operations sub-group then analyzed the square footage necessary for each machine presently in the facility and adjusted for the additional machine allocation defined by the development team in the future state. This data was compared against the space need provided by the development team. This data was categorized as follows: total workroom, available space and required space for OF/DF machine needs.

Attachments: Equipment by Campus

Assumption 11-continued

The development team acknowledges a need to increase the square footage requirements in the model by a factor of 34% to account for aisles and staging space needs. It has been verified that AS 504 criteria was used in the development of square footage needs.

A more in-depth review was performed on two OF/DF sites (Southern CT P & DC & Rochester NY P & DC). This review included the present layout and the available workroom space as compared to the data in the model. The layout of each site was adjusted to reflect the machine additions and deletions defined by the modeling outputs. This conclusion from this analysis is the model did provide adequate space using AS 504 criteria.

A review of RDC site locations where APPS machine deployments were modeled was conducted. The sites were: Anchorage P&DC; Des Moines BMC; Seattle BMC; St. Paul, P&DC; Midland P&DC; North Houston P&DC; North Jersey PMPC; Philadelphia BMC; San Francisco P&DC; and Santa Clarita P&DC. The maximum footprint of 40,000 square feet was utilized to determine the space requirement for each site in the modeling. The review of each of the above sites with the new machinery as defined in the modeling fell within the square footage range provided by the development team. This analysis is based on the revised approach the development team intends to use, that being, a 54% aisle, storage and prepping space allocation. The development team acknowledges a need for a spacing/sizing tool for RDCs. They are presently developing in conjunction with Headquarters Facilities and Engineering a modeling tool for this purpose. Changes to approach, i.e. PSM's remaining, no DBCS distribution will need to be taken into consideration. The development team acknowledges this as well.

Members of the operations sub-group have participated as previously outlined in a number of local site specific validation exercises. This process continues. It is obvious from these efforts there is a clear understanding of the need for proof of concept, local site validation, and site specific space requirements planning by the development team. These implementation and planning exercises also aid in identifying any local anomalies such as TMS implications, and rough cull configuration changes necessary where additional AFCS's are added to OF/DF's.

Assumption Data Sheet

Assumption #12: Every truck may contain mixed products

Source of Data to be utilized/methodology used for IV & V (as appropriate):

This assumption will be evaluated intuitively. Obtain a narrative of the rationale for shape based and class flows of mail on transportation between facilities from the Evolutionary Network Development group. In our present environment, volumes may be staged in a yard for loads that are less time sensitive. Future state will require all trucks to be considered as "hot". What are the ramifications of this methodology on the overall management of transportation and loading and unloading of volumes especially during the key dispatch/CET/CT times? What are the potential effects of this item on the arrival profile? How did Evolutionary Network Development determine the arrival flows? What are the ramifications of this item on staging - particularly in RDCs.

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of reviewing data utilized, documentation, and may include field site visits. The development team estimates they will need five (5) days preparation time, and the primary contact is Dave Strohecker (contractor).

Observations: | ***Dates:*** *10-25-2004*

Data provided reaffirmed that shared product transport will require all trucks be loaded and unloaded quickly at each RDC. The national and regional models assume 30 minute unload and a 20 minute load time. All arrivals are therefore hot trucks. The expectation is that shared product transportation should improve the overall profiles. Trucks will be filled more quickly due to availability of multiple/commingled products at each site. Due to this hot truck approach it is acknowledged that there will be an increase in the amount of destinating containers to be staged. This will be a significant change to our current operating environment, especially with Standard A and B where traditionally the volumes are stored in trailers on yards to aid in management of floor space. The operations sub-group has not been able to visualize fully the impact of this processing concept. The level of discipline in loading, unloading, staging and transport within these large facilities would seem to require a great deal of study and planning at the site specific level. This modeling is acknowledged by the development team as a necessity but has not been completed at this time.

To fully evaluate the implications of this approach, the operations sub-group would recommend a completely modeled IRDC showing all truck arrivals, the anticipated unload time, the cross dock flows; any build and break volumes from these trucks, internal transport, processing and dispatch of all products. While this may seem on surface to be a complex analysis, given the significant change from today's operating environment, this granular level evaluation would seem to be an imperative. This would also ensure sufficient time is allocated for each step in each facility keeping in mind that a two hour receipt to dispatch window for build and break and cross dock is assumed. It should also ensure sufficient space is provided in each of these

Attachments: Audit Team Presentation/ 10-25-04/ Dave Strohecker

Assumption 12 -continued

facilities. The National HASP modeling is one step in this process. Once complete the above recommendation should be implemented in conjunction with the dock door optimizer. The present modeling assumes a standard CT/CET for every facility. While this may be possible, each facility will have different levels of volume and sortation for various products. As an example an IRDC will have more build and break and more cross dock responsibility. The above site specific level modeling should validate that CT/CETs planned will work together in a very structured way to ensure products with the most time sensitive commitments are not bumped by less time sensitive products.

The 4-bank routing scenario is the beginning of the right approach to modeling the transport and processing timeframes in the RDC/HASP network. Once this effort is concluded the development team acknowledges the need for a great deal of local operational validation at the site specific level. The ramifications of mailer entries in the future state must be incorporated in to this analysis as well. A more structured and disciplined approach to the mailer reservation systems will also be required to meet operating commitments.

Assumption Data Sheet

Assumption #13: Mailers (or USPS employees) separate turnaround volume from non-turnaround volume before induction at the OF

Assumption #14: Mailers change to new drop times and locations to accommodate changes in processing locations

Assumption #15: Mailing requirements and changes necessary to accommodate the new network are assumed to all take place prior to implementation (mailer make-up and drop location methodologies)

Source of Data to be utilized/methodology used for IV & V (as appropriate):

Data may be necessary to evaluate the magnitude of the work associated with capturing turnaround at the OF prior to dispatch to the RDC. This data may be obtained from aggregate national level data sources. Evolutionary Network Development will be asked to provide a narrative outlining the logic for this assumption. What is the significance of this item with the industry? Has Evolutionary Network Development identified the percentage of turnaround versus non-turnaround that would need to be "tray-sorted" at the OF level? What mailing requirement changes are anticipated by Evolutionary Network Development to accomplish this assumption? Will these changes be made prior to implementation? Is the service standard for overnight presort anticipated to remain in place? What are the implications of the OF "tray-sorting" an entire presort or priority mailer prepared mailing to identify the overnight? A second part of the evaluation of this item will be to ascertain the magnitude of the change to drop times to achieve both overnight service and RDC CET. A randomly selected group of sites should be evaluated to determine the number of late deposit arrangements that exist with presorters that will not meet the CTs to NCPs from OFs. In so doing, an evaluation of the number of changes can be made. Is marketing aware and involved in the process that would be necessary?

Source Data Used or Facility Observed (as appropriate):

See Assumptions #6n and #16. The primary contact is Dave Strohecker (USPS).

Observations: | ***Dates:*** *10-14-2004*

Assumptions 13, 14, and 15 are considered to be extremely critical to the overall success of this effort. The work necessary to identify the needed mailing requirement changes and potential pricing changes has been started by the development team. It is also acknowledged by the development team that a great deal of work is yet to be done. Many of the changes envisioned will only entail labeling list changes or mailing requirement revisions. However, we also envision a number of pricing changes and/or incentives to redirect mailers to the new entry points. This effort would seem to be a major task. The attachments identify some of the early work on creation of new bundling and containerization needs. Prior to finalization of this effort, however, any modifications or changes to the original network configuration must be defined.

Attachments: Mail Prep and Entry Requirements, Mailer Entry Times, See Assumption 6 G-Package/Bundle Mail Flow and Mail Prep Analysis)

The operations sub-group recommends a process for mapping the entry points for products and sort levels in a well defined way. The attachments included with this write-up show the effort already underway to create this mapping. For instance, over 400 DSCF sites need to be mapped to new locations such as 66 DRDCs and 164 DFs. This in-depth mapping effort should support a streamlined pricing and costing analysis. The attachment outlines the initial drop ship classifications in a broad sense on page 11. The mapping would literally define the present level of sortation and location to be dropped and the new level of sortation and location to be dropped. This should aid in the ensuing discussions with the pricing and mailing requirements experts to define the needed changes and scope of the effort. The time-lag between the development of the new makeup/labeling requirements and the rate setting process would seem to dictate that this effort begin as soon as possible.

In the broader sense, the costs of handling should be reduced as a result of the network consolidations. At the same time however, drop points for products by mailers could be in entirely different geographic locales. For example, in today's environment, mailers receive an SCF drop ship discount for dropping at the DF. In the future state, if this drop shipment has any working pallets of bundles or machineable parcels, the drop location would have to be the DRDC. In many instances this could move the drop location further away from the DF and thus add costs to postal transportation not presently incurred. There are examples also where the lack of an incentive for mailers could lead to drops in a location other than that desired. One such example would be mailers presently receive a DBMC discount at 21 BMCs. The apparent replacement facility will be the 66 DRDCs. Absent an incentive, mailers may not be willing to expand the number of locations that drops are required and/or the desired separations to obtain the discount.

There would seem to be several key issues that will require changes in mailer entry practice. For example, presort mailers presently located in a city where the plant is proposed to close may be forced to deposit mail earlier and/or at another location. In major metropolitan areas this should not be a significant issue, however in non metropolitan areas, distances and earlier DOV requirements could dictate a change in mailer practice. As a result, presort mailers could lose preferential drop times or be required to travel to the new OF. The distance to travel, cost associated, and time necessary may cause presort mailer concerns. Confronting these issues in advance of implementation would seem to be the proper approach.

The operations sub-group has concluded that a comprehensive plan for implementation of the network and the required mailing requirements changes should be developed to ensure the appropriate timing of events. Absent such a plan, as facilities are phased in mail makeup and deposit locations could compromise savings and service objectives.

Assumption Data Sheet	
Assumption #16: Only FCM overnight and OND Priority is captured as turnaround at OF/DF	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
No sampling will provide useful data. The IV&V team will evaluate this assumption based on reasonability/feasibility, and planned methodology. Evolutionary Network Development to provide detailed methodology to be used for processing turnaround Priority Mail (e.g., no equipment is planned, yet many OF/DFs will be required to make in excess of 400 5-digit separations). This should address Priority flats, parcels and outside pieces.	
Source Data Used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development group consists of reviewing data utilized, documentation, and may include field site visits. The development group estimates they will need two (2) days preparation time, and the primary contact is Dave Strohecker (USPS).	
Observations:	***Dates:*** *10-25-2004*
All post offices/stations will be required to separate overnight Priority and First Class SPRs at a minimum for this assumption to work. Large Priority mailers dropping at a point of origin will also be required to make these separations to obtain overnight service commitments. Any volumes not separated prior to arrival at the OF will either have to be separated at the OF manually or will not receive overnight treatment. It would not seem feasible for the OF to rehandle every piece of Priority prior to dispatch to the RDC and therefore it would seem that a portion of the Priority mail with overnight commitments will not receive overnight handling. This is less of an issue where OF/DFs and RDCs are co-located or in metropolitan areas where the RDC is in close proximity to the OF/DFs served and RDC processing of overnight mail may be possible. The operations sub-group would recommend that an analysis be performed to ascertain the number of locations where proximity will preclude the need for manual processing of overnight by an OF. In reviewing the Priority volume to be distributed at RDCs in Assumption 6, it would appear that a significant amount of overnight Priority may require manual distribution at OF/DFs. The above study should aid in determining the amount of this volume by site. A key question raised during this validation was the cost and efficiency implications of shifting from a mechanized/automated sortation to manual distribution of this volume. At the OF, 5 digit zip codes for offices that contain 20 or more routes will be distributed into a container while zips with less than 20 routes will be distributed into sacks. The amount of square footage allocated based on this distribution is 33.9 square feet per container or 7.11 square feet for the sack operation. The total separation space is then multiplied by 120% to account for staging. It would not appear feasible for associate offices to also make 3-digit separations prior to dispatch of overnight turnaround. Given the number of delivery units in each of the OF/DFs a priming operation would seem to be a necessity. The operations sub group would recommend further evaluation of the cost and efficiency ramifications as well as the space allocation impacts for this assumption. It may be a low impact item in many of the larger volume sites based on the proximity of the RDC, but this should be evaluated.	
Attachments: Audit Team Presentation/ 10-25-04/ Dave Strohecker, Manual Parcel and manual Priority Mail Workload	

Assumption Data Sheet

Assumption #17: All mail transported to RDCs will arrive shape based in containers

Source of Data to be utilized/methodology used for IV & V (as appropriate):

The IV&V team will evaluate planned methodology provided by the Evolutionary Network Development work group. This will include how/where shape separations are planned to take place, who will perform these separations, and associated cost implications. There will be no SPBS at the OF. Any/all work will be manual. What are the implications of this?

Source Data Used or Facility Observed (as appropriate):

See Assumption #12. The primary contact is Dave Strohecker (contractor).

Observations: | ***Dates:*** *10-25-2004*

The present methodology of the development group is: Package shapes (packages, Priority, and bundles) will be combined when using shared transport from ORDC to DRDC or DRDC to 5 digit. This would take place wherever mail is processed on an APPS. The intent still appears to be that originating shape-separations will be maintained throughout the relay transport network for letters, flats, and packages regardless of break-build or cross dock methods. In essence this means First Class, Standard A, Periodicals, packages albeit Priority or Standard B can be commingled in the same container. This represents a significant operational change from our present environment. This could potentially reduce local management's ability to manage/curtail mail types within specific operating windows. Several issues remain unclear at this time. They are: 1) the level and number of separations required at the Post Office/Station level to support the new network, i.e. turnaround Priority, turnaround First Class, local mailings, shape sortation, etc., 2) the staging implications since all containers and mail will be "hot" by design. The operations team recommends further development of the approach to these items and more specificity as to how these concepts will be applied at each distribution level in the new environment.

Once a decision regarding what mail types will be processed in RDCs and on what types of equipment, and full development of the National HASP network concept has occurred, this assumption should be further evaluated to determine the overall operational feasibility.

Attachments: Audit Team Presentation (10/25/04)

Assumption Data Sheet

Assumption # **Assumption #18:** Necessary dock door capacity, at the right height, will be in place (either existing or through expansion) in all locations. We must also consider maneuvering area as it relates to new transportation equipment requirements in the future state.

Source of Data to be utilized/methodology used for IV & V (as appropriate):

Since discussed with Evolutionary Network Development by the IV&V team, work has begun to understand the implications of this assumption. It will not be possible to evaluate this item at the granular level to 100%. Evolutionary Network Development to provide the IV&V operations sub-group with the dock door optimization model of a randomly selected group of facilities. What are the implications of maneuvering area? Does the optimization model build from the clearance times of the DF and RDCs? Are there sufficient dock doors for critical time frames for dispatching? Is there sufficient platform space for the needed dock transfer operations? This item extends beyond OF/DF/RDCs. Many changes are implied in the flows of mail to and from associate offices. Will DFs be capable of providing pure five digit containers and routings to every associate office? Does the Evolutionary Network Development group assume that consolidation will need to occur in upstream and downstream operations? Associate offices and closed plants may be required as cross docking operations to accommodate shape based sortations for outgoing mail, as well as to provide logistics efficiencies to and from small offices. How will the offices needed for consolidation/cross docking be defined? How have/will cost implications associated with this manual work be identified and considered in the final evaluation? Has the RDC concept been modeled to identify the implications of cross dock operations associated with intermediate HASP/transfers & stops? Has the more recent HASP modeling been updated based on the number of transfer stops anticipated? How are BME/other dock door and staging needs considered in the dock door optimization process?

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development team consist of reviewing data utilized, documentation, and may include field site visits. The development team estimates they will need two (2) days preparation time, and the primary contact is Luke Grossmann (contractor).

Observations: | ***Dates:*** *10-13-04*

The operations sub-group met to evaluate the status of the dock door optimizer as well as the method for evaluating the future needs in the newly established network facilities. It is acknowledged by the development team that some method for determining height and number of dock doors, platform depth, and maneuvering area requirements is needed. In an effort to develop such a process, several regression analyses were conducted to identify the main drivers of need. At this point, there is no known methodology for determining actual requirements. A discussion regarding methods presently used by the facilities group and AS-504 planning requirements in 929 formats was held.

Attachments: Dock Door Presentation

Assumption 18 -continued

The operations sub-group concluded that given the change in operating requirements of the future state, i.e. 2/3 day consolidation, Priority consolidation, hot trailers at RDC, etc, the present methodology will not aid in design of a process. There are many issues that impact the determination of dock doors to include, number of five digit Zip Codes served, volume/cubic feet entering and departing the facility, mailer entry, dispatch windows (especially in the newly formed DF operations with many more secondaries to perform & in the OF's with the larger flows of collection volumes).

Given the optimized network requirements, it is imperative that a solution be developed. The dock door optimization model should be structured to simulate optimized peak loading periods, taking in to consideration time frames such as day after holidays, fall mailing season, etc. There is no accurate inventory of the present dock doors and their configuration. The operations sub-group recommends gathering this information as a starting point.

A solution to this problem is of the utmost importance to the overall implementation and success of the END process. Failure to adequately evaluate and address this issue through establishment of a dynamic modeling tool will impact mail flow assumptions, dispatch and clearance time assumptions as well as total network costs. While no model exists at present, the development team acknowledges its need and continues to work toward a solution. The difficulty to identify this solution reflects the overall complexity of the problem.

Assumption Data Sheet

Assumption #19: Current processing plants can be modified/expanded subject to space constraints identified in data gathered at each site.

Source of Data to be utilized/methodology used for IV & V (as appropriate):

Input item # 11 requests a listing of all facilities that are to be expanded. Randomly select a group of these facilities to perform an analysis thru on-site visit/area consultation/review of floor layouts to validate that the amount of expansion assumed for that facility can actually be accomplished. This assumption should be validated simultaneously with input item #11.

Source Data Used or Facility Observed (as appropriate):

See Input #11. The primary contact is Jeff Williamson (contractor).

Observations: | ***Dates:*** *10-2004*

The operations sub-group reviewed the campus summary listing for END. This listing included all facilities (P&DC, P&DF, BMC, PMPC and MPO) where mail processing functions are presently performed. Facilities were categorized as follows: campus ID, campus name, area, state, and type of facility, total workroom square feet, square feet available and square feet required for a future OF/DF or RDC. Each of these facilities are listed based on their future designation, i.e. OF/DF, RDC, COLOC, or n/a for no mail processing responsibilities. The percent of utilization of total workroom presently and percent of available workroom space is included in this file. 32 facilities are identified by the current modeling process to have space requirements in excess of the current available space.

Recent changes in approach have resulted in a reevaluation of the need to invest in additional square footage. As such, the development team is in the process of reevaluating the facility use planned, adjusting modeled constraints to accommodate this change in thinking, and to identify other means for accommodating this plan absent new construction or expansion. Given the decision to modify the original assumption and to mitigate the costs associated with new construction, the operations sub-group will not pursue further evaluation of this item.

It is clear from the approach presently being used that decisions regarding adjustments to the original facility plan will be presented and evaluated at the area and local operational level. This site specific planning process and needs evaluation should result in a workable solution. The development team understands and agrees with the need for multiple constituency involvement in this process, i.e. headquarters engineering, area and local operating managers, etc.

Based on the latest concept change the assumption would not be a concern.

Attachments: Campus Summary

Assumption Data Sheet

Assumption #20: Variation and unpredictability in flows is sufficiently guarded against by ADV volume plus 30% modeling

Source of Data to be utilized/methodology used for IV & V (as appropriate):

This item cannot be validated at the 100% level. A randomly selected group of facilities will be reviewed to consider the ramification of this item. Review the volumes for a given facility for each shape category in the simulation model. Compare this data at the facility level to other data sources, i.e. MODS, onsite verification, EOR etc. to determine if this 30% modeling adequately represents ADV +30% for the examined facility. This item will be evaluated simultaneously with Assumption #6. This is a capacity issue significantly influenced by assumed throughputs (Assumption 7). The simulation model will be observed for the randomly selected sites to validate that a facility can clear under a certain level of unpredictability (which is more an expert conclusion) and that the assumption sufficiently guards against variation anticipated.

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of reviewing data utilized, documentation, observe the modeling, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The primary contact is Luke Grossmann (contractor).

Observations: | ***Dates:*** *11-30-04*

AFCS: Overall, Optimization Model volumes +30% appear to be adequate for contingencies. Regional Simulation Model workload is generally less than Optimization volumes. The Operations sub-group could not validate that calculated Simulation workloads were adequate to guard against variations and unpredictability in flows. However, during on-site reviews of implementation planning meetings, issues like these were resolved with local management before proceeding.

- [redacted] Regional Simulation workload +30% (345,301 pieces per day) is substantially less than the mean ADV developed by the operations sub-group (475,690 pieces per day). However, Optimization volume +30% (530,942 pieces per day) sufficiently guards against variations and unpredictability in flows.

- [redacted] Regional Simulation workload +30% (797,266 pieces per day) is substantially less than the mean ADV developed by the operations sub-group (881,181 pieces per day). However, Optimization volume +30% (1,183,715 pieces per day) not only sufficiently guards against variations and unpredictability in flows, but may significantly exceed actual requirements.

Attachments: 30 % Contingency Spreadsheets (Ken Billings)

Assumption 20 -continued

- [redacted] Both the Regional Simulation workload +30% (125,581 pieces per day) and the Optimization volume +30% (134,238 pieces per day) sufficiently guard against variations and unpredictability in flows when compared to the mean ADV developed by the operations sub-group (112,884 pieces per day).

- [redacted] Both the Regional Simulation workload +30% (216,888 pieces per day) and the Optimization volume +30% (260,599 pieces per day) exceed the mean ADV developed by the operations sub-group (214,411 pieces per day). However, the Regional Simulation volume +30% only minimally exceeds mean ADV and is not sufficient to guard against variations and unpredictability in flows.

- [redacted] Regional Simulation workload +30% (366,431 pieces per day) is substantially less than the mean ADV developed by the operations sub-group (543,410 pieces per day). However, Optimization volume +30% (578,537 pieces per day) marginally guards against variations and unpredictability in flows.

2nd Pass DPS: Only Regional Simulation workload is utilized because 2nd Pass DPS volumes are not identified as a separate entity in the Optimization Model. The Regional Simulation workload +30% sufficiently guards against variations and unpredictability in flows when compared to the mean ADV developed by the operations sub-group. However, in many cases the Regional Simulation volumes appeared to be substantially higher than could be validated by the Operations sub-group. We observed during on-site reviews of implementation planning meetings that issues like these were discussed and resolved with local management before proceeding.

- [redacted] Only Regional Simulation workload is utilized because 2nd Pass DPS volumes are not identified as a separate entity in the Optimization Model. The Regional Simulation workload +30% (2,172,149 pieces per day) sufficiently guards against variations and unpredictability in flows when compared to the mean ADV developed by the operations sub-group (2,070,043 pieces per day). Note that the mean ADV was increased from current DOIS % DPS to the modeled 95% DPS for comparison purposes.

- [redacted] Only Regional Simulation workload is utilized because 2nd Pass DPS volumes are not identified as a separate entity in the Optimization Model. Regional Simulation workload +30% (4,777,494 pieces per day) is substantially more than the mean ADV developed by the operations sub-group (3,855,711 pieces per day). Note that the mean ADV was increased from current DOIS % DPS to the modeled 95% DPS for comparison purposes. While this sufficiently guards against variations and unpredictability in flows, actual requirements may be significantly exceeded.

Assumption 20 -continued

- [redacted] Only Regional Simulation workload is utilized because 2nd Pass DPS volumes are not identified as a separate entity in the Optimization Model. Regional Simulation workload +30% (812,727 pieces per day) is substantially more than the mean ADV developed by the operations sub-group (603,149 pieces plus 70,123 current CSBCS pieces per day). Note that the mean ADV was increased from current DOIS % DPS to the modeled 95% DPS for comparison purposes. While this sufficiently guards against variations and unpredictability in flows, actual requirements may be significantly exceeded.

- [redacted] Only Regional Simulation workload is utilized because 2nd Pass DPS volumes are not identified as a separate entity in the Optimization Model. Regional Simulation workload +30% (928,313 pieces per day) is substantially more than the mean ADV developed by the operations sub-group (638,384 pieces per day). Note that the mean ADV was increased from current DOIS % DPS to the modeled 95% DPS for comparison purposes. While this sufficiently guards against variations and unpredictability in flows, actual requirements may be significantly exceeded.

- [redacted] Only Regional Simulation workload is utilized because 2nd Pass DPS volumes are not identified as a separate entity in the Optimization Model. The Regional Simulation workload +30% (2,372,546 pieces per day) sufficiently guards against variations and unpredictability in flows when compared to the mean ADV developed by the operations sub-group (1,423,529 pieces plus 524,266 current CSBCS pieces per day). Note that the mean ADV was increased from current DOIS % DPS to the modeled 95% DPS for comparison purposes.

Secondary Flats: Both the Regional Simulation workloads and Optimization volumes +30% substantially exceeded the mean average daily volumes developed by the operations sub-group for each selected site. Though all potential variation and unpredictability in flows is adequately guarded against, modeled volumes may significantly exceed actual requirements.

- [redacted] Both the Regional Simulation workload +30% (369,016 pieces per day) and Optimization volume +30% (381,640 pieces per day) substantially exceeded the mean average daily volume (161,000 pieces per day) developed by the operations sub-group. This mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility. Though all potential variation and unpredictability in flows is adequately guarded against, modeled volumes may significantly exceed actual requirements.

- [redacted] Both the Regional Simulation workload +30% (890,017 pieces per day) and Optimization volume +30% (663,756 pieces per day) substantially exceeded the mean average daily volume (251,000 pieces per day) developed by the operations sub-group. This mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility. Though all potential variation and unpredictability in flows is adequately guarded against, modeled volumes may significantly exceed actual requirements.

Assumption 20 -continued

- [redacted] Both the Regional Simulation workload +30% (156,959 pieces per day) and Optimization volume +30% (206,429 pieces per day) substantially exceeded the mean average daily volume (75,000 pieces per day) developed by the operations sub-group. This mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility. Though all potential variation and unpredictability in flows is adequately guarded against, modeled volumes may significantly exceed actual requirements.

- [redacted] Both the Regional Simulation workload +30% (105,946 pieces per day) and Optimization volume +30% (176,450 pieces per day) substantially exceeded the mean average daily volume (42,000 pieces per day) developed by the operations sub-group. This mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility. Though all potential variation and unpredictability in flows is adequately guarded against, modeled volumes may significantly exceed actual requirements.

- [redacted] Both the Regional Simulation workload +30% (327,976 pieces per day) and Optimization volume +30% (395,241 pieces per day) substantially exceeded the mean average daily volume (156,000 pieces per day) developed by the operations sub-group. This mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility. Though all potential variation and unpredictability in flows is adequately guarded against, modeled volumes may significantly exceed actual requirements.

Outgoing (Originating) Priority: In all sampled sites, the Regional Simulation workload was less (in most cases significantly less) than the mean ADVs developed by the Operations sub-group. Overall, Optimization Model volumes +30% appear to be adequate for contingencies. The Operations sub-group could not validate that calculated Simulation workloads were adequate to guard against variations and unpredictability in flows. However, during on-site reviews of implementation planning meetings, issues like these were resolved with local management before proceeding.

- [redacted]: The Regional Simulation workload +30% (107,493 pieces per day) and Optimization volume +30% (88,318 pieces per day) were substantially less than the mean average daily volume (177,000 pieces per day) developed by the operations sub-group. The mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility, and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Potential variation and unpredictability in flows did not appear to be adequately guarded against, and modeled volumes appear much lower than could be validated

- by the operations sub-group.

- [redacted]: The Regional Simulation workload +30% (55,699 pieces per day) and Optimization volume +30% (68,429 pieces per day) were substantially less than the mean average daily volume (177,000 pieces per day) developed by the operations sub-group. The mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility, and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Potential variation and unpredictability in flows did not appear to be adequately guarded against, and modeled volumes appear much lower than could be validated by the operations sub-group.

- [redacted] The Regional Simulation workload +30% (70,952 pieces per day) and Optimization volume +30% (173,376 pieces per day) were substantially different from one another. While the Regional Simulation workload was less than the mean average daily volume (177,000 pieces per day) developed by the operations sub-group, the Optimization Model output was more than twice that volume. The mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility, and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Potential variation and unpredictability in flows did not appear to be adequately guarded against in the former model, and far exceeded volumes that could be validated by the operations sub-group in the latter.

- [redacted] The Regional Simulation workload +30% (3,947 pieces per day) and Optimization volume +30% (8639 pieces per day) were substantially different from one another and were both less than the mean average daily volume (14,000 pieces per day) developed by the operations sub-group. The mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility, and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Potential variation and unpredictability in flows did not appear to be adequately guarded against, and modeled volumes appear much lower than could be validated by the operations sub-group.

- [redacted] The Regional Simulation workload +30% (57,272 pieces per day) and Optimization volume +30% (188,299 pieces per day) were substantially different from one another. While the Regional Simulation workload was less than the mean average daily volume (115,000 pieces per day) developed by the operations sub-group, the Optimization Model output was more than twice that volume. The mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility, and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Potential variation and unpredictability in flows did not appear to be adequately guarded against in the former model, and far exceeded volumes that could be validated by the operations sub-group in the latter.

Assumption 20 -continued

- [redacted] The Regional Simulation workload +30% (5,454 pieces per day) and Optimization volume +30% (9,888 pieces per day) were substantially different from one another and were both less than the mean average daily volume (9,000 pieces per day) developed by the operations sub-group. The mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility, and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Potential variation and unpredictability in flows did not appear to be adequately guarded against, and modeled volumes appear much lower than could be validated by the operations sub-group.

Incoming (Destinating) Priority: The variation between Regional Simulation workload and Optimization volume was too great to validate whether or not either accurately represented future requirements.

- [redacted] Both the Regional Simulation workload +30% (93,301 pieces per day) and Optimization volume +30% (122,399 pieces per day) substantially exceeded the mean average daily volume (86,000 pieces per day) developed by the operations sub-group. This mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Though all potential variation and unpredictability in flows is adequately guarded against, modeled volumes may exceed actual requirements.

- [redacted] Both the Regional Simulation workload +30% (34,824 pieces per day) and Optimization volume +30% (36,488 pieces per day) substantially exceeded the mean average daily volume (23,000 pieces per day) developed by the operations sub-group. This mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Though all potential variation and unpredictability in flows is adequately guarded against, modeled volumes may exceed actual requirements.

- [redacted] The Regional Simulation workload +30% (75,206 pieces per day) and Optimization volume +30% (149,438 pieces per day) were substantially different from one another. While the Regional Simulation workload was less than the mean average daily volume (81,000 pieces per day) developed by the operations sub-group, the Optimization Model output was nearly twice that volume. The mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility, and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Potential variation and unpredictability in flows did not appear to be adequately guarded against in the former model, and far exceeded volumes that could be validated by the operations sub-group in the latter.

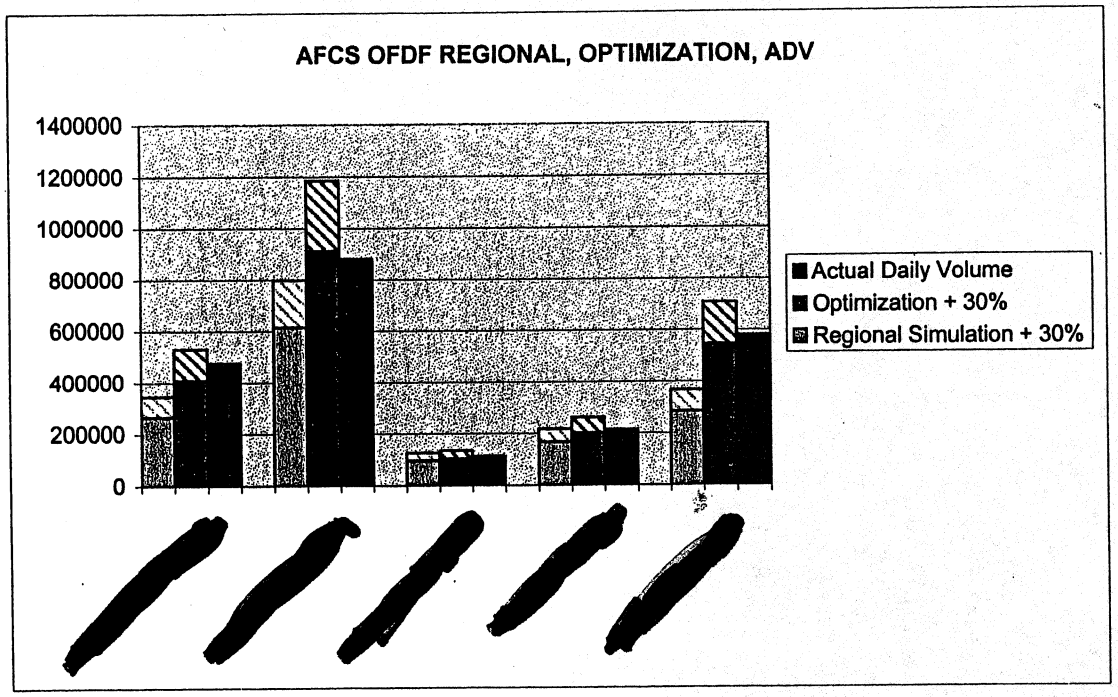
- [redacted] The Regional Simulation workload +30% (8,458 pieces per day) and Optimization volume +30% (22,783 pieces per day) were substantially different from one another. While the Regional Simulation workload was less than the mean average daily volume (14,000 pieces per day) developed by the operations sub-group, the Optimization Model output was 62.7% higher than the sampled ADV. The mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility, and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Potential variation and unpredictability in flows did not appear to be adequately guarded against in the former model, and far exceeded volumes that could be validated by the operations sub-group in the latter.

- [redacted] The Regional Simulation workload +30% (90,126 pieces per day) and Optimization volume +30% (318,842 pieces per day) were substantially different from one another. While the Regional Simulation workload was far less than the mean average daily volume (168,000 pieces per day) developed by the operations sub-group, the Optimization Model output was nearly twice the ADV. The mean ADV was developed from MODS data by facility and operation number, as indicated in the attached. It included current volumes processed manually within each facility, and incorporated local turnaround volume which should have resulted in an ADV 5-10% higher than the modeled volumes. Potential variation and unpredictability in flows did not appear to be adequately guarded against in the former model, and far exceeded volumes that could be validated by the operations sub-group in the latter.

APPS: The Operations sub-group was unable to develop comparative volume data. As indicated in Assumption 6g (and the accompanying APPS charts of the selected RDCs), the Regional Simulation model and Optimization model project significantly different workloads/volumes (respectively). In four (Des Moines, St. Paul, Midland, North Houston) the Optimization volume is substantially greater than the Regional Simulation workload. In Philadelphia, the reverse is true.

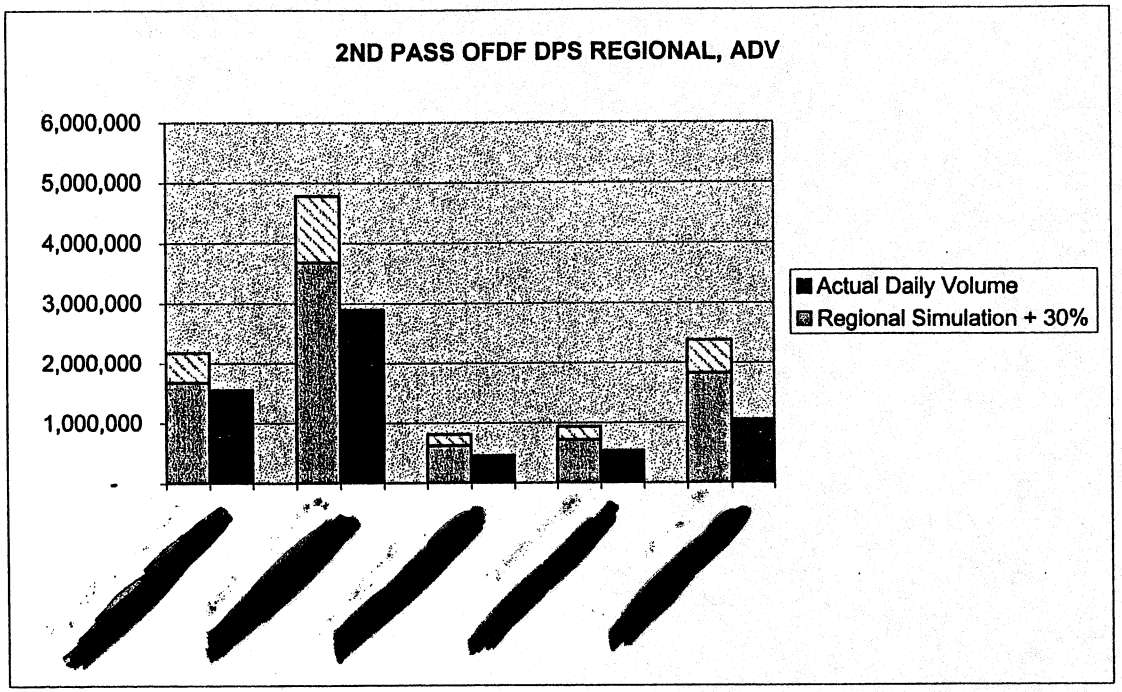
General Observation: The Optimization volumes (+30%) are generally adequate for contingencies in the products sampled. Though likely representative at the aggregate level, specific facility level modeling will be necessary during implementation. The Regional Simulation workloads could not be validated due to wide variances between facilities, products, and between the two models.

OFDF	VOLUME	@ 30%
[redacted]	265616	79685
	408417	122525
	475,690	
[redacted]	613,282	183,984
	910,550	273,165
	881,181	
[redacted]	96,601	28,980
	103,260	30,978
	112,884	
[redacted]	166,837	50,051
	200,461	60,138
	214,411	
[redacted]	281,870	84,561
	543,410	163,023
	578,537	



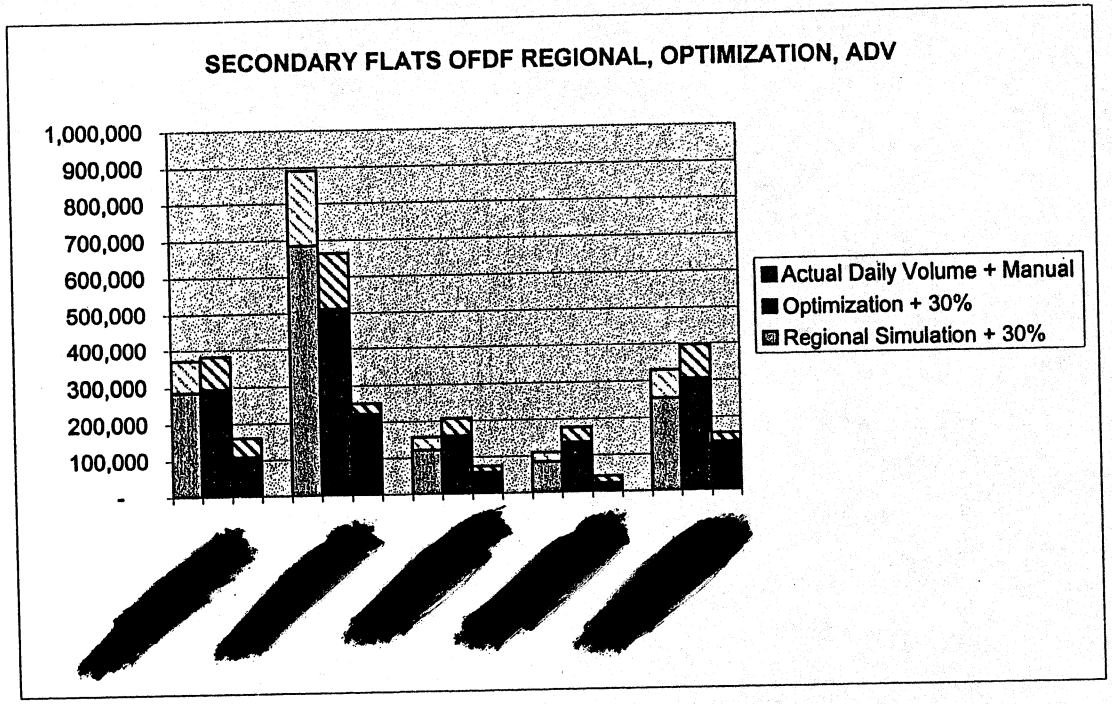
Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Optimization Workload: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 3: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 4: Values of actual ADV from data provided by [redacted] FAST

OFDF	VOLUME	@ 30%
[redacted]	1,670,884	501,265
	1,544,470	
[redacted]	3,674,995	1,102,499
	2,891,783	
[redacted]	625,175	187,552
	458,711	
[redacted]	714,087	214,226
	538,460	
[redacted]	1,825,035	547,511
	1,048,916	



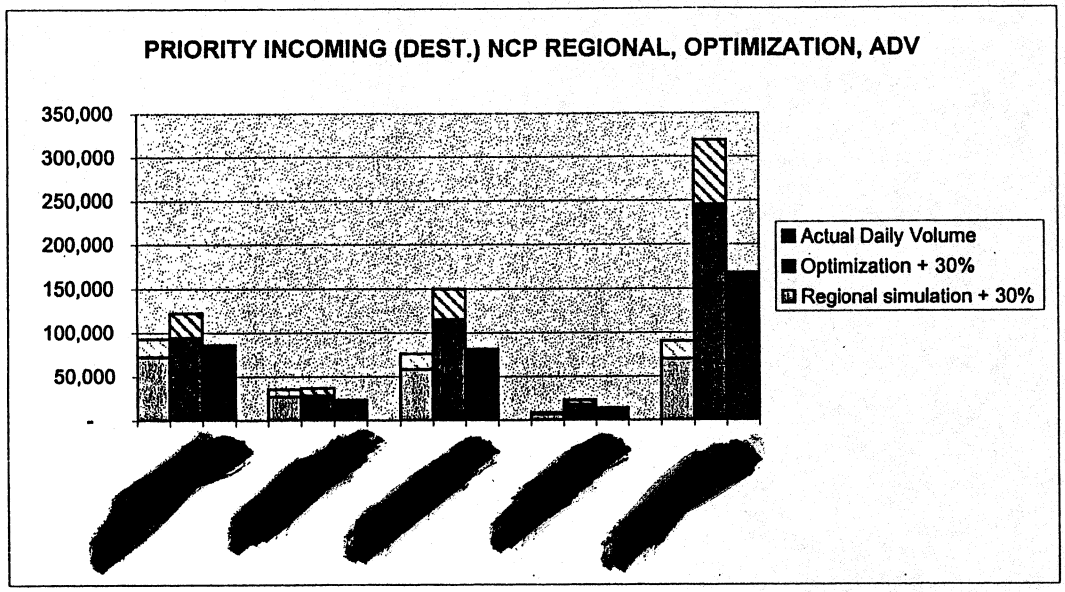
Note 1: Actual ADV Source: FAST(Finalization on Automation Secondary Tracking) EOR From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 3: Optimization model is not included due to our inability to separate out DPS 2nd pass from other destinating facilities roles (ie: Incoming Secondary (INS), DPS 1st pass)

OFDF	VOLUME	@ 30%
[redacted]	285,397	85,619
	293,569	88,071
	108,000	53,000
[redacted]	684,628	205,389
	510,582	153,174
	222,000	29,000
[redacted]	120,738	36,221
	158,792	47,637
	58,000	17,000
[redacted]	83,805	25,141
	135,731	40,719
	23,000	19,000
[redacted]	252,289	75,687
	304,032	91,209
	131,000	25,000



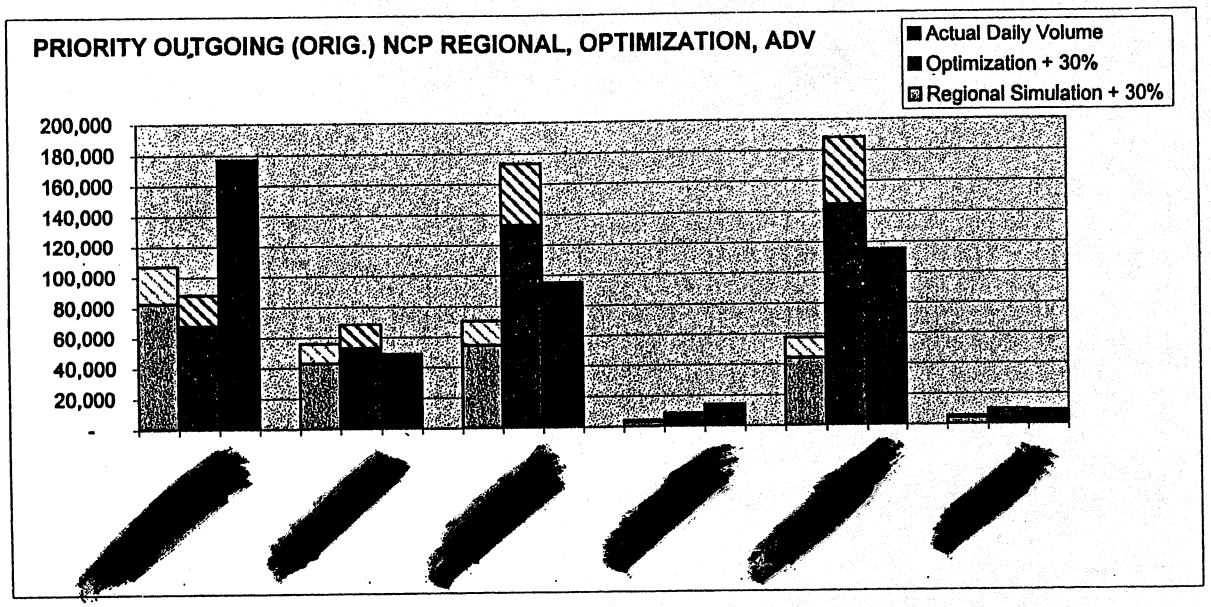
Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average includes: M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencies
Note 3: Values of actual ADV from data provided by [redacted] Area

NCP	VOLUME	@ 30%
[redacted]	71,770	20751
	94,153	28246
	86,000	
[redacted]	26,788	8037
	28,068	8420
	23,000	
[redacted]	57,851	17355
	114,952	34486
	81,000	
[redacted]	6,506	1952
	17,525	5257
	14,000	
[redacted]	69,328	20799
	245,263	73579
	168,000	



Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencie
Note 3: Values of actual ADV from data provided by [redacted] (Priority turn-around volume appears to average 5% to 10% of Total volume, though no thorough analysis could be conducted)

NCP	VOLUME	@ 30%
[redacted]	82,687	24806
	67,937	20381
	177,000	
[redacted]	42,845	12853
	52,638	15792
	49,000	
[redacted]	54,225	16268
	133,365	40010
	95,000	
[redacted]	3,036	911
	6,645	1993
	14,000	
[redacted]	44,055	13216
	144,845	43453
	115,000	
[redacted]	4,195	1258
	7,606	2282
	9,000	



Note 1: Actual ADV Source: MODS From AP04,FY2002 To AP03 FY2003
Mean Average of M-F Volumes excluding Holidays and Christmas period AP04(Dec 01 - Dec 28)
Note 2: Regional Simulation Volume: ADV provided by Network Design group reduced by 30% for comparison purposes. The Volume provided had been inflated by 30% for contingencie
Note 3: Values of actual ADV from data provided by [redacted] Priority turn-around volume appears to average 5% to 10% of Total volume, though no thorough analysis could be conducted)

Key Input Data Sheet	
Input #1: 467 Facilities were assigned to 336 campuses (campus assignment/facility locations)	
Sources of Data to be utilized/methodology to be used for IV & V (as appropriate):	
The IV & V team will validate accurate input and review the process used by Evolutionary Network Development to develop the listing. Obtain the list from the Evolutionary Network Development group on all facilities as they exist today. Review to ensure they all still exist. This can be a 100% check. The process for verification will include cross checking the listing against FMS and finance number data. If significant variation is identified during this process, further validation with Area offices will be considered.	
Source Data used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development team consists of meetings, discussions, reviewing data utilized, documentation, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The primary contact is Jeff Williamson (contractor).	
Observations:	***Dates:*** *11-30-04*
One of the main goals of the Optimization Model was to identify the most cost efficient assignments for Zip codes. As an outcome of the modeling, 467 facilities were remapped into 336 campuses. The operations sub-group validated this data by a 100% check of the master listing of campuses to ensure that every facility has been accounted for. No discrepancies were noted.	
Attachments: NIA Phase II Full Facility List	

Key Input Data Sheet	
Input #2: Square footage inputs: Do these inputs consider any and all anomalies with column widths/ doors, ceiling heights, floor layouts, tray line systems, etc?	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
The IV & V Finance sub-group will ensure data received from the field is the data used in the model and will review the process used by Evolutionary Network Development to develop the data. What steps were taken? What form of follow up verification has occurred and how many updates or revisions have occurred? A 100% verification of this item will not be possible. Evolutionary Network Development will provide a listing of a randomly selected set of facilities provided by the IV&V Operations subgroup showing the total square footage and the portion that was "discounted" as available. Due to TMS footprint/configuration issues, the selected sample must include a review of those facilities. Consider all forms of space within a facility that is not useable. This may include customer service/delivery operations space, CFS, admin space etc. Consider the platform area and the ramifications of the process for not including it in the input. Review this larger group using engineering CAD drawings. Examine floor layouts, column widths, configuration of existing equipment, etc. The final evaluation process will be to take a smaller sub-set of this group and perform physical examinations. Provided no major discrepancies are found, this item will be considered valid.	
Source Data Used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development team consists of meetings, discussions, reviewing data utilized, documentation, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The primary contact is Jeff Williamson (contractor).	
Observations:	***Dates:*** *11-20-2004*
See Assumptions 11 & 19. Initial modeling did not take into consideration column widths, door spacing, or ceiling heights nor the configuration of fixed mechanization/TMS sites. This is acknowledged by the development team. The process used was to assess the square footage based on the interior square footage of the building assuming no facility obstructions. Site specific validation will occur during implementation and planning. The ramifications of this issue should be considered to ensure no serious anomalies exist. The operations sub-group recommends a site specific OSL for each facility in the new network. This should ensure the facility is capable of handling the equipment provided in the model. To complete an evaluation of our national space needs would seem to imply that the dock door optimization model and DPS optimization model would be completed. This coupled with our recommendations from assumption 12 & 17 regarding staging implications associated with the new processing environment should be further evaluated.	
Attachments: Reference, Assumption 11 and Assumption 19	

Key Input Data Sheet	
Input #3: Volume/Volume Sources/Downflows: Are these sources and flows representative of the actual volumes?	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
Global verification of nationally available or centralized data will be performed by the IV & V Finance sub-group and they will review the process used by Evolutionary Network Development to develop the data. What steps were taken? The Operations sub-group will review what form of follow up verification occurred to further validate the data at a granular level. Do the volumes represent actual volume as it exists today? Do the average daily volume + 30% approach represent reality? How much variation exists around this number in each facility? Verify that the total PIMS/MODS data for the nation matches the RPW data for the nation. Use the same groupings that the Evolutionary Network Development group used for MODS/PIMS categories and attempt to replicate the results. Due to the complexity of this testing, a 100% check will not be possible. A randomly selected sample will be provided by the IV & V team. Evolutionary Network Development will provide the data for this representative sample. The analysis will validate that the actual workload in the facilities examined is represented by the model. A subset of this sample would then be asked to examine the average daily volume for a selection of the volumes to validate their level of agreement with the number representing average daily volume plus 30%.	
Source Data Used or Facility Observed (as appropriate):	
The development team recommended an approach of collaborating with the HQ Finance IV & V team as they have already begun examining many of these issues. The validation process with the development team consists of meetings and discussions. The preparation time will need to be determined. The primary contact is Andy Louis (contractor).	
Observations:	***Dates:*** *11-30-2004*
Volume comparisons are discussed in depth in Assumptions 6g and 20 (w/attachments). Regional simulation workload (plus 30%) could not be validated as completely representative of actual volumes by the operations sub-group. Optimization Model volume (plus 30%) was generally sufficient to allow for variations and unpredictability in flows. In most facilities sampled, there were substantial differences between regional simulation workload and optimization volume. Site specific data validation with local management will be necessary during the implementation phase.	
Attachments: Reference, Assumption 6G and 20	

Key Input Data Sheet

Input #4: Productivity/Throughput: Do the productivities/throughputs used in the model actually represent what the assumptions state? Do they represent actual productivity/throughput?

Source of Data to be utilized/methodology used for IV & V (as appropriate):

Review the process used by Evolutionary Network Development to develop the data. What steps were taken? What form of follow up verification has occurred to further validate the data at a granular level? Do the throughputs that were input into the model actually represent the "average" throughputs nationally for the period specified? (Note: There will be an overlap in the validation process between the IV & V Finance and Operations sub-groups). What degree of variation exists around the average, i.e. highly productive, low productive sites? What are the ramifications of the differences in machinery in the inventory?

Source Data Used or Facility Observed (as appropriate):

The development team agreed with the IV & V approach. The validation process with the development group consists of meetings and discussions, reviewing data utilized, documentation, and may include field site visits. The development team estimates they will need two (2) days preparation time, and the primary contact is Jeff Williamson (contractor).

Observations:	***Dates:*** *11-30-2004*

See assumption 7.

It has been validated that average throughputs were utilized throughout the model. Continual discussion regarding the validity of using this particular approach has resulted throughout our validation process. Generally, it is acknowledged by the development team that further evaluation of the site specific performance must occur as planning continues. Use of a single throughput number, while appropriate in national level modeling, should be evaluated at each facility. To under or over model throughputs at the facility level has obvious ramifications.

Attachments: Reference Assumption 7

Key Input Data Sheet	
Input #5: Operating Times: (a) Are they universal throughout? (b) How are they derived?	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
Review the process used by Evolutionary Network Development to establish the clearance times. This will be a 100% verification for both OF/DFs and NCPs. Have Evolutionary Network Development group provide a listing of all CT/CETs. Verify that these are standard across the nation and are input correctly into the model. Review a randomly selected set of facilities present CT/CETs. How much variation exists today around the future state CT/CET?	
Source Data Used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development team consists of meetings and discussions. No preparation is needed; it may be scheduled at anytime. The primary contact is Dave Strohecker (USPS).	
Observations:	***Dates:*** *11-30-2004*
See assumptions 13, 14, & 15. Standard CET's and CT's were utilized throughout the modeling.	
Attachments: Reference Assumption 13, 14 15	

Key Input Data Sheet	
Input #6: Volume Arrival Profiles: (a) how did NIA develop input information? (Validate through sampling) (b) Do they represent what is implied to have been modeled? (c) Are they correct/realistic based on all other inputs and assumptions, i.e. transportation times, capacities, etc.	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
Review the process used by Evolutionary Network Development to establish the arrival profiles. What key arrivals were input into the model, i.e. arrival of cancellation mail, permit volume etc? This item cannot be validated at the 100% level. A randomly selected sample of facilities will be provided by the IV & V team. This sample must include facilities that are implied to be consolidated. As an example, the cancellation volume for these facilities will be compared to the actual occurring today by examining EOR to validate the variation that may exist around the assumed arrivals of volumes.	
Source Data Used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development team consists of meetings, discussions, reviewing data utilized, documentation, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The primary contact is Jeff Williamson (contractor)	
Observations:	***Dates:*** *11-30-2004*
See assumption 7. The graphic representation of staged and processed volumes in the selected mail sort types reviewed appears to be a reasonable representation of what should be expected in the new processing environment. The operations sub-group cannot validate the arrival profiles specifically resulting from the modeling. At this stage these profiles are concepts and are the result of multiple inputs, i.e. ODIS 3 digit volume flows, surface and air transportation routing assumptions, etc. A proof of concept during implementation should help to clearly evaluate each facility. Site specific planning and implementation should include evaluation by local management of the arrival profiles in select sort groups, i.e. cancellation operations, IC primary, metered outgoing, IC periodicals, IC packages, IC standard, AFSM secondaries comparing the future state profiles to the present state profiles in a simple "apples to apples" approach. This intuitive evaluation should help to minimize any negative consequences. The development team should consider the above comparison on a select group of sites at this point in the planning to increase the level of confidence in the outcomes that result. The team may also want to consider examining the before and after changes to arrival profiles in sites recently AMP'd to get a general feel for the changes that may result.	
Attachments: Reference Simulation Model (Simulation Sensitivity Analysis Review for Audit), Assumption 7	

Key Input Data Sheet	
Input #7: Equipment Inventory: Is the total required equipment inventory accurate? (e.g., right size, right numbers)	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
Review the process used by the Evolutionary Network Development group for gathering the inventory data for key pieces of equipment, i.e. LCOCR, DIOSS, AFCS, AFSM, APPS. This will be a 100% verification. What is implied about bin counts, the level of modification of the inventory today, and future modifications? Obtain the listing of inventory for this equipment from the Evolutionary Network Development group. Verify this listing against the capital equipment inventory listing or other available systems, i.e. NIMICS. This is a national verification of the total number of pieces of equipment in the system. The number(s) at the local facility level may be verified based on random sampling.	
Source Data Used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development team consists of reviewing data utilized, documentation, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The primary contact is Luke Grossmann (contractor).	
Observations:	***Dates:*** *11-2004*
Initial actual (raw) and modeled future state equipment requirements were provided by the development team. To reduce complexity, the development team modeled each specific equipment set based on the same footprint, number of separations and standardized technology/capability. These sets (Regional Simulation needs) were based on modeling performed during March and April 2003. It should be noted that these will not be the final equipment requirements. For some equipment types, the Optimization Model has determined requirements (i.e., AFCSs, which will be further refined during the implementation process). Other equipment sets may serve as a placeholder until more precise modeling is accomplished. Future DBCS requirements will be based on the DPS optimization model and refined during implementation; AFSM 100 requirements will be based on a flats optimization model; APPS requirements are unclear due to depth of sort issues and will continue to change as the operational methodologies advance. Another factor influencing equipment options will be the comparative costs of entirely new fleets versus some integration with existing equipment. Though the best operational scenario may be elimination of all older (semi-obsolete) equipment types, it is likely that integration with existing equipment will be necessary for the foreseeable future. Examples include FSM 881s, CSBCSs, Secondary PSMs, DBCSs with nonstandard capabilities/footprints and SPBSs. The feasibility to change each set/shape processing platform will be partially based on available capital during the phase-in/implementation. Some older equipment types will likely be upgraded and retained indefinitely.	
Attachments: Simulation Equipment Sets, Total National Inventory Raw Data CD, Equipment Inventory Comparison spreadsheet, RDC Count & Jeff Williamson 12/02/04 email	

Inputs regarding equipment capabilities (throughputs/productivities/#separations) significantly impact requirements. For example, through discussion at several meetings between the development team and operations subgroup, it was determined that the DBCS throughputs were generally reasonable. However, it seemed unlikely that all breaks/lunches could be fully staffed in every facility. This factor would tend to undersize the actual DBCS requirements in the future state. It was agreed that it would be beneficial for both HQ Engineering and the development team to reach consensus on a standard approach to determining equipment capabilities. The two groups are presently working together to ensure the most accurate performance expectations possible are utilized.

Accurate volume/workload projections are also critical in establishing future equipment needs. This has been discussed in detail in Assumptions 6g and 20. The operations subgroup found that the Optimization Model volumes were representative at the aggregate level, and reasonably reflective of actual facility volumes in the majority of facilities and equipment types sampled. However, using ODIS flows creates many inaccuracies already discussed in the assumptions cited above. More importantly, there appear to be wide disparities between Optimization volumes and Regional Simulation workload, and in some cases it was noted the Simulation Model does not always react in the way you would intuitively expect. For these reasons it is imperative that final decisions on facility level equipment sets be determined during local implementation, using local knowledge and expertise. To date, the operations subgroup has observed that issues like this have been effectively coordinated during initial implementation meetings.

Current existing inventories shown in this narrative were provided to the operations subgroup by HQ, Engineering in December 2004. Although it represents the best data available, accurate organizational totals by equipment type were difficult to find. Different HQ groups maintain records of equipment inventories specific to their particular function. The purpose of the comparisons below is to determine whether the initial inventory used by the development team was reasonably accurate, and how it and the modeled inventories compare to current equipment levels:

- **AFCS:** The initial (raw) inventory provided by the development team totaled **1065**. The modeled requirements for the future state total **1065**. Currently, the inventory provided by HQ Engineering is **1086**. The differences in equipment are fairly small, and will likely be absorbed or redistributed during implementation.

- **AFSM 100:** The initial inventory totaled **533**. System-wide requirements in the future environment (provided by the development team): **623**. Current inventory (provided by HQ Engineering): **537**. The difference of 86 (more than a 16% increase), is significant. Though processing windows in the future state may be compressed and there are plans to capture 85% of the machinable flats volume, the operations subgroup recommends that continuous revalidation of AFSM 100 equipment requirements occur, since modeled needs may be overstated.

- **DBCS:** The initial inventory totaled **4625**. Note that this number incorporated only those DBCSs located in FN1 campuses and excluded approximately 463 DBCSs located in FN4 sites. Therefore, the grand total of the initial inventory was approximately **5088**. FN1 requirements in the future environment (provided by the development team): **4786**. In addition, there will still be a requirement for 167 FN 4 DBCSs for a grand total of **4953** in the future state. The differences in equipment are relatively small, and will likely be absorbed or redistributed during implementation. DPS Optimization modeling and testing will continue to refine equipment sets necessary in the future state.

- **FSM 1000:** The initial inventory totaled **371**. System-wide requirements in the future environment (provided by the development team): **577**. Current inventory (provided by HQ Engineering): **355**. The difference of 216 (more than a 60% increase), is significant. Combined with the increased AFSM 100 requirements, this substantial increase appears counterintuitive. The operations subgroup recommends that continuous revalidation of FSM 1000 equipment requirements occur, since modeled needs may be overstated.

- **APPS:** First article testing was underway when initial data was gathered. System-wide requirements in the future environment (provided by the development team): **234**. There are currently only 4 APPS deployed nationwide. The operations subgroup could not validate that modeled requirements will be adequate to sort parcels, bundles and Priority mail in the future state. APPS were modeled on the premise that each piece would be handled once. APPS currently sort to 150 separations which will be increased to 300 in the near future. However, current PSMs can sort to as many as 2000 5-digit Zips. A replacement TPSS is on hold due to high costs, and no effective replacement has been identified. An interim plan of utilizing existing PSMs in concert with APPS or other equipment has not yet been completed. There are complicating factors including different shape capabilities and mailer make-up changes that would be required. Until a plan is fully developed, the actual requirements needs in the future cannot be determined.

Conclusion: Of the types of equipment examined, AFCS and DBCS requirements were reasonable. AFSM 100 and FSM 1000 requirements may be overstated. APPS requirements are not clearly defined at this point. The modeling assumption regarding a standardized fleet for each equipment type most likely needs to be further evaluated to ensure the correct types of equipment are in place. Site specific modeling at the facility level should resolve these discrepancies during implementation.

Equipment Inventory

	Development Team Raw Equipment	Development Team Simulation Needs	HQ Inventory Data
AFCS	1065	1065	1086
OCR	843	0	875
BCS	718	0	
DBCS	4625	4786	5181
FSM 1000	371	577	355
AFSM 100	533	623	537
SPBS	336	0	347
APPS		234	5

Contact: Leslie Frick
Source: Development Team and B Duong
12/01/04
Input 7

Key Input Data Sheet	
Input #8: Transportation Trip Times: Is the source accurate? Reasonable?	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
Review the process used by the Evolutionary Network Development group for establishing trip times. This will include a solid understanding of the implications of the use of PC Miler and the Texas Institute data. It will not be possible to do 100% verification of this item. The IV & V group will provide a sample of specific point to point trips. This grouping must include long hauls as well as inter and intra plant. The Evolutionary Network Development group will provide the travel time that is established in the model for this sample. This listing will then be verified against TIMES data and existing transportation contracts to validate the present travel time built into the contract. Also consider ramifications of the new DOT regulations. Determine the degree of variation that exists.	
Source Data Used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development team consists of reviewing data utilized, documentation, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The primary contact is Luke Grossmann (contractor).	
Observations:	***Dates:*** *11-30-2004*
See write-up in Assumption 4. There is a degree of variation in mileage in the randomly selected sites when compared to the feasible path mileage in the optimization model. This variation is believed to be caused by the use of a five digit centroid as opposed to the physical address of the facility when determining the mileage. The assumption 4 write-up contains a spreadsheet comparing actual PC Miler physical address highway miles to the mileage in the modeling. Further evaluation of this item by the development team is recommended. Input 9 also contains a more detailed analysis of intra DF service area mileage and travel times.	
Attachments: *Reference Assumption 4*	

Key Input Data Sheet

Input #9: Associate Office Arrival Times (a) Are they correct based on model assumptions? (b) Are they realistic?

Source of Data to be utilized/methodology used for IV & V (as appropriate):

Review the concept for establishing the arrival times and percents of volume to the Associate Offices with the Evolutionary Network Development group. Are they standard throughout? The Evolutionary Network Development group will provide the arrival times calculated. It is unclear at this time the level of detail necessary to validate this item. It may roll into the assumption evaluation of the population centroid and travel time evaluations

Source Data Used or Facility Observed (as appropriate):

The development team recommended the IV & V team focus on whether the CET for each 3-digit Zip Code is representative of the Associate Offices within that 3-Digit Zip Code. This input should be examined in conjunction with the 3-Digit Zip Code centroids.
The validation process with the development team consists of meetings, discussions, reviewing data utilized, documentation, and may include field site visits. The development team estimates they will need one week preparation time, and the primary contact is Luke Grossmann (contractor).

Observations: | ***Dates:*** *12-14-2004*

To aid in evaluation of this input, the operations sub-group identified ten DF's from the random selection list. They were: Chicago P & D, Detroit P & D, Savannah P & DF, Eugene P & DF, Rochester P & D, Reno P & D, St Louis P & D, Bakersfield P & D, Southern CT P & D, and Orlando P & D. For each of the sampled sites, the respective Manager or Supervisor, Transportation provided five of the most distant DPS zones for evaluation. The sub-group collected the present actual trip time, present actual departure and arrival time, actual mileage between facilities via MapQuest, and whether the transportation is presently by direct run. This data was compared to the clearance time specified in the DPS Model. To allow for transport from the distribution operation to the dock and loading on the vehicle a 15 minute additional time allowance was allocated.

Our conclusion from the in-depth analysis of 50 DPS operations in 10 randomly selected sites is that the modeled clearance times and transit times are sufficient to account for the time necessary to arrive at the delivery unit by 0730. In virtually every instance, arrival times at delivery units are earlier than the present state. This is a favorable result of the modeling.

It should be noted that 33 of the 50 zones examined are presently on transportation that makes multiple stops. The development team agrees that further evaluation of the implications of multi-stop and multi-product transportation will need to be considered during the site specific modeling and implementation planning phase.

Attachments: DPS Associate Office Arrival Time Analysis/END Group Future DPS Clearance Times

Key Input Data Sheet	
Input #10: Flexibility/contingency percentages/adjustments (a) Where was it used? (b) Is it accurate/reasonable?	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
Evolutionary Network Development will provide the IV & V team with a listing of any/all adjustments made to inputs to safeguard against volume fluctuations or items of this nature. An example would be adding 30% to average daily volume. The question is: Is this a reasonable adjustment to be made? For any adjustment made, thoroughly examine the specific ramifications (i.e. was 30% added to each product category, does Texas Inst. adjust sufficiently for traffic congestion etc.) This should be a 100% verification item since it is assumed the list of adjustments will be relatively small and the adjustment was applied universally.	
Source Data Used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development team consists of reviewing data utilized, documentation, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The development team estimates they will need one week preparation time, and the primary contact is Jeff Williamson (contractor).	
Observations:	***Dates:*** *11-30-2004*
The contingency adjustment in the modeling is a 30% increase in the average daily workload/volumes associated with both the optimization and simulation models. Additionally, the classification of a campus as metro, non-metro, and mega-metro (as defined by TTI data) would seem to also provide a degree of protection for transit time traffic congestion. A more detailed analysis and write-up for this item can be found in assumptions 4,6g, 20, and input 3.	
Attachments: Reference Assumption 4, 6 G and 20	

Key Input Data Sheet	
Input #11: Facility expansion capability: (a) How was it developed? (b) Is it correct? (c) Is it doable, i.e. wetland issues, environmental, community issues?	
Source of Data to be utilized/methodology used for IV & V (as appropriate):	
Review the process Evolutionary Network Development used for determining which facilities could be expanded and how the 50% and 10% assumptions were derived. The IV & V team will ask for a listing of all facilities that are to be expanded by 50%. Provided the list is manageable, a 100% verification of the expansion ability of each of these facilities up to 50% will be performed. This will require examination in conjunction with the areas and the facility group of each site.	
Source Data Used or Facility Observed (as appropriate):	
The development team agreed with the IV & V approach. The validation process with the development team consists of reviewing data utilized, documentation, and may include field site visits. No preparation is needed; it may be scheduled at anytime. The primary contact is Jeff Williamson (contractor).	
Observations:	***Dates:*** *12-1-2004*
See assumption 19. The data for facility expansion capability was collected with the assistance of area coordinators. During the area level presentation and reviews, this information was discussed and further evaluated. Given the recent changes in criteria to this assumption, no further validation of expansion plans or capabilities was deemed necessary by the operations sub-group. The development team acknowledges the need for facility specific planning and OSLs at each of the facilities in the future network.	
Attachments: Reference Assumption 19	

Implementation 1
Process Data Sheet

Implementation Process Data Sheet 1

Does the model, in effect, "Self Verify/Validate" within the implementation coordination process?

Source of Data to be utilized/methodology used for IV & V (as appropriate):

100% validation of this item is not possible. IV & V Team members will observe planning meeting throughout the validation effort. Planning documents will be reviewed to determine whether or not local changes are incorporated to accommodate site specific operational requirements. Do changes to the simulation model affect the overall efficacy of the optimization model? Does the optimization model, in effect, "Self Verify/Validate" itself during the coordination/implementation process?

Source Data Used or Facility Observed (as appropriate):

Two IV & V (operations group) team members observed BMC offload meetings conducted with [redacted] Senior Staff. Offload plans were reviewed (samples attached).

Observations: ***Dates: 05/11/04 & 05/25/04***

These meetings were conducted to discuss "BMC Offload" plans within the [redacted] Selected Bulk Mail Centers will be the first facilities retrofitted into Regional Distribution Centers (RDCs). Participants included the Area Vice President, MOS, MIPS, representatives from DNO, all [redacted] BMC Managers, and affected District and Senior Plant Managers. The development team began the first meeting with a brief refresher of the OF/DF & RDC concept (with particular focus on RDC operations). Offload planning templates had been provided by the development team to the Area MOS for completion by BMCs prior to the meeting. Maps of the [redacted] were placed on the walls for reference. While the development team led the first meeting, BMC Operations (Jaime Fuentes) attended the second and indicated his group had been tasked with leading the planning process in future offload meetings. Strategies were discussed to move operations currently performed in [redacted] BMCs into other processing facilities and other BMCs during the 14-22 month (estimated) retrofit process. As strategies are developed, the development team will identify the costs and impacts associated with implementation to present to senior management. The first step in the offload process is removing non-BMC operations from all BMCs. Much of the remaining discussion centered on parcel distribution. Parcel workloads can be offloaded in a number of alternate ways – holding metro turnaround in origin plants, making 3-digit separations and placing the parcels on direct transportation to the destination plant; offloading destinating volumes to adjacent BMCs (by destinating Zip Code); manual annexes. Plans for sack handling, IRPS and bundles were less defined. The next steps were also discussed. The offload plans requested and presented dealt with full-up removal of all operations from the BMCs. The development team requested a phased plan be developed (e.g., a phased retrofit - do part of a BMC at a time, allowing for partial processing). Offices that have not traditionally been the point of acceptance for mailers must be phased in, and changes to the DMM must take place concurrent with (or prior to) the operational changes. To a great extent, the current output of the simulation model was accepted. However, some changes were made to accommodate local conditions. Discussions took place regarding equipment throughputs in specific plants, and minor variations from the standard inputs in the original model were noted.

Attachments: ***1) Network Redesign Transition Planning Template***
[redacted] ***Offload Plan***
[redacted] ***Offload Plan***

However, the impact was not significant, and likely did not affect total equipment requirements. There is a more significant question regarding whether or not the ½-hour sweep and pull-down allowance is adequate. Managers felt this did not adequately account for jams, interim vacuuming, etc. the development team and operations sub-group will research this more deeply. Due to environmental and structural issues, it was suggested that [redacted] not be converted. Current construction/expansion plans for [redacted], and [redacted] were discussed as alternatives. Again, while the original facilities identified in the Optimization Model may change, it doesn't appear to have major impact on the overall proposed network. This provides some initial confirmation that continuous field interaction and operational shifts from those suggested by the Optimization Model do not appear to materially affect the outcome of the Optimization Model. It is important to note that the Continuity of Operations Plan (COOP) provides a fundamental starting point for the BMC offload process, and can be utilized as a basis in future facility offload planning. This initial observed interaction between the development team, [redacted] staff, senior managers, and BMC Operations indicates that considerable internal validation of NIA optimization/simulation model outputs will occur throughout the implementation process. As indicated above, senior managers with specific facility and operational knowledge were provided the opportunity for extensive input, but significant model outputs do not appear materially affected by changes made up to this point.

Implementation 2
Process Data Sheet

Implementation Process Data Sheet 2

Does the model, in effect, "Self Verify/Validate" within the implementation coordination process?

Source of Data to be utilized/methodology used for IV & V (as appropriate):

100% validation of this item is not possible. IV & V Team members will observe planning meeting throughout the validation effort. Planning documents will be reviewed to determine whether or not local changes are incorporated to accommodate site specific operational requirements. Do changes to the simulation model affect the overall efficacy of the optimization model? Does the optimization model, in effect, "Self Verify/Validate" itself during the coordination/implementation process?

Source Data Used or Facility Observed (as appropriate):

One IV&V Operations Team member observed the BMC offload and retrofit meeting conducted at the [redacted] BMC with [redacted] Area Senior Staff. The primary focus was to begin planning for retrofit of the [redacted] and [redacted] BMCs, planned to begin in 2005.

Observations: | ***Dates: 08/30-31/2004***

Discussions were led by Pranab Shah, Manager Networks Operations Development. Attendees included the [redacted] VP, Area MOPS, Area IPS, senior managers from affected facilities, BMC Operations, and representatives from URS, an engineering consulting firm. URS has been retained to develop space/facility and timeline requirements for the initial RDC retrofits. During Day 1, a brief overview of the NIA (now Evolutionary Network Design) was provided to attendees. After the NCP (RDC) concept was explained, the initial "backbone" of the system was discussed. Generally, BMCs and other suitable facilities will be retrofitted into approximately 66 Regional Distribution Centers. The first two retrofits will be the [redacted] and [redacted] BMCs. Network Operations Design took the leadership role to provide continuity and define roles/responsibilities between short and long-term milestones. Per Pranab, the intent is to, "...tailor each BMC to local unique challenges/concerns." NIA/END is presented as the "Grand Plan", while meetings like these are designed to look at the details of implementation. He was clear that, "This (was) not the final solution." The operational effectiveness of the meeting was detrimentally impacted by the obvious tension and disagreement between Network Operations Design and BMC Operations. To promote cohesive planning and execution, one entity should be charged with overall implementation responsibility. The [redacted] Area MIPS presented a detailed offload plan for the [redacted] BMC. It should be noted that the [redacted] BMC Manager and staff had not been provided the opportunity for significant input, and that their plans varied substantially from the Area plans. Though the distribution concept was accepted as relatively straight-forward, it was agreed that more discussion was needed to determine dock door requirements, queue yard maneuvering space, and specific transportation needs. Up to this point, little consideration had been given to dock height requirements. BMCs were originally constructed with 48" docks, and many do not have docks capable of handling transportation equipment smaller than tractor-trailers.

Attachment: Framework for Transition Planning

Implementation Process Data Sheet-continued

Shalini Mohan, the project manager from URS discussed their initial findings. Four BMCs had been studied. Their conclusions were that the buildings do not meet new code requirements, they are generally not energy compliant, and will require complete refurbishment for another 25-year life cycle. Extensive discussion took place regarding full-up versus phased retrofit. Operationally, a phased approach has many advantages, including a smaller propensity for any interim service degradation and reductions in temporary movement of employees between facilities. Complement issues have not yet been addressed, and it was suggested that a combined team from Operations and Human Resources begin a comprehensive planning effort. A phased approach would also generally allow transition impacts to be contained or absorbed within a local metro area, as opposed to shifting significant workload to other sites. However, this approach could extend the retrofit process into an unacceptably long period. It was agreed that a phased approach was more effective, and Pranab agreed to coordinate with URS and the Facilities department to change their charter to a phased retrofit. A new approach for DAR funding would be necessary, since the Network impacts of optimization are long term. Would there be one DAR submitted for each facility or (for example) 19 bundled together for the BMCs? Another approach discussed was bundling periods of time: all projects planned for 2005-2007 would be bundled together for board approval. The meeting then shifted to a discussion of TPSS (Total Package Sortation System). Because of limited depth of sort, APPS is a placeholder in both the Optimization and Simulation Model, but a larger system is required. Currently, any RDC that qualifies for at least 5 APPS will be slated for TPSS. Two designs (large and small) are required. Each TPSS will be custom built (no assembly line). There were initially 5 vendors interested in developing cost proposals. After initial requirements were determined, 2 dropped out and there are currently 3 (Siemens, Sandvik, Lockheed-Martin) that will provide their proposals by September 30, 2004. Lockheed-Martin has already provided a preliminary drawing loosely based on APPS technology. More compact versions of TPSS are under development that could reduce initial facility space requirement estimates. First article deployment will occur approximately 2 years after funding approval by the board. Overall, the phased approach to the retrofit process will extend the timeline by a year in each facility. TPSS will add an additional year. In other words, full-up retrofit would have taken 14-22 months. The phased approach will increase this to 26-34 months. If TPSS is installed in that facility, the total timeframe will be 38-46 months. As is evident in the earlier BMC offload observations, it appears the models continue to self validate as local and expert knowledge are applied. Both the model(s) and the implementation process adapt effectively to necessary changes.