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POSTAL RATE AND FEE CHANGES, 2001:	**Docket No. R2001-1**

DIRECT TESTIMONY
OF
LINDA A. KINGSLEY
ON BEHALF OF THE
UNITED STATES POSTAL SERVICE

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Direct Testimony
of
Linda A. Kingsley
Autobiographical Sketch

My name is Linda A. Kingsley. I have been the Manager, Operational Requirements within Operations Planning since January 1998. My office serves as the focal point for operations planning related to operational impacts of rate and mail preparation issues. We interface with pricing, finance, mail preparation and standards, and customers to evaluate and implement various internal and external rate and mail preparation changes. Specific responsibilities include assisting in the development of mail make-up requirements and rate-related changes for compatibility with operational processing, determining operational impacts resulting from rate and mail classification cases, and preparing the field for the expected changes before implementation.

I joined the Postal Service in 1985 as an Industrial Engineer Trainee in the Central Region Headquarters located in Chicago, IL. I became an Industrial Engineer at the North Suburban Illinois Field Division in 1986. I worked on methods improvements, implementation of sector/segmenting for letters, and workroom floor layouts for mail processing and delivery services. In 1989, I came to the Office of Rates at Postal Service headquarters where I appeared before the Postal Rate Commission in Docket No. R90-1 as witness Callies. I presented cost support testimony in that docket for the Postal Service's letter automation and carrier route presort discounts.

In 1992, I moved to the Office of Processing Policies and Programs where I was the group leader for letter automation issues. We coordinated with other functions to develop training materials and sessions to implement Delivery Point Sequencing across the country. I became an Operations Support Specialist in 1993 in the Western Area Inplant Support office in Denver CO. While at the Western Area, I primarily implemented and refined DPS and RBCS processing for Processing and Distribution Centers and Facilities. I was also on two temporary assignments as

Acting Manager, In-Plant Support in Reno, NV and Acting Plant Manager, Linthicum, MD Incoming Mail Facility.

In Docket No. R2000-1, I appeared as the operations witness to support various Postal Service proposals.

I have a Bachelor of Science Degree in Industrial Engineering from the University of Wisconsin – Madison and a Masters of Business Administration Degree from the University of Maryland at College Park.

I. Purpose of Testimony

The purpose of my testimony is to provide operational support for various elements of the Postal Service's proposals. In Chapter Two, Processing Operations, I provide an overview of the Postal Service's processing operations for the current environment, the test year, and beyond. I specifically address:

1. Basic processes by shape;
2. Types and capabilities of equipment;
3. Equipment deployments and processing changes planned through the test year and beyond;
4. Operational implications of various pricing proposals.

In Chapter Three, Volume and Workhours in Mail Processing, I discuss scheme changes and other activities required to support the network. In order to address some apparent misinterpretations of my previous testimony, I provide explicit examples of how these factors affect the way workhours vary in response to volume.

I am supporting Library Reference LR-J-101, results of a field survey of the experimental "Ride-Along" classification for Periodicals.

II. Processing Operations

In this part of my testimony, I provide an overview of our processing operations, with a focus on the equipment and methods used to process mail, as well as expected changes on the horizon. Since we process letters, flats, and parcels as distinct mailstreams, each one is discussed separately.

A. Letter and Card Mail Processing

1. Preparation

The focus of letter mail preparation operations is to sort letters and cards into three separations; barcoded, non-barcoded machinable, and nonmachinable (manual). These separations are necessary whether volumes are presented in trays, bundles, or as single pieces (such as collection mail) for subsequent piece distribution to read an existing barcode, to determine and print a barcode, or to sort in manual operations.

The operation where collection mail is prepared is often referred to as "010,"[1] and encompasses the culling, facing, and sorting of mail by shape and indicium. This operation is where letters, flats, and parcels are separated for subsequent handling. Bundles and trays of metered letters are forwarded directly to sortation equipment, while stamped mail is first faced and canceled. Hampers of single-piece collection mail are dumped into the dual-pass rough cull feed system for the Advanced Facer Canceller System (AFCS) described further in the following section. This machine culls out non-letter sized pieces (over 6 1/8 inches tall, over ¼ inch thick, and/or over 11 ½ inches long), faces the piece based on the location of the stamp, meter, or Facing Identification Mark (FIM)[2], and cancels the piece.

The volume arrival profile of collection mail into the 010 operation is dependent upon mail arrivals from stations, branches, associate offices, and collection runs. Due to varied distances and demographics, the arrival profile varies

[1] "010" refers to MODS operations 010-019 and 020-028 for volume and workhour reporting.

[2] FIM is the series of vertical bars to the left of the postage area such as on courtesy reply (FIM A) and business reply (FIM C) mail indicating the letter is barcoded.

by facility, and may vary by day depending on volume, weather, or time of the week or month. The status of the outgoing mail preparation operation dictates whether the subsequent operations will meet the operating plan's clearance times (the time processing must be completed), since none of the outgoing operations can be finalized until the 010 operation is clear of all mail volume.[3]

Letter mail is also received from sources other than collections. The Business Mail Entry Unit (BMEU) supplies mail at origin. At destination, the primary sources are presorted mail from mailers and mail sorted by origin postal facilities. At destination, letters are again separated into barcoded, non-barcoded machinable, and manual mail flows for subsequent processing.

2. Equipment

Our letter processing equipment is geared towards getting as much letter volume as possible barcoded and sorted to Delivery Point Sequence (DPS)[4] or, to a lesser extent, carrier route level on automated equipment. Letter sorting equipment sorts into bins that subsequently have to be manually swept into letter trays. Therefore, processing may commence without first setting up all of the trays.[5]

- The Advanced Facer Canceller System (AFCS) - The AFCS faces, cancels, and separates letters and cards into Optical Character Reader (OCR) readable (or enriched), prebarcoded with FIMs A and C, "all other" (e.g. script), and rejects. AFCSs have received the Input Sub System (ISS) modification to capture images for the Remote Bar Coding System (see RBCS below). AFCS image lift has reduced the pressure on the outgoing OCR operation, thereby easing the constraints on the outgoing processing window and allowing incoming

[3] Due to its critical nature, 010 is commonly started as early as possible, but with minimum staffing. However, even minimum staffing may be in excess of processing requirements. This creates capacity to absorb some volume increases without increasing workhours.

[4] DPS provides letters to the carrier in walk sequence of the route, thereby eliminating the need for the carrier to case letters in walk sequence in the office.

[5] This affects the time required to change a scheme and differs from the FSMs, which sort directly into trays that must be set up each scheme change. As explained in Chapter 3, time required to change a scheme affects the way work hours respond to a shift in volume.

processing to start earlier.[6] The AFCS can lift images of script and OCR-readable pieces. National policy currently directs AFCS operations to lift only images of script mail. Enriched/OCR-readable pieces are sent to the MLOCR (see below) since fewer images end up going to the Remote Encoding Center (REC) for keying than if the images were captured at the AFCS. Throughput of the 1,086 AFCSs is approximately 32,000 pieces per hour and the staffing index is one mailhandler per machine.

- Direct Connect System (DCS) - The Direct Connect System transports letters from the AFCS directly to a DBCS/OSS (see below). Current plans are to add DCS and OCR capability to 200 AFCSs by early CY 2004 contingent upon Board of Governors' approval. These units will eliminate the need to tray and move letters from AFCSs and re-feed the letters into DBCS/OSSs. Projections are that Phase II will commence soon after with an additional 775 units.
- Letter Sorting Machines (LSMs) - Growth in barcoded letters has allowed for all but one MPLSM to be removed (used for international sortation). Removal has simplified mail flows and improved service due to enhanced automation quality.
- Multiline Optical Character Reader (MLOCR) - Non-barcoded machinable letters are fed through MLOCRs to obtain a postal applied barcode. A total of 875 MLOCRs were deployed. Previous enhancements have improved the overall encode rate of the MLOCR and reduced the amount of mail that obtains a barcode through Remote Bar Coding. Throughput of an MLOCR is approximately 29,000 pieces per hour.[7] It has a staffing index of two clerks, one

[6] For reasons explained in Chapter 3, a reduction in the volume processed in a sorting operation also tends to make workhours in the operation less responsive to changes in volume, everything else equal.

[7] Throughput is very different than productivity. Throughput is the number of pieces that can be fed through the machine during one machine run hour. Productivity is the total pieces finalized (pieces fed minus rejects) divided by the total workhours used (includes setup, sweep, jam clearance time, etc.). Though the MLOCR can achieve a throughput of 29,000 pcs/hr, an example productivity over an eight-hour tour would be calculated by totaling the pieces fed during the eight hours (184,000 pieces), deducting rejects/no reads (125,000 pieces finalized), then dividing pieces finalized by the total workhours used (17 hours, 2 clerks plus break relief). In this example, productivity would equal 7,353 (125,000/17), *not* 14,500 (29,000/2).

feeding and the other sweeping its 60 stackers. MLOCRs currently are experiencing end of life parts issues and evaluation is currently under way exploring the replacement of MLOCRs with DIOSS (see below).

- Low-Cost MLOCR - This machine is the result of a Delivery Barcode Sorter modification that enables it to function also as an MLOCR (see DBCS below). Unlike MLOCRs, this equipment currently does not have a co-processor, co-directory,[8] or image lift capability. As of June 2001, 103 machines have been deployed to the field with no plans for additional purchases. Assuming the DIOSS (see below) program moves forward, a portion of these machines will likely be upgraded with additional capabilities. Throughput of the low-cost MLOCR is approximately 28,000 pieces per hour and it is staffed with two clerks.
- Remote Bar Coding System (RBCS) - RBCS has three distinct components: the Input Sub System (ISS), the Image Processing Sub System (IPSS), and the Output Sub System (OSS). The ISS consists of a retrofitted MLOCR (MLOCR-ISS), retrofitted Advanced Facer Canceller System (AFCS-ISS), and/or retrofitted DBCS (DIOSS) and is used to "lift images" of non-barcoded machinable letters. A fluorescent ID tag is sprayed on the back of the mailpiece and an electronic image of the mailpiece is forwarded to the IPSS. The IPSS is the computer system, which controls the image flows, contains the barcode result information, and communicates with the Remote Encoding Center's (REC) system. While in the IPSS, the image may be resolved through the use of a RCR[9]. If not resolved, it will be forwarded on to a REC where an operator keys the address information into a computer. Once the address is resolved to the depth of sort required (5, 9 or 11-digits), the mailpiece is fed back through the OSS. The OSS is a retrofitted

[8] Co-processor provides parallel processing to interpret address information resulting in higher resolution. Co-directory takes the co-processor results and looks for an address match in parallel processes resulting in more matches in the limited look-up time available. Both contribute to fewer images going to RCR and RECs.

[9] RCR is an off-line optical character recognition device that is part of RBCS. It uses advanced recognition techniques and is currently able to resolve 68 percent of the letter mail images introduced to it for processing. MLOCR and RCR resolution is expected to increase to 93 percent for FY 03 due to software enhancements.

Mail Processing Barcode Sorter (MPBCS-OSS), DBCS (DBCS-OSS), or DIOSS where the fluorescent ID tag is read and the barcode information is accessed from the IPSS to apply the barcode to the piece. RBCS is fully deployed to 324 plants. In 1997 the total REC volume peaked at approximately 25 billion images. As of September 2001, there were 25 RECs, a reduction of 30 since September 1999. By 2003, the number of RECs is planned to be reduced further. The high proportion of Transitional Employees (TEs) at RECs allows for timely staffing reductions as RCR improvements are made.

- Delivery Bar Code Sorter (DBCS) - This machine is used for processing letters already barcoded either by the OCR, RBCS, or our customers. DBCSs come in multiple configurations; most machines have between 190 and 220 sortation bins. Due to the greater number of sort stackers compared to the MPBCS (see below), the DBCS is used for outgoing processing, incoming primary sortation, and Delivery Point Sequencing (DPS). The DBCS deployment is complete with over 5,100 sorters currently operational. Throughput is approximately 37,000 pieces per hour and the staffing index is two clerks.

  As the automation workhorse, some DBCSs have undergone changes to better fit specific processing needs. Additional stackers have been added to some machines to accommodate the growth in delivery points and volume for DPS. Currently, 893 of the over 5,100 DBCSs are retrofitted as OSSs.

- DIOSS - The ultimate DBCS retrofit currently available is the DIOSS, a combination of DBCS/OCR/ISS/OSS in one machine. One of the main advantages of DIOSS is that it provides all capabilities in a small footprint with up to 300 sorting bins, depending on the DBCS configuration. Two hundred forty-six DIOSS kits have been added to existing DBCSs. Throughput is approximately 37,000 pieces per hour while operating in the DBCS/OSS modes and 32,000 pieces per hour operating in the OCR/ISS operation modes. The different throughputs are the result of a variable speed motor that slows the machine in the OCR/ISS mode to allow for the additional time for address look-up. The staffing index is two clerks.

- Carrier Sequence Bar Code Sorter (CSBCS) - This machine is located in delivery units and is used for Delivery Point Sequencing. The CSBCS sequences barcoded letters and cards already sorted by carrier route into delivery sequence order in three passes. Letters are processed for one to six carrier route(s) at a time because the number of stackers (17 or 21) support a limited number of delivery points and volume. The Postal Service plans to modify 357 of the 17-stacker CSBCSs at 119 sites with a 21- or 25-stacker modification by December 2001. With additional stackers, the CSBCS will have the capacity to sort a greater number of delivery points, sort additional volume, and allow for the consolidation of additional routes within a sort plan. Deployment of 3,732 CSBCSs to 1,200 sites was completed in March 1997, with no additional deployments planned. Throughput is approximately 19,000 pieces per hour with a staffing index of one.
- Mail Processing Bar Code Sorter (MPBCS) - This machine is a generation prior to the DBCSs. It has 96 bins, and is used primarily for outgoing primary and incoming primary processing with OSS modifications. There were 1,307 MPBCSs deployed; however, there have been reductions in the number of machines. As of AP 12 FY 01, approximately 821 machines are still in use. Throughput is approximately 35,000 pieces per hour. Staffing is two clerks.
- ID Code Sortation (ICS) - Deployment is complete for ICS systems on all types of BCSs, which allows sortation using the ID tag as well as the POSTNET barcode. The system provides a redundant opportunity for sorting a mailpiece. If the barcode becomes unreadable for any reason, the BCS will look for an ID tag. If an ID tag exists, it will look up the unique tag number (every mailpiece in the national system is unique for each month) in the national database for the barcode information associated with the mailpiece. The BCS will then sort the mailpiece to the correct stacker based on the destination information from the database. Deployment was completed in December 2000 and eliminates the need to LMLM (see below) letters with unreadable POSTNET barcodes.
- Letter Mail Labeling Machine (LMLM) - The LMLM allows more mail to remain in the automated mail stream by providing another opportunity to put a clean,

readable, barcode or ID tag on the mailpiece. Mailpieces are also "pre-LMLMed" when machinable, yet too glossy for the barcode and/or ID tag to be applied without smearing. This machine applies a white label to either the front of a letter to provide a barcode clear zone or to the back of the letter for application of a clean, readable, fluorescent ID tag. Labeling provisions have been made for mailers who do not want their mailpieces LMLMed, thus keeping their pieces in manual operations.[10] There are 360 LMLMs deployed with an approximate throughput of 20,000 pieces per hour and each is staffed by one clerk.

- Tabbing Equipment - In an effort to continue moving the last portion of letter volume to automation and DPS, some facilities have purchased letter-tabbing equipment. This equipment is used to place a tab (or tabs depending on length) on the letter to seal a non-automation compatible piece, thus making it automation compatible. Similar to LMLM, labeling provisions have also been made for mailers who do not want their pieces tabbed, thus keeping their volume in manual operations. Seventy-six sites currently have tabbing equipment. Throughput is approximately 15,000 pieces per hour, and is staffed by one clerk.
- Certified Mail Detectors (CMDs) - Certified mail detector hardware and software are on all BCSs to provide the ability to separate pieces with "hot", fluorescent, certified labels for the entire office from the rest of the carriers' letter and card volumes during DPS, sector/segment, or automated incoming secondary processing. This separation is needed so that delivery scans and signatures can be obtained when certified mail is delivered. Without the use of CMDs, carriers or clerks would be required to look at each piece of DPS, box, or firm mail looking for certified mail. Such a search would undo much of the efficiency automated processing provided. Similarly, it is impractical to obtain delivery scans or signatures for letters that are not sent as certified mail, since such letters are not "tagged" and are unable to be separated from the rest of the letter and card mailstream on automation. In February 2002, an expected enhancement to CMDs is the ability to hold out multiple stackers of certified mail on all outgoing and incoming BCS sort plans.

[10] See Postal Bulletin 22016 dated January 27, 2000.

- Postal Automated Redirection System (PARS) - In the near future, the Postal Service is planning to make enhancements to letter automation equipment to more efficiently handle machinable Undeliverable-As-Addressed (UAA) letter mail. PARS will specifically target letter mail that requires forwarding, needs to be returned, or contains an incorrect, illegible, or insufficient address. This program will eliminate multiple downstream handlings by moving the processing of UAA letter mail up the automation ladder. MLOCR-ISSs, Low-cost OCRs, and DIOSSs will be retrofitted to allow the equipment to intercept a large portion of UAA mail at originating processing facilities as part of the first handling similar to the *Fastforward*[SM] process.[11] Carriers will intercept the remainder of the PARS-candidate UAA mail in delivery units and send it to mail processing facilities. Both of these streams will be processed on specially modified DBCSs, which will generate and apply the Postal Service's yellow labels for re-directed mail. PARS may possibly be expanded to AFCSs by adding an OCR. First phase of deployment is estimated to begin in early CY 2003 at approximately 75 sites.

3. Manual

Volume that is still left in manual letter operations is primarily composed of pieces that are deemed to be nonmachinable on letter automation due to one of several factors. Any letter-size piece is considered nonmachinable if it meets any of the following criteria:

- Has an aspect ratio of less than 1.3 or more than 2.5.
- Is polybagged or polywrapped.
- Has clasps, strings, buttons, or similar closure devices.
- Is non-rectangular (i.e., does not have 90 degree corners).
- Contains rigid or odd-shaped items (e.g., pens, pencils, keys, and loose coins).
- Does not bend easily when subjected to a transport belt tension of 40 lbs. around an 11-inch diameter turn (e.g., wooden postcards).
- Too flimsy such that the equipment could damage the mailpiece.
- Contains an address parallel to the shortest dimension instead of the longest dimension.

[11] Refer to DMM F030.3.1 for more information concerning *Fastforward*[SM].

- Folded self-mailer where the folded edge is not parallel to the longest dimension, regardless of the use of tabs, wafer seals, or other fasteners.
- Booklet-type piece where the bound edge (spine) is not the longest edge of the piece, or is not at the bottom, regardless of the use of tabs, wafer seals, or other fasteners.
- Some glossy postcards that would require LMLM labels. When labels applied to the front or the back would cover the address and/or message.
- Labeled for "manual only" processing by the mailer, which also indicates that tabbing equipment and LMLM labels should not be used.

These mailpieces are excluded from automated processing for various reasons, which may impede the mail flow or damage the mail or mail processing equipment. Manual letters are considerably more costly to operations (approximately eleven times more labor cost per handling) to process than machinable letters, as shown in the Volume and Workhours chapter. Pieces over 6 1/8 inches in height, ¼ inch thick and/or 11½ inches in length are considered a flat.

Rejects from automation also end up in the manual operation. Pieces may have been rejected due to an unreadable barcode and ID tag or due to an insufficient 5- or 9-digit barcode for DPS processing. For example, the street directional (North or South) or suffix (St, Rd, Dr) may be missing, yet is required for coding to the delivery point when duplication exists in the address range. As automated operations sweep their stackers, many of these rejects will arrive in manual operations close to the clearance time, which is the completion time necessary to meet dispatches. Manual cases are staffed to sort the somewhat uncertain volumes of automation rejects in order to meet the transportation dispatch schedules and, ultimately, service commitments.[12]

In an effort to automate some of the manual mail, "Expanded Capability" (EC) DBCS equipment and modifications will be added to a limited extent. The EC modification will permit a *portion* of the heavier, thicker, letter mail currently being

sorted in manual operations to be processed on DBCS-EC machines. Engineering estimates that 25 percent of existing manual volumes may be candidate for the DBCS-EC. Letters with stiff enclosures such as pens are still not machinable on this modified DBCS. Beginning in January 2002, 106 new DBCS-EC will be deployed at a limited number of plants. These volumes will be a separate mailflow and will not be combined with machinable barcoded letters into DPS since not all of the DBCSs will be able to accept these heavier, thicker pieces. More expensive manual incoming secondary (sortation to carrier) and manual carrier casing will still be required for pieces that can be run on the DBCS-EC even if a site has a machine. The expected throughput for the DBCS-EC processing manual characteristic mail is 12,500 pieces per hour. The throughput on the DBCS-EC processing automation compatible mail (separate run) is expected to be 37,000 pieces per hour.

4. Automation Update

The volume of 9- and 11-digit barcoded letter mail has grown to 91.1 percent of all letters in AP 12, FY 01. Mailer applied barcodes comprised almost 72 percent of the total letter mail barcodes. The remaining 28 percent were applied by the Postal Service with OCRs and RBCS.

As of AP 12, FY 01, there were over 180,000 routes on DPS and 84 percent of all 11-digit barcodes were sorted to DPS. Plants processed 81 percent of their total incoming secondary (sortation to the carrier) letter volume in automated operations, a four percentage point increase over same period last year (SPLY).[13] Of the incoming secondary distribution performed on automation, 85 percent was sorted to DPS, 2 percent to sector/segment, 9 percent to carrier route, and 4 percent to 5-digit. Sector/segment operations require two passes to sort to the ZIP+4 and are usually for a “Firm” or PO Box program for 9-digit unique holdouts.

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[12] Due to service and network requirements, sort schemes must be worked up to the end of their processing windows. This establishes a minimum staffing requirement and generally creates excess capacity to absorb volume increases.

[13] This is determined at the incoming secondary level by dividing the number of piece handlings in automated operations by the piece handlings in all incoming secondary operations.

Delivery units have worked closely with plants to increase the amount of DPS mail. They have worked together to identify and capture machinable Enhanced Carrier Route (ECR) letter bundles and trays to incorporate these pieces into the carriers' DPS mail, thus eliminating the need for manual casing by a carrier. As postal barcoding of non-barcoded carrier route letters has become common practice and as the number of DPS zones has increased, the value of carrier route presort letters continues to diminish for automated zones. The machinable mail processed to DPS on DBCSs needs only to be sorted to the 5-digit level, so the carrier route sortation provides no added value in these situations. The Postal Service is again proposing that pricing of the ECR Basic letter continues to reflect its reduced value to operations when compared to automation 5-digit presort. Requiring ECR high density and saturation walk sequence letters to be prebarcoded, as proposed by witness Hope (USPS-T-31), will provide operational flexibility and eliminate postal barcoding of this mail before going to DPS. DPS sort plans are updated daily. Therefore, any changes in route assignments between carriers are captured in the DPS process daily; unlike mailers which have up to 90 days before a mailing to match carrier route information. Automation ECR continues to have value for zones processed either manually or on CSBCSs to DPS. Non-automation letters will continue to be sorted in a manner similar to flats by carriers.

The option for mailers to request "manual only" processing for letters has impacted operations' efforts to provide as much volume as possible to carriers in DPS.[14] At a minimum, this volume must now be manually sorted both to carrier and by carrier to walk sequence. There is a cost consequence of this request that the mailer currently does not directly bear. The non-machinable surcharges as proposed by witnesses Robinson (USPS-T-29) and Moeller (USPS-T-32) will at least encourage customers to consider the impact of their "manual only" requests and mailpiece design when it affects their rates. This proposal will then allow us to offer mailers the option of preparing *machinable* Presorted rate mail into full trays similar to the option now available for OCR-upgradable pieces. This will reduce bundle preparation costs for both the mailers and Postal Service given that this machinable

[14] See Postal Bulletin 22016 dated January 27, 2000.

volume can go right to the letter automation equipment instead of to a bundle sort or mail preparation operation.

Another significant factor that impacts the automation program is the overall level of presort of automation mail presented by bulk mailers. As the depth of presort increases, the number of operations necessary to sort the letters into DPS decreases. For example, letters in Mixed-AADC trays (the last level of presort), which require no specific presortation, are more expensive to process in a relative sense. Consequently, the rate and mail preparation structure should encourage finer presortation by mailers when volume exists. To that end, proposals by witnesses Robinson (USPS-T-29) and Moeller (USPS-T-32) further refine the rates for First-Class Mail and Standard Mail automation letters by splitting the Basic rate tier into an AADC rate and a Mixed-AADC rate. This should provide an additional incentive to prepare or consolidate mailings that result in AADC or finer trays.

5. Description of Future Systems Beyond the Test Year

Continuous improvements in image recognition technology, such as RCR, and equipment modifications will continue to be pursued to increase automated volumes. The MLOCR Replacement Program/DIOSS with Expanded Capability (DIOSS-EC) is a program that is expected to allow the replacement of some MLOCR machines with the latest in automated letter sorting technology. The DIOSS-EC kits will provide ISS, OCR, and OSS capabilities with additional stackers over the MLOCR. All 106 DBCS-ECs currently planned for deployment would be further upgraded to a DIOSS-EC by installing this DIOSS kit (front end OCR and ISS) as well as modifying almost 200 other existing DBCSs. Additional new DIOSS-ECs, not just modification kits for existing DBCSs, may also be pursued. It is expected that the DIOSS-EC will allow machines to handle a percentage of mail that is currently handled through manual processing similar to the DBCS-EC.

B. Flat Mail Processing

This portion of my testimony is devoted to piece distribution operations where individual flats are processed. The processing of packages of flats in opening unit operations is covered later in my testimony, under parcels and bundles.

1. Preparation

Depending on the class of mail, flats destined for piece distribution operations can originate from several different operations. First-Class metered or permit flats that are prepared in flat tubs by mailers generally can be sent from the platform or BMEU directly to flats sorting operations. Flats obtained through collection mail that subsequently go through the 010 operation are faced, canceled (if necessary), and trayed before they are sent to flats sorting operations. Flats that originate from opening unit[15] operations must also be "prepped" before they can be inducted into piece distribution operations. Depending on where the prepping is performed, prepping can consist of unloading containers, separating bundles for subsequent operations, removing the packaging material, orienting, and stacking the flats in postal containers or on ledges of distribution equipment. All of the prepping operations are performed manually and are labor-intensive.

Barcoded and non-barcoded flats are "prepped" in a single operation and are directed to piece distribution operations based on physical characteristics (see Equipment section below), mail class, and presort level. All flats sorting equipment, by the end of FY 2002, will be able to process both barcoded and non-barcoded pieces together in the same operation. Most of the non-carrier route presort flats receive some level of processing on flats sorting equipment.

2. Equipment

There currently are three different types of equipment used in the Postal Service to process flats:

- Multi-Position Flats Sorting Machine 881 (FSM 881) - As of August 2001, 412 machines were still in plants. Each machine has four manual induction stations and 100 bins. All of the FSM 881s are equipped with OCR/BCRs that can read addresses and barcodes on flats. There is no on-line video coding for OCR rejects. For non-barcoded flats, the FSM 881 sorts the piece based on the address read by the OCR, but does not spray a barcode on the piece. The throughput of the FSM 881 is approximately 6,500 pieces per hour for BCR/OCR

[15] An opening unit is the operational area within a processing facility where sacks and containers of mail are opened and prepared for distribution.

operations, and the maximum staffing requirement is six employees. By FY 2003, the number of FSM 881s in operation is expected to be reduced to approximately 110. They will primarily be relocated to smaller facilities.

- Multi-Position Flats Sorting Machine 1000 (FSM 1000) - This machine is intended to process the vast majority of flats that are nonmachinable on the FSM 881. Prior to the deployment of the FSM 1000, non-machinable flats had to be processed in manual operations. There are 351 machines deployed, and each FSM 1000 currently has four induction stations and 101 bins. All of the FSM 1000s are equipped with a BCR and can sort flats using mailer-applied barcodes. An OCR modification, currently scheduled for deployment in FY 2002, will be added to the FSM 1000. Part of the OCR deployment includes the addition of an automated flats feeder (AFF) to one of the existing keying consoles. Three keying consoles will remain on the machine. Similar to the FSM 881, there is no on-line video coding for OCR rejects nor does it spray a barcode on the piece. Currently, throughput is approximately 5,000 pieces per hour in BCR operations and is expected to increase to 7,000 with the new AFF/OCR modification. The maximum staffing is currently six employees and is expected to be reduced to five with the AFF/OCR enhancement. Presently there are no plans to purchase additional FSM 1000s.
- Automated Flats Sorting Machine 100 (AFSM 100) - This machine represents the first step into the future processing environment envisioned for flats. Phase I deployment of 175 machines is complete. Phase II deployment of 362 machines began in December 2000 and is scheduled for completion in April 2002. The processing and technological capabilities of this machine are vastly superior to those of the FSMs 881 and 1000. The machine has three automatic feeders and can sort to 120 bins, with the possibility of future expansion to more bins. It has both BCR and OCR capability, as well as on-line video coding[16] for the OCR rejects. Similar to the other FSMs, the AFSM does not spray a barcode on the piece. AFSM 100s are currently undergoing a performance modification to

[16] Keyers resolve addresses unreadable by the OCR by an on-line video coding process.

increase the machine's throughput as a result of a new software release and minor hardware changes. Deployment began in July 2001, and is expected to be completed by April 2002. The AFSM 100 has for the most part replaced the FSM 881 at a ratio of 1 to 2.5. Throughput of the AFSM 100 is approximately 17,000 pieces per hour and the staffing is five employees on the machine and up to three video encoding keyers depending on mail readability.

Unlike letter sorting equipment, all FSMs sort mail directly into flat trays.[17]

3. Processing / Mailflow

Since the majority of flats that require piece distribution are machinable on the AFSM 100, field sites flow flats to that machine first. The BCR/OCR reader scans the mailpiece in search of a barcode/address block. If a POSTNET barcode is found, the piece is sorted based on the information read by the BCR. If a POSTNET barcode is not found or cannot be read, the OCR looks for the delivery address and the piece is subsequently sorted based on the information returned by the OCR. Flats that contain extraneous information, thereby interfering with OCR address recognition, or addresses that cannot be read by the OCR, have their images keyed on-line or sent to manual operations.

Flats that are nonmachinable on the AFSM 100 are diverted to the FSM 1000. Because the FSM 1000 is able to process a wider variety of flats, flats processed on the FSM 1000 do not flow to an AFSM 100 or an FSM 881 for subsequent operations. The FSM 1000 has reduced the volume processed in manual operations.

Each FSM also has the flexibility to operate with less than a full crew in light volume periods. However, the setup and pull down times per machine remain fairly constant between tours and operational runs, whether the number of pieces processed is 5,000 or 50,000.[18]

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[17] By contrast, letter-sorting equipment sorts into bins that need not be set up for each change in sort scheme. This is among the factors that alter the effect of changes in operating volumes on operation workhours.

[18] As explained in Chapter 3, this is a key reason why workhours fluctuate less than volume in sorting operations, including the FSM.

Deployment of the AFSM 100 has significantly impacted our mail flows. Although the machinability specifications have not been finalized, they should be comparable to the FSM 881. Full AFSM 100 deployment will result in the capacity necessary to allow the FSM 1000 to process only the truly non-machinable mail.

One of the biggest changes that has resulted from the deployment of the AFSM 100 is an increase of incoming secondary distribution sort (to carrier) from manual to automated FSM operations. Throughput of the AFSM 100 is approximately 2 to 3 times higher than that of the FSM 881. As a result, facilities have a greater opportunity to do incoming secondary processing for more zones. Much of the distribution that has been performed manually in delivery units is being automated in plants. It is anticipated that with the AFSM 100 deployments, the zones that will receive incoming secondary processing on the FSMs will generally be the zones with 10 or more carrier routes.

4. Manual

Flats that remain in manual operations at the plant today (other than for incoming secondary processing) are pieces that do not meet the processing specifications for the FSM 1000 or are rejects from that machine. Examples of these types of flats include rolls, lightweight pieces, or pieces that are not uniform in thickness. There are also heavy volume periods (during the day, week, month or year) where a temporary shortfall in flats sorting capacity results in some flats, that could otherwise be processed on an FSM, being processed in manual operations. Typically, this occurs when flats sorting equipment is at full capacity and the mail must be processed manually in order to ensure that service standards are met. While there will undoubtedly always be some mail in manual operations such as the types listed earlier, the additional FSM capacity provided by continued AFSM 100 deployment will further reduce the overall amount of mail in manual operations.

Very few delivery units have an FSM, so the vast majority of the incoming secondary processing at the delivery units is manual.

5. Automation/Mechanization Update

The percent of non-carrier route presorted flats barcoded by mailers has continued to grow. At the end of FY 96, approximately 43 percent of all non-carrier

route flats were barcoded. Barcoded flats increased substantially in FY 97, with approximately 60.4 percent of all non-carrier route presorted flats bearing a barcode. The percentage of non-carrier route flats bearing a barcode was 69.6 percent in AP 12 FY 01. At the same time, plants processed 29 percent of the *total* incoming secondary volume on FSMs. Of the incoming secondary volume in plants, 73 percent was finalized on automated operations.[19] As stated earlier, continued deployment of the AFSM 100s will cause more incoming secondary flat distribution to move from manual to automation. As of AP 12 FY 01, the percent of total flats workload in plants was 54 percent on the AFSM 100, 17 percent on the FSM 1000, 14 percent on the FSM 881, and 15 percent in manual sortation.

For the most part, deployments of the OCR on the FSM 881 and the BCR on the FSM 1000 have resulted in positive improvements for processing operations. However, two significant processing concerns have surfaced as a result of these deployments as I first mentioned in Docket No. R2000-1. The concerns are separate and distinct issues, but both are related to mail makeup and preparation.

The first concern is related to the OCR on the FSMs. The OCR can have difficulty discerning the intended delivery address and may interpret a portion of the incidental information as the delivery address piece when other information is on the same side as the delivery address. Likewise, when a return address is more prominent (e.g., font size, print quality) than the delivery address, the OCR may interpret the return address as the delivery address. Presence of a barcode facilitates identification of the address block, which helps the OCR discern the delivery address if for some reason the barcode is unreadable. Therefore, even with the OCR on the FSMs, barcodes continue to add value, yet not to the same extent prior to OCR deployments. The Postal Service has published articles in mailer publications and continues to work with mailers through the Mailers Technical Advisory Committee (MTAC) regarding the refinement of flats OCR/BCR addressing standards.

[19] This is determined at the incoming secondary level by dividing the number of piece handlings in flat sorter operations by the piece handlings in all incoming secondary operations at plants.

The other concern relates to the deployment of the BCR on the FSM 1000 and the extension of the barcode discount to FSM 1000-sized pieces. Since implementation of the Standard residual shape surcharge in Docket No. R97-1, field sites have noticed a proliferation of parcels being prepared as FSM 1000 flats. Because the FSM 1000 can process flats up to a maximum thickness of 1¼ inches, the Postal Service expanded the definition of what may qualify as an automated flat. Generally, processing operations work in accordance with the processing category dimensions contained in the Domestic Mail Manual (DMM). Dimension requirements in section C050 set the maximum thickness for a flat at ¾ inches.

Prior to implementation of the residual shape surcharge, many, if not all, of these pieces were prepared as machinable parcels. As machinable parcels, these pieces were processed through the Bulk Mail Centers on parcel sorters and sorted to 5-digit locations. These parcels are now "disguised" as packages of flats and many of them can no longer be processed directly to 5-digit on BMCs' parcel sorters. To compound the matter, plants generally do not sort parcels on the FSM 1000, and therefore must sort these pieces manually or on the SPBS to the 5-digit level. The irony of this situation is that mailers are paying less postage but their pieces are usually incurring more handling.

The reasons that these parcels are not sorted on the FSM 1000 vary, but the primary ones are the incompatibility with the flats mail stream and the impact on downstream delivery operations. It is difficult to sort and handle the smaller, thicker, more rigid parcels with larger, thinner, more flexible flats. Parcels also lose orientation when sorted into flat trays and can fill a tray with only a few pieces if they fall on end. This necessitates very frequent sweeping and increases flat tray usage.

Although these pieces may be prepared as packages of flats, employees in both processing and delivery offices, for the most part, continue to treat and handle them as parcels. While this expanded definition may reflect the physical capabilities of the FSM 1000, it is not congruent with the manner in which field sites are actually using the machine. Future Postal Service efforts are likely to address this anomaly. This supports limiting the proposed BPM flats barcode discount and the flat and parcel rate distinction (witness Kiefer, USPS-T-33) to AFSM 100 compatible criteria.

6. Description of Future System Beyond the Test Year

Ultimately, the Postal Service plans to pursue sorting flats to DPS, which would begin in FY 2004 at the earliest. Currently, the value of DPS flats is being reviewed and explored. While the specifics are yet to be resolved, it is envisioned that the Postal Service may DPS flats with a different type of equipment than what is used today. The AFSM 100, or a machine similar to it such as a sequencer, would be used to process and sequence flats. This would be a zone-based (5-digit) process similar to the two passes required on DBCS for letters. Of course, flats that are not machinable on the sequencer are unlikely to be included in DPS.

There will likely be two significant changes for mailers as the Postal Service moves toward a DPS environment for flats. First, all flats that claim the barcode discount will be required to bear an 11-digit barcode, similar to letters, in order to sort to delivery point. Second, if the sequencer is the selected method, carrier route presorted packages will not have value for DPS zones and a 5-digit presort will be the finest sort required. Emphasis will also be on the machinability and entry level characteristics to maximize the candidate flat volume for DPS. The Postal Service intends to work on these issues with the mailing industry to provide ample time for mailers to make these needed changes in the future. This highlights the long-term operational value for flats of machinability (currently AFSM compatibility), barcoding (required for DPS), and carrier route presort for non-DPS zones.

C. Parcels, Bundles, Sacks, and Trays

In this part of my testimony, I provide an overview of operations as they relate to the processing of parcels, bundles, sacks, and trays today and in the test year.

1. Parcel Processing

Standard Mail and Package Services parcels are predominantly processed within the bulk mail network consisting of 21 Bulk Mail Centers (BMCs) and eight Auxiliary Service Facilities (ASFs).

a. Equipment

Until recently, machinable parcels have been processed in the BMCs with the same basic equipment for the last 25 years. ASFs are not similarly equipped.

- The Primary and Secondary Parcel Sorter Machines (PSM) are fed by mechanized conveyors which feed parcels onto slides. Parcels are then manually separated and inducted into a tilt tray sorter. Parcel barcodes continue to enhance the sortation of machinable parcels and have reduced manual keying requirements. If a barcode does not exist on the parcel, the ZIP Code information is read by the operator, manually keyed, and a 5-digit barcode label is applied to the parcel for possible subsequent handlings.
- The Singulate, Scan, Induction Unit (SSIU) equipment currently in deployment automates the singulation and induction of barcoded parcels onto the BMC PSM. This device allows parcels to be sent one at a time, through a dimensioning unit, a weigh-in-motion scale, and a scanning tunnel that reads the parcel barcode. Deployment is expected to be completed by May 2002.

Non-machinable outside parcels (NMOs) are either sorted manually or with the use of mechanized sorting equipment at several BMCs depending on the non-machinability characteristics of the parcel. This equipment ranges from basic rolling conveyors to more elaborate keying and sorting machines.

b. Mailflow

Non-presort or non-dropshipped parcels entered into the mailstream are transported to the origin BMC either directly from retail/delivery units or more commonly consolidated through the plant. The origin BMC sorts the machinable parcels on the primary PSM which sorts parcels to the high-volume 5-digit destinations within the BMC service area as well as to each destination BMC. Parcels for the lower-density destinations within the BMC service area are sorted from the primary PSM directly to the secondary PSM, which sorts parcels to 5-digit destinations for a total of approximately 2,000 separations. The 5-digit containers of machinable parcels are transported to the delivery units either directly from the BMCs on occasion or, more commonly, transferred through a plant.

NMO parcels are processed to the 3-digit level in the BMCs for their service area and transferred to the plants. Plants then process the NMOs received from the BMCs to the 5-digit level. If customers were to prepare 3-digit containers of NMOs and dropship the containers to destination plants as proposed by witness Kiefer

(USPS-T-33), these parcels would be processed in NMO operations set up at plants.[20] This operation is performed manually and requires regular set-up (gathering of rolling stock and placarding containers) and breakdown, virtually regardless of the volume processed. [21]

Parcels presorted to BMC level and dropshipped at the destination BMC are processed on PSMs to the 5-digit level. Parcels presorted to 5-digits and drop-shipped at an SCF are cross-docked to delivery units. For the most part, parcels are sorted to carrier route at the delivery unit regardless of class or subclass.

For Package Services parcels, flats bundles, and irregulars, the mailflow for a specific processing category is similar for all of the subclasses (Parcel Post, Bound Printed Matter, Media Mail, and Library Mail). Witness Kiefer's (USPS-T-33) proposed changes to outdated Library Mail and Media Mail requirements will result in similar preparation for these subclasses depending on the processing category and better align with operational processes. For example, current preparation requirements result in BMC-level bundles for flats, letters and irregulars. Piece distribution for BMC-level bundles do not exist at the BMCs and currently this volume has to be sent to a plant to sort to the BMC's service area which is inconsistent with either the existing outgoing or ADC sort plans at the plant.

2. Bundle Processing

Flat mail bundles that arrive at a mail processing plant in sacks, on pallets, or in flat trays, are often sorted before they are dispatched or opened for piece distribution. When pallets and sacks contain bundles made up to finer sortation levels than the container, a bundle sort is required. This is accomplished in a manual or mechanized operation. Bundles are usually sorted into rolling containers.

a. Equipment

- Small Parcel and Bundle Sorter (SPBS) - The SPBS is deployed with four, five, or six induction stations, and requires a staffing of no more than three people per induction station. The SPBS can sort to 100 separations. However, some sites have added either 16 or 32 additional bins to these machines. There are

[20] Machinable parcels would still need to sorted to 5-digits at the BMCs or by mailers and would *not* be allowed to be included as part of the 3-digit NMO sort.

currently 346 machines deployed in the field. The average throughput of the SPBS is between 678 and 945 bundles or small parcels per hour per induction station. The majority of plants and 19 of the 21 BMCs have SPBSs.

- SPBS Feed System - This system is a recent addition to the SPBS. Feed systems consolidate all the induction lines into a centralized network capable of transferring mail from all types of mail containers and transporting the contents on mechanized conveyors to all the induction/keying consoles. There are currently 272 feed systems deployed in the field. With the SPBS Feed System, a staffing reduction equivalent to 0.5 to 3 people per crew can be realized, depending on the number of induction stations.
- Linear Integrated Parcel Sorters (LIPS) - The LIPS machine is not part of a national program and is procured locally. The configuration and performance vary based on the vendor, but the basic design consists of a feed station where mailpieces or bundles are keyed and sent down a rolling conveyor for deposit into rolling containers or pallet boxes.

b. Mailflow

Bundles, or packages of flats, are processed in both BMCs (Standard Mail and Package Services) and mail processing plants (all classes). Mixed-ADC bundles are transported to the origin plant to be opened for piece distribution to the ADC network. BMCs and ADC plants sort bundles primarily to 3-digit and SCF separations. Plants subsequently sort 3-digit and SCF containers for either piece distribution or a bundle sort depending on the presort level of the bundle. Other separations may be performed at the plants on bundles for various operational reasons, other than just based on the presort level. For example, machinable volumes may be separated from non-machinable volumes.

The SPBS is the equipment of choice for these bundle-sorting operations. The remaining sortation of bundles is performed with LIPS equipment or in manual operations. The manual options are either dumping the bundles on a belt and sorting to containers, or sorting the bundles into containers directly from the pallet.

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[21] Another example of fixed costs that cause workhours to vary less than volume.

Mechanized and manual bundle distributions require manual labor for operational set-up and breakdown. This involves the collection and placement of containers and placards for set-up. Also, at the time of dispatch, containers are closed and moved to the dock to meet transportation. No matter the volume received during a specific operating window, set-up and breakdown are fairly fixed.[22]

3. Sack Processing

a. Equipment

- Sack Sorting Machine (SSM) - Sacks are sorted in BMCs on the SSM to the BMC network for origin sacks and, for intra-BMC volume, to the 3-digit or SCF level. Keying or automated reading of the barcoded label occurs at the induction station, while the clerk places the sack into a bucket that inducts it onto the tilt tray system.

b. Mailflow

Sacks arrive at plants and BMCs from customers and other plants and may be containerized or bedloaded in vehicles. Containers are unloaded with either pallet handling equipment or, if wheeled, with manual labor. Containerized loads are much more efficient for unloading than bedloads. Bedloaded sacks are unloaded manually and, in some cases, the unloading is accomplished with the assistance of mechanized conveyors. Bedloads can maximize transportation cube utilization, yet are labor intensive and time consuming to unload.

Intra-BMC sacks are transported to the plants for opening or, in the case of carrier-route and some 5-digit sacks, further sortation to downstream facilities. Sacks, in most cases, are opened and dumped manually. Mechanized sack dumping equipment assists with emptying sacks of parcels into the parcel sorter system in the BMCs. Sack sortation is performed, in some cases, with mechanized sack sorters, but mostly with manual labor. Sacks are opened in the plants and delivery units with manual labor.

[22] This is one reason why workhours fluctuate less than volume in these operations.

4. Tray Processing

a. Equipment

- Robotic Tray Handling (2 types) - (1) Pedestal-style robots are designed to move sleeved and strapped letter trays from conveyors to containers. Currently, 85 pedestal-style robots have been deployed. Primary operations for robotics are the dispatch areas in plants and in-bound distribution operations at Airport Mail Centers. (2) One hundred gantry-style robots, which have the capability to handle flat tubs and strapless and sleeveless letter and flat trays, have also been deployed. They have increased processing capacity and higher throughputs than the pedestal-style robot. The gantry robot is essentially an arm that can move along an overhead track distributing mail into 24 separations. Gantry-style robots are predominantly located in plant dispatch areas.
- Tray Management System (TMS) - TMS uses tray identification, transport, storage, and process control technologies to automate the movement and staging of trayed letter and flat mail between most mail sortation operations. TMS is assembled from a family of common components that can be easily reconfigured. TMS was fully deployed in 28 plants by the end of FY 01. There are no further plans for additional systems at this time.

b. Mailflow

Letter trays are often sorted in the BMCs on the SSMs to the BMC network for origin trays and, for the intra-BMC volume, to the 3-digit or SCF level. Certain BMCs sort all or a portion of the trays on other mechanized equipment that in certain cases is also used to sort NMOs. In the plants, trays are sorted manually, with the assistance of the tray handling equipment described above, or by TMS. Trays sorted at origin are either transported to the Airport Mail Center, sorted to the appropriate containers for dispatch to surface transportation, or flowed to the appropriate piece distribution operation. Destination trays are sorted and flowed to the appropriate piece operation, dispatched to a downstream distribution facility, or dispatched directly to a delivery unit. Mixed ADC/AADC trays are sent to the closest plant consolidation center for piece distribution.

5. Description of Future System Beyond the Test Year

The Postal Service is in the process of evaluating new technologies that have the potential to replace, supplement, or enhance our SPBS equipment. The focus of this effort is to assess technology that can add OCR/BCR capabilities to bundle sortation, improve equipment throughput/productivity, and add separations. Analysis will be performed to determine if completely new pieces of equipment should be procured or if enhancements could be applied to our current inventory of equipment. It is possible that enhancements could take place before the end of the test year, but if the choice is to purchase new equipment, deployment will likely occur after the test year.

The Postal Service continues to explore enhancements to sorting equipment in the BMCs with the goal of reducing labor and improving equipment reliability. We are in the early development stages of enhancing the SSIUs with OCRs and barcode applicators.

Additional applications for robotic equipment will also be explored focusing primarily on dispatch operations.

D. Allied Operations

Allied operations are mail processing operations other than piece distribution. The most important examples are cancellation, opening units, pouching, and platform. Opening units sort incoming trays, bundles, and sacks for subsequent distribution operations and take off sleeves and straps from incoming trays and tubs. Opening units, as tracked by MODS, also prepare outgoing mail by sleeving and strapping trays, apply air assignment tags if applicable, and containerize for dispatch transportation. Pouching consists of sorting bundles and small parcels into sacks hung from racks, although larger containers may also be used. Platform consists of the activities required to load and unload mail from trucks, identifying container contents for movement to the appropriate operation, and moving containers to and from the docks and operations.

Movement of containers and handling of the contents are often augmented when customers choose to use pallets instead of sacks. Pallets allow the use of

forklifts, pallet jacks, and/or container unloaders to move, load, unload, and dump a significant quantity of mail. In addition, an MTAC study (USPS-LR-I-297) has shown that the condition of the contents (i.e. bundle integrity) is often superior at the first handling operation when prepared on pallets as opposed to sacks.

Some activities in allied operations, such as dumping sacks at an SPBS, can also be performed at a piece distribution operation. If a single person performs the activity for multiple distribution operations, that person would be assigned to an allied operation. However, people assigned to distribution operations, such as to the FSMs or automation, can also perform allied activities related to their operations.

Except for the cancellation operation, volume is not consistently measured for these operations due to the difficulty of measuring the workload, so piece productivities cannot be calculated. However, allied functions are still closely monitored because of their impact on service and cost. As noted below in the Volume and Workhours chapter, allied operations are often gateway and dispatch operations that are critical to service. Their costs have appeared more significant over time because our automation and mechanization efforts have reduced costs in distribution operations much more than in allied operations. Increasing the marginal volume on DPS through tabbing or “LMLM-ing”, and using different FSMs to handle pieces with differing characteristics, all increase the number of separations that allied operations must perform.

The Postal Service is continuing to evaluate technology to improve productivity in allied operations. Our efforts are focused specifically on lower-cost, off-the-shelf solutions that target point-to-point mail movement, as well as mail preparation and breakdown activities.

E. Delivery Operations

The carrier arranges mail based on the practicalities of the route and the mix of mail to deliver. For example, awkward shaped pieces will not be sorted into a vertical flats case where it would not only take up too much space in the case (usually a one inch separation per delivery), but would also create bundle handling difficulties on the street. Pieces that are rigid, non-uniform in thickness, and thick

(over ¾") are cases in point, and would most likely be handled as parcels, or, possibly, collated into the flats after pull-down. For example, a Bound Printed Matter (BPM) flat would be sorted into a vertical flats case, while a BPM irregular or machinable parcel would likely be held out and handled separately. This supports Witness Keifer's (USPS-T-33) proposal for shape based rates in BPM similar to Standard Mail.

Vertical flats cases are used for most routes while horizontal flats cases, with larger separations for multiple delivery points, are generally used on business routes and routes with a large proportion of centralized delivery.[23] In the case of horizontal holdouts, many of the small parcels and rolls (SPRs) would be cased and collated in with the flats. The identification of Delivery Confirmation and Signature Confirmation items is ensured because parcels and Priority Mail, regardless of shape, are held out and handled separately by clerks and carriers, unlike letters and flats. This is fully consistent with witness Mayo's (USPS-T-36) proposal to limit Delivery Confirmation and Signature Confirmation to parcels and Priority Mail.

III. Volume and Workhours in Mail Processing

In Docket No. R97-1, Dr. Bradley provided testimony on econometric estimates of the response of workhours to changes in volume for various groups of mail processing operations. The Commission's insistence that mail processing workhours vary in exact proportion with volume prompted the Postal Service to offer operational testimony supporting the reasonableness of Dr. Bozzo's econometric estimates in Docket No. R2000-1. Witness Degen (USPS-T-16) and I (USPS-T-10) provided that testimony. My testimony on this issue in the current docket addresses some of the possible misinterpretations of my previous testimony and provides specific examples of mail processing costs that are primarily driven by factors other than volume.

My testimony below should not be misconstrued as saying that any of these costs are entirely fixed or independent of volume nor that other mail processing costs vary in exact proportion with volume. The examples I provide illustrate why I

[23] Rows of mailboxes in apartments are a common form of centralized delivery.

would expect workhours to vary significantly less than volume for most types of mail processing operations. I defer to Dr. Bozzo for the actual estimation.

A. Network

As I testified in R2000-1, "The ideal configuration for distribution is centralized distribution within an existing plant…" (USPS-T-10, page 32). In space planning, the Postal Service tries to concentrate distribution operations in a single facility to create opportunities for savings due to automation and other efficiencies. *Unfortunately, we cannot do this in all situations*. Plants must be located coincident with the population they serve in order to meet service standards. With that constraint, and subject to practical requirements such as transportation costs and the need to make the best use of our existing space, we prefer larger plants. For example, it is common practice to consolidate collection mail processing for several plants when holiday processing is necessary to avoid excessive workload the following day. This is done to achieve economies. Further evidence of the Postal Service's preference for centralized distribution is processing to DPS on DBCSs in plants. It is when there are space constraints that DPS is done at delivery units on CSBCSs instead.

Each plant must sort mail to a network of other plants, post offices, carrier routes, box sections, large firms, etc. This network is a major determinant of the plant's workload. In conjunction with the characteristics of the mail and the sorting equipment, this network determines the sort schemes that must be spread over the equipment. The work required to service the network can sometimes be distinguished from the work of processing mail volumes. This is seen most dramatically following a rate increase. Volume, and the workload required to process that volume, may decline, but the number of separations required for the network are unaffected.

Conversely, if the network grows without any growth in volume, then the processing time will stay the same while the number of sort schemes, and sort scheme changes, will grow (described further below). For example, in DPS, the number of delivery routes and delivery points to be sorted determines the number of DBCS stackers required. An increase in delivery points and delivery routes means

an increase in DBCS schemes as available stackers are exhausted and, one-by-one, schemes must be split. The resulting drop in pieces sorted per hour is not a loss of efficiency—it is simply that pieces per workhour is only a partial measure that ignores the network component of workload.

B. Scheme Changes

Scheme changes entail activities such as ending the previous sort, sweeping the bins, removing containers, printing a report, labeling and inserting new containers, and loading a new sort plan. Depending on the type of sorting equipment and the work methods at a plant, the time to change a scheme can range from under five minutes to over thirty minutes. The time required to change sort schemes each day within a plant is largely fixed and does not change in proportion to changes in volume.

1. Automated and Mechanized Distribution Operations

To gain some perspective on the magnitude of the impact of schemes on processing, the Managers of In-Plant Support (MIPS) at two local plants were asked for information on their mechanized and automated sorting operations. The results are summarized below.

The Effect of Daily Sort Plan Changes In Automated and Mechanized Distribution Operations At Two Facilities				
	FSMs (1)	BCSs (2)	MLOCRs (3)	SPBS
Number of Machines	12	49	11	3
A. Average Run Time Per Machine (hrs.)	15.04	9.88	7.24	17.20
B. Average Number of Sort Plan Changes Per Machine	10.71	4.61	2.45	4.00
C. Average Time to Change Sort Plan (min.)	8.54	12.71	16.04	31.33
D. Scheme Changes, % of run time (4)	0.10	0.10	0.09	0.12
E. Schemes Effect (5)	*0.90*	*0.90*	*0.91*	*0.88*
1) AFSM 100, FSM 1000, FSM 881				
2) DBCS, OSS, BCS				
3) OCR, ISS				
4) B * C / (60 * A)				
5) 1 – D				

Row E, labeled Schemes Effect, is the proportionate change in workhour requirements that would be expected from a change in volume if scheme changes were the only non-volume cost.[24] For example, if total run time is 100 hours consisting of 90 hours of processing and 10 hours spent changing sort schemes then the Schemes Effect is 0.90. Then suppose that the volume declines by 10 percent. There would be 81 hours of processing plus 10 hours changing sort schemes for a total run time of 91 hours—a 9 percent decline in workhour requirements resulting from the 10 percent decline in volume. In this example, workhours do not change in exact proportion to volume. The proportionate change in workhours for a change in volume is 90 percent. It is *not* 100 percent.

Although a volume increase might increase the number of parallel sort schemes in a few plants, it would have little impact on the number of sort schemes

[24] As discussed below, scheme changes are only one example of costs that do not vary in proportion to volume.

used. The above table shows 129 daily FSM[25] and 226 BCS[26] scheme changes, illustrating the very limited effect of an additional parallel sort scheme change on the proportion of volume to workhours.

The Schemes Effect calculations are simple averages per machine for two facilities showing some effects of sort scheme changes. They are not intended as alternatives to Dr. Bozzo's estimates, but rather to demonstrate that network effects represent a substantial component of mail processing costs that are not primarily driven by volume.

Also, the Schemes Effect is not the only impact of scheme changes on the relation between volume changes and workhours. For example, when a scheme is running smoothly with an inventory of mail waiting to be processed, it is relatively easy to maintain high productivity. However, near scheme change time, volume may be lighter or intermittent as the last pieces come in from up stream operations. Skilled supervision can reduce, but rarely eliminate, the resulting loss of productivity.

2. Manual Operations

The role of scheme changes in manual costs is fundamentally similar to mechanized and automated operations.[27] Unfortunately, manual cases do not have the automated data recording systems found on processing machinery. Manual sort schemes largely service the same network as automated schemes. However, because there are fewer separations on manual cases than on machines, more sort schemes are required in manual distribution. Fewer incoming secondary manual schemes are processed in plants because incoming secondary manual distribution operations are more likely to be decentralized due to lower volumes per scheme and shortages of scheme qualified clerks. The relative number of machine and manual sort schemes will vary significantly by plant due to the balance of these factors. A plant's network role (i.e., ADC, SCF) also affects the number of sort schemes.

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[25] 10.71 * 12 = 129

[26] 4.61 * 49 = 226. Most letters are delivery point sequenced on automation. Flats are delivery point sequenced manually by carriers.

[27] When a manual case is labeled for multiple sort schemes, changes are analogous to scheme changes for machines. In plants, manual cases are commonly labeled for multiple schemes due to a lack of floor space.

I have not been able to identify any quantitative basis for estimating the Schemes Effect for manual distribution (other than Dr. Bozzo's econometric models), but my experience suggests it would be lower than for machine distribution. Whether it is the Schemes Effect[28] or other factors, basic observations tell me that workhours do not change in proportion to volume in manual distribution. As an operations manager, if volume was expected to increase by five percent over SPLY, you always plan to use significantly less than five percent more workhours. A clerk standing at a case will sort a letter every two to four seconds, but a good productivity is about 600 pieces per hour, i.e. 6 seconds per piece. I believe that much of this productivity difference is caused by non-volume factors.

For manual parcel and bundle sorting operations, set-up and take-down time can be substantially greater than for letter and flat sortation. Manual parcel and bundle operations involve sorting to rolling containers, and obtaining, labeling, and placing those containers can take significant amounts of time.[29]

3. Allied Operations

The Schemes Effect for allied operations is even more difficult to identify and quantify, but again it seems likely to be lower than for machine distribution. Consider platform operations. In the outbound dock operation, sorting containers to dock doors is the equivalent of a sort scheme. For internal USPS origins and destinations, departures are scheduled to service the network. As long as the network does not change, the departure schedule need not change. Generally, the only effect of a volume change would be a change in the number of containers that must be sorted. Even considering arrivals from customers, a volume decrease may be reflected more in volume per arrival than a decrease in the number of arrivals.

If there is no change in the number of departures or arrivals, the only impact on dock workhours from a volume change will be the time required for loading or unloading. For unloading, a crew may have to wait for the arrival, open the doors,

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[28] If long-term manual volumes decline while the fixed time for scheme changes remains constant, the proportionate impact of volume changes on workhours is reduced.

[29] This is evident in the significant amount of time, reported in the table above, to change sort plans in SPBS operations, which use rolling containers as output bins.

position a conveyor or obtain a forklift, unload and move the containers, and close the doors. Only the actual unloading varies with the number of containers. Unloading one less container will have much less than proportionate impact on the total time to process the arrival.[30]

In addition, the volume of mail can be more variable than the number of containers. For example, collection mail from smaller offices typically arrives at the plant as one container, i.e. a sack or hamper, per office. If volume from these offices decreases, there will still be one container per office, and offices rarely close. Similarly, manual flats for delivery are typically sorted into flat trays on shelves in a rolling container, one tray per route. If volume declines, there will still be one tray per route and there will still be the same number of containers because the number of routes is unlikely to change. The number of delivery points, especially in a DPS environment primarily drives route-related workload.

Therefore, the limited effect of a volume decline on the number of arrivals and departures, loading and unloading times, and number of containers combine to explain why a volume decline has a less than proportional effect on dock workhours.

C. Gateway and Dispatch Operations

There is a minimum crew size to start and end an operation. For example, in a facer-canceller operation, to get the first machine running and processing mail, you need a machine operator, a culler, a dumper, and perhaps others depending on the setup. This minimum requirement at the beginning and end of the operating window does not change with volume.

In R2000-1 (USPS-T-10, pages 30-31), I described the critical nature of gateway and dispatch operations and the difficulty in predicting the timing and magnitude of their workloads. Although total volumes are reasonably predictable, actual arrivals during the gateway processing window depend on the weather and traffic, which are much less predictable. Early in the operating window, it is important to get mail upstream to support uninterrupted processing runs. Late in the

[30] This process is analogous to carrier street activities in which a fixed time component, regardless of volume, is well accepted.

operating window, it is important to get mail upstream so it can clear sorting operations before they must switch to a different scheme. These factors cause gateway operations to be run with excess capacity early and late in their operating window. This excess capacity is not inefficiency, but rather a cost of meeting service standards.

Manual dispatch-related operations, especially dispatch-related letter case distribution, frequently have excess capacity for similar reasons. They must process rejects from automated operations, have a relatively short processing window, and represent the last opportunity to sort and dispatch this type of mail on time.

D. Labor Processing Costs

In AP 12 FY 01, the approximate cost per 1000 pieces processed[31] was:

Category	**Labor Cost per 1000 pieces processed**
AFSM 100 (includes keying, prep and sorting)	$34
FSM 1000	$56
Manual Flats	$62
Automation Letters	$5
Manual Letters	$56

These are the cost figures operations managers use as a guide in order to process mail in the most economical operation while meeting service requirements. For letters, modest losses in manual and automated productivities are insignificant compared to the dramatic reduction in unit cost of moving volume from manual to automation. For flats, the improvement is somewhat less dramatic, but still substantial. To illustrate, suppose that at some plant, flats are processed one-third on the AFSM 100 and two-thirds in manual casing. If the plant's unit costs for manual and AFSM 100 processing equal the national averages, their average cost

[31] These National figures come from the NWRS (National Workhour Reporting System) cost per hour by LDC (Labor Distribution Code), multiplied by MODS (Management Operating Data System) hours and divided by TPH (Total Pieces Handled).

per 1000 flats would be $53.[32] Now suppose the plant gets additional automated flats equipment so that flats processing shifts to two-thirds on the AFSM 100 and one-third manual. Even if productivity declines and unit costs increase by, say, $1 per thousand pieces in both manual and automated operations, the average cost per 1000 pieces would still decrease to $44,[33] a 17 percent savings.[34]

If we can move a letter or flat from manual processing to automation, there are tremendous savings opportunities. Operationally, we are interested in sending the right rate and make-up signals to mailers consistent with reducing our processing costs. In Chapter 2, I discussed a number of these rate and make-up issues, including the pricing of ECR Basic letters, a non-machinable surcharge for manual letters, the expanded thickness definition for automated flats, shape based rates for BPM, NMO dropshipments to plants, and the realignment of Library Mail and Media Mail preparation requirements to avoid non-parcel shaped volume at BMCs that require piece distribution.

E. Summary of Volume and Direct Labor Hours

As I described in R2000-1 (USPS-T-10, pages 28-32), the Postal Service staffs to workload, both hour-to-hour and year-to-year. This should not be construed to say that we staff to just volume. My testimony in this case demonstrates—more explicitly than in R2000-1—that a substantial portion of mail processing workload is relatively independent of volume. Despite the best efforts of our skilled supervisors, mail-processing operations do not operate at "nearly uniform average output rates per man (sic) hour." [35] Service requirements compel management to staff for

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[32] 1/3*$34+2/3*$62=$53

[33] 2/3*$35+1/3*$63=$44

[34] ($53-$44)/$53 = 17 percent

[35] R2000-1, Opinion and Recommended Decision, Appendix F, page 12. The full paragraph is: "In summary, the Commission finds that the testimony of the Postal Service operations witnesses is basically compatible with the historical observations that led to the established proportionality finding. These are, first, that mail processing operations are run at nearly uniform average output rates per man hour; second, that there is little labor time that can be identified as downtime or slack time (in the sense that the activities are fully staffed when the processes are not running at full capacity); and, third, that proportional changes in both labor and capital in

excess capacity in gateway and dispatch operations; a significant portion of mail processing workload is driven by network requirements, such as scheme changes, that are largely independent of volume; and automation best reduces overall unit costs when rate and make-up signals produce a cost-minimizing mix of mail.

F. Supervision

As I explained in R2000-1 (USPS-T-10, page 31), it may take a year to recognize a decline in volume, calculate staffing adjustments, and get them through the bidding process. During that time, supervisors frequently have to work harder to adjust staffing for low volume nights. This is never entirely successful, not all supervisors and in-plant support staffs are equally skilled or experienced, and some plants are relatively slower in adjusting their staffing. In my experience, it requires focused efforts to reduce workhours when average volume declines in an operation.

A volume decline affects supervisory hours as well as craft hours—an operation requires supervision only when it is running. However, there are additional considerations for supervisors when volume declines. On a light night, Casual and Part-Time Flexible (PTF) employees can be clocked-out early. However, this option is not available with supervisors and even a partially staffed operation must be supervised. In addition, more supervisory time is required to reassign personnel, "sell" leave, and clock-out casuals and PTFs. A volume decrease means that light nights are more frequent and pronounced. Under these circumstances, there would be little change in supervisory hours until there can be a general adjustment in staffing.

Equipment also affects supervisory hours. Supervisors are responsible for the operation(s) they are supervising. This consists of managing both the people assigned to the operation and the mail flow through the operation within the service window. As operations are automated, the number of people in the operation declines while the difficulty of managing the mail flow and the equipment increases, preserving a rough balance in the supervisory workload. With automation, the

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response to volume changes are feasible at individual plants within a three-to-four year period of time."

supervisor must not only manage the flow of mail in and out of an operation and ensure that cut-off times are met, she must monitor the equipment. The loss of 15 minutes might mean 300 pieces unprocessed in a manual case, but 15 minutes might mean 10,000 pieces unprocessed on a DBCS. Ensuring mail availability and coverage for breaks and lunch are key supervisor responsibilities. Excessive rejects and jams, or excessive time to change a sort scheme can greatly reduce the throughput. Supervisory attention is critical to all of these areas.

IV. Library Reference (LR-J-101 Field Operations Ride-Along Survey)

This survey was conducted to understand any impacts that the "Ride-Along" attachments may be having on the processing and delivery of the host Periodicals mailpieces. There was an assumption prior to the experiment that any impact that these attachments would have on costs would be minimal. This informal survey was an attempt to verify this assumption, as well as to understand processing and delivery operation's overall opinion of the Ride-Along experiment.

Results of the survey showed some minor operational issues due to the inclusion of Ride-Alongs. However, the overwhelming majority favored having the item as a Ride-Along instead of as a separate piece.