BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Conversion To Automated Mail Processing Should Continue; Nine-Digit Zip Code Should Be Adopted If Conditions Are Met

The U.S. Postal Service is buying automated equipment which it believes will curb mail processing costs. It is also proposing to implement a nine-digit ZIP Code program (ZIP + 4) for First-Class letter-size mail.

GAO endorses the planned automation and ZIP + 4, provided the Postal Service:

- --Demonstrates that the new automated equipment will perform satisfactorily.
- --Establishes a postage rate incentive for volume ZIP + 4 mailers.
- --Has reasonable assurance that the established incentive will result in usage sufficient to make ZIP + 4 cost effective.

Extensive use of ZIP + 4 by business mailers would be absolutely essential to the program's cost effectiveness; extensive use by householders would not.

GAO/GGD-83-24
JANUARY 6, 1983

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COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

CONVERSION TO AUTOMATED MAIL PROCESSING SHOULD CONTINUE; NINE-DIGIT ZIP CODE SHOULD BE ADOPTED IF CONDITIONS ARE MET

D I G E S T

Congress put a hold on the Postal Service's implementation of the proposed nine-digit ZIP Code program ("ZIP + 4") and asked GAO to review its soundness. In particular, GAO was tasked with reviewing the

--accuracy of the Postal Service's financial projections,

--likelihood that the new automated equipment intended for use with the program--especially optical character readers and bar code sorters--would perform as intended, and

--potential impact of ZIP + 4 on mailers.

OVERALL CONCLUSIONS

After a wide-ranging and in-depth examination of these and a number of related issues, GAO is unable to give an unqualified "yes" or "no" answer to the central question of whether the Postal Service should move forward with ZIP + 4. There are some risks involved that cannot be adequately assessed at this time.

GAO does, however, endorse the acquisition of the new equipment and its use to automate the processing of five-digit ZIP Code mail, provided that the Postal Service demonstrates that the equipment will perform adequately. Sufficient results of acceptance tests to determine actual equipment performance are expected to be available by April 1983.

GAO recognizes that even if the equipment performs adequately (that is, meets contract specifications), there will still be risks associated with its use in processing five-digit mail. However, given the Postal Service's labor intensive operations and the opportunity that automation offers to reduce labor costs through greater productivity, GAO considers these risks acceptable.

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The Service should proceed with the nine-digit code if and when--in addition to having demonstrated that the equipment will perform satisfactorily (that is, at contract specifications)--it has (1) an established postage rate incentive and (2) reasonable assurance that the established incentive will result in ZIP + 4 usage sufficient to ensure that the system's benefits exceed its costs.

A usage level sufficient to meet the above test cannot be determined until the amount of the rate incentive--if any--is established by the Service's Board of Governors. This is expected to occur before October 1983.

Householders' use of the nine-digit ZIP Code would help the Postal Service reduce mail processing costs but would not be critical to the cost effectiveness of the ZIP + 4 program. (See pp. 121 to 126.)

HIGHLIGHTS OF PLANNED AUTOMATION AND ZIP + 4

The planned automation, if used with the current five-digit ZIP Code only, would reduce mail processing costs involved in intermediate mail processing, and is thereby expected to contribute to postage rate stability (that is, smaller or less frequent rate increases). (See pp. 1 and 47.)

Used with the nine-digit code, the new equipment could further reduce mail processing costs substantially, primarily by providing automated mail sorting down to carrier routes --with fewer errors than now occur with manual and machine sorting. (See pp. 42 and 46.)

The Postal Service does not claim that automation and ZIP + 4 would result in faster mail delivery. The number of letters sorted to the wrong destination would be reduced, enabling such letters to be delivered on time. But, in general, delivery time for ZIP + 4 mail and five-digit ZIP Code mail are not expected to differ. (See pp. 127 to 129.)

As currently designed, ZIP + 4 would be targeted to First-Class letter-size mail and primarily to business mailers, whose voluntary use of ZIP + 4 would be essential to its cost effectiveness. (See p. 2 and pp. 44 to 47.)

Because the cost effectiveness of ZIP + 4 would hinge heavily on voluntary participation by business mailers--and such participation is not certain--GAO can give only a qualified endorsement to the Postal Service's move to the nine-digit ZIP Code.

However, GAO believes that the potential incremental gain to the Postal Service in moving from automated use of the five-digit code to automated use of the nine-digit code is so great in comparison with the incremental cost that if certain conditions are met, the move to ZIP + 4 would be more than justified, as shown in the following table.

Incremental projects	Incremental costs	Incremental benefits		
		Gross	Net	ROI a/
	(millions)			(%)
5-digit	$1,988	$3,404	$1,416	16.3
9-digit				
If rate incentive remains fixed	873	6,128	b/3,466	36.4
If rate incentive is escalated for inflation	873	6,128	c/1,718	23.5

a/Return on investment. (The ROI method of analysis is discussed on pp. 21 and 24.)

b/Benefits of about $5.26 billion less about $1.79 billion returned to qualified mailers through a fixed rate incentive of one-half cent per piece.

c/Benefits of about $5.26 billion less about $3.54 billion returned to qualified mailers through an escalated rate incentive.

for the Postal Service have demonstrated competence in optical character reading technology (see p. 55), GAO believes that any equipment that fails to perform up to expectations after acceptance because of inadequate pre-acceptance testing can probably be made to eventually function well in U.S. postal operations. However, corrective measures could entail additional cost and the need for operational adjustments. (See pp. 61 to 73.)

--The Postal Service may have initial problems in maintaining its new automated equipment. However, strong management actions can limit the extent and duration of these problems. Service officials were aware of most of the potential problems GAO identified and had recently taken steps, or planned to take steps, to minimize them. (See pp. 73 to 79.)

THE AUTOMATED SYSTEM-- ANALYZED AS THREE SEPARABLE PROJECTS

GAO analyzed the proposed automated system on an incremental basis, considering separately and in turn the following three projects, or options: (1) improvements to existing letter processing equipment; (2) an automated system using the five-digit ZIP Code; and (3) an automated system, with expansion of the ZIP Code from five to nine digits.

GAO's analysis of costs and benefits on an incremental basis for each option shows that:

--When considering both investment and operating expenses, improving the existing equipment would reduce costs by about $105 million--that is, from $718 to $613 million--over the Service's 16 year project evaluation period, and would produce a return on investment (ROI) of about 48 percent. (See pp. 36 and 38.)

--Acquiring and operating the new optical character reading and other equipment and using it with the five-digit ZIP Code would yield a total positive net cash flow of $1.4 billion for the 16 year evaluation period at an additional cost of $2.0 billion, and would provide an ROI of about 16 percent. (See pp. 37 and 38.)

To secure such use, the Postal Service will seek permission from its Board of Governors to lower the First-Class Mail rate by one-half cent per piece for mailers who mail, at one time, 500 or more pieces of First-Class Mail suitable for processing on the automated equipment. It is reasonable to assume that mailers will add ZIP + 4 codes to address files if savings in postage from repeated use of the lower rate exceed the cost of file conversion and maintenance.

The Omnibus Budget Reconciliation Act of 1981 (P.L. 97-35), enacted in August 1981, prohibited implementation of ZIP + 4 before October 1, 1983, but permitted the Postal Service to proceed with preparations. These preparations include the purchase of automated mail processing equipment, primarily optical character readers and bar code sorters.

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In assessing the potential performance and reliability of automated equipment, GAO was aided by a team of engineers of the National Bureau of Standards, Department of Commerce.

EQUIPMENT RISKS AND UNCERTAINTIES REQUIRE ATTENTION

There are risks and uncertainties associated with the advanced optical character reading equipment that the Postal Service is acquiring to process five- and nine-digit mail. For example:

--Performance assumptions which the Service used in its economic analysis to justify the automation program were based to a significant extent on assumed future improvements in machine readability of addresses through mailer cooperation in upgrading addressing of mail pieces. At the time of GAO's review, it was too early to assess programs the Postal Service was planning toward achieving these improvements. (See pp. 56 to 61.)

--Testing and evaluation procedures are not adequate to measure the performance of automated equipment or determine the need for design changes. Because foreign licensors of the U.S. firms manufacturing equipment

ZIP + 4 regardless of whether a rate discount were offered, most would require an adequate rate discount to offset their ZIP + 4 conversion costs before they would be willing to add the nine-digit code to their address lists. (See pp. 105 and 106.)

Given the ROI's extreme sensitivity to usage levels (see pp. 44 and 45) and the uncertainty of mailer cooperation at this time, GAO lacks a basis to give an unqualified endorsement to the move from a five-digit to a nine-digit code or, conversely, to rule out the chances of its success.

THE ROI--NOT A COMPLETE PICTURE

The picture painted by the ROIs computed by GAO for the ZIP + 4 project is not complete without disclosure of potential savings to mailers resulting from reductions in Postal Service operating costs if the ZIP + 4 code is used extensively by large-volume mailers.

With a ZIP + 4 usage rate of 90 percent, the automated system, using the nine-digit code, could sort mail down to the carrier route and --over a 16 year project evaluation period-- potentially reduce net operating costs by about $5.3 billion (over and above the benefits of using it with the five-digit ZIP Code). The ROIs computed by GAO are based on this number less the cumulative amount of the proposed rate reduction considered necessary to obtain extensive use of the ZIP + 4 code.

A fixed postage rate reduction of one-half cent per piece would return to qualified mailers $1.8 billion [1]/ of the above $5.3 billion in savings, leaving the Postal Service with a net cash flow of about $3.5 billion over the 16 year project evaluation period and an ROI of 36 percent. An escalated rate reduction would return about $3.5 billion to qualified mailers, leaving the Postal Service with a net cash flow of about $1.7 billion and an ROI of 23 percent.

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[1]/ Calculated on the basis of the Postal Service's estimate of an annual volume of 28 billion pieces of mail qualifying for a ZIP + 4 discount.

--Under an automated system, the move from a five-digit to a nine-digit ZIP Code would yield a total positive net cash flow of $3.5 billion for the evaluation period at an additional cost of $873 million, and would result in an ROI of about 36 percent on this incremental investment. This assumes a fixed rate incentive of one-half cent for each qualifying piece of mail. If the rate incentive were escalated to keep pace with inflation, the ROI would be about 23 percent. (See pp. 37 and 38.)

Viewed in this way, the incremental move from five to nine digits would seem to be more than justified by the potential added net benefits. There are, however, major uncertainties regarding mailer usage which cause GAO to qualify its endorsement of this move.

MAILER BEHAVIOR IS UNCERTAIN

The major uncertainties regarding mailer usage concern

--whether the Postal Service will be successful in establishing reduced rates for volume ZIP + 4 mailers; and

--whether the amount of such an established incentive would be sufficient to result in a usage rate which, in turn, would be adequate to make the ZIP + 4 program cost effective.

GAO found that many large-volume mailers were taking a wait-and-see position on the use of the ZIP + 4 code. They were waiting mainly to see what postage rate incentive--if any--will be offered and what other mailers will do. (See pp. 106 and 107.)

According to the Postal Service, use of the nine-digit code would be voluntary. Mailers' decisions on moving to it would, to a great extent, be based on the economics of their particular cases--the sum of costs, such as adding ZIP + 4 codes to their address files and keeping the codes current, versus benefits such as reduced postage and improved mail service.

GAO's questionnaire survey of major mailers disclosed that, although some would convert to

The Postal Service concurred in general with GAO's recommendations and described current and planned actions to comply with them. In one significant decision, the Service accepted GAO's recommendation to extend the testing of new equipment and said it would conduct its own 8- to 12-week test on one of the first optical character readers delivered to a postal facility from each contractor. Data from these tests will enable the Service to better assess the performance and reliability of the new equipment.

Regarding GAO's conclusion that business mailers lacked necessary information about the ZIP + 4 program to enable them to make informed decisions about whether to convert to ZIP + 4, the Service agreed. It said that following enactment of the 1981 Omnibus Budget Reconciliation Act, it had cancelled aggressive ZIP + 4 education and information programs to comply with the intent of the act. It said such programs would be reinstated.

Although the potential ROI calculated by GAO was favorable for the ZIP + 4 project, the Postmaster General considered it understated, primarily because of the methodology GAO used in calculating the ROI. The Postmaster General disagreed with GAO's treatment of the assumed one-half cent rate reduction for ZIP + 4 mail as a program cost in computing the ROI. He held the view that the rate reduction represents a distribution of savings to mailers, as required by law, and that it should not diminish the ROI. (See pp. 171 to 173.)

GAO holds to the position that because the proposed rate discount will be a necessary incentive to induce large-volume mailers to use ZIP + 4, it should be treated as a program cost for purposes of computing the ROI. The Service is, in effect, buying mailers' usage of the nine-digit code. Without this usage, the program would not succeed, and there would be no savings to distribute. (See pp. 34 and 52.)

However, the benefits measured by GAO's ROI are understated by the extent to which, over time, the cumulative amount of the rate reduction received by mailers exceeds mailers' costs of adding the ZIP + 4 code to their address files. GAO cannot estimate such costs.

The $1.8 billion (or $3.5 billion) returned to mailers will serve to offset their file conversion and maintenance costs, and provide a net saving if postage reductions from repeated and frequent use of the lower rate exceed the costs of file conversion and maintenance. GAO cannot estimate such costs but major mailers consider them significant enough to decline to convert their address files without a rate reduction. GAO believes it reasonable to assume that, over time, the cumulative amount of the rate reduction received by mailers will exceed mailers' costs. The benefits measured by GAO's ROI are understated to the extent that mailers realize net savings.

How soon a mailer breaks even and begins to realize net savings--and the amount of these savings--will be determined by the frequency of use of each ZIP + 4 coded address. Large-volume mailers who use each address frequently will recover conversion costs and begin realizing net savings earlier than low-volume mailers qualifying for the ZIP + 4 discount. (See pp. 102 to 106.)

AGENCY COMMENTS AND GAO'S EVALUATION

Postal Service comments on GAO's draft report appear in appendix XIV. GAO discusses the Service's comments in individual chapters of the report.

GAO recommends Postal Service actions to:

--Improve the optical character readability of mail. (See p. 60.)

--Improve the testing and evaluation of new equipment. (See pp. 71 and 72.)

--Broaden assistance to mailers in converting their mailing lists to ZIP + 4. (See p. 132.)

--Maintain at least the current quality of delivery service for five-digit ZIP Code mail after ZIP + 4 is implemented. (See pp. 132 and 133.)

--Provide mailers necessary information about the ZIP + 4 program. (See p. 133.)

calculations certain potential additional costs to the Postal Service which it identified in the report.

Although some mailers will add the ZIP + 4 code to their addresses for non-monetary reasons (such as the expectation of improved mail service), it is reasonable to expect that most mailers will not add the code unless they can realize monetary savings from repeated use of the expanded code.

The Postal Service disagreed with GAO's assumption that the Service's contract for a toll-free "800" telephone inquiry service would remain in force for the full 16 year project evaluation period at a total cost of $500 million. (See p. 172.)

There is no evidence to support the Postal Service's assumption that the volume of calls requesting nine-digit ZIP Codes would drop markedly after fiscal year 1985, causing costs for this service to drop. On the contrary, evidence points to a sustained large volume of calls. As GAO stated in the report (see pp. 28 and 29), in 1980--17 years after the five-digit ZIP Code program began--the Service estimated that it was receiving about 100,000 ZIP Code inquiry calls a day. The great increase in the number of ZIP Codes resulting from the expansion to nine-digit codes makes it likely that the volume of inquiries will increase significantly. With the expansion to nine digits, the number of ZIP Codes will increase approximately 800 times over the current level.

The Postal Service contended that, although GAO recognized in its report a number of additional savings potentially available through the use of automation and ZIP + 4, it failed to include these savings in its ROI calculations. (See pp. 178 to 180.)

As GAO pointed out in the report (see pp. 48, 49, and 53), it did not include these potential additional savings in its ROI calculations because it was not possible to quantify them with sufficient accuracy. The savings depended on planned actions which were still uncertain and tenuous at the close of GAO's review. Where possible, GAO did indicate the possible magnitude of savings on the basis of available information, but GAO continues to believe it would not have been prudent to include them in the ROI calculations. For the same reasons, GAO did not include in its ROI

Contents

GLOSSARY

Bar code	A series of vertical printed lines designed to represent a numerical value. The Postal Service has a bar code, designed to represent a ZIP Code, to be printed by optical character reader machines and read by bar code sorters.
Bar code sorter (BCS)	A Postal Service letter sorting machine that optically reads the bar code printed on an envelope and sorts the letter into one of a number of attached bins, according to the ZIP Code that the bar code represents. In Postal Service usage, a small BCS has 96 to 102 bins, while a large BCS has 300 to 305 bins.
Coding accept rate	The percentage of mail handled by an optical character reader/channel sorter that is imprinted with a bar code and sorted.
Collection mail	Mail collected from households, street collection boxes, and businesses. This mail contains stamped, metered, and Facing Identification Mark mail.
Error rate	The percentage of total mail sorted by a letter sorting machine that is sorted incorrectly or, in the case of optical character reader/channel sorters, coded or sorted incorrectly.
Expanded ZIP retrofit (EZR)	A package of electronics designed to upgrade the capabilities of multiposition letter sorting machines. These electronics (1) allow operators to sort mail on the basis of four ZIP Code digits,instead of the current three digits; (2) are designed to improve the mail transport mechanism within the multiposition letter sorting machine (MPLSM); and (3) provide more data on, and better monitoring of, machine and operator performance.

ABBREVIATIONS

BCS	Bar code sorter
CSR	Customer service representative
ELSAG	Elettronica San Giorgio
EZR	Expanded ZIP retrofit
FIM	Facing identification mark
GAO	General Accounting Office
LSM	Letter sorting machine
MPLSM	Multiposition letter sorting machine
MTSC	Maintenance Technical Support Center
NEC	Nippon Electric Company
OCR	Optical character reader
OCR/CS	Optical character reader/channel sorter
REI	Recognition Equipment, Incorporated
ROI	Return on investment
USPS	United States Postal Service

Meter bypass mail (also called large-volume meter mail)	Large quantities of meter mail which are delivered to postal facilities in trays (about 500 pieces per tray). This mail is generally uniform and bypasses facer-canceler machines, going directly into letter sorting machines.
Multiposition letter sorting machine (MPLSM)	A semiautomatic sorting machine that allows up to 12 operators to sort mail pieces by keying either part of the ZIP Code, or the carrier route number, into the machine. The MPLSM can sort mail into as many as 277 bins.
Net accept rate	The percentage of mail handled by a sorting machine that is actually sorted correctly.
Optical character reader (OCR)	The generic name for equipment that optically detects and reads alphabetic and numeric characters, marks, and bar codes. In this report, the term refers to equipment that reads all or part of the address on a piece of mail.
Optical character reader/ channel sorter (OCR/CS)	A type of optical character reader that detects and reads the city, State, and ZIP Code on an address; prints a bar code representing the ZIP Code; and sorts the piece of mail to one of up to 60 bins attached to the machine.
Optical Character Reader-I (OCR-I)	An early model optical character reader being used by the Postal Service. The OCR-I reads either the city/State/ZIP Code line or the street address line on a piece of mail, then sorts it into a bin in an adjacent letter sorting machine.

Facing identification mark (FIM)	A series of vertical bars printed near the upper right corner of business reply mail and some courtesy reply mail to allow sorting and canceling of this mail.
Gross accept rate	The percentage of mail handled by a sorting machine that is actually sorted (whether correctly or incorrectly).
Machinable mail	Mail pieces meeting Postal Service standards for mail that can be handled by letter sorting machines. Machinable mail is between 3-1/2 and 6-1/8 inches wide; is between 5 and 11-1/2 inches long; and is between 7/1,000 and 1/4 inch thick.
Mechanical throughput (also called throughput rate)	The number of pieces of mail handled by a sorting machine in an hour.
Meter mail	Mail bearing a postage meter imprint and collected by Postal Service carriers or from collection boxes. Meter mail does not need to be canceled.
Meter belt mail	Meter mail collected and initially separated from other mail by Postal Service employees. It is processed on a separate conveyor belt (physically separate from conveyor belts used for collection and stamped mail). Meter belt mail is processed through a facer-canceler machine for facing only.
Meter bundle mail	Mail bearing meter imprints that is generally faced in the same direction and tied or banded together by the mailer. At the postal facility initially receiving these bundles, a bundle may be extracted from other mail, placed in a tray with other meter belt mail, and sent directly to a letter sorting machine, bypassing facer-canceler machines.

CHAPTER 1
INTRODUCTION

In late 1980, the U.S. Postal Service requested and received approval from its Board of Governors to purchase automated mail sorting equipment. The Service proposes to maximize the benefits of this automation by expanding its five-digit ZIP Code to nine digits. [1]/ Added to the current five digits (which for most mailers would not change) would be a hyphen and four new numbers, as in the following example:

XYZ Company
P.O. Box 964
Washington, D.C. 20044-0964

The Postal Service has adopted the term "ZIP + 4" as its trademark for the nine-digit code.

The planned automation, if used with the current five-digit ZIP Code only, is expected to curb Postal Service costs by reducing the number of mail sorting clerks involved in intermediate processing, thereby contributing to postage rate stability (that is, smaller or less frequent rate increases). Used with the proposed nine-digit code, the new equipment would further reduce the number of mail sorting clerks, primarily by providing automated mail sorting of First-Class letter mail [2]/ down to carrier routes with fewer errors than now occur with manual and machine sorting. The Service believes this increase in sorting accuracy would improve mail service through greater consistency in meeting current delivery-time standards.

SAVINGS ARE PROJECTED THROUGH PERSONNEL REDUCTIONS

Personnel compensation accounts for 84 percent of total Postal Service costs. According to the Service, ZIP + 4 would significantly contribute to curbing these costs by helping to reduce the number of mail-sorting related work-years by an estimated 15,600 annually by 1987, when it expects to have the new system fully operational. In its 1980 economic justification for automating letter sorting, the Service maintained that beginning in 1987, the system would save the agency about $600 million a year, with annual savings increasing to more

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[1]/The acronym "ZIP" (for Zone Improvement Plan) was introduced to the public in 1963 with the new five-digit ZIP Code.

[2]/The discussion of the processing of "letters" and "letter mail" in this report pertains to the processing of all First-Class letter-size mail, including post cards.

Read/code/sort/optical character reader	A type of optical character reader that detects and reads the entire address on a piece of mail, prints a bar code to represent the ZIP Code, and sorts the mail piece either into an adjacent multi-position letter sorting machine or into one of several bins attached to the machine.
Return on investment (ROI)	An average effective rate of interest at which a project's positive net cash flow values repay the negative net cash flow values over the project's evaluation period. (See pp. 21 and 24 for a more detailed definition.)

--1981: (Apr.) Postal Service filed with the Postal Rate Commission a proposal for (1) two new sub-classes of First-Class Mail for volume mail bearing the ZIP + 4 code and (2) a 0.5-cent-per-piece rate incentive for volume ZIP + 4 mail. (The Service later withdrew the proposal, following congressional action prohibiting ZIP + 4 implementation before October 1, 1983, stating it would refile later.)

--1981: (June) Postal Service awarded contracts totalling $182 million for purchase of 252 optical character reader/channel sorters (OCR/CSs). This was the first equipment purchase in Phase I of the two-phase ZIP + 4 automation plan. Delivery was scheduled to begin in the fall of 1982.

--1981: (Aug.) Postal Service notified 15 million businesses and post office box holders of their nine-digit ZIP Codes and urged them to begin using the new codes at their convenience. Omnibus Budget Reconciliation Act of 1981 (P.L. 97-35), enacted August 13, prohibited implementation of ZIP + 4 before October 1, 1983, but permitted the Postal Service to proceed with actions necessary to prepare for implementation.

--1981: (Dec.) Postal Service awarded an approximate $22 million contract for purchase of 144 small bar code sorters (BCSs). This was the first of two purchases of this equipment in Phase I of the automation plan. Delivery was scheduled to begin in the fall of 1982.

--1982: (Aug.) Postal Service completed awarding of four contracts for testing OCR/CSs for Phase II of the automation program. Tests were to be conducted during the spring and summer of 1983.

--1982: (Sept.) Postal Service awarded an approximate $12 million contract for 104 small bar code sorters. This was the second of two planned purchases of this equipment in Phase I of the automation plan.

--1982: (Oct.) Acceptance of initial OCR equipment in Phase I purchase delayed by testing and contractor delivery problems.

than $1 billion by 1995. The Service projected that over a 16 year operating period, it would achieve a 48 percent rate of return on its $887 million investment in automated equipment and program costs.

PRIMARY TARGET FOR ZIP + 4: LARGE-VOLUME BUSINESS MAILERS

Efforts to promote ZIP + 4 have been targeted primarily to large-volume business mailers, whose use of the new code would be essential for the achievement of projected savings.[3]/ Although the Service stated that use of the nine-digit code would be voluntary, it planned to seek approval of lower postal rates which would serve as an incentive to encourage businesses to use ZIP + 4.

Although the Service is currently including households in its plans for ZIP + 4, it has deferred notifying householders of their four-digit add-ons and intends to reassess the extent to which it will ask householders to use the ZIP + 4 code.

CHRONOLOGY OF EVENTS

The following are significant events in the evolution of ZIP Codes:

--1963: Five-digit ZIP Code was implemented.

--1976: Deputy Postmaster General's Task Force on Future Mail Processing Systems recommended automation of mail processing and expansion of ZIP Code to nine digits.

--1978: Postal Service announced the intention to expand ZIP Code to nine digits in 1981.

--1980: Postal Service began "coding the Nation"; that is, dividing the Nation into nine-digit ZIP Code locations or areas.

--1980 (Nov.): Postal Service presented a proposal for automation (supported by an economic justification) to its Board of Governors. Proposal was approved.

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[3]/For purposes of the ZIP + 4 program, the Postal Service's definition of the term "business mailer" includes "standard business organizations, professional services, churches, schools, government, etc." According to the Service, business mailers generate over 80 percent of the letter mail volume.

1980 mail flow data which had been used to compute cost and savings projections.

Another major part of our work was assessing the reasonableness of assumptions that the Postal Service had used in 1980 in calculating projected costs and savings. While we found the Service's assumptions generally reasonable, we conducted sensitivity analyses of the effects that real-life variances from these assumptions might have on the Service's expected return on investment. For example, we projected to a 95 percent confidence level the effects of variances in (a) the rate of mailer usage of the nine-digit code, (b) annual cost escalation rates, and (c) equipment performance.

A more detailed discussion of the methodology used in this part of the review appears in appendix III.

Assessing equipment and technology

To assess the potential performance and reliability of automated equipment, we interviewed officials and staffs of the Postal Service and of the American equipment contractors. Since none of the equipment had been delivered to the Postal Service at the conclusion of our field work, we were unable to gather operating history on the equipment. In the absence of actual experience data, our task was largely a matter of assessing the risk that the equipment would not perform as expected by the Postal Service. We were able, however, to observe pilot equipment in operation in contractors' plants. We also reviewed documentation such as requests for contract proposals, contracts, equipment test records, equipment design drawings, and correspondence.

In Canada, France, Italy, and Japan we interviewed postal officials and engineers, observed mail sorting equipment, and obtained information about foreign research and development in mail sorting technology.

Equipment assessment was primarily an engineering task, in which we were aided by a team of engineers of the National Bureau of Standards, Department of Commerce. This team possessed expertise in electronic and mechanical engineering, optical character reading equipment, computers, test design and application, and statistical analysis.

Determining potential impact of ZIP + 4 on mailers and general public

To determine potential costs and benefits of ZIP + 4 to mailers and the general public, we interviewed officials and staffs of the Postal Service, business mailers, and other Federal agencies. We also contacted business associations and

--1982: (Oct.) Contractor began delivery of small bar code sorters under the first contract awarded in December 1981.

RELATIONSHIP BETWEEN AUTOMATION AND ZIP + 4

The Postal Service's planned programs to automate its mail sorting operation and expand the ZIP Code to nine digits are two separate but directly related programs. The Service maintains that savings achievable by using automated equipment in conjunction with the current five-digit code would justify the equipment investment but that the equipment's full potential for savings and efficiency can be achieved only by implementing the nine-digit code. In fact, the ZIP + 4 code was designed specifically for use with the planned OCR-based letter mail processing system. Because of this interrelationship between automated equipment and expanded code, the terms "ZIP + 4 program" and "ZIP + 4 system" implicitly refer to the processing of nine-digit mail by automation.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our overall review objectives were to:

--Determine the potential costs and savings of ZIP + 4 to the Postal Service.

--Assess the performance and reliability of the equipment (primarily OCRs and BCSs).

--Determine the potential costs (and benefits, if any) of ZIP + 4 to mailers and the general public.

--Determine the potential value and workability of the ZIP + 4 system as a whole.

--Suggest any improvements needed in the proposed system.

Determining potential costs and savings to Postal Service

To determine the potential costs and savings of ZIP + 4 to the Postal Service, we interviewed local, regional, and headquarters officials and staffs. Also, we examined the Service's 1980 calculations of costs and savings which it used as the justification for its proposal to automate in conjunction with ZIP + 4.

At 30 postal facilities constituting a statistical sample from a universe of 208 facilities, we verified or corrected

Most of our field work was done during the period January 1982 to August 1982. It was performed in accordance with generally accepted government auditing standards.

examined mailers' congressional testimony, results of Postal Service consumer opinion surveys, and other Service records.

To obtain the views of some of the large-volume business mailers whose participation would be essential to the success of ZIP + 4, we mailed a questionnaire to about 400 of these mailers. [4]/ Their responses provided such information as costs of converting mailing lists from the five-digit code to the nine-digit code, perceived advantages and disadvantages of ZIP + 4, and mailers' intent to use ZIP + 4. We also received--but treated separately from the above sample--about 90 unsolicited, completed questionnaires from a wide variety of business organizations.

To obtain mailer comments and views in greater depth than we could practicably obtain by questionnaire, we interviewed officials of 24 business, nonprofit, and governmental organizations. We selected these mailers with a view to obtaining a mix of different sizes and types of mailing organizations. [4]/ We also sought mailers with opposing views on ZIP + 4 in order to get comments on both sides of the issue. Further, we invited 36 associations--members of the Technical Advisory Committee [5]/--to provide (1) their comments, pro and con, on ZIP + 4 and (2) their positions on using ZIP + 4 if it is implemented.

We obtained data from five Federal agencies concerning procedures and costs that would potentially be involved in converting automated mailing address files to the nine-digit ZIP Code.

Observations and conclusions resulting from questionnaires, interviews, and other review work with business and governmental organizations cannot be used to draw inferences about all such organizations. However, we believe that, in the composite, they provide valuable insight concerning the costs, benefits, and problems that mailers might experience in using ZIP + 4, and concerning mailers' perceptions about other aspects of ZIP + 4.

For more detailed information on the scope of this part of our work and how we obtained our data, see chapter 5 and appendix XI.

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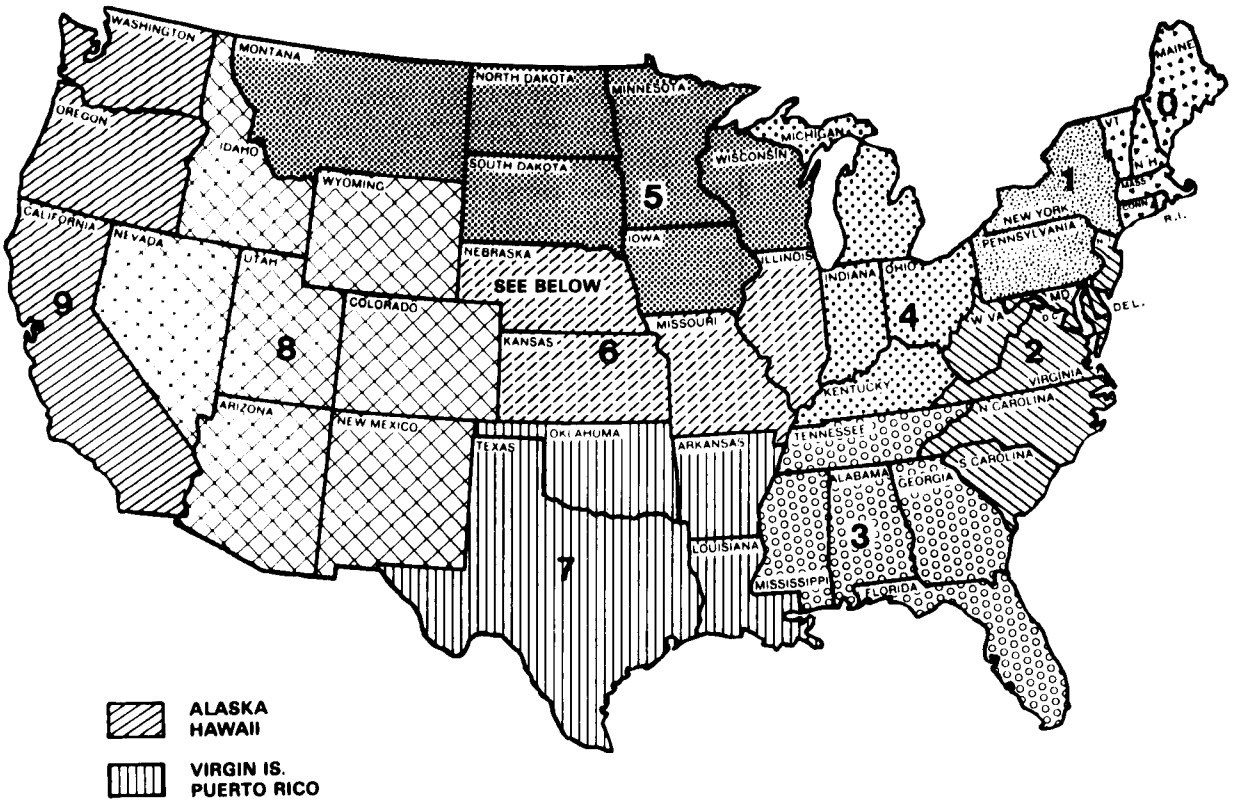
[4]/In order to obtain candid responses, we agreed not to identify, by name, non-Federal firms and organizations in our report.

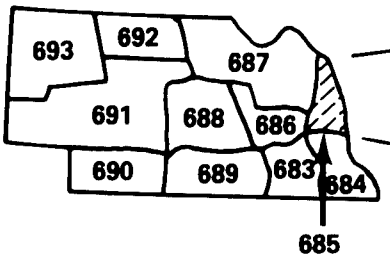
[5]/This committee provides information and advice to the Postmaster General on postal services and other postal matters. Members represent associations of large commercial mailing organizations and related mailings services.

ZIP CODE NATIONAL AREA



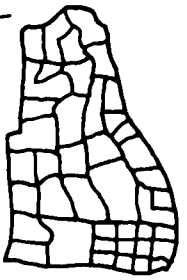
The first digit of a ZIP Code divides the country into 10 large groups of States numbered from 0 in the Northeast to 9 in the Far West.

Sectional Center Facilities or Large Post Offices



Each State is divided into an average of 10 smaller geographical areas, identified by the 2nd and 3rd digits of the ZIP Code. The two digits can represent a large city, a post office or a geographical area.

Smaller Post Offices or Geographical Areas Within Post Offices



The 4th and 5th digits identify a delivery area or location. It can represent a small town, a post office within the corporate limits of a large city, or a geographical area.

Source: Adapted from Postal Service illustration.

CHAPTER 2

HOW ZIP + 4 WOULD CHANGE MAIL PROCESSING

The current mail processing system requires an individual to visually observe the ZIP Code or address on a mail piece at each mail processing step. Under the proposed system, properly prepared meter mail will not be read by a postal employee until it reaches a carrier. [1]/ An optical character reader/channel sorter (OCR/CS) will "read" the ZIP Code and print on the mail piece a bar code representing the five- or nine-digit ZIP Code. Bar code sorters (BCSs) will subsequently read the bar code and sort 5-digit mail to the destinating post office and 9-digit mail directly to the carrier. Stamped or handwritten mail with a 9-digit ZIP Code will not be read by an OCR/CS or BCS but will be more efficiently sorted to the carrier by a clerk operating an Expanded ZIP Retrofit (EZR) letter sorting machine. [2]/

If the Service were prohibited from expanding the ZIP Code it could still utilize the OCR and BCR equipment but could sort the mail only down to the destinating office. Sorting to carrier routes would continue to be done manually or on a letter sorting machine.

THE ZIP CODE DISTRIBUTION SYSTEM

The five-digit ZIP Code is an integral part of the current mail processing system. The five-digit ZIP Code was implemented in 1963 and is now used on over 97 percent of all mail.

The current five-digit code identifies specific geographical areas as illustrated below.

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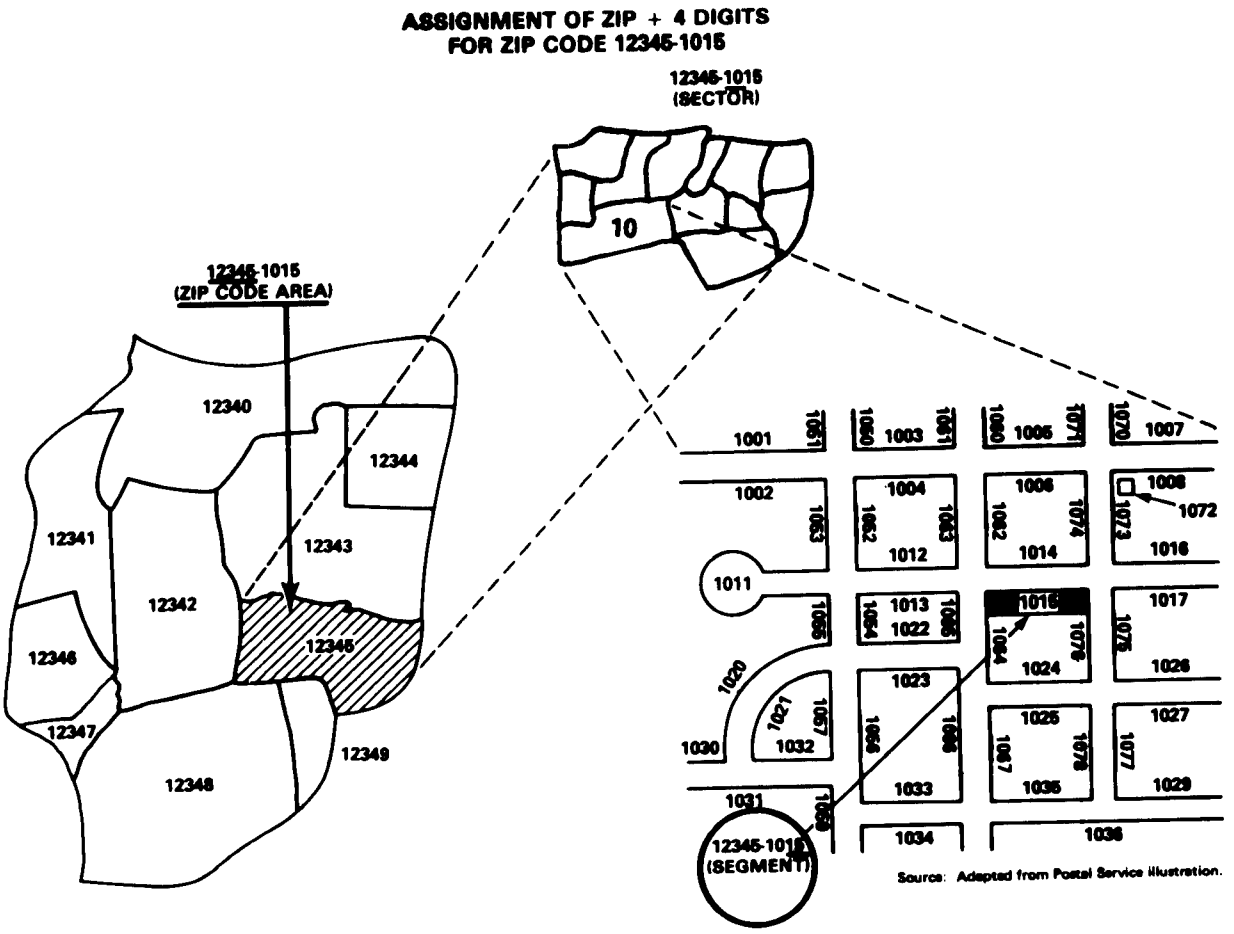
[1]/For definition of meter mail, see glossary.

[2]/For definition of EZR letter sorting machine, see glossary.



CURRENT MAIL PROCESSING SYSTEM

The current mail processing system requires letters to be handled at a number of facilities prior to delivery. These facilities can be referred to as originating offices, transit offices, and destinating offices. The originating office is the office where the mail receives its first handling or is accepted. A transit office (for example, an area distribution center) is an office which performs an intermediate handling before the mail reaches the destinating office. The destinating office is the office where the mail receives its final handling prior to delivery.

Letter mail

Most of the letter mail processed by the current system is either stamped or metered mail.

Stamped mail is usually sent by individuals and dropped in collection boxes or picked up from the mailers by carriers.

The nine-digit code

As of May 1981, the Postal Service had assigned about 32.6 million nine-digit codes. The first five digits of the expanded code will usually be identical to the present ZIP Code and will continue to designate areas served by a post office. The first two digits of the add-on code (digits 6 and 7) designate a small geographical area called a sector. The last two digits (digits 8 and 9) designate a segment within a sector. A hyphen will be used to separate the five-digit code from the add-on numbers.

Sectors

Sector boundaries do not cross state or county lines, and the numbers are generally assigned as follows:

00-09 to postal boxes and box sections.

10-97 to streets, firms and rural routes.

98-99 to business reply and special codes.

Sectors in commercial areas are much smaller than they are in residential areas and can be completely contained within a single building or within a single city block.

Segments

A segment--the last two digits of the add-on code--can be one side of a street between intersections; both sides of a street, including cul-de-sacs; a company or building; a floor or group of floors within a building; a cluster of mailboxes; sections of post office boxes; or any other designated delivery point.

The following diagrams illustrate how sector and segment numbers are assigned.

Source:Postal Service illustration

MPLSM Sorting Operation

Source:Postal Service illustration

Manual Sorting Operation

The stamp must be cancelled and the mail piece must be faced (oriented in the same direction with all pieces right side up so that all addresses are located in the same general area) for manual or machine sorting. The addresses are frequently handwritten.

Businesses normally "meter" their mail, which can be dropped in collection boxes, delivered to post offices in trays, or picked up by a postal employee at the mailer's facility. Metered mail is not cancelled, and the pieces delivered in trays are usually faced by the mailer and have typed addresses.

Metered mail, depending on volume and other characteristics, can be presorted by mailers down to the three-digit location (for example, the transit office), the five-digit location (for example, the destinating office), and--when a two-digit carrier route number appears on the envelope--to the carrier route. Mailers receive a 3-cents-per-piece discount for sorting to the three- and five-digit locations and a 4-cent discount for mail sorted to the carrier route.

How letter mail is currently processed

Under the current mail processing system, stamped First-Class Mail is initially processed by a model M-36 or Mark II Facer-Canceler. The equipment cancels the stamp and faces the mail in the proper direction. First-Class meter mail does not require cancellation but must be faced prior to sorting. Presorted mail bypasses facer-canceler operations.

Non-presorted stamped and metered mail is sorted in a primary operation at the originating office. Machinable mail [3]/ is sorted on a multiple position letter sorting machine (MPLSM)--a machine with 12 input operator consoles (see photograph, p. 13). Using a portion of the ZIP code, an MPLSM operator keys a mail piece to one of 277 bins. Non-machinable mail is handsorted to manual letter cases. (See photograph on p. 13.)

Mail for destinations outside the immediate area is generally dispatched to a transit facility where it is again distributed on MPLSMs or manual cases. At the destinating office, mail is distributed in an "incoming secondary" operation to carriers, boxes or firms. This final sortation is made

[3]/Machinable mail is letter mail which conforms to the length, width, thickness, and weight requirements enabling it to be processed on the Postal Service's letter sorting machines.

PORTION OF A CARRIER ROUTE SCHEME

STREET	ROUTE
Abbeywood Ct.	44
Aberdeen Rd.	6
Aldridge Ave.	11
Alison Dr.	39
Almond Ct.	12
Alva St.	33
Amherst	27
Anderson Dr.	
800-999	29
1000-1299	28
1300-1499	19
1500-1599	14
Appleby Rd.	15
Ardmore St.	15
Apple Tree Ln.	36
Arlene Ave.	34
Arlingdale	48
Arlington Rd.	15
Arlington Hgts. Rd.	RR1
Arrowhead Dr.	24
Ash St.	10
Ashland Ave. N.	
1-199	2
200-399	22
1200-1399	27
Ashland Ave. S.	1
Aster Ln.	27
Austin Ln.	20
Ayreshire Ln.	6
Azalea Ln.	44

B

Babcock Dr.	
1-325	16
326-999	21
Baldwin Ct. (2300's)	46
Baldwin Ln. (1200's odd)	12
Baldwin Rd. E.	
400-799	47
800-999	16
Baldwin Rd. W.	
1200's even	46
Baldwin Rd. W.	
1-199	48
200-799	9
800-1699	
(ex 1200's even)	33
1200-1699 even	38
1400-2199	6
Baldwin Way (2200's)	44
Balmoral Ln.	45
Balsam Ln.	40
Banbury Rd.	6
Bannockburn	45
Banberry	44
Barrington Woods Rd.	9
Baybrook	34
Bayer Dr.	9
Bayside Dr.	41
Beaver Pond Rd.	15
Bedford Dr.	20
Bellaire Ter.	29
Belle Ave.	34
Bennett St.	5
Benton St. N.	
1-119	18
120-599	4
600-799	22
Benton St. S.	
1-599	3
600-1699	23
Berwick	45
Big Oak Rd.	9
Bishop St.	32
Bissell Dr.	
160-327	16
328-out	21
Blackburn Dr.	6
Bon Aire Ter.	29
Bonnie Ln.	6
Borders Dr.	20
Bothwell St. N.	
1-54	13
55-329	8
Bothwell St. S.	26
Boynton	16
Bradley	12
Bradwell Rd.	15
Bracburn Rd.	6
Brandon Ct.	48
Brentwood	9
Briarwood Ln.	7
Brice Ln.	43
Brighton Ln. & Ct.	20
Bristol Ct.	20
Brockway St. N.	
1-99	19
100-499	8
500-599	48
Brockway St. S.	
1-299	26
600-1399	11
1600-2300	23
Brookdale Ln.	7
Brookside Ln.	10
Brookview Ln.	23
Brown Rd.	RR1
Bryant St.	
1-99	48
100-out	11
Burno Dr.	5
Butterfield	45

C

Cady Dr.	16
California St.	23
Cambridge Ct.	44
Campbell Cir.	15
Candlenut Ln.	44
Canterbury Ln. & Trl.	43
Capri Dr.	
(ex 812-868 even)	27
812-868 even	12
Carlton Ave.	11
Carmel Dr.	24
Carol Ct.	41
Carpenter Dr.	
200-499	36
500-799	24
800-1129	25
1130-1399	37
Carriage Ln.	12
Carriageway Ln.	48
Carter St. (ex 501)	48
501	8
Cascade Ln.	43
Castle Ct.	12
Castlewood	45
Cedar St. N.	13
Cedar St. S.	
1-500 (ex 17 & 326)	17
17	26
326	11
501-699	5
700-out	11
Cederwood Ct.	31
Center Rd.	9
Charlotte St.	8
Chatham Dr.	20

Source: Postal Service illustration.

through the use of scheme knowledge [4]/ by an MPLSM operator who reads the street address and number, recalls the carrier route number associated with the specific address, and keys the carrier route number into the MPLSM. MPLSM operators must continually relearn portions of carrier route schemes because of changes resulting from annual route inspections, new delivery points, and fluctuations in mail volume.

To illustrate the complexity of carrier route schemes, a small portion of the Palatine, Illinois carrier route scheme for ZIP Code 60067 is shown on page 15. This scheme has a total of 793 items (128 shown) which the operator must memorize. Many schemes require operators to memorize as many as 1,000 items. Under the ZIP + 4 system, MPLSM clerks would not need to memorize schemes such as this. Proponents of ZIP + 4 point to this as a primary advantage of ZIP + 4, stressing that it would result in fewer sorting errors.

Presort mailings require less processing than that described above. For example, mail presorted to five-digit ZIP Codes by the mailer bypasses primary and transit distribution that non-presorted mail receives. At the destinating office, however, three- or five-digit presorted mail receives the same incoming secondary distribution that non-presorted mail receives.

In summary, the present mail processing system requires an individual to read the ZIP Code or address on each piece of mail and manually sort the mail or key a code into a letter sorting machine. The current system requires these procedures to be repeated each time the mail piece is sorted on its way to the carrier route. Mail received by a carrier is in random order and must be sorted by the carrier into delivery sequence.

PROPOSED MAIL PROCESSING SYSTEM

Under the proposed system, properly prepared nine-digit meter mail will not be read by a postal employee until it reaches a carrier. An OCR/CS will read the five- or nine-digit code and print on the mail piece a bar code representing the ZIP Code. BCSs will thereafter be used to read the bar code and sort five-digit mail to the destinating office and nine-digit mail directly to the carrier.

To date, the Postal Service has purchased 126 OCR/CSs manufactured by Pitney Bowes, Inc., under a licensing agreement with Elettronica San Giorgio (ELSAG) of Genoa, Italy and 126 OCR/CSs manufactured by Burroughs Corporation under a

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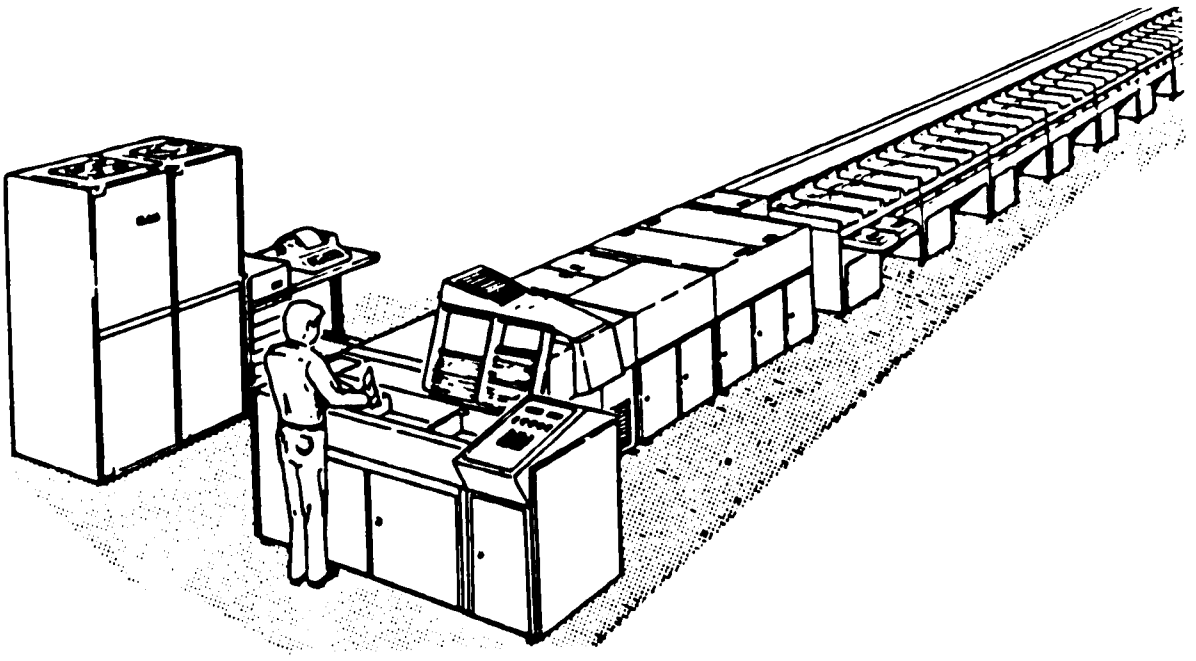
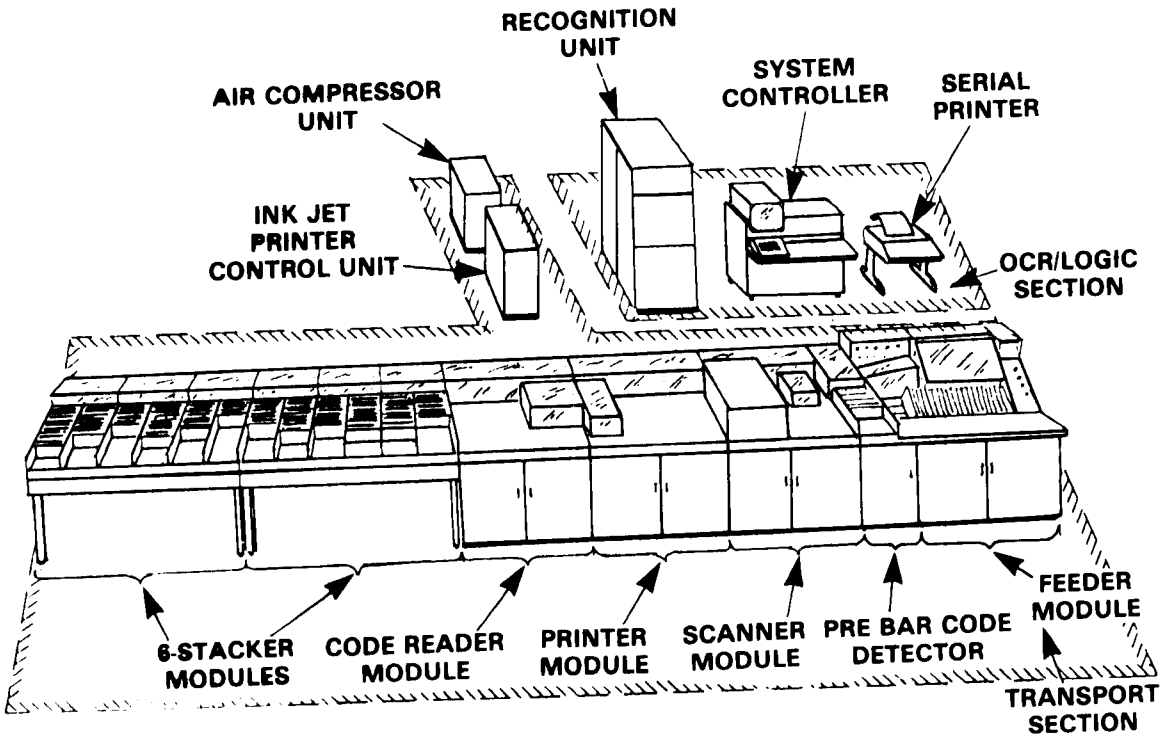
[4]/A scheme is an officially published list of elements of address. It is used as a systematic plan to guide mail to its destination.



Pitney Bowes OCR/CS



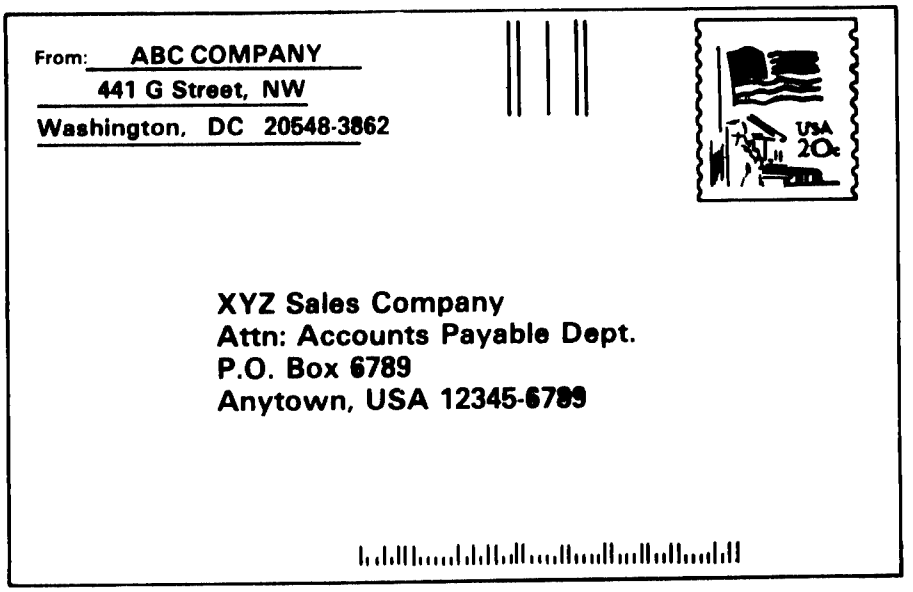
Source:Postal Service illustration

Burroughs Corporation OCR/CS

licensing agreement with the Nippon Electric Company, (NEC) of Tokyo, Japan. (See diagrams of equipment on p. 17.) In addition, the Service has purchased 144 BCSs from Bell and Howell.

How letter mail will be processed under the ZIP + 4 system

Under the proposed mail processing system, all non-presorted metered mail received at the originating office will be processed on an OCR/CS. As designed, the OCR will read the ZIP Code on each metered piece of typed, foundry printed, or computer generated mail; verify that the first five digits of the code correspond to the city and state address; and print on the lower edge of the letter a bar code representing the ZIP Code. (See below.)



Source: Adapted from Postal Service Illustration.

The OCR/CS will sort the mail (into 30 to 60 separations) for dispatch to destinating offices or to the local sorting operation for sorting to carriers. On the basis of the Postal Service's equipment test results, the Service estimated that 60 to 80 percent of all meter mail would be successfully read and intially sorted by the OCR/CS. Mail pieces rejected by the OCR/CS will be sent to an MPLSM and will be handled in the same manner in which mail is handled by the current system. This will include pieces that were unreadable and pieces with unverifiable ZIP Codes.

Work-hour Productivity of Current and Proposed Systems

Current operations	Productivity in pieces per hour
MPLSM (outgoing primary sort)	1,600 to 1,850
MPLSM (incoming secondary sort)	1,300 to 1,450
Manual (incoming secondary sort)	700 to 1,000

Proposed operations	Productivity in pieces per hour
OCR/CS (all operations)	10,000
BCS (all operations)	4,000
EZR (incoming secondary sort)	1,300 to 1,450

HOW AUTOMATION WOULD BE USED WITH A FIVE-DIGIT ZIP CODE ONLY

As stated earlier (see p. 3), the Postal Service is prohibited from implementing a nine-digit ZIP Code before October 1, 1983. The Service, however, may take steps necessary to prepare for the implementation of the expanded code and may process five-digit mail on automated equipment.

Mail with the five-digit code can be sorted down to designating offices using the OCR/CSs and the BCSs. However, the sort to the carrier route must be made manually or on an MPLSM by operators with scheme knowledge.

Mail with the five-digit code can be sorted down to designating offices using the OCR/CSs and the BCSs. However, the sort to the carrier route must be made manually or on an MPLSM by operators with scheme knowledge.

The Postal Service initially intended to purchase small BCSs which could sort to 100 separations and large BCSs which could sort to 305 separations. The large BCS was to be a converted MPLSM from which its 12 console operator stations had been removed and replaced by two mail transport units and a computer subsystem. The Service also intended to procure a "new generation" large BCS in Phase II of the contract period. During our review, however, the Service found that small BCS productivity levels were much higher than expected, and as a result, no large sorters are being purchased during Phase I. The Service had not determined whether it would procure large sorters during Phase II.

Presorted mail (presorted to three and five digits) received at an orginating, transit, or destinating office must be processed through an OCR/CS to obtain a bar code for sorting to the carrier route.

All nine-digit stamped mail and all mail rejected from the automated system will be processed with an MPLSM in a manner very similar to current processing procedures. A very significant difference will be that MPLSM operators will not have to memorize schemes for sorting to the carrier route. Instead, as a result of an EZR assembly attached to the MPLSM, operators will sort the mail by keying the last four numbers of the nine-digit ZIP Code.

All nonmachinable mail will continue to be processed with today's manual system.

Comparison of productivity rates of current and proposed systems

Productivity rates of OCR/CSs and MPLSMs cannot be compared because OCR/CSs both read and sort mail, while MPLSMs can only sort mail. However, the following table shows examples of the Postal Service's current and expected productivity per work-hour under the current and proposed systems, as indicated in the Service's proposal.

investment decisions, such as the Service's 1980 proposal for an automated letter sorting system. The procedures require an economic analysis based on comparative cash flows and use of a return on investment approach. A proposal based on economic factors exclusively--as was the case with the Service's 1980 proposal for an automated system--may be considered for approval only if it is estimated to produce an ROI of at least 15 percent. The guidelines further specify that all viable alternatives must be considered and analyzed and that sensitive factors or assumptions with significant impact on the results of the analysis be identified and evaluated. For example, a change in mail volume or a change in projected inflation rates may affect the results of the analysis considerably and, therefore, may call for additional evaluation.

Cash flow analysis

According to the Service's guidelines, the goal of the analysis is to identify anticipated savings and expenses of a proposed project compared with continuing the present (baseline) situation and compared with other viable alternatives. This is accomplished by displaying in a cash flow chart all pertinent cash inflows and outflows in a specified time frame by project years. The cash flows presented must be projections of real cash anticipated dollar values paid out or earned by the Postal Service each year of the evaluation period--in this case, the 16-year period beginning with fiscal year 1981. The cash flow comparison is derived by subtracting the projected annual cash flows of the baseline system from the projected annual cash flows of an alternative system, or by subtracting annual cash flows of one alternative system from another. Shown on page 22 is the Service's projected cash flow chart assuming implementation of the Service's proposed optimal alternative system (automation with use of the nine-digit ZIP Code) and a 90 percent ZIP + 4 code usage rate by fiscal year 1987. Shown on page 23 is a cash flow chart assuming automation with use of the existing five-digit ZIP Code only. We developed this chart based on projected cost and benefit calculations as included in the Service's 1980 automation proposal and in a related Service analysis presented to the Office of Management and Budget.

ROI approach

The ROI method of analysis is a useful and widespread tool used in government and many large corporations to compare, on a common basis, widely different and often competing projects. A project's ROI is an average effective rate of interest calculated from the project's net cash flow assuming:

--The project's negative net cash flow values are viewed as the project's investment cost.

CHAPTER 3

FAVORABLE RETURN ON INVESTMENT--MORE CERTAIN FOR AUTOMATION USING THE FIVE-DIGIT CODE THAN FOR THE NINE-DIGIT CODE

In 1980, the Postal Service estimated that over a 16-year period, use of the nine-digit ZIP Code in conjunction with its proposed automated letter sorting system would yield a 48.5 percent return on investment (ROI). The Service further estimated that, in contrast, automation with use of the existing five-digit ZIP Code would produce an ROI of 22 percent.

Our review of the Service's 1980 economic analysis showed that

- --cost data was incomplete and, in some instances, cost and savings data was not accurate;
- --the need for a rate reduction and its impact on the ROI were not included; and
- --the proposed automated system should have been analyzed as three separate projects.

Our analysis of the proposed automated system as separable projects disclosed that automation using the five-digit ZIP Code would not be risk free. However, since automation would provide an opportunity to reduce the Postal Service's labor costs, which comprise about 84 percent of its total operating costs, we consider the risks acceptable.

The success of the nine-digit ZIP Code would hinge heavily on voluntary participation by business mailers--and such participation is not reasonably certain. (See ch. 5.) We believe that the Postal Service should proceed with the nine-digit code if and when--in addition to having demonstrated that the equipment will perform adequately (see ch. 4)--it has an established postage rate incentive and reasonable assurance that the authorized incentive will result in ZIP + 4 code usage sufficient to make the system cost effective.

THE POSTAL SERVICE'S 1980 PROPOSAL

Two Postal Service publications [1]/ prescribe policies, procedures, and formats to be used to support major capital

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[1]/"Capital Investment Policies and Procedures," Postal Service Publication 190, issued on September 15, 1978, as amended; and "Capital Investment Implementation Instructions," Postal Service Publication 191, issued on June 15, 1978, as amended.

USPS ORIGINAL 5 DIGIT ONLY
CASH FLOW

(USPS COST & REVENUE ACCOUNTS IN $MILLIONS FOR YEARS 1981-1996)

USPS-PROJECT YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
CALENDAR YEAR	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	****
HARDWARE INVESTMENT	-13.	-129.	-126.	-158.	-181.	-60.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-666.
PROGRAM EXPENSE COSTS	-4.	-22.	-21.	-25.	-28.	-9.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-110.
MAINTENANCE LABOR	-52.	-61.	-72.	-78.	-85.	-94.	-92.	-99.	-106.	-114.	-122.	-132.	-142.	-152.	-164.	-176.	-1740.
MAINTENANCE TRAINING	-6.	-10.	-9.	-10.	-10.	-6.	-4.	-5.	-5.	-5.	-6.	-6.	-7.	-7.	-8.	-8.	-114.
MAINTENANCE PARTS	-3.	-4.	-7.	-10.	-14.	-19.	-20.	-22.	-24.	-27.	-30.	-33.	-36.	-39.	-43.	-48.	-379.
EXPANDED ZIP CODE RELATED COST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SUB-TOTAL OF COSTS	-78.	-226.	-235.	-281.	-318.	-188.	-116.	-126.	-136.	-146.	-158.	-171.	-184.	-199.	-215.	-232.	-3008.
OUTGOING CLERK SAVINGS	0.	2.	25.	66.	120.	195.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	409.
SYSTEM CLERK SAVINGS (INTERIM)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SYSTEM CLERK SAVINGS (TOTAL)	0.	0.	0.	0.	0.	0.	227.	244.	262.	281.	302.	324.	348.	374.	402.	432.	3196.
SUB-TOTAL OF SAVINGS	0.	2.	25.	66.	120.	195.	227.	244.	262.	281.	302.	324.	348.	374.	402.	432.	3605.
TOTAL ALTERNATIVE A	-78.	-224.	-209.	-214.	-198.	8.	111.	118.	126.	135.	144.	154.	164.	175.	187.	199.	596.
LESS BASELINE COSTS	59.	63.	68.	73.	78.	84.	91.	97.	105.	113.	121.	131.	140.	151.	163.	175.	1712.
LARGE FCM RATE-REDUCTION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET CASH FLOW	-19.	-161.	-142.	-142.	-120.	92.	201.	216.	231.	248.	265.	284.	305.	326.	350.	374.	2308.

ROI 22. %

USPS ORIGINAL ZIP + 4
CASH FLOW

(USPS COST & REVENUE ACCOUNTS IN $MILLIONS FOR YEARS 1981-1996)

USPS-PROJECT YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
CALENDAR YEAR	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	*****
HARDWARE INVESTMENT	-13.	-129.	-126.	-169.	-186.	-138.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-762.
PROGRAM EXPENSE COSTS	-4.	-22.	-21.	-26.	-29.	-22.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-125.
MAINTENANCE LABOR	-52.	-61.	-72.	-78.	-85.	-94.	-92.	-99.	-106.	-114.	-122.	-132.	-142.	-152.	-164.	-176.	-1740.
MAINTENANCE TRAINING	-6.	-10.	-9.	-10.	-10.	-6.	-4.	-5.	-5.	-5.	-6.	-6.	-7.	-7.	-8.	-8.	-114.
MAINTENANCE PARTS	-3.	-4.	-7.	-10.	-14.	-19.	-20.	-22.	-24.	-27.	-30.	-33.	-36.	-39.	-43.	-48.	-379.
EXPANDED ZIP CODE RELATED COST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SUB-TOTAL OF COSTS	-78.	-226.	-236.	-294.	-325.	-279.	-116.	-126.	-136.	-146.	-158.	-171.	-184.	-199.	-215.	-232.	-3119.
OUTGOING CLERK SAVINGS	0.	2.	25.	52.	82.	118.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	278.
SYSTEM CLERK SAVINGS (INTERIM)	0.	0.	20.	70.	157.	296.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	544.
SYSTEM CLERK SAVINGS (TOTAL)	0.	0.	0.	0.	0.	0.	597.	641.	689.	740.	795.	853.	917.	984.	1057.	1136.	8410.
SUB-TOTAL OF SAVINGS	0.	2.	45.	122.	240.	413.	597.	641.	689.	740.	795.	853.	917.	984.	1057.	1136.	9232.
TOTAL ALTERNATIVE A	-78.	-224.	-190.	-172.	-85.	135.	481.	516.	553.	594.	637.	683.	732.	786.	843.	903.	6112.
LESS BASELINE COSTS	59.	63.	68.	73.	78.	84.	91.	97.	105.	113.	121.	131.	140.	151.	163.	175.	1712.
LARGE FCM RATE-REDUCTION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET CASH FLOW	-19.	-161.	-123.	-99.	-7.	219.	572.	613.	658.	706.	758.	813.	873.	937.	1005.	1078.	7825.

ROI 48.5 %

assumptions and estimates. Therefore, the results of an analysis may vary depending on the precision of assumptions and estimates made. (See app. II for a list of assumptions made by the Postal Service in its 1980 economic analysis.) Postal Service capital investment guidelines specify that sensitive factors with significant impact on the projected ROI must be identified and analyzed. The analysis is to show the effects of increase, decrease, or elimination of the sensitive factors on the projected ROI; that is, the analysis is to show the sensitivity of the projected ROI to changes in these influencing factors. These procedures allow a decisionmaker to judge the importance of each assumption. Sensitivity of the 48.5-percent ROI to changes in assumed conditions was considered by the Postal Service.

ZIP + 4 RELATED COSTS-- WHICH COULD EXCEED $800 MILLION-- WERE EXCLUDED

For the proposed automated system, the Postal Service included in its 1980 analysis only the estimated costs to acquire and maintain the equipment. The Service excluded the costs of developing, maintaining, and promoting the nine-digit ZIP Code, even though some of these costs had been previously identified and included in the analysis initially. Subsequent identification and projections by the Service of ZIP + 4 code related costs were inconsistent and incomplete because the Service did not adequately monitor some costs as they were incurred and failed to project others. As a result, we found that these costs--which could exceed $800 million for the 16 year project evaluation period--were never fully summarized or projected by the Service.

Costs of developing, maintaining, and promoting ZIP + 4 were not consistently identified

We found that the Service had never clearly and fully estimated and presented all costs it is likely to incur by expanding the five-digit ZIP Code to nine digits. Instead, it had treated the ZIP + 4 related costs differently at various times, each time considering different cost items and providing different dollar estimates.

In its 1980 analysis, the Service initially included $216 million in ZIP + 4 related costs for the 16 year project evaluation period. These projected costs were for assigning codes, maintaining the computerized ZIP + 4 files through 1996, and providing a free telephone inquiry service to mailers, also through 1996. However, all these costs were excluded before the analysis was completed because Service officials responsible for the analysis did not consider them a required expense of the automation proposal.

--The project's positive net cash flow values are viewed as project income that repays the investment with interest by the end of the project evaluation period.

--Negative values precede all positive values in the net cash flow.

The rate of interest with which the income repays the investment is the project's ROI. As used here, the project's net cash flow is the sum of the differences of all Postal Service cash inflows and outflows, changed as a result of the decision to implement the proposed project. The net cash flow is expressed as a single dollar outlay or dollar income figure in each year of the project evaluation period.

The Postal Service applied the ROI measuring approach to two basic cash flow charts, shown on pages 22 and 23, to compute the following ROI percentages:

--The ROI computed on automation with use of ZIP + 4, compared with continuing the baseline system, was 48.5 percent.

--The ROI computed on automation with use of the current five-digit ZIP Code only, compared with continuing the baseline system, was about 22 percent.

The net cash flow from which the Service computed its ROI did not include anticipated reductions in revenue caused by providing a rate incentive to large-volume mailers to encourage their use of the nine-digit code. (See p. 33.) While the Service recognizes the necessity of providing an incentive to large-volume mailers, it viewed the incentive as a return of savings required by the Postal Reorganization Act of 1970 and did not include the resulting revenue reduction as an offset to savings. However, the conventional method of computing an ROI would include in the project's cash flow the revenue reduction caused by the rate incentive. Without a monetary incentive, the desired ZIP + 4 code usage rate probably could not be achieved. Therefore, we used the conventional method in our computations in order to correctly use the term "return on investment."

We recognize, however, that the overall net gain to society is higher than the ROI computed by use of this method. The Postal Service's net cash flow plus any amount by which mailers' postage rate reductions exceed the mailers' costs associated with implementing ZIP + 4 represent the net gain to society.

Sensitivities

A cash flow and ROI analysis--like any situation in which future events and costs are estimated--necessarily involves

Our estimate for coding costs is based on information gathered from Service officials who had not consistently and separately accounted for all costs associated with this effort, such as staff hours, travel, supplies, and automated data processing support. Our ZIP + 4 code maintenance cost estimates consist mainly of only one-third of the projected work-hour costs of the staff responsible for monitoring the Service's address information systems. However, we believe that the ZIP + 4 code system is likely to consume more than one-third of this staff's time, since it is by far the most detailed of the three address systems for which they are responsible. In addition, we have not included any costs attributable to other necessary activities, such as assistance from delivery units in assigning new codes and ZIP + 4 map maintenance, because we were unable to assess how time consuming these activities will be.

Customer services and promotional activities

We estimate that customer services and promotional activities currently being planned by the Service could cost in excess of $620 million over the fiscal year 1981 through 1996 evaluation period. The costs of specific services and promotional activities are difficult to project for the entire 16-year period, because the Service can adjust such plans as needed according to their cost and success. Also, current plans may be revised, terminated, or replaced by new activities as methods of information retrieval and communication change. For these reasons, Service officials were hesitant to project such costs for more than a few years.

The Service has recognized that an extensive public awareness campaign is needed to eventually achieve the high ZIP + 4 usage rate that was projected in 1980. We agree that this public awareness is necessary, and we believe that customer services and promotional activities in some form will be needed to inform mailers of their own ZIP + 4 codes, provide mailers with the ZIP + 4 codes of others, and encourage widespread use of the expanded code. The Service has considered all of these needs and has planned the following services and activities:

--A toll-free telephone inquiry service.

--ZIP + 4 directory and retrieval systems to support the mail forwarding service, and printed directories for internal Postal Service use.

--A one-time notification of ZIP + 4 codes mailed to each residence and business in the Nation.

In early 1981, the Service, in response to a request from the Office of Management and Budget, prepared a regulatory impact analysis which included ZIP + 4 code related costs of about $74 million for a 3-year period beginning with fiscal year 1981. This amount consisted of the estimated costs of developing ZIP + 4 codes nationwide, notifying mailers of their own nine-digit codes, providing free telephone inquiry service for 3 years, and promoting ZIP + 4. This analysis did not include ZIP + 4 related costs which would occur after fiscal year 1983.

We found it very difficult to identify fully and precisely the amount of ZIP + 4 related costs the Service had incurred since the proposal for automation had been approved in 1980, because the Service had not accounted separately for such costs. For this reason, it was necessary to gather such cost information from Service officials who did not always agree on the identification of past and current ZIP + 4 code related efforts and the costs related to them.

It was equally difficult to identify costs the Service would possibly incur in the future, because Postal Service officials provided conflicting information concerning what ZIP + 4 related activities were planned and what the cost of these future activities would be.

We have attempted to identify all significant ZIP + 4 related cost items that we believe are likely to arise during the 16-year period and which should be included in the cash flow analysis. On the basis of cost information provided to us by Postal Service officials, we estimated that these costs could exceed $800 million for the 16 year evaluation period. Ongoing ZIP + 4 code maintenance and promotion costs are mainly staff related and, as such, have been increased by the projected 7.42 percent annual labor wage rate escalation factor used by the Service in its 1980 economic analysis.

The costs fall into two main categories:

--Coding and address file maintenance.

--Customer services and promotional activities.

For a detailed listing of these costs, see appendix IV.

Assigning nine-digit ZIP Codes and maintaining the coding system

We estimate that the cost of assigning ZIP + 4 codes and maintaining the coding system for the entire evaluation period, fiscal year 1981 through fiscal year 1996, will be at least $180 million. This amount includes about $23 million for coding the Nation and $157 million for maintaining the coding system.

100,000 per day. This, and the fact that it is relatively easy for customers to look up a code in an 1,800 page five-digit ZIP Code directory, but not so easy to look up a code in a 57,000 page ZIP + 4 directory, seem to indicate a continuing need for the toll-free "800" number.

ZIP + 4 directory and retrieval systems

The Postal Service recognizes that looking up and retrieving nine-digit ZIP Codes will be more costly than looking up and retrieving five-digit codes. We estimate that, over the evaluation period for this project, the costs beyond those which the Service would have incurred for the five-digit ZIP Code could exceed $107 million.

The Service has recognized that the printed directories and computerized retrievel system currently used to aid in looking up and retrieving five-digit codes for internal purposes will not be feasible for looking up and retrieving the much more detailed and voluminous ZIP + 4 codes. It has tested an alternative method--a microfilm look-up system--which will be used mainly to facilitate the forwarding of mail to customers who move. The cost of equipment and staff-hours for looking up ZIP + 4 codes for change of address cards, based on the Service's projections of ZIP + 4 usage on change of address cards, could total $82 million over the entire evaluation period. The Service also plans to have some ZIP + 4 printed directories available for internal use at a projected cost of more than $25 million over the same period.

Customer notification

The Service has tentative plans (see pp. 125 and 126) to notify, by direct mail, every address in the Nation of its ZIP + 4 code, including 15 million businesses and boxholders previously notified in 1981. We estimate that the cost of this effort will total about $16 million. This amount includes preparation, printing, and mailing costs of a one-time notification delivered to each of the estimated 88 million addresses in the Nation, and printing and mailing costs of notifications that were delivered to 15 million businesses and boxholders in 1981.

Promoting ZIP + 4

From the start of the project evaluation period through August 1982, the Postal Service had incurred costs of about $1.4 million for ZIP + 4 promotional activities. About half of this money was spent in media advertising. Although Postal Service customer service representatives have been and still are promoting ZIP + 4, the Service does not separately account for such costs and claims that they are small. Therefore, such costs are not included in our estimates.

Toll-free telephone inquiry service

The Postal Service has contracted for a toll-free "800" telephone inquiry service which will provide ZIP + 4 codes to customers on request. The Service has estimated that approximately 100,000 inquiries per day will be received. On the basis of this many calls per day during the Service's evaluation period through 1996, the telephone inquiry service could cost $500 million. However, this cost will vary according to the number of calls actually received.

The telephone inquiry service is, by far, the most expensive promotional service currently planned, and the Service is exploring the feasibility of alternative, less costly means for responding to ZIP + 4 inquiries. However, at the conclusion of our review, none of these alternatives had been sufficiently developed for us to determine their practicality or related costs.

In comments on our draft report (see app. XIV, p. 172) the Service, although not disagreeing that the ZIP + 4 related costs should be included in the evaluation of this project, disagreed with our estimate that a ZIP + 4 code customer inquiry service could cost about $500 million for the 16 year project evaluation period. Instead, the Postal Service estimates that the cost for this service will be about $73 million for the 16-year period.

Although the Service re-emphasized the need to retain a ZIP + 4 code customer inquiry system on a continuing basis, it disagreed with our assumption that the inquiry calls will continue to be as numerous--estimated at an average of 100,000 calls per day--beginning with fiscal year 1986. Instead, the Service contends that the demand for this service will have tapered off markedly by that time and, therefore, Postal Service staff now providing a five-digit ZIP Code inquiry service will be able to assume the added responsibility. This, according to the Service, will eliminate the necessity for the costly toll-free "800" telephone inquiry service contracted for prior to fiscal year 1986.

We continue to believe that it is reasonable to assume that the ZIP + 4 inquiry service, if provided, will likely cost more than the $73 million estimated by the Service, because available evidence does not indicate that the average daily calls for this service will drop markedly after fiscal year 1985. The estimate of an average of 100,000 ZIP + 4 inquiry calls per day is the Service's own. In making this estimate, the Service used statistics on the number of five-digit ZIP Code inquiry calls it had received in six cities during January 1980, to project the number of such calls it was receiving throughout the Nation. It concluded that in 1980--about 17 years after the five-digit ZIP Code had been implemented--the number of such calls was an average of

Automated equipment maintenance costs were understated

In our view, the Postal Service understated the projected maintenance labor costs for the proposed automated letter sorting equipment by underestimating the time required to maintain the equipment. One cost element, operational maintenance, was understated for two types of proposed automated equipment--small BCSs and OCR/CSs--and a second cost element, preventive maintenance, was understated for the proposed OCR/CSs.

The Service's criterion for projecting operational maintenance requirements is based on the amount of time the equipment will be in use. We found that the Service had based its projected maintenance requirements for small BCSs on historical data of similar equipment it was using in 1980. However, the Service projections did not consider that the BCSs in the proposed system would be used more extensively than the equipment the Service used as the basis for projecting future costs. Consequently, the Service's operational maintenance cost estimates for small BCSs were understated. We also found that by disregarding its own criterion for projecting operational maintenance requirements, the Service had also underestimated this cost element for the OCR/CSs.

We believe that in addition to underestimating the operational maintenance costs discussed above, the Service also underestimated the preventive maintenance costs for the proposed OCR/CSs. Our view is based on our discussions with users of OCR equipment and on the evaluation of OCR/CS maintenance requirements by experts from the National Bureau of Standards.

Whereas Service officials responsible for preparing the 1980 analysis agreed with us that their projected maintenance costs for small BCSs were understated, they did not agree that the same was true of their cost estimates for maintaining the OCR/CSs. Our differences over the amount of estimated preventive maintenance are caused by differences in professional engineering judgements. As to our differences over the amount of estimated OCR/CS operational maintenance requirements, we calculated our cost estimates on the basis of the criterion used by the Postal Service maintenance unit. The officials responsible for preparing the 1980 analysis disagreed with this criterion. However, they were unable to document or explain to us the basis for the estimated OCR/CS operational maintenance costs included in the Service's 1980 analysis.

Other maintenance cost estimates were understated

The cash flow schedules used by the Service in its 1980 economic analysis included some other understatements of

We did not include estimates for future ZIP + 4 code advertising costs, because, at the close of our review, Service officials claimed that they had no plans for such activities. However, in commenting on our draft report, the Postmaster General stated that the Service has developed a program which, in addition to providing technical ZIP Code conversion assistance to business mailers, includes material for promoting ZIP + 4. Therefore, the Service will incur more costs for promoting ZIP + 4 than are included in our projections.

THE SERVICE'S ANALYSIS INCLUDED OTHER INACCURATE COST AND SAVINGS PROJECTIONS

In addition to excluding all ZIP + 4 related costs, the Postal Service's 1980 economic analysis contained deficiencies in projected maintenance costs and in projected savings. For example, for the 16 year evaluation period of automation with use of the ZIP + 4 code, the Service underestimated the additional maintenance costs for the proposed system by about $530 million and underestimated savings due to automation by about $300 million. Correcting these deficiencies reduces the Service's estimated total positive net cash flow for the 16-year period by about $230 million, or about 3 percent. Following is a discussion of the major items that contributed to this change.

Incorrect average labor wage rates were used

By using hourly labor wage rates that varied from those actually paid in 1980, the Postal Service understated its estimated maintenance costs and overstated its proposed system related savings.

The Postal Service generally uses average labor wage rates when calculating labor related costs and savings. However, in its 1980 automation analysis, the Service inadvertently used wage rates that varied from the average. When calculating projected costs for maintaining the equipment of the baseline and the proposed system, the Service used an hourly labor wage rate that was somewhat lower--grade level 9, step 7--rather than the average wage rate actually paid to the appropriate maintenance technicians--grade level 9, step 9. The net result was that the projected additional maintenance costs for the proposed system were understated. In addition, when calculating projected savings based on eliminating mail-sorting clerk work-hours by automation, the Service used an hourly labor wage rate that was somewhat higher--grade level 6, step 9--rather than the average wage rate paid to mail sorting clerks--grade level 6, step 7. This, in turn, resulted in an overstatement of estimated savings. The net result of using the incorrect labor wage rates in calculating costs and savings was an overstatement of estimated savings.

manually, and (3) labor savings were not identified until the first full year after equipment deployment.

Acceptance rates used in our computer model are identical to rates used by the Service in developing its estimated savings and are higher than the acceptance rates identified in Postal Service tests. (See pp. 41 and 42.) While we agree that mail acceptance rates could increase once an incentive is offered, we have no basis for estimating the amount of such an increase.

At one location we treated manually processed mail as processed by MPLSMs. We made the adjustment because in the absence of the automation proposal the Service would have more than likely installed MPLSMs at this facility.

We agree that the Postal Service will probably receive some mail processing savings in the year the equipment is deployed. However, we cannot compute any such savings at this time because in constructing our computer model, we used the original Postal Service assumption that significant labor savings would not occur until the first full year after equipment deployment.

IMPACT OF RATE INCENTIVE ON ROI NOT INCLUDED

An automated system using the expanded code will not produce its full potential cost savings without substantial use of the ZIP + 4 code by large-volume mailers. The Postal Service recognized as early as July 1980 that large-volume mailers would not add the ZIP + 4 code to their address lists without a monetary incentive to offset conversion costs. The use of the ZIP + 4 code was to be voluntary, but the Postal Service believed that large-volume mailers would convert to ZIP + 4 codes if the savings in postage from repeated use of the rate incentive outweighed the cost of conversion. The Postmaster General, in a September 1980 speech before the XIVth National Postal Forum, 2/ promised that an incentive would be provided.

Although it was recognized that a rate incentive was critical to the success of the program, this recognition, as well as the impact of the anticipated rate reduction on the ROI, was not included in the Service's October 1980 proposal to acquire automated equipment for use with the expanded code. Service officials told us that the need for a rate incentive was not commented on in the 1980 proposal or considered in computing an ROI because a rate reduction for large-volume mailers who use ZIP + 4 was not considered a cost of the

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2/The Forum is a nonprofit, educational corporation for the purpose of developing a closer working relationship between the Postal Service and its customers.

projected maintenance costs. For example, for the 16 year evaluation period for automation with use of the ZIP + 4 code, projected spare parts costs for the automated equipment were understated significantly because the estimated spare parts purchase price excluded an assumed 10 percent annual inflation rate during the first 5 years of spare parts buys. And, projected maintenance labor costs for some automated equipment were erroneously based on maintaining this equipment only part of each year after the year of deployment. This, in turn, resulted in understating maintenance labor costs for the proposed system.

Clerk savings were understated by about $300 million

On the basis of our analysis of 30 statistically selected postal facilities nationwide (see app. III for a listing of the facilities included in our review), we found that the Service's projection of clerk-hour savings was reasonable. Our projection showed, with a 95 percent confidence level, that over the 16 year project evaluation period, the total estimated savings for the ZIP + 4 system in comparison to the current baseline system were understated by about $300 million, or about 3.3 percent.

The difference between the Postal Service's and our work-hour estimates is the result of a combination of errors in both the current baseline system and the proposed system. We identified relatively minor errors made by the Postal Service in determining mail volumes and mail densities, in simulating the mail flow, and in calculating the hourly savings based on actual productivity rates for the baseline system and anticipated rates for the proposed sytem. In addition, we made adjustments in the mail flow simulation and hourly savings calculation to improve the accuracy of the projections and to insure consistency in approach. While the Postal Service's and our projected savings varied in individual facilities, the total effect of the variances did not significantly affect the total projected savings.

We discussed the results of our review with postal officials in each of the 30 facilities and with regional and headquarters officials. On the basis of these discussions and our analysis, we developed a computerized mail flow model representing each of the 30 facilities and used the model to project national savings for the Service's ZIP + 4 program, to identify savings for an automated five-digit ZIP Code program, and to perform various sensitivity studies.

In comments on our draft report (see app. XIV, p. 179) the Service stated that we understated savings because (1) mail acceptance rates will be higher as a result of a rate incentive, (2) our computer model identified mail in one facility as processed by letter sorting machines rather than

Inclusion of ZIP + 4 code related costs and other corrections discussed above significantly lower the Service's originally projected savings for the 16 year project evaluation period as follows:

--For automation and use of the current five-digit ZIP Code only, the total positive net cash flow is lowered by about $790 million; that is, from about $2.31 billion to about $1.52 billion. The resultant ROI is lowered from about 22 percent to about 17 percent. (See app. VII.)

--For automation and use of ZIP + 4, the total positive net cash flow is lowered by about $1 billion; that is, from about $7.83 billion to about $6.78 billion. The resultant ROI is lowered from 48.5 percent to about 37 percent. Including the revenue reduction caused by the proposed rate incentive in the ZIP + 4 project's cash flow lowers the ROI to about 26 or 20 percent, depending on whether the rate incentive remains fixed or is escalated by 7.42 percent annually, the same rate as the Postal Service's assumed labor costs. (See apps. V and VI.)

PROPOSED AUTOMATED SYSTEM SHOULD HAVE BEEN ANALYZED AS THREE SEPARABLE PROJECTS

The Service's 1980 proposal essentially presented the costs and benefits of the automated system as one project--an automated system using the expanded ZIP Code--instead of three separable projects as required by the Service's capital investment guidelines. The three separable projects which should have been analyzed at that time were

--improvements to letter sorting machines used by the current system,

--an automated system using the five-digit ZIP Code, and

--an automated system with expansion of the ZIP Code from five to nine digits.

An analysis showing the automated system as three separable projects would have provided the ultimate decisionmakers (the Service's Board of Governors) with complete cost and benefit information on all viable alternatives, including an automated system with or without an expanded code. The benefits produced mainly by the expanded code would have been identified, and some of the confusion and controversy over the Postal Service's plans to implement ZIP + 4 could possibly have been avoided.

system, but rather a return of savings to these mailers. Service officials believe such a return of savings is in compliance with the Postal Reorganization Act of 1970, which states that postal rates for any one class or subclass of mail must be based on costs attributable to that class or subclass of mail.

To provide a reduced rate to large-volume mailers, the Service requested, in April 1981, that the Postal Rate Commission issue a recommended decision to the Governors of the Postal Service favoring the establishment of two subclasses of First-Class Mail for volume ZIP + 4 mailings. 3/ The Service proposed subclass rates of one-half cent less than the current regular and presort First-Class rates. The reduced rates would benefit mailers who mailed, at one time, 500 pieces or more of First-Class ZIP + 4 mail suitable for processing on the OCR/CS equipment.

Since a rate incentive was considered necessary to secure the desired level of ZIP + 4 usage, the resulting loss of revenue should have been included in the ZIP + 4 project's net cash flow to compute an ROI.

The estimated annual savings from an automated system using the expanded code were based on the assumption that 37 billion pieces of mail would be processed annually on the OCR/CS machines from 1987 onward and that 90 percent of these pieces would have ZIP + 4 codes. The Service estimated that 28 billion of these pieces would be mailed at the subclass rate of one-half cent less than the First-Class Mail rates.

On the basis of an estimated annual volume of 28 billion pieces and a fixed rate reduction of one-half cent per piece, the corrected projected net positive cash flow of about $6.8 billion for the ZIP + 4 project's 16 year evaluation period would be reduced by $1.8 billion, resulting in an ROI of about 26 percent and a net positive cash flow of about $5 billion. (See app. V.) If the one-half cent-per-piece incentive were escalated annually at the same rate as Postal Service estimated labor costs--7.42 percent--the ZIP + 4 project's net positive cash flow of about $6.8 billion would be reduced to about $3.2 billion, resulting in an ROI of about 20 percent. (See app. VI.) However, society's overall net gain would be the Postal Service's savings plus the amount by which mailers' postage rate reductions exceed mailers' costs associated with implementation and continued use of ZIP + 4.

3/The Service withdrew this request after the Congress postponed the implementation of the ZIP + 4 system. The Service plans to resubmit the request in December 1982.

Automation with use of the current five-digit code

The second separable project, automation of the letter sorting process with use of the current five-digit ZIP Code, although claimed by the Service to be a viable alternative, was not supported by a complete ROI analysis prepared by the Service. Instead, it was treated as a "worst case" situation with no mailers using the nine-digit ZIP Code.

The risk analysis, which assumed "zero nine-digit usage," still resulted in a computed ROI of about 22 percent for the system. This ROI was based on the Service's assertion that (1) savings from the proposed automated system for mail processing operations in originating and transit offices were not dependent on use of a nine-digit code and (2) new equipment needs would be somewhat reduced, because it would not be possible to automate sorting to carrier route without the additional four digits. However, an optimum network for five-digit processing was not developed, a cash flow chart was not presented, and the 22-percent ROI was subjected to only one sensitivity analysis. This analysis assumed that no additional equipment would be purchased beyond Phase I of the project and resulted in an ROI of 12 percent.

We prepared a cash flow analysis of a five-digit automated system as a separate project and found that the ROI was about 16 percent, resulting from a net positive cash flow of $1.4 billion over a 16 year evaluation period. (See app. IX.)

Automation with expansion of ZIP Code

The Service's 1980 proposal was titled "Proposal to Capital Investment Committee--Automated System for Expanded ZIP Code Program." The proposal, as considered by the Board of Governors in November and December 1980, was to acquire automated equipment for use with the nine-digit code.

System implementation was proposed over a 6-year period with the automated equipment being acquired in two phases--Phase I (1981 to 1983) and Phase II (1984 to 1986)--in order to minimize risks by deploying equipment commensurate with anticipated usage of the expanded ZIP Code. The Service estimated that complete system implementation would, when compared with the current system, result in a reduction of 15,600 mail sorting related work-years--a cost savings potential of $597 million annually beginning with full system implementation in 1987, or an ROI of 48.5 percent over the evaluation period ending in 1996. (The reduction in the labor force was to be accomplished by attrition--see p. 138.)

Capital investment guidelines require separate project analyses

The Postal Service's capital investment guidelines require that all viable alternative solutions to a problem be analyzed and presented in a decision analysis report. Alternatives are to be arranged in ascending order of investment. In the cash flow comparison, the least initial investment alternative is to be used to evaluate the next higher investment alternative. If the next higher alternative provides at least the minimum acceptable rate of return, it becomes the basis for evaluating the third higher alternative--and so on, until all alternatives have been evaluated.

To assure that an economic analysis is a reliable document, the Postal Service requires that the controller or an equivalent authority review and validate the decision analysis report. The validator in this case noted that the improvement of the sorting machines used as part of the current system was a separate project and, as such, required a separate economic analysis. However, Postal Service officials, aware of the deficiency in the analysis report, did not require that it be corrected prior to presenting it to the Service's ultimate decisionmakers. The validator did not suggest that automation with use of the existing five-digit ZIP Code only was also a viable alternative and, as such, also required a more thorough separate analysis rather than the simplified ROI calculation included as part of the nine-digit analysis.

Improvements to equipment currently used for sorting mail

The Service's 1980 proposal provided for the acquisition of Expanded ZIP Retrofit (EZR) kits to improve the operation and maintenance of the MPLSMs currently used by the Service to sort mail. In addition to improving the operation and maintenance of an MPLSM, the EZR increases the sorting capability of the MPLSM from three keyed digits to four. Thus, the EZR, when installed on the MPLSM, will enable operators to sort non-bar coded letter mail bearing a nine-digit Zip Code directly to the carrier route without having scheme knowledge.

While this keying feature is a benefit which cannot be realized without the use of the expanded code, EZRs are most beneficial to the operation and maintenance of MPLSMs, and their use was not dependent on the installation of OCR/CSs and BCSs--the equipment needed to process nine-digit mail. As such, EZRs should have been viewed as an improvement to the current system and should have been analyzed and selected on their own merits. Installing the EZRs would reduce the Service's costs over a 16-year period from $718 to $613 million, producing an ROI of about 48 percent. This makes their installation a viable project without the expanded code. (See app. VIII for a GAO-developed cash flow which provides the ROI of about 48 percent.)

estimated ROI of about 16 percent--a rate slightly above the Service's acceptable decision point of 15 percent. 4/

Expanding the ZIP Code to nine digits could potentially produce additional net benefits equal to an ROI of about 36 or 23 percent depending on whether the incentive remains fixed or is escalated. However, the expanded code will not produce its full potential cost savings without substantial use of the nine-digit code by large-volume mailers. The ROI of 23 to 36 percent is based on the assumption that 37 billion pieces of mail are processed annually by OCRs from 1987 onward and that 90 percent of these pieces have nine-digit codes, but it is extremely sensitive to usage levels below 90 percent. (See pp. 44 to 46.)

Although the ROI for an automated system using the five-digit code is just above the Service's current acceptable decision point of 15 percent, the use of the five-digit code is already widespread; and success of the automated system does not hinge on a change in mailer behavior, which becomes very difficult to predict if the ZIP Code is expanded to nine digits. However, as discussed below, the ROIs for both the five and nine digit systems respond to changes in underlying assumptions.

Effect on ROI of change in mail volume

In estimating an ROI from the acquisition and use of automated equipment, the Postal Service made what it considered a conservative assumption--that the volume of First-Class letter mail would not increase beyond the level achieved in 1980. Our ROI computations are based on the same assumption.

History indicates that the no-growth assumption is indeed conservative. First-Class Mail volume has steadily increased from 53.6 billion pieces in 1977 to 61.4 billion pieces in 1981, and total mail volume increased from 92.2 billion pieces to 110.1 billion pieces over the same period.

4/In December 1979, the Postal Service raised its return on investment criteria from 10 percent to 15 percent for capital investments. The justification for this increase was to bring the return up to the current cost of money at that time. The cost of money, as reflected in the yield of 90-day Treasury bills in which the Service invests available cash, remained in line with the 15-percent criterion until the second half of 1982. By the fall of 1982, the 90-day Treasury bill yield had fallen below 10 percent. If the current cost of money remains at a level well under 15 percent, an ROI criterion for acceptable capital investments of less than 15 percent can be justified.

By not analyzing the automated systems as separable projects, the Service did not identify costs and benefits directly attributable to the use of the expanded code. Additional automation in conjunction with the expanded code, which we analyzed as a separate project, produces an estimated ROI of about 71 percent without consideration of revenue reductions caused by the proposed rate incentive. This return is so high because it considers only the incremental costs associated with the expanded code. A fixed rate incentive of 0.5 cent-per-piece would reduce the ROI to about 36 percent. The ROI would be about 23 percent with an incentive escalated at the same rate as the Service's assumed average annual labor cost escalation for the 16 year project evaluation period.

In summary, the net benefits to the Postal Service for the individual options can be portrayed as follows:

Incremental projects	Incremental costs	Incremental benefits to the Postal Service		ROI
		Gross (millions)	Net	(percent)
Improvements	$ 613	$718	$105	47.9
5-digit	1,988	3,404	1,416	16.3
9-digit	873	6,128	a/3,466/1,718	36.4/23.5

a/After deducting Postal Service investment and operating costs, about $5.26 billion in benefits remain. A fixed rate incentive of 0.5 cent-per-piece would return about $1.79 billion to qualified mailers, leaving the Service with about $3.5 billion, or an ROI of about 36 percent. An escalated rate incentive would return about $3.5 billion to qualified mailers, leaving the Service about $1.7 billion, or an ROI of about 23 percent.

FAVORABLE ROI--MORE CERTAIN FOR AUTOMATION USING THE FIVE-DIGIT THAN USING THE NINE-DIGIT CODE

Our analysis of the proposed automated system as separable projects indicates that automation--the use of OCR/CSs and BCSs to sort letter mail--with the five-digit ZIP Code would be an acceptable risk considering the opportunity to reduce labor costs through greater productivity. As a separate project, automation using the five-digit code will produce an

in 1987. However, a substantial part of third-class machinable mail will most likely continue to be sorted to the carrier route by mailers, and, therefore, would not be available for processing on the automated equipment.

At this time, known threats to an increased volume of First-Class machinable mail are the Carrier Route Presort program (see pp. 135 and 136) and the diversion of letter mail to electronic communications. A decrease in the volume of First-Class Mail to 20 percent below the 1980 level, caused by the above factors or others, would reduce the ROI from about 23 percent to about 9 percent, assuming an escalating rate incentive.

Effect on ROI if OCR/CS performance is less than expected

Our ROI computations use the Service's assumption that the OCR/CSs being purchased will perform better than the machines tested under the release-loan program. (See pp. 56 to 60.) If the performance of the OCR/CSs purchased does not exceed the actual performance level achieved by the machines tested under the release-loan program, the ROIs would be reduced as follows.

Comparison of ROIs Using Assumed Acceptance Rates With ROIs Using Actual Test Results

	ROI based on assumed rate (percent)	ROI based on actual test results a/ (percent)
Automated system using the five-digit ZIP Code	16.3	16.5
Automated system with ZIP Code expanded to nine digits (using fixed incentive/using escalated incentive)	36.4/23.5	30.1/15.3

a/Computed by GAO using raw test data and Postal Service's formula for determining an acceptance rate for nine-digit mail. The release-loan equipment was tested using five-digit mail. The ROIs presented represent a midpoint between the highest and lowest acceptance rates projected from the raw test results.

In anticipation of improved acceptance rates, the Service used a higher OCR/CS performance level in its ZIP + 4 proposal than that achieved under the release-loan program. It found that mail pieces were rejected by the release-loan OCRs because of difficulty in finding the address or ZIP Code, skewed lines, poor contrast, special printing fonts (sizes and styles

To determine how sensitive the ROIs are to volume changes, we arbitrarily changed First-Class Mail volume as shown in the following table.

Variations of ROI Values in Response to Changes in First-Class Mail Volume

Changes in First-Class Mail volume	ROI for automation used with five-digit ZIP Code (percent)	ROI for additional automation used with nine-digit ZIP Code	
		With a fixed 0.5-cent rate incentive (percent)	With an escalated 0.5-cent rate incentive (percent)
20% decrease	9.7	26.7	9.0
15% decrease	11.5	29.3	13.3
10% decrease	13.2	31.8	17.0
5% decrease	14.8	34.1	20.4
No change	16.3	36.4	23.5
5% increase	17.8	38.6	26.3
10% increase	19.3	40.8	29.0
15% increase	20.7	42.9	31.6
20% increase	22.0	44.9	34.0

The Postal Service's Strategic Business Plan for fiscal years 1983 to 1987 predicts a steady growth in total mail volume to an annual total of 128 billion pieces by 1987 (a 20-percent increase over 1980), assuming that postage rates increase no more rapidly than the overall Consumer Price Index and there is no significant diversion of existing mail.

As shown in the above table, a 20-percent increase in First-Class Mail volume over the 16 year evaluation period would increase the ROI from about 23 percent to about 34 percent, assuming an escalating rate incentive. An increase in such mail could come from steady growth in First-Class Mail volume. In addition, the Postal Service believes that some third-class mail could eventually be processed on the automated equipment if the ZIP Code is expanded to nine digits. The Service predicts that third-class mail will grow at a more rapid pace than mail in general. It is projected to rise from less than 29 percent of all mail in 1980 to almost 36 percent

effective with full implementation, automation with use of the five-digit ZIP Code could eliminate about 4,780 such work years annually, and automation with use of the nine-digit code could eliminate about an additional 10,980 such work-years annually, for a total of 15,760 work-years. The 160 work-year difference between the Postal Service's total and our total is a result of the Service's underestimation of certain labor costs and savings. To estimate the reduction in work-year related monetary savings, the Service escalated labor costs at an annual rate of 7.42 percent. The following table shows the effect on the ROIs of changes in labor costs.

Variations of ROI Values in Response to Changes in Labor Escalation Rates

Changes in labor costs (percent)	ROI for automation used with five-digit code (percent)	ROI for additional automation used with nine-digit ZIP Code	
		With a fixed 0.5-cent rate incentive (percent)	With an escalated 0.5-cent rate incentive (percent)
6.0	15.1	32.3	21.0
6.5	15.5	33.8	21.9
7.0	16.0	35.2	22.8
7.42	16.3	36.4	23.5
8.0	16.9	38.1	24.5
8.50	17.3	39.5	25.3

Regarding equipment costs, we found that substantial increases would effect the ROIs as follows.

Variations of ROI Values in Response to Increase in Equipment Costs

Increases in equipment costs (percent)	ROI for automation used with five-digit codes (percent)	ROI for additional automation used with nine-digit ZIP Code	
		With a fixed 0.5-cent rate incentive (percent)	With an escalated 0.5-cent rate incentive (percent)
No change	16.3	36.4	23.5
30	12.0	34.3	21.7
50	9.7	32.9	20.6

of print), or poor printing quality. The Service assumed that more than half of these rejected pieces could be read if the Postal Service developed:

> "a vigorous effort to obtain better compliance with addressing standards, a very limited OCR recognition improvement for printed mail, and a modest OCR capability to read script."

A "vigorous effort" with substantial emphasis from headquarters, regional, and local officials may significantly improve acceptance rates, but as of November 1982 the Service had not developed a test program needed to collect data for improving OCR readability (see pp. 57 and 58). Also, as discussed on pages 61 to 73, deficiencies in the Service's acceptance test program could result in the Service accepting OCRs which do not perform as expected. However, the proposed rate incentive should improve the acceptable read rates for nine-digit mail.

If both the 90 percent ZIP + 4 code usage rate and improved OCR/CS performance are achieved, some improvement over our computed ROIs can be expected from lower scheme training costs and a reduced number of sorting errors.

The use of OCR/CSs in conjunction with ZIP + 4 will reduce the amount of mail to be sorted by clerks who must memorize route schemes, resulting in a reduction in the number of work-hours spent memorizing these schemes. Service officials did not know how many scheme training hours will be eliminated, but one official roughly estimated that, on the basis of the number of such hours required in fiscal year 1981, this training would decrease by approximately 20 percent when the automated system is in full operation and the ZIP + 4 usage rate has reached 90 percent. We estimate that such a reduction could result in savings of about $2.5 million dollars annually after that time.

The Service's 1980 economic analysis stated that one benefit of the OCR equipment over the present LSM system is a reduction in mail sorting errors. That is, fewer pieces of machinable mail would be sent to the wrong location. We agree that there could be additional savings from the OCR equipment with a reduction in the number of sorting errors, but the impact on the ROI would not be significant.

Effect on ROI of changes in labor and equipment costs

Most of the savings from the automated system using either the five-digit or nine-digit ZIP Code come primarily from a reduction in mail sorting labor costs. As stated earlier, the Postal Service estimated that automation and use of the ZIP + 4 code would eliminate, by attrition, about 15,600 mail sorting related work-years. We estimate that,

If mailers' use of the ZIP + 4 code is substantially less than that expected by the Postal Service, our computed ROI will be significantly reduced. The table below identifies the effect of usage rates on the ROI. It indicates that a nine-digit usage rate of 50 percent produces an ROI of only 5 percent with a fixed rate incentive of 0.5 cent. If the 0.5 cent incentive, escalated annually at 7.42 percent, is provided for an estimated 15.5 billion pieces of mail, the ROI is negative at the end of the 16 year evaluation period.

Variations of ROI Values in Response to Changes in Nine-Digit ZIP Code Usage

Nine-digit ZIP Code usage (percent)	With a fixed 0.5-cent rate incentive (percent)	With an escalated 0.5-cent rate incentive (percent)
50	5.1	(negative)
60	13.2	(negative)
80	24.7	7.5
90	36.4	23.5

An 80 percent usage rate combined with a mail acceptance rate obtained from the release-loan test results (see p. 41) lowers the ROI from about 25 percent to about 17 percent with a fixed incentive. The ROI would be negative with an escalated incentive.

Incentive rate over 0.5 cent would substantially reduce the ROI

The ROI would be reduced considerably, as shown in the following table, if the per-piece incentive rate was more than 0.5 cent.

Effect on ROI of reductions in estimated total savings and evaluation period

Our computed ROIs are based on savings to be realized over a 16-year period. If only 85 percent of projected savings are actually realized, the ROI for an automated system using five digits would be reduced to about 12 percent. The ROI for additional automation with expansion of the ZIP Code to nine digits would be reduced to about 29 percent with a fixed rate reduction and to about 13 percent if the rate reduction were escalated.

If the project life were shortened because the proposed automated system had become obsolete and the Service decided to discontinue its use at that time, the ROI would be reduced correspondingly. For example, if the project life were shortened from the 16-year period used by the Service to a 12-year period ending in 1992, the ROI for an automated system using only the five-digit ZIP Code would be about 10 percent. The ROI for the additional automation and use of ZIP + 4 could range from about 32 percent to about 18 percent, depending on whether the rate incentive remained at one-half cent or was escalated.

Usage rate for the nine-digit code substantially affects the ROI

Our analysis shows that the additional automation in conjunction with the expanded ZIP Code results in a relatively high ROI. However, a change in just one critical assumption--the usage rate--significantly lowers this ROI, which is based on the Service's assumption that 37 billion pieces of First-Class Mail will be processed on OCR/CSs from 1987 onward and that 90 percent of these pieces will have nine-digit codes. It is expected that 28 billion pieces will come from large-volume mailers who would receive a rate incentive of at least 0.5 cent-per-piece in return for using the expanded code. The Postal Service cannot unilaterally provide this reduced rate, but must submit justification to the Postal Rate Commission, secure the Commission's recommended decision, and secure final approval from the Governors of the Postal Service. Past experience indicates that the recommended decisions desired by the Postal Service are not always obtained from the Postal Rate Commission.

Our questionnaire survey of large-volume mailers disclosed that most would not add the nine-digit code to their address lists without receiving a rate incentive to offset conversion costs.

Systems	Incremental investment and operating costs	Incremental mail-sorting clerk related savings	Total incremental savings
		(millions)	
Automated system using five-digit ZIP Code	$1,988	$3,404	$1,416
Automated system using nine-digit ZIP Code	$873	$6,128	$5,255

As shown above, automation with use of the five-digit ZIP Code--requiring incremental investment and operating costs of almost $2 billion--could produce mail-sorting clerk related savings of about $3.4 billion. In contrast, minimal additional automated equipment and use of the ZIP + 4 code--requiring incremental investment and operating costs of about $870 million--could produce additional mail-sorting clerk related savings of about $6.1 billion. In addition, the majority of the costs to be incurred by moving to a nine-digit system will not be committed at the outset, but rather on a year-to-year basis. This gives the Service the opportunity to reduce these costs if ZIP + 4 usage does not materialize as expected.

It should also be noted that beneficial aspects of the nine-digit code are clouded by uncertainties surrounding the proposed rate incentive and by our ROI computation method. For example, our projected ROI of about 36 percent (see app. X) is based on reduced mail-sorting costs of about $5.26 billion less about $1.79 billion returned to qualified mailers by a fixed rate incentive of 0.5 cent-per-piece. A rate incentive escalated annually by 7.42 percent would return about $3.54 billion to qualified mailers, leaving the Postal Service with about $1.72 billion, or an ROI of about 23 percent.

The $1.79 billion (or $3.54 billion) returned to mailers will serve to offset their costs of adding the ZIP + 4 code to their address files and provide net savings if reductions in postage from repeated use of the lower rate exceed the costs of file conversion and maintenance. We cannot estimate such costs, but it is reasonable to assume that most mailers will not add the ZIP + 4 code to their address files unless repeated use of the code provides net savings within a reasonable period of time.

SUBSEQUENT EVENTS HAVE EFFECT ON ROI

Since publication of the Postal Service's October 1980 analysis which proposed an automated letter sorting system to be used with ZIP + 4, events have occurred which will change

Variations of ROI Values in Response to Changes in Incentive Rates

Per-piece incentive (cents)	With a fixed rate incentive (percent)	With an escalated rate incentive (percent)
0.25	50.9	44.7
0.5	36.4	23.5
0.75	25.1	(negative)
1.0	15.7	(negative)

As indicated, a 0.5-cent incentive (escalated at a 7.42 percent annual rate) provides about a 23 percent ROI. If the rate incentive were raised to 0.75 cents the ROI would be negative. Although a 0.5-cent-per-piece rate discount was proposed in April 1981, it was subsequently withdrawn. The Postal Service expects to have Postal Rate Commission recommendations and final Governors' action on a 0.5 cent rate discount by October 1983.

ROI CALCULATIONS--NOT A COMPLETE PICTURE OF THE NINE-DIGIT CODE

Although our analysis of the automated system with expansion of the ZIP Code from five to nine digits disclosed that the realization of the projected ROI is not a certainty, the picture painted by the numbers is not complete without disclosure of potential savings to mailers resulting from reductions in Postal Service mail sorting costs.

As disclosed in Chapter 2, the distinct difference between an automated system using a five-digit code and one using nine digits is that a mail piece with a nine-digit code can be sorted down to the carrier route by the automated equipment. A mail piece with the five-digit code can be sorted to the destinating office using the automated equipment, but the sort to the carrier route must be made manually or on an MPLSM by an operator with scheme knowledge. The capability (i.e, carrier route sort) that the nine-digit code provides has a substantial impact on mail sorting costs, as shown by the following incremental analysis of costs and benefits.

Planned increase in maintenance training will increase costs

Since issuing its 1980 economic analysis, the Postal Service had changed, at least twice, the number of maintenance technicians to be trained. According to the Service's latest plan, training requirements could considerably exceed those planned earlier and used as the basis in 1980 to calculate projected maintenance training costs. However, at the conclusion of our review, Service officials were again re-examining the number of maintenance personnel to be trained and, consequently, we could not measure the eventual increase in these costs.

Use of lower salaried workers may result in additional savings

The Service may realize additional savings because it is planning to operate and maintain the automated equipment with personnel whose average salaries are lower than those used to determine the costs of the automated system in the 1980 analysis. On the basis of estimates made by Service officials, we project that by operating the new automated equipment with mail processors who may be paid less than the current mail sorting clerks whom they will replace, additional savings of about $270 million could be realized during the 16 year evaluation period. In addition, by maintaining the automated equipment with a mix of technicians whose average salaries would be lower than those used to calculate projected maintenance labor costs in the 1980 analysis, this originally projected cost could be reduced by about $40 million, thus increasing projected savings.

However, we did not include these savings in our ROI computations because at the close of our review the salary level of the mail processing position was subject to arbitration and the mix of maintenance technicians was still under review.

New automation may require air conditioned environment

Additional costs may be incurred to air condition postal facilities that will house the new automated equipment in order to control temperature, humidity, and dust, all of which can affect the performance of the new machines. At the close of our review, the Service was in the process of collecting temperature and humidity information at postal facilities scheduled to receive automated equipment. According to postal officials, preliminary information indicated that some provisions for air conditioning were required, but that the cost should be minimal. (See p. 75.)

the amount of savings projected at that time. These include the mandated postponement of implementing ZIP + 4, delay in the deployment of automated equipment, and a change in the mix of the planned BCS purchase. Other factors could possibly either increase or decrease the Service's original savings projections, but planned actions were still uncertain and tenuous at the close of our review. Postal Service comments on this issue and our response are discussed on page 53.

Delay and uncertainty in system implementation

As disclosed in chapter 1, the Postal Service had planned to implement a nine-digit ZIP Code in October 1981, but was prohibited by the Congress from doing so before October 1983. Since the Service had projected some ZIP + 4 related savings during the 1-year period ending September 1983, a delay in implementing the expanded code had the potential of delaying these savings by at least 1 year. However, the Service has experienced some delay--unrelated to the postponement of the expanded code--in deploying the automated equipment needed to realize the projected savings. Thus, the delay in ZIP + 4 implementation is not the only cause of the delayed savings. Since these implementation delays involve only about $47 million in clerk savings during fiscal years 1982 and 1983, the effect on the overall ROI should be minor.

In addition to experiencing delay in equipment deployment, the Service's BCS deployment strategy has changed. Small BCS testing done by the Service after the 1980 proposal for automation showed that their actual performance was better than anticipated. In view of this, the Service has chosen to purchase only small BCSs during Phase I of this project and may do the same during Phase II, thus eliminating all planned large BCSs from the system. According to the Service's "preliminary" calculation, this strategy could yield an increase in savings of approximately $50 million annually after full system implementation, and equipment costs could be reduced by about $100 million because the cost of small BCSs was less than anticipated for the originally planned purchase. The Service calculated that this could increase the originally projected ROI from 48 to 53 percent.

We agree with the Service that the better-than-projected small BCS performance will increase the projected savings and resultant ROI. However, at the close of our review, the Service had not yet made a firm decision on the number of small BCSs to be purchased and deployed and, therefore, we were unable to measure the precise economic effect of this change in systems configuration.

Under the Postal Reorganization Act, the Postal Service must submit a request with supporting justification to the Postal Rate Commission for its rate discount proposal and secure its recommended decision. We have no way of forecasting what the Postal Rate Commission's views of such a proposal would be.

According to the Postal Service, use of the nine-digit code would be voluntary. Mailers' decisions on moving to it would be based, to a great extent, on the economics of their particular cases-- the sum of costs, such as file conversion and maintenance, versus benefits, such as reduced postage and improved mail service. Our questionnaire survey of major mailers disclosed that most were unlikely to add the nine-digit code to their address lists without receiving an adequate rate reduction to offset their costs to use ZIP + 4.

Substantial ZIP + 4 use is critical because we found the ROI to be extremely sensitive to this factor. For example:

--A usage level of 80 percent with a fixed postage rate reduction of one-half cent would lower the ROI from about 36 to about 25 percent. An escalated rate reduction at the 80 percent usage level would lower the ROI to about 7.5 percent.

--At a 60-percent level, the ROI would be about 13 percent if the rate reduction remained at one-half cent-per-piece. The ROI would be negative if the rate reduction were escalated.

However, the majority of the additional costs required to move to automation with substantial use of the nine-digit ZIP Code will not be committed at the outset, but rather on a year-to-year basis as the use of the expanded code increases. This gives the Service the opportunity to reduce these costs if the ZIP + 4 usage does not materialize as expected.

In addition, ROI numbers do not paint a complete picture of the potential benefits of an automated mail sorting system with the ZIP Code expanded to nine digits. With a usage level of 90 percent, the automated system, using the nine-digit code, could sort mail down to the carrier route and potentially reduce overall mail sorting costs by about $5.3 billion. A fixed postage rate reduction of one-half cent per piece would return $1.8 billion of these savings to qualified mailers, leaving the Postal Service with a net positive cash flow of $3.5 billion and an ROI of about 36 percent. An escalated rate reduction would return about $3.6 billion to qualified mailers, leaving the Postal Service with a net cash flow of about $1.7 billion and an ROI of about 23 percent.

The $1.7 billion (or $3.5 billion) returned to mailers will serve to offset their costs of adding the ZIP + 4 code to

CONCLUSIONS

We believe that the proposed automated system should have been analyzed on an incremental basis, considering separately and in turn the following three options: (1) improvements to existing letter processing equipment; (2) an automated system using the five-digit ZIP Code; and (3) an automated system with expansion of the ZIP Code from five to nine digits. Adjusting Postal Service cost and savings estimates and analyzing costs and benefits on an incremental basis for each option show that:

--When considering both investment and operating costs, improving the existing equipment would reduce costs by about $105 million; that is, from $718 to $613 million over a 16-year period, providing an ROI of about 48 percent.

--Acquiring and operating the new optical character reading and other equipment and using it with the five-digit ZIP Code would cost an additional $1.99 billion and provide an ROI of about 16 percent.

--The move from a five-digit to a nine-digit ZIP Code would cost an additional $873 million and yield an ROI of about 36 percent on this incremental investment, assuming a fixed rate incentive of one-half cent. The ROI would be about 23 percent if the rate incentive were escalated.

Our analysis of the proposed automated system as separable projects indicates that automation--the use of OCR/CSs and BCSs to sort letter mail--with the five-digit ZIP Code would be an acceptable risk considering the opportunity to reduce labor costs through greater productivity. As a separate project, automation using the five-digit code will produce an estimated ROI of 16 percent--a rate slightly above the Service's acceptable decision point of 15 percent.

Expanding the ZIP Code to nine digits could potentially produce substantial additional net benefits. However, the expanded code will not produce its full potential cost savings without substantial use of the nine-digit code by large-volume mailers. The ROI of 23 to 36 percent is based on the assumption that (1) 37 billion pieces of mail are processed by OCRs from 1987 onward and that 90 percent of these pieces have nine-digit codes, and (2) 28 of the 37 billion pieces would come primarily from large-volume mailers who would receive a rate reduction of at least 0.5 cent-per-piece to secure their use of the expanded code.

not add the ZIP + 4 code to their address files unless they can realize savings from repeated use of the ZIP + 4 code.

In further comments on our draft report (see pp. 178 to 180) the Service stated that automated systems related savings estimates--as presented in its 1980 analysis--were conservative, because many potential savings were not quantified at that time. The Service further stated that although we recognized many of these potential savings in our report, we excluded them when computing an ROI for this project.

We essentially agree with the Service that additional savings are possible and that, if included, a higher ROI would be achieved. However, we excluded such potential savings (as well as additional potential costs) from the ROI calculations because it was difficult, if not impossible, to quantify them with a sufficient degree of accuracy, since they depended on planned actions which were still uncertain and tenuous at the close of our review. For example, although we agree that the Service's decision to purchase only small BCSs instead of a mixture of small and large BCSs will result in additional savings, it was not possible to quantify these savings with any accuracy, because the number of small BCSs required to replace the large BCSs was still very uncertain at the close of our review. The Service is currently doing a detailed site-by-site analysis to determine the number of small BCSs actually required. Only after the results of this analysis are known can the savings related to the small BCS issue be more accurately quantified. Therefore, while we believe that it was proper to point out the potential savings and indicate their possible magnitude based on "preliminary" calculations, we continue to believe that it was prudent not to include them in the ROI calculations.

their address files and provide net savings if postage reductions from repeated use of the lower rate exceed the costs of file conversion and maintenance. We cannot estimate such costs, but it is reasonable to assume that most mailers will not add the ZIP + 4 code to their address files unless repeated use of the code provides a reasonable return on investment costs (i.e., on costs of file conversion and maintenance).

Also on the positive side, GAO found that the Postal Service was very conservative in estimating the mail volumes that may be available for processing by the automated system. The Service's own estimates--given credibility by a history of growth in First-Class Mail volume--indicate that this volume could be as much as 20 percent more than that used in the ROI computations. Using the higher figure would obviously increase savings. Further, undetermined potential for additional savings lies in the possible use of automated equipment to process some third-class mail. Since the Postal Service does not yet have specific plans to include third-class mail, it did not include these possible savings in its economic analysis.

AGENCY COMMENTS AND OUR EVALUATION

In commenting on our draft report, the Postmaster General took the position that the anticipated reduction in revenue caused by providing a rate incentive to large-volume mailers should not be included in the project's (ZIP + 4) cash flow used to compute an ROI. (See app. XIV, pp. 171 to 173.) The Postmaster General believes that treating the proposed rebate of savings as a program cost in computing an ROI is not appropriate when analyzing the Service's capital investment project, because all savings produced by a capital investment project eventually are returned to postal customers through the prescribed rate making process.

We know that postal rates are based on cost and that capital investments which produce lower operating costs have a favorable impact on rates paid by postal customers. However, for the ZIP + 4 project the proposed rebate to large-volume mailers is necessary to secure their use of the nine-digit code and to make the project a financial success. (See pp. 33 to 35.) As such, the proposed rebate should, for ROI calculation purposes, be considered a program cost because the Service is in effect buying usage of the nine-digit code from large-volume mailers.

However, the benefits measured by our ROI are understated by the extent to which the cumulative amount of the proposed rebate exceeds, over time, mailers' costs of adding the ZIP + 4 code to their address files. We cannot estimate such costs but it is reasonable to expect that most mailers will

--Inserted tight delivery schedule requirements in OCR/CS contracts.

--Used firm fixed-price OCR/CS and small BCS contracts which included performance specifications.

During the period 1979 to 1981, the Postal Service tested commercial OCR/CS and small BCS mail sorting equipment from several American and foreign manufacturers. These tests were conducted in operating postal facilities, using actual U.S. mail. They were conducted under "release-loan" agreements, under which the manufacturers and the Postal Service shared the costs. The tests were designed to prove that commercial equipment could process U.S. mail under realistic operating conditions.

OCR acquisition and deployment

The Service invited over 50 American and foreign vendors to participate in the Phase I OCR/CS release-loan tests. No American and only six foreign vendors responded to the Service's invitation. Five of the six vendors were subsequently invited to test their machines for 8 weeks on "live" mail, each in a different city.

As a condition for bidding on the two contracts that the Service planned to award in Phase I of the automation program, the Postal Service required that foreign vendors whose equipment performed satisfactorily in the release-loan tests license American firms to manufacture OCR/CSs in the United States, using American parts as much as possible.

Two U.S. licensees (Burroughs Corporation and Pitney Bowes, Inc.) were awarded contracts in June 1981 to produce a total of 252 OCR/CSs at a cost of $182 million. 1/ The contracts called for Postal Service acceptance of the first units in October 1982. Each contract includes an acceptance test plan and performance specifications based on the release-loan test results.

The Postal Service began its Phase II OCR/CS procurement action in April 1982 by inviting vendors to submit proposals for release-loan testing of their machines. Tests will be conducted in Chicago during the spring and summer of 1983.

1/The two original manufacturers of machines which the Service purchased are the Nippon Electric Company (NEC), Japan; and Elettronica San Giorgio (ELSAG), Italy. For the production of OCR/CSs for the Service, NEC is affiliated with the Burroughs Corporation, while ELSAG is affiliated with Pitney Bowes, Inc.

CHAPTER 4

MANAGEMENT ACTIONS ARE NEEDED TO ENSURE ADEQUATE EQUIPMENT PERFORMANCE

Performance of OCR equipment could be less than the Postal Service anticipated, resulting in unacceptable risks to the cost effectiveness of the ZIP + 4 program, unless the Service:

--Takes effective action to improve the quality (that is, the OCR readability) of mail processed by the equipment.

--Improves testing procedures for accepting production pieces of equipment from the contractors.

--Gives close and continued attention to several potential maintenance problems.

The Service is developing equipment which can perform the same functions as the OCR equipment already bought, but which can do it without the nine-digit ZIP Code. However, at the time of our review, development of this equipment was not far enough along to affect the Service's current plans to acquire OCR equipment or to affect the implementation of the ZIP + 4 program. Further testing of this alternative equipment may show that it can effectively supplement OCR equipment already in use.

HOW AND WHY POSTAL SERVICE SELECTED COMMERCIAL EQUIPMENT FOR USE WITH ZIP + 4 PROGRAM

The Postal Service's twofold objective in acquiring equipment for use with the ZIP + 4 program has been to minimize

--the time required to have the equipment available for operations, and

--the risks of poor equipment performance.

To achieve this objective, the Service:

--Selected what it asserts was existing, commercially available equipment.

--Continued in-house research and development work on OCRs to allow for the possibility of problems developing with acquisition of commercial machines.

--Must develop clear and precise procedures and techniques for applying the OCR readability guidelines.

--Had not formalized plans to analyze data on mailer reaction to the Service's requests for voluntary addressing changes on mail that does not qualify for a reduced ZIP + 4 postage rate because it is not OCR readable.

Postal Service officials acknowledged that many of the procedures and guidelines that will have to be developed to ensure a significant improvement in OCR readability had not been fully identified. They pointed out that operating experience on the OCR equipment could not be obtained until the equipment was deployed. They said experience on deployed equipment is required to identify actual problem areas and corrective actions needed. They stated that programs responsive to these problems would be implemented as the need for such programs was identified. In our view, the need for taking these steps has already been demonstrated.

Test program needed to collect data for improving OCR readability guidelines

The current OCR readability guidelines were based on prior Service experience with older OCR equipment and on a Service analysis of release-loan test results. The Service plans to improve these guidelines to reflect actual operating experience with the new OCR/CSs. However, the Service does not have an adequate test program established to develop the information it will need to revise the current guidelines.

Determining why a letter was not read, or was not read correctly, can often be difficult and time consuming. During the testing of a "read/code/sort OCR" machine [2/] in Dallas, Texas, Postal Service and contractor officials showed us letters which had been read correctly to five digits despite address deficiencies which, according to current OCR guidelines, made the mail unreadable by OCR equipment. On the other hand, these officials also showed us letters which for no apparent reason were not read correctly. A Service official said that some mail read correctly on one pass through an OCR would be rejected on a second pass through the OCR. Conversely, he said that some mail rejected on the first pass would be read correctly on a second pass.

Postal Service and contractor officials agreed that determining the OCR readability of mail is an undeveloped art. They also said that a thorough and conclusive analysis

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[2/]For definition, see glossary.

Bar code sorter acquisition and deployment

The Postal Service originally planned to spend about $67 million to purchase 382 small BCSs as part of its automation program. All of these machines were to be deployed in Phase I to support the initial deployment of OCR/CSs. The Service also planned to spend about $300 million in Phases I and II for 401 large BCSs--new machines and retrofitted LSMs--to provide the bulk of the bar code sorting work in the automation program.

The Service conducted two sets of Phase I release-loan tests on small BCSs, involving eight manufacturers. Machines from four American firms were tested in July and August 1981. One firm's machine (Bell and Howell's) passed the test criteria, and the company was awarded a $22 million contract in December 1981 to produce 144 machines. Acceptance testing of the first machines began in November 1982.

The second Phase I release-loan test, involving four foreign firms and one U.S. firm whose machine was retested, was held from October through December 1981. All five firms' machines performed satisfactorily. In September 1982, the Postal Service awarded a follow-on contract to Bell and Howell for 104 machines.

The Service stated that, because of the unexpectedly good results achieved in the small BCS release-loan tests, it was reconsidering its plans for future purchases of BCSs. The Service said it may increase its planned purchase of small BCSs instead of buying the large BCSs that it originally intended to buy.

MANAGEMENT ACTIONS NEEDED TO IMPROVE OCR READABILITY OF MAIL

The actual performance of the release-loan OCR/CS machines in reading and sorting mail was less than the assumptions used by the Service in its 1980 economic analysis. The Service assumed that this difference could in large part be eliminated by upgrading the OCR readability of First-Class letter mail. To upgrade the OCR readability of mail, the Service has established guidelines for mailers to follow in preparing their mail. The Service plans to improve these guidelines after actual operating data is available from deployed OCR/CSs. The Service has also prepared pre- and post-equipment deployment operating plans to guide Service personnel in increasing the volume of OCR readable mail. However, the Service:

--Did not have an adequate test program to collect data for improving the OCR readability guidelines.

The final guidelines will be legally binding on mailers who wish to receive a reduced postage rate. Thus, the procedures and techniques which the Service will use to determine whether a mailer qualifies for a reduced postage rate must be precise enough to result in accurate decisions, and clear enough to give consistent decisions to all mailers.

In October 1982, Service officials said that guidelines and procedures were being evaluated for the proposed rate filing and that these guidelines and procedures would specify how readability guidelines would be administered for incentive qualification.

Management actions needed to obtain mailers' voluntary improvements in OCR readability

The Service is relying exclusively on voluntary actions by mailers to improve the OCR readability of mail which does not qualify for a reduced ZIP + 4 usage rate. However, the Service may not get that cooperation if changes requested by the Service will cost mailers money. The Service did not have data to support its claim that most changes will not cost the mailers money.

The Service has established action plans to upgrade the address characteristics of First-Class mail for OCR readability. Plans are in effect to identify and seek necessary changes by mailers, both before and after the OCR/CSs are deployed at each of the 118 sites scheduled to receive this equipment in Phase I. The plans call for inspecting mail, assessing its compliance with current OCR addressing guidelines, communicating the results of this assessment to the mailer, and requesting the cooperation of the mailer in removing any problems which interfere with OCR readability.

The Service stresses that the program is strictly voluntary, and that mailer compliance with readability guidelines is of mutual benefit to the mailer and the Service. Mailers are to be told that they will benefit because:

--They will receive more consistent mail service.

--Their organization's professional image will improve.

--Reducing postal operating costs will contribute to a more stable rate structure.

However, we believe mailers may resist making changes voluntarily if these changes would cost them money. Service officials agreed that mailers have been reluctant in the past to make changes where the cost of correction has been more than nominal. They correctly point out that a key factor in

showing exactly why a letter was rejected could not have been done with the equipment and personnel at the test site in Dallas. They said that a thorough knowledge of machine design is often required to determine why a letter was not read or not read correctly.

We believe that to have adequate data to improve the OCR readability criteria of mail, the Service must conduct a thorough and carefully controlled test program using mail which the deployed OCR/CSs are unable to read or unable to read correctly.

The test program should:

--Identify the mail characteristics which preclude or limit accurate reading of address information.

--Indicate the frequency with which these characteristics appear, and the proportion of the mail these characteristics affect.

--Identify changes needed in addressing criteria to improve the OCR readability of mail.

The test program should be conducted with proper test equipment and personnel who are trained and experienced in OCR equipment, because less extensive and thorough data collection and analysis will not provide the Service with adequate data to improve existing criteria. In commenting on our draft report, the Service agreed to conduct such a test program.

Clear and precise techniques and procedures needed for applying OCR readability guidelines

One method the Service plans to use to upgrade OCR readability in the future is to require that mail meet Service OCR readability requirements in order to qualify for a ZIP + 4 reduced postage rate. The Service intends to offer a reduced postage rate to mailers of 500 or more pieces of ZIP + 4 mail, provided that the mail meets established criteria for OCR readability. The Service said it would request the Postal Rate Commission to issue a recommended decision on this reduced postage rate and would establish the final guidelines for OCR readability prior to implementation of the rate discount. Service officials expected that by that time, the guidelines being used by the Service would have been re-evaluated and improved on the basis of:

--What the OCR/CS equipment actually reads.

--Input from mailers during the rulemaking process related to regulations implementing a reduced postage rate.

Agency Comments

The Service concurred with our recommendations and said it would:

--Develop a test program to improve the OCR readability of the mail.

--On the basis of actual machine performance, develop criteria for use in qualifying mail for a proposed rate incentive.

--Develop a plan to train postal clerks in the application of OCR readability guidelines.

--Identify mailers' reactions to requests for voluntary changes that will improve the OCR readability of mail.

TESTING AND EVALUATION EFFORTS SHOULD BE IMPROVED

By not requiring adequate testing and evaluation procedures, the Postal Service cannot accurately measure the performance of the equipment purchased, and cannot determine the need for design changes.

The Service did not:

--Require normal and prudent first article testing before full production.

--Require nine-digit ZIP Code mail tests against specific performance criteria.

--Establish an acceptance test plan which accurately tests individual machines.

The Service faces significant risks from these deficiencies because:

--The OCR/CS machines purchased by the Postal Service are significantly different in design and components in comparison with the machines tested under the release-loan program (see p. 63).

--The U.S. manufacturers have never before produced an OCR/CS machine for mail processing and had to acquire the capability to produce the machines in a short time frame.

The Postal Service maintains that the OCR/CS machines being purchased are not significantly different from the machines tested under the release-loan program and that design testing procedures beyond those called for by the contracts

the Service's effort to improve OCR readability of letter mail will be the extent of necessary changes that will cost the mailer money.

Service officials had no data from prior, early-model OCR operations showing the number of changes which cost mailers money or what mailers' reactions had been to the Service's requests for changes. This data is being recorded on current reports of contacts with mailers, but is not being consolidated in management reports and analyzed by the Service. We discussed this issue with the Service. Officials said plans had not been formalized but that the Service would assemble this data if it found that mailers were not making requested changes.

To adequately manage this program, the Service needs timely information on mailer responses when mailers are asked to make voluntary changes to improve the OCR readability of their mail. This information can be used to assess the need for further management action or the need for a financial incentive.

Conclusions

Management actions are needed to improve the OCR readability of mail before the Service can achieve its goal of improving the performance of the OCR/CS machines to the level assumed in the 1980 economic analysis. These actions include (1) collecting adequate data to improve current guidelines, (2) developing procedures and techniques which the Service will use to determine whether mail submitted by large-volume mailers is eligible for the reduced postage rate, and (3) encouraging mailer cooperation where necessary.

Recommendations to the Postmaster General

We recommend that, to improve the OCR readability of mail, the Postal Service:

--Implement a test program to develop adequate data for improving OCR readability guidelines.

--Develop clear and precise procedures and techniques to apply OCR readability guidelines to determine that mail is eligible for a reduced postage rate.

--Obtain data on mailer reactions to the Service's requests that they voluntarily improve the OCR readability of their mail, and determine whether additional management actions are needed to encourage cooperation.

The Postal Service commingled the verification-of-design and individual machine performance tests into a 1-week test of each machine. We do not believe, as discussed below, that the Service's 1-week test is adequate to validate the design or to properly test individual machines' performance.

First article design tests not conducted before full production

First article design tests are not being performed by the Postal Service before full-scale production of OCR/CSs and small BCSs. Federal Government contracts often provide for first article testing, especially in major equipment acquisitions such as the OCR/CS purchase, in order to minimize risks to both the contractor and the Government. A first article test subjects a first unit off the production line (or a sample of the first units off the production line) to a test over a period of time long enough to establish that the machine performs at the expected level. The first article test can also demonstrate that the machine will be reasonably reliable and will be available for use an adequate amount of time. Except in very unusual circumstances, production of the remaining units should be delayed until the first article test is satisfactorily completed. This would avoid the expense of retrofitting completed machines where design problems are disclosed in a first article test.

We believe that the OCR/CSs, in particular, should have been subjected to a first article design test because many design and component changes have been made since the machines were tested under the release-loan program and because the U.S. contractors did not have prior experience producing these high technology machines. A commonly accepted principle of procurement practice holds that the item that is tested should be representative of the items that will be purchased. This principle is implicit in several GAO reports, Department of Defense testing and acquisition directives, and OMB Circular A-109, "Major System Acquisitions."

Both contractors believe the machines they are producing differ significantly from the release-loan test machines. We agree. We identified about 25 changes in each of the two OCR/CS manufacturers' equipment. These changes were (1) mandated by the Postal Service, (2) made to adapt the equipment to U.S. parts, or (3) made to improve the performance of the machines. One of the potentially more significant changes to the Pitney Bowes equipment is the change from vertical stackers to horizontal stackers. Another significant change to the Pitney Bowes machine is that it will be operated without an air conditioned computer room, which was provided for the ELSAG release-loan machine. Air conditioning was provided to the NEC release-loan machine but was not used by the company. One of the potentially more significant changes in the Burroughs equipment is a redesign of the stacker roller assembly.

are not necessary to ensure that the machines will meet performance specifications and perform reliably. As discussed on p. 63, we disagree with the Service's characterization of these differences. The Service also does not believe that its acceptance test plan is flawed; therefore, it did not have a test plan to deal with the potential problems we identified.

However, initial results from the extended acceptance test of the first production OCR/CS of Pitney Bowes, Inc., in Los Angeles suggest our concerns were well founded. After about 3 weeks of testing through November 5, 1982, the Service had not accepted the Pitney Bowes machine, and further tests were planned. In addition, the Burroughs Corporation was unable to meet its scheduled October acceptance deadline for its first production machine because Burroughs underestimated the effort required to convert a foreign design to American components. Burroughs told the Postal Service that it expected to pass the first acceptance test in an operating postal facility in January 1983.

Acceptance test plan commingles two separate test objectives

Acceptance tests of commercial equipment like that which the Postal Service is buying should provide assurance that:

--The design of the contractor's equipment is sound, and the equipment is capable of meeting the acceptance criteria.

--Individual production machines have been produced with adequate quality control and manufacturing procedures.

The length of tests and retests required to accomplish these two objectives can vary according to the risks and costs involved:

--Validation of the design of equipment is done to avoid risks with serious consequences. The expected return on investment can be reduced if the equipment cannot meet acceptance criteria. Therefore, any tests should be conducted over a length of time sufficient to identify significant design flaws in critical components.

--Validation of the performance of an individual piece of equipment involves a lesser risk once the design has been successfully tested: only defects in individual machines should be expected. Therefore, tests need be only long enough to assure that the piece of equipment works at an acceptable level of performance.

According to the contractor, the tests were needed, in part, because some new parts were substituted for hand fabricated parts used in the test machine. However, the contractor's tests were not supervised or directed by the Postal Service, and, therefore, still do not constitute adequate first article tests.

Testing of release-loan machines is not an adequate substitute for standard first article design testing--Postal Service officials said that standard first article testing methods were not used in the OCR/CS contracts because the units tested under the release-loan program were considered prototypes and that the production units were considered "off-the-shelf" units.

Our review disclosed that the release-loan machine offered by the Nippon Electric Company (NEC) was an export model not used at all in Japan and not used anywhere in the world with the same design. The Elettronica San Giorgio (ELSAG) release-loan machine was not constructed like other units made by the company because it was extensively modified for the release-loan test. Therefore, the machines tested under the release-loan program should not be considered production prototypes, and the machines being purchased are not "off-the-shelf" units.

Testing of training machines is not an adequate substitute for standard first article design testing--Postal Service officials claimed that design changes made subsequent to the release-loan tests would be tested by the contractors on units the contractors would construct for training Service personnel. They also claimed that these training units would actually be first production units off the assembly line.

Testing of these machines did not provide adequate first article test assurance because:

--The machines were not tested in a realistic postal operating environment and under Postal Service control.

--The machines were assembled by engineers and highly skilled technicians (while the production units--up to six units a month--are produced by production line personnel).

--The machines contained many foreign made parts which will not be in the units delivered to the Postal Service.

--The machines used at Burroughs for training Postal Service personnel were built by NEC, not Burroughs. Burroughs did not have a machine that it built available for testing until October 1982.

In commenting on our draft report, the Burroughs Corporation agreed that changes had been made to the design of its machine since the release-loan tests, but it said the machine delivered to the Postal Service was functionally identical to the release-loan machine. We agree that the Burroughs machine is functionally identical to the release-loan machine. That is, the two machines perform the same functions, such as reading city, State, and ZIP Code information; printing the proper bar code; and sorting mail according to that bar code. However, the design of the machine delivered to the Service has been changed, and the total of the individual design changes introduces an element of risk that the machine may not perform as well as the release-loan machine.

Burroughs stated that the design changes had been tested on equipment made by NEC. However, these tests cannot be considered an adequate first article test because they were not supervised or directed by the Postal Service.

An adequate first article test was also needed because the current OCR/CS contracts had tight schedules under which the U.S. contractors had to transfer technology from the foreign manufacturers and find adequate U.S. substitute parts. Officials of both contractors said that they had underestimated the difficulty in fulfilling the contract requirement to substitute American made parts for foreign made parts.

In written comments on our draft report, Pitney Bowes said it and ELSAG had fully recognized at the beginning the difficulty of transferring technology from ELSAG to Pitney Bowes and said that both parties committed sizeable resources to this task. We agree that Pitney Bowes and ELSAG made significant efforts to meet contract requirements. However, Pitney Bowes had difficulty maintaining its planned schedule for "Americanizing" final drawings and for ordering mechanical and electrical components. These problems were overcome by lengthened work weeks, staff adjustments, and alternative purchasing methods. We believe the problems experienced by Pitney Bowes created a risk of performance problems.

With regard to the small BCS contract also, the Postal Service did not require a standard first article test. However, the contractor followed good procedures, and planned to conduct its own tests, even though:

--The design of the production machine closely resembled the machine tested by the Postal Service.

--No transfer of technology from a foreign firm was required.

--The firm had been making similar equipment for several years.

--The acceptance procedures do not specify the required degree of reliability (frequency of breakdowns) or availability (a machine's actual operating time, compared to its scheduled operating time).

Current test plans do not require nine-digit ZIP Code mail tests against specific performance criteria

To achieve an acceptable rate of return on its investment in equipment, the Postal Service must have machines that will operate at some reasonable level of performance with nine-digit mail.

The Postal Service planned to test the capability of the contractors' OCR/CSs to process an intermixed five- and nine-digit mail test deck. However, the test plans did not include a numerical criterion establishing how well each contractor's machine must process nine-digit ZIP Code mail before the Postal Service will accept the machine. The contracts:

--Require that the machines be capable of processing intermixed five- and nine-digit ZIP Code mail without changing the software in the machines.

--State that the Postal Service will evaluate the machines' ability to (a) read nine digits; (b) print nine-digit bar codes; and (c) sort, using the nine-digit code.

The Service said there was no nine-digit live mail to process through the OCR/CSs during the release-loan tests. Therefore, the Service believed it would be unfair to the contractors to require a theoretical minimum acceptance performance for nine-digit mail for the production machines. The Service said that the required demonstration by the contractors that their machines have the capability to process mail is sufficient because, it believes, once the ZIP Code is located by the OCR, "it is a simple task to read the additional four digits."

A machine will not read a nine-digit code at the same accept rate at which it will read a five-digit code. In fact, the Postal Service had available, from the release-loan tests, performance data on nine-digit test mail that demonstrated a lower nine-digit accept rate. The Service could have used this data to provide a specified performance level by applying a formula that it had already developed for that purpose.

In commenting on our draft report, the Postal Service said that test deck mail is not truly representative of live mail. We agree that test decks do not completely represent live mail, but they are better than no test at all.

--The Pitney Bowes machine used for training purposes did not have the 60-stacker unit, which has never previously been built by either foreign manufacturer, and which involves mechanical hardware that has been a problem on some similar equipment in the past.

--The Pitney Bowes machine was not thoroughly tested on live mail; the Burroughs machine began live mail tests after our visits to Burroughs, and we did not, therefore, verify the tests.

Planned acceptance testing of each production unit will not provide an adequate first article design test--Postal Service officials said that another reason the Service is not using the standard first article testing method is that each production unit will have its own acceptance test and, therefore, each unit should be considered a first article. We believe this position is unrealistic because:

--The acceptance test plans did not provide for a delay in production pending a successful first article test.

--The planned 1 week acceptance test for each production unit is most likely too short for an adequate first article design test. Any design problems involving critical adjustments or excessive wear will probably not be noticed in a 1-week test.

--Performance that is marginally below contract levels is likely to be obscured by week-to-week variations in the mail mix. Such week-to-week variations caused a substantial difference in the test results from week to week during the release-loan tests. For example, one contractor's release-loan machine had a 67.1 percent gross accept rate [3]/ (One of the four performance criteria) on meter belt mail (one of the four mail types). If the delivered machines had a true long-term average gross accept rate of exactly 67.1 percent, there would be a 95-percent probability that the test results from a 1 week acceptance test on this machine would be in the range between 60.2 and 74.0 percent. However, if the tests were extended to 8 weeks, as in the release-loan tests, the range would be between 64.7 and 69.5 percent.

--The current test plan will not give an accurate estimate of the true long-term performance of a machine, because differences in mail characteristics among cities are not completely compensated for.

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[3]/For definition, see glossary.

would not have changed our findings). We found that because of the variations in mail quality from week to week, an acceptable OCR/CS with a potential long-run performance barely equal to the acceptance criteria is unlikely to ever pass all of the requirements in a single test, even with averaging of the test scores.

For example, assuming that (a) an OCR/CS exceeds throughput requirements for all four types of mail by 3 percentage points, (b) each gross accept rate and each net accept rate are 2 percentage points above the contract requirements, and (c) error rates are one-half of the rates allowed by the contract, then the Burroughs OCR/CS has only a 12.3 percent chance of meeting all of the contract requirements at one time. Using the same assumptions, the Pitney Bowes machine has only a 3.8-percent chance. Assuming, in this example, that the entire test is repeated two more times, the Burroughs machine's chance of passing increases to 32.5 percent, and the Pitney Bowes machine's chance of passing increases to 11.0 percent.

If, in this example, the Service also allows averaging of throughput scores, then on the first test, the Burroughs OCR/CS's chance of passing all of the contract requirements at one time increases to 31.9 percent, while the Pitney Bowes machine's chance rises to 10.1 percent. Repeating the entire test two more times increases the Burroughs machine's chance of passing to 68.0 percent, and the Pitney Bowes machine's chance to 27.0 percent.

Even an OCR/CS that could be expected to significantly exceed the contract requirements over the long run will have trouble passing the acceptance test. For example, a machine that exceeds contract requirements by two standard deviations for all contract requirements [5]/ would have only about a 90-percent chance of being accepted on the first test, assuming averaging of errors rates as well as gross and net accept rates.

Thus, a machine capable of meeting contract requirements could be subject to extensive retesting if the entire test is constantly repeated. However, as of early November 1982, the Service had not developed an acceptance test plan describing retesting procedures (the first machine was scheduled for acceptance by the end of October but had not been accepted as of early November 1982). Service officials told us that the contractors would not necessarily have to repeat the entire acceptance test if a machine failed its first acceptance

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[5]/A standard deviation is a statistical measure of the random variation of performance above and below an average score. For example, Pitney Bowes must build a machine that can achieve a gross accept rate on meter belt mail of 73 percent, in order to be two standard deviations above the release-loan test score of 67 percent for that criterion.

OCR acceptance tests do not accurately measure machines' performance

Even if a successful design test were to be performed, the current acceptance test plan does not accurately test individual machines. Our statistical analysis of the current test plan shows that a machine which meets contract requirements may never pass the entire test (16 subtests) at one time. However, if just the subtests that were failed must be repeated, this limited testing may not be stringent enough to assure the Service that the machine meets contract specifications.

The OCR/CS contracts contain five acceptance criteria [4]/ for each machine. However, one criterion was not independent and was not analyzed. Three of the other four criteria will be tested on samples of four types of mail over a 1-week period. The fourth criterion--throughput--will be tested on 600,000 pieces of mail during the 1-week test.

Because of contractor concerns about using live mail for the acceptance test, the contracts allowed limited averaging of test results. For two criteria (gross and net accept rates) the OCR/CS contracts allowed test scores for a criterion to be averaged across the four types of mail, provided that:

--No more than two of the four mail types have test scores below 100 percent of the contract requirements.

--No single test score is less than 95 percent of the contract requirements.

--The average of test scores of the four mail types for each criterion equals or exceeds the average of the same four contract requirements.

The Service's OCR/CS contracting officer indicated that averaging of error rates will also be allowed.

To evaluate the adequacy of the acceptance plan, we statistically analyzed the performance of the release-loan OCR/CSs using four of the five criteria specified in the contracts. (The coding accept rate was not used because it is closely correlated with the net accept rate, and its inclusion

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[4]/The contracts provide for five criteria--coding accept rate, gross and net accept rates, error rate, and a throughput rate. See glossary for definitions. Only four criteria were analyzed because the coding accept rate is not an independent variable.

this regard, the Service's OCR/CS test program does not minimize the risks involved as it will not ensure that the machines being purchased will perform at the expected level. Many design and component changes have been made since the machines were tested under the release-loan program. A commonly accepted principle of procurement practice holds that, where significant changes are made to equipment after operational testing is complete, further tests should be made before production begins.

Without testing the OCR/CSs to validate design changes, the Service is assuming that the machines will perform as expected. If the Service is right, the ZIP + 4 program can move forward without disruption and expensive retrofitting. If wrong, it will be a costly and time-consuming risk which did not have to be assumed. The Service can still take steps to possibly lower the level of risks by conducting an 8-week test on two or more of the first machines to have a much more accurate test of performance capability.

Even if there are no design problems, the current test program will not accurately test individual machines. A machine which just meets contract requirements may never pass the entire test at one time. If just the subtests that were failed must be repeated, the limited testing may not assure the Service that the machines meet contract requirements.

Recommendations to the Postmaster General

For the current OCR/CS contracts, we recommend that the Postal Service:

--Conduct an 8-week test on the first unit or units built by each contractor.

--Thoroughly evaluate the criteria to be used for retesting of machines which fail initial acceptance tests.

For future OCR and other equipment procurements, we recommend that the Postal Service:

--Conduct a comprehensive first article test of a representative machine, where the production machine is significantly different from (1) machines currently in use or (2) machines which were tested in a release-loan program. These first article tests should be conducted under expected environmental conditions and cover all operating parameters (to include processing of nine-digit mail).

test. These officials said that, depending on individual circumstances, contractors might be allowed to repeat only those parts of the tests which a machine failed.

Such decisions must be made cautiously because the Service could easily accept a machine which does not meet contract requirements. For example, a machine with a true long-term gross accept rate of 63.5 percent for a given type of mail has only a 16-percent chance of meeting a contractual requirement of 67 percent on the first acceptance subtest. But the same machine has a cumulative chance of 41 percent of passing this subtest by the end of the third retest, and a cumulative 58-percent chance of passing the subtest by the end of the fifth retest.

Options open to the Service for the current OCR/CS contracts

Our findings on the acceptance test plan were developed after the Service had contracted for the first buy of OCR/CSs. However, as discussed below, the Service can still reduce the degree of risk caused by an inadequate test plan.

With respect to first article testing, the Service can continue tests on whichever machine or machines it wants to select for a full 8-week test. If the Service did continue the test for a full 8 weeks, it would have a much more accurate test of the performance capability of the machines' design. An 8-week test would also be a better indicator of machine reliability and durability.

The Service could use the 8-week test information to make decisions on retesting of individual production machines. With a reasonably accurate estimate of the machines' true performance capabilities, the Service would be in a better position to assess whether poor performance of individual machines is being caused by poor quality of mail or by design defects. With the design validated, the tests of individual machines can be viewed by the Service as quality control tests. For this purpose, the current acceptance test plan is better suited.

Conclusions

The criticality of the OCR/CS to the overall success of the ZIP + 4 program makes a strong argument for taking a cautious, conservative, and prudent approach to developing and testing the machines. We recognize that testing cannot eliminate all elements of risk and that the ultimate test must come when the OCR/CSs are operated in postal facilities. A good testing program can, however, minimize the risks involved by comparing observed performance with expected performance. In

contract terms and safeguards in Bell and Howell internal testing procedures without a formal first article test.

As stated earlier (see p. 64), we agree that Bell and Howell followed good internal testing procedures. However, Bell and Howell tests were not supervised or directed by the Service, and, therefore, should not be considered a first article test. Further, the acceptance test required by the contract is not long enough to identify any design problems involving excessive wear or the need for critical adjustments.

Neither Pitney Bowes nor Burroughs commented on the need for a first article test.

With respect to modifications made to foreign equipment used for the release-loan tests, Pitney Bowes did not agree that extensive modifications had been made to ELSAG equipment (see p. 186). The firm said that the ink jet printer had been changed and a bar code verifier added, but that both changes were of low level technical difficulty. However, information we obtained at ELSAG offices in Genoa and our observation of ELSAG equipment in use in Italian postal facilities showed that additional hardware and software changes not mentioned by Pitney Bowes had been made to ELSAG equipment to prepare for the release-loan tests. We believe these changes were extensive, even if they were of low level technical difficulty. For example, ELSAG officials said they had to redesign the connection between the stacker unit and the OCR itself, so the two units could be joined together directly. These officials said that in Italy the two units had been separated by an extensive conveyor system.

CONTINUED MANAGEMENT ATTENTION NEEDED TO AVOID POTENTIAL MAINTENANCE PROBLEMS

The Postal Service will maintain OCR/CS and small BCS equipment without assistance from the contractors. To do this effectively in the near and long term, continued management attention is needed to:

--Obtain data needed to effectively maintain the equipment immediately after deployment.

--Establish maintenance skill requirements and determine that these skills can be made available over the long term.

--Define the duties and authority of the organizations and individuals responsible for maintenance management.

--Perform a thorough engineering analysis of any changes proposed to the design of the machine after the initial first article test, and retest a first article if these changes are deemed significant.

Agency comments

For the current contracts in Phase I of the automation program, the Postal Service agreed that an 8-week test offers a better assessment of machine reliability and durability than a short acceptance test does. The Service accepted our recommendations for extended testing of the equipment and said it planned to conduct its own 8- to 12-week test on one of the first OCRs delivered to a postal facility from each contractor. These tests will be conducted after the Service has accepted the machines from the contractors. The Service believes these tests will clearly establish the performance capabilities of these machines and provide data to better estimate their reliability, maintainability, and logistical requirements.

The Service said the test procedures it is pursuing will provide equipment which is sound and will perform as it expects. (See p. 175.) The Service plans to continue its current 1-week tests of each piece of machinery to ensure that it is adjusted to local conditions. A Service official said current test criteria for retesting will be adjusted if actual test data demonstrates that the current criteria are not adequate.

With respect to future OCR equipment purchases, Service officials said they will decide later whether to incorporate a first article test. They said their decision would be based on (a) experience from the current contracts and (b) the Service's selection of contractor(s) for the Phase II purchase.

Service officials also said they will use the Phase I acceptance test results to develop minimum performance levels for processing nine-digit mail in Phase II.

The Service did not specifically agree to conduct an engineering analysis of proposed design changes after a piece of equipment has undergone a first article test. Instead, the Service agreed to test all significant engineering changes, without specifying how changes will be deemed significant. (See p. 175.)

Contractor comments

The full text of contractor comments appears in Appendix XV.

With regard to first article tests (see p. 181), Bell and Howell said the Postal Service was adequately protected by

earlier visits to foreign postal administrations and equipment manufacturers, and placement of Postal Service maintenance personnel in U.S. contractors' plants.

Release-loan machines--As discussed on pages 63 to 64, the release-loan test machines were different from the machines now being purchased by the Service. However, enough similarities existed that valuable knowledge could have been obtained about machine reliability, maintenance needs, and skill levels required for maintenance staff if the release-loan machines had been purchased. More specifically, the release-loan machines could possibly have been used to provide information on how well an OCR/CS will operate in a postal facility environment. For example, above certain maximum levels of temperature and humidity in a postal facility, and below certain minimum levels, OCR/CSs may encounter reliability problems.

At the time of our review, the Postal Service did not have data on actual temperature and humidity conditions in its facilities. The Service initiated a procedure to collect temperature and humidity data for 30 days during the summer of 1982. Service officials said that they will make any necessary provisions for air conditioning before the summer of 1983. As of October 1982, final data was not available to calculate the added costs of this work and their effect on the return on investment. However, Service officials said that preliminary data indicated that only minimal costs would be incurred to provide adequate temperature and humidity for the OCR equipment.

Postal Service maintenance officials said purchase of the two release-loan machines would have been beneficial and pointed out that the solicitation for the second OCR/CS procurement includes an option for the Service to buy the release-loan machines.

Visits to foreign postal administrations and manufacturers--In August 1982, Service officials went to Europe to observe the operation of OCRs and to obtain, first-hand, operating and maintenance data. Our visits to Canada, Europe, and Japan disclosed that data on foreign operations must be used with caution in predicting machine performance in the U.S. because foreign OCRs are custom built to reflect different countries' mail characteristics and operating philosophies. However, foreign operating data would have been useful for planning purposes, and Service officials acknowledged that they should have gone to Europe before August 1982.

Maintenance personnel at contractors' plants--During our review, Service officials acknowledged that assigning maintenance personnel at the contractors' plants on an as-needed basis would have been beneficial, and they said they would consider doing so in future procurements.

Late development of basic information and manuals

The Service's maintenance planning has been hampered by the late development of basic information and materials. For example, as of April 1982, Service officials had not started preparing field maintenance mini-handbooks needed for the October 1982 deployment of the first OCR/CSs because the contractors delivered required operation and maintenance manuals late. These officials said that the field maintenance mini-handbooks are needed for trouble-shooting work and preventive and on-line maintenance. A more comprehensive handbook will be developed when the "as built" OCR/CS drawings are finished in January 1983. In October 1982, the Service said the mini-manual for Pitney Bowes machines had been distributed, and it expected that data on the Burroughs machines would be available to the field staff in January 1983 to support maintenance of the first machines deployed to postal facilities. Service officials agreed that their planning efforts had been hampered by the late development of contractor information.

In addition to being late, the initial contractor materials that the Service received were generally poor in quality and required extensive revision by the Service and the contractors.

In commenting on our draft report, Burroughs said it delivered preliminary and final operation and maintenance manuals on time and had not been formally notified they were of poor quality. According to Service officials, Burroughs shipped manuals about two weeks late in mid-April. Drawings in these manuals were notated in Japanese, and the manuals were for a machine different from the one bought by the Service. Final manuals were due from Burroughs September 17, 1982, but were not shipped until October 15. Burroughs then recalled the manuals for technical corrections and reshipped them to the Service November 15.

In its comments on the draft report, Pitney Bowes said the delayed delivery of its manuals benefited the Postal Service by providing a higher quality manual. It said the final manuals were enhanced because they reflected the experience gained in classroom training sessions.

We believe that the effect of these delays on the Service has been reduced because Burroughs has slipped its scheduled delivery of equipment from October 1982 to January 1983, Pitney Bowes machines were not accepted on schedule, and the Service is using other sources of information to prepare for maintaining Burroughs and Pitney Bowes equipment.

We believe that the development of basic knowledge about the operation and maintenance of the OCR/CS could have been assisted by the purchase of the release-loan test machines,

The Service has assumed that sufficient numbers of qualified electronics technicians to meet future needs will be available from:

--Existing electronics technician ranks.

--A new Electronics Technician Trainee position, which will qualify mechanical technicians to become electronics technicians.

--Outside hiring.

We did not collect Service-wide data on the skills and qualifications of the Service's maintenance staff. We did, however, examine the procedures used to select students for OCR/CS training courses.

Service officials told us that plant maintenance managers will, in their own self-interest, send their best maintenance personnel to OCR/CS training. For this reason, the Service is not concerned about minimally qualified staff being nominated for training courses. However, instructors at the classes we visited said that two of their 14 students had not had extensive prior experience on electronic equipment. In addition, one plant maintenance supervisor told us that the pressure to keep other equipment operating was a significant factor in deciding which employees would be sent to training. Several students at the Pitney Bowes training class told us the same thing.

After we expressed concern about the quality and selection of students, Service officials said that they would contact five post offices around the country to determine whether maintenance staffing levels and training plans are potential problem areas. At the time of our review, results of this work were not available.

Management responsibilities need to be defined

In assigning management responsibility for maintenance of the automated equipment, the Service needs to be sure that:

--Adequate technical support will be provided to local postal facility technicians.

--Effective management controls will be maintained over engineering changes to the new equipment.

Technical support--The relationship between the Maintenance Technical Support Center (MTSC) in Norman, Oklahoma, and regional maintenance staffs should be watched to prevent duplication of activities. The MTSC currently provides technical

Maintenance training requirements were being firmed up

As of November 1982, the Service was taking action to establish final skill requirements needed to maintain the OCR/CS equipment and to design training courses to develop these skills.

Potential short-term training problems--An adequate maintenance training program for OCR/CS equipment rests on a clear assessment of the skills to be taught to each type of maintenance technician. To maintain the OCR/CS, the Postal Service initially established two levels of training:

--Level I (equipment technicians), for electromechanical maintenance, preventive maintenance, and simple electronics maintenance.

--Level II (systems technicians), for more complex maintenance and repairs.

During initial OCR/CS training classes the Service was not able to clearly define the differences between the two levels of technicians to either instructors or students. As of November 1982, the differences between the types of technicians were being defined and training courses were being changed.

In addition, the Service:

--Was not training enough of its maintenance staff to provide adequate coverage for all operating hours. The Service agreed to re-examine its training needs.

--Had, within the past 6 months, begun to provide electronics training to maintenance supervisors who did not have electronics backgrounds.

Providing properly trained maintenance staff in the long term--Most of the staff to be trained to maintain OCR/CSs and BCSs will come from the current electronics technician workforce. The Service does not have a complete profile of the training and experience of these employees. This information could be critical because the Service plans to more than double its electronics technician complement within 5 years. Officials estimated that the Service's current electronics technician workforce must increase from about 1,200 in 1982 to about 2,600 in 1987 to maintain OCR/CSs, small BCSs, and other new electronic equipment. Officials said that most of the 1,200 current electronics technicians will be trained on the new equipment. A similar number of mechanical maintenance technicians will be trained to become electronics technicians to maintain existing electronic equipment.

--correct design flaws,

--improve equipment performance, and

--incorporate safety features.

Postal Service officials acknowledge that machines do not always remain in a standard configuration because local personnel make unauthorized changes or do not make authorized changes. These officials said that a procedure was being developed and would soon be implemented to identify and correct unauthorized changes. They said the new procedures will stress the role of the MTSC in developing changes and transmitting them to local facilities. Regional staff are then to ensure that authorized changes are made. Regional officials will also be charged with detecting and removing unauthorized changes.

We found that the MTSC has had the responsibility for both implementing and enforcing authorized changes. We pointed out to the Service that the MTSC role should be redefined if the regions are to function as intended. Service officials agreed to do this.

Conclusions

The Postal Service may have some initial problems in maintaining its new OCR/CSs and BCSs. However, strong management actions can limit the extent and duration of these problems. Service officials were aware of most of the problems we identified and had recently taken steps, or planned to take steps, to minimize them.

For the Phase II procurement of OCR/CSs, the Service will have "lessons learned" from Phase I to guide decisions on

--purchasing release-loan machines, and

--placing Service personnel in contractors' plants to obtain basic knowledge about the operation and maintenance of OCR/CSs and to expedite the preparation of acceptable manuals.

TESTING OF ALTERNATIVE EQUIPMENT SHOULD CONTINUE

The Postal Service is developing OCR equipment which can perform the same functions as the OCR equipment being acquired, but which can do it without the nine-digit ZIP Code. However, this type of equipment has not been developed to the extent that the Phase II equipment acquisition or implementation of the ZIP + 4 program should be delayed on the basis of the equipment's potential. Further testing may show that this alternative type of equipment can effectively supplement OCR equipment already in use.

support to local maintenance personnel. It provides this support through extensive telephone contacts, supplemented by field visits. On some pieces of equipment, "area" technicians are designated, and work through an informal network established by the MTSC, to help other maintenance personnel.

Management of maintenance activities will become more structured with the acquisition of OCR/CSs and other automation. A new Mechanization Maintenance Officer position has been created for each of the five regional offices. In addition to having overall responsibility for equipment maintenance, this officer will be responsible for managing direct technical support for the automated equipment at local postal facilities. The expertise for direct technical support will be available from senior level electronics technicians domiciled at large postal facilities. Service officials said that these technicians will receive training beyond that given to local personnel and will be expected to handle most problems. Technical assistance will be available from the MTSC for problems the senior technicians cannot handle. In November 1982, the Service was working on a management instruction to move the primary responsibility for managing technical support from the MTSC to the regional offices.

In addition to the relationship between the MTSC and regional offices in providing technical support, the Service should be concerned about and pay close attention to the relationships that must be handled by the senior level electronics technician. The regional maintenance officer will direct the technician's activities but the technician will administratively report to a maintenance supervisor at his domicile--a large postal facility with automated equipment. The maintenance supervisor will evaluate the technician's work, and it is reasonable to expect that the supervisor, as well as the technician, will view as the technician's primary responsibility the equipment at the home facility. If this happens, technical support might not be readily available for postal facilities which do not have a senior level technician.

Service officials were aware of these potential problems and said that they would closely monitor the arrangement between the MTSC and regional staffs in providing direct technical support to local facilities, and the relationship of the regions to the senior electronics technicians. They said that in late 1983 they would begin integrating all technical support resources into a well defined network.

Engineering changes--Unless preventive measures are taken, organizational conflicts can develop between the MTSC and the regional maintenance officer in implementing approved engineering changes and in the detection and prevention of unauthorized changes to equipment. Engineering changes are frequently made during the first 2 years after equipment is first deployed to:

equipment in New York and Chicago through April 1983. REI was the only firm under contract with the Postal Service to develop a multiline read machine.

On the basis of our observation of the Dallas test and our discussions with postal officials, we consider the tentative test results to be favorable.

Capabilities of the multiline read equipment

The multiline read equipment can read and sort mail to the carrier without a nine-digit ZIP Code in the address. Most of the savings from the nine-digit ZIP Code result from elimination of human sorting of letter mail to the carrier route. The single-line read equipment requires the nine-digit ZIP Code to sort mail to the carrier level. However, the multiline equipment can sort to the carrier without the nine-digit code because it

--reads the entire address (firm name, floor or suite number, street address, and city and State); and

--matches this address against an internal nine-digit ZIP Code directory, and prints a nine-digit bar code when a successful match is made.

The advantages of this equipment are limited by the nature of mail. About 60 percent of the outgoing mail is local mail, and will stay within the area served by the originating office. The multiline read equipment can apply a nine-digit bar code to this local mail for sorting to the carrier, even if the nine-digit ZIP Code is not present. However, the multiline read equipment can apply only a five-digit bar code to the 40 percent of the mail not for local delivery if that mail does not have a nine-digit ZIP Code on it. This limitation exists because the multiline equipment at the originating office does not have a street directory for destinating post offices outside of the local area. When mail which has only a five-digit bar code arrives at a destinating post office, that mail must be processed through multiline read equipment again to add an additional four digits to the bar code for sorting to the carrier route.

Multiline equipment can also improve the accept rate and help reduce the error rate on OCR readable mail which has a nine-digit ZIP Code. The single-line read equipment compares the first five digits of a ZIP Code against the city and State information before printing a five-digit bar code. This confirming procedure provides "redundancy," which helps the machine read the address and helps prevent errors. The single-line read equipment, however, cannot compare the last four digits of a nine-digit ZIP Code to the street address (which

Why the Service elected to buy single-line read OCR equipment

The decision regarding the type of OCR to be purchased by the Postal Service for the ZIP + 4 program was based on the 1976 report of the Deputy Postmaster General's Task Force on Future Mail Processing Systems. At that time, the Service considered basing its future mail processing operations on either

--an OCR that would read the city, State, and a nine-digit ZIP Code and apply a bar code (commonly called a single-line read OCR); or

--an OCR that would read the firm name, building name, box number, and street address, as well as the city and State, and print a nine-digit bar code based on internal ZIP Code directories. If a nine-digit ZIP Code were present, the machine would read that code and print the bar code. (This type of machine is commonly called a multiline read OCR.)

The Service had spent millions of dollars on in-house research on multiline read equipment since about 1965. However, it elected to buy commercially available single-line read equipment because it believed that:

--This equipment did not require further development and could be acquired and deployed much faster than the multiline read equipment.

--The multiline read equipment would cost about twice as much as single-line read equipment.

--Performance of multiline equipment under development by the Service had not been satisfactory.

--Multiline read equipment required an extensive address directory which was difficult and expensive to develop and to maintain.

Multiline read equipment being tested

However, the Service has continued development work on multiline read equipment as insurance against inadequate performance by the single-line equipment. As of early November 1982, multiline read equipment built by Recognition Equipment Incorporated (REI) had been tested in Dallas and Philadelphia, and was being used to sort mail at these post offices. Another three tests were planned on similar units of REI

effective and could eliminate the need for a nine-digit code on the mail piece.

If the ZIP + 4 program is implemented, the use of multiline read equipment would not be incompatible with the use of single-line read equipment. As an augmentation to single-line equipment, multiline equipment would offer the potential advantages of a higher accept rate and a lower error rate in sorting nine-digit ZIP Code mail. These advantages could be especially important to the Postal Service if mailer utilization of ZIP + 4 were less than that needed to obtain anticipated savings from the use of single-line equipment. Low utilization of ZIP + 4 is possible if large-volume mailers are not offered what they consider to be an adequate financial incentive to convert their five-digit address files to nine digits.

We do not know how close the potential of multiline OCR equipment is to full realization. As of early November 1982, the Service had completed testing of two of five multiline units made by REI. Complete test results from the second test were not available, although results from the first test showed the machine met all contract specifications except one. However, neither the encouraging test experience in Dallas nor the experience gained with multiline read equipment in Europe provides sufficient basis for suggesting the delay of either the Phase II procurement of OCR equipment or the implementation of the ZIP + 4 program, should they be otherwise warranted.

CONTRACTORS' COMMENTS

In commenting on our draft report (see p. 188), REI said that the Postal Service's reasons for buying single-line read equipment (see p. 80) may have been valid at the time of the decision. However, REI said some of these reasons have since been overtaken by the REI equipment's favorable performance and price-competitiveness, and the recent development of address directories for the ZIP + 4 program.

The Postal Service said that tests of REI's multiline read equipment were not complete and that, therefore, the performance of the equipment had not been fully demonstrated. The Service also said the price competitiveness of REI's multiline read equipment could not be determined until REI's proposed pricing could be analyzed in a free market environment in Phase II of the Service's OCR/CS procurement.

the last four digits represent), and, therefore, cannot catch any errors which may be caused by either inaccurate reading of the last four digits or an inaccurate ZIP Code. An advantage of the multiline read equipment is that because it reads the entire address, it makes a check of the accuracy of the last four digits of the nine-digit ZIP Code. However, it performs this function only on local mail which has a nine-digit ZIP Code.

More tests needed to establish costs and performance of multiline read equipment versus single-line read equipment

In November 1982, Service officials said they had started modeling postal facility mail flows and will use data from two or more tests of the REI machines to determine how--and in what quantities--this equipment could best be used in an automated letter sorting system. The Service had no plans to solicit competition for the REI multiline read equipment or to test the REI equipment against single-line read equipment.

Multiline read equipment is more complex than single-line read equipment, and probably would cost more to purchase and maintain. These added costs might be minimized, and added performance obtained, through competition among different contractors. Other OCR equipment manufacturers have already demonstrated a capability of, or interest in, developing multiline read equipment. ELSAG, the original manufacturer of the single-line read equipment which Pitney Bowes is supplying to the Service, has already built two-line read equipment in Europe which can read the street address. According to a French postal official, France is testing this multiline capability in one city. Italy also has equipment which can read the street address, and it plans to begin using this capability in 1983. The ELSAG two-line read equipment and the Pitney Bowes single-line read equipment have shown that they have the potential, with modifications, to read the entire address, as the REI equipment now does. Two other OCR equipment manufacturers told us they could also modify their equipment to read the entire address if they were given contracts to do so.

The Service is not currently interested in obtaining proposals from Pitney Bowes or other companies to build multiline equipment because it believes these contractors could not develop and test multiline read equipment in time for the Phase II acquisition of OCR equipment.

Conclusions

Unlike the single-line read equipment, the multiline equipment can sort to the individual carrier without a nine-digit ZIP Code. However, further, competitive testing is needed to determine whether this equipment could be cost

Directory, the Service performed an accuracy audit, concentrating on city and selected noncity delivery zones. 3/ An audit of omitted noncity delivery zones began in the summer of 1981 and was expected to be completed by the fall of 1981. The audit had not been completed as of November 1982. While we have not verified the accuracy of either audit, the Service was taking less procedural care in auditing most noncity delivery zones than it had in auditing city and selected noncity delivery zones. Because of this lack of procedural care, it is uncertain whether the Service's goal of producing a 99-percent accurate National ZIP + 4 Directory has been achieved.

The completeness of the National Directory--that is, whether it includes all addresses--can be gauged by matching actual addresses against the directory. Although they are not conclusive, indications from several firms which matched addresses suggested that the directory is reasonably complete.

The Postal Service is now facing the difficult task of keeping the National ZIP + 4 Directory current and has established the Address Information Systems unit to maintain the directory. Crucial to the updating process is information provided by mail delivery units. Personnel in these units, however, generally lacked the understanding of the ZIP + 4 program which is essential to promoting proper file maintenance. To overcome this deficiency, the Service has instituted training for delivery unit managers. We believe other delivery unit employees should also receive structured ZIP + 4 program and maintenance indoctrination.

How the Nation was assigned ZIP + 4 codes

During fiscal years 1980 and 1981, the Postal Service planned for and completed the coding of the Nation. This involved dividing the Nation into small geographic units--for example, a side of a street, a business location, a commercial or apartment building, floors and offices within buildings, ranges of apartment units, and post office boxes--and assigning a four-digit code to each unit. In most cases, these four digits were added to the existing five-digit ZIP Code. The sheer size and dynamics of the Nation, together with the necessity to pinpoint small geographic units, made the coding an enormous and complex task, as suggested by the increase in ZIP Codes. The number increased from 40,600 five-digit codes to

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3/A delivery zone is an area enclosed by five-digit ZIP Code boundaries. A city delivery zone is an area that has a population of 2,500 or more, or more than 750 possible deliveries. These zones receive carrier delivery of mail addressed to residences and businesses. All other delivery zones are defined as noncity delivery areas.

CHAPTER 5
BUSINESS MAILERS' DECISIONS ON USING ZIP + 4 AWAIT RATE INCENTIVE AND INFORMATION

The Postal Service has targeted ZIP + 4 to the business community [1]/ and must provide adequate inducements for businesses to adopt it. One inducement must be the assurance of an accurate National ZIP + 4 Directory. Although the extent of the directory's accuracy is uncertain, early and limited tests made by mailers and the Postal Service were encouraging.

The Postal Service is providing certain services to help businesses convert to ZIP + 4, and these services appear conceptually appropriate. The Service, however, should provide more and clearer information about the program to assist businesses in deciding whether to use ZIP + 4.

Whether businesses would use ZIP + 4 is essentially an economic decision, and too many unknowns exist today for many businesses to make a firm decision. Many businesses are waiting to see what postal rate incentive--if any--will be offered and what other mailers will decide to do.

In order for the Postal Service to achieve maximum possible savings from ZIP + 4, businesses of all sizes must use ZIP + 4, and householders must use their nine-digit ZIP Codes in corresponding with businesses. Use of nine-digit ZIP Codes on household-to-household mail would result in some savings to the Service, but it is not critical to the success of the ZIP + 4 program.

ACCURACY OF NATIONAL ZIP + 4 DIRECTORY IS UNCERTAIN BUT EARLY INDICATIONS ARE FAVORABLE

The Postal Service has completed the mammoth task of "coding the Nation"; that is, assigning a ZIP + 4 code to every known address in the Nation. [2]/ The Service's goal in assigning the codes was to produce a 99-percent accurate National ZIP + 4 Directory. After assigning the codes and before issuing the first version of the National ZIP + 4

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[1]/As stated earlier (see p. 2), the Postal Service's definition of the term "business mailer" includes "standard business organizations, professional services, churches, schools, governments, etc."

[2]/Individual codes were generally assigned to clusters of addresses rather than to each address. See chapter 2 for more information about the ZIP + 4 code and how the Postal Service would use it to process mail.

99-percent accurate, at least 10 percent of the zones did not pass audit until additional corrections were made.

Accuracy of ZIP + 4 coding in noncity delivery zones uncertain

After the Nation's addresses had been assigned ZIP + 4 codes, audits were performed to verify the accuracy of the assigned codes and related address information. The audits were conducted by selected coders, using address information and coding maps developed during the coding process. The verification was important because the accuracy of the four-digit add-on code cannot be checked any other way. The Service audited city and selected noncity delivery zones, which account for the bulk of the ZIP + 4 codes. However, these audits did not cover all noncity delivery zones. While the Service was auditing the omitted noncity delivery zones during our review, the audits were being performed using different procedures and inconsistent sampling methodology among postal regions. Because of these inconsistencies in auditing noncity delivery zones, the overall accuracy of the National ZIP + 4 Directory is uncertain.

The Postal Service developed a Service-wide statistical sampling plan and audit procedures for performance of the coding audit. The sampling plan provided the methodology that was to be used to select ZIP + 4 records for coding audit. The plan was designed so that no single delivery zone with an error rate greater than 1 percent would pass audit. The plan was also designed to provide coverage of all delivery zones, both city and noncity.

The Service, however, did not follow the Service-wide sampling plan or audit procedures for most noncity delivery zones. Most noncity delivery zones were not audited initially because the Service believed more problems would occur in city delivery zones, which account for the bulk of the ZIP + 4 codes. The Service, after issuing the first ZIP + 4 directory tapes, began audits of those noncity delivery zones not previously audited. However, unlike the city delivery audits, completion of the audits was not tracked by Postal Service Headquarters, nor did the headquarters establish uniform audit procedures for use Service-wide. Instead, each postal region was given the responsibility for developing its own audit procedures for noncity delivery zones. As a result, the procedures varied and the original sampling plan has not been consistently used. Since the Service neither established uniform audit procedures nor consistently followed its original sampling plan during its audits of most noncity

32.6 million nine-digit codes. [4]/ This is a total of 803 times the original number.

The Postal Service performed several preparatory operations prior to coding. For example, it:

--Tested coding procedures in five cities.

--Acquired and/or prepared maps for every five-digit ZIP Code zone.

--Identified businesses receiving an average of at least 10 pieces of letter-size mail on a daily basis, commercial and apartment buildings, number of floors within buildings, office and apartment number ranges, and post office box sections.

--Updated address information from the Carrier Route Information System, which became a basis for a part of the ZIP + 4 directory.

The actual coding of the Nation took approximately 9 months and the efforts of over 800 postal employees, called "coders," who received formal training on coding procedures. These coders worked in teams of two or more, coding the Nation on a zone-by-zone basis. The general steps coders were to take are as follows:

--Identify and number "segments" and "sectors" on coding maps.

--Assign unique four-digit add-ons to businesses receiving an average of at least 10 pieces of letter-size mail on a daily basis.

--Record this information on computerized address listings, which were used to develop the ZIP + 4 directory.

--Update computerized address listings and verify each line on the new listings with the coding maps.

--Correct, change, update, and verify coding data until the number of errors found and corrected was less than or equal to 1 percent.

Once the coding process had achieved what was believed to be a 99-percent level of accuracy, the zone was ready for audit, the next step. Even though coding was believed to be

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[4]/The Service's initial ZIP + 4 directory contained approximately 20.7 million records (that is, lines of address information). Some records, however, contain more than one ZIP + 4 code.

We also manually matched the mailing addresses of 175 GAO employees located throughout the country to the ZIP + 4 directory. Working with the Service, we were able to accurately locate 96 percent of the addresses in the directory. Each address not located in the directory was verified by the GAO employee who resided at the address and by the Service's Address Information Systems personnel.

The Service has matched both its five-digit ZIP Code and Carrier Route Information Systems directories, via computer, against the ZIP + 4 directory. The Service's match of the five-digit ZIP Code and ZIP + 4 directories revealed that the ZIP + 4 directory contained approximately 230 invalid five-digit ZIP Codes. The invalid codes represented less than 1 percent of the approximately 40,600 five-digit codes used nationwide. When the Service matched addresses from the Carrier Route Information System with the National ZIP + 4 Directory, about 12 percent of nearly 9 million Carrier Route System addresses could not be located in the directory. One apparent reason for the nonmatches was the Service's use of "fabricated" addresses. (The Carrier Route Information System contains street address ranges and, for matching purposes, the Service created individual addresses from these ranges. Whether the created address actually existed was unknown.) The Service did not compile data as to which directory--Carrier Route or ZIP + 4--caused the nonmatches.

The Postal Inspection Service examined the accuracy of the Address Information Systems files (Carrier Route Information System, five-digit ZIP Code, and ZIP + 4 directories) and the Official Distribution Schemes for selected delivery zones in 15 cities. Using a manual comparison of the Address Information Systems files and the Official Distribution Schemes, the Inspection Service concluded that 11 of the 15 cities had files that were reasonably accurate or better. The four remaining cities--Chicago, Denver, Minneapolis, and San Francisco--were identified as having files that contained a significant number of discrepancies. However, because the Inspection Service did not specify which of the three files contained the erroneous information, whether errors existed in the ZIP + 4 file at the time of the audit is uncertain.

At the request of the Address Information Systems Division, the Inspection Service, 3 months after its initial audit, performed a second accuracy audit of the Address Information Systems files in the four cities where problems had previously been found. The Inspection Service reported that the files in the four cities showed a marked improvement over those previously audited. According to Inspection Service data, the second audit showed that the ZIP + 4 directory in each of the four cities had an accuracy rate of 97 percent or better.

delivery zones, it is not certain whether the directory, overall, is at least 99 percent accurate. [5]/

Limited address matching suggests that the National ZIP + 4 Directory is reasonably complete

Although not all were statistically valid, tests suggest that the ZIP + 4 directory is reasonably accurate. We and three firms which had large address files matched actual addresses against the directory and found it reasonably accurate in terms of completeness. That is, the addresses that we and the mailers matched were generally in the directory. In addition, the Service matched its other Address Information Systems files and the Official Distribution Schemes against the directory and said that it found the directory reasonably accurate. While it is uncertain whether the Service met its overall goal of producing a 99-percent accurate ZIP + 4 directory, these tests did not indicate that major problems existed with the completeness of the directory. Also, the Service has made corrections to the ZIP + 4 directory as errors have been identified.

We contacted three firms which had large address files and which had matched varying portions of their address files, via computer, against the ZIP + 4 directory. Officials with each of the firms reported that the portions of the ZIP + 4 directory they reviewed were at least 95-percent complete, although two of the firms, during the matching process, found either missing and incomplete apartment ranges or inconsistent abbreviations. The officials believed these problems were minor and would be corrected as the Service updated the ZIP + 4 directory. (Both firms used the initial--June 1981--version of the ZIP + 4 directory tapes. See p. 92.)

In addition to matching addresses, the third firm checked for its own purposes, via computer, each record in the June 1981 version of the ZIP + 4 directory tapes. The firm found what an official believed to be more than minor problems in the directory tapes such as missing street names and incomplete four-digit add-ons. However, after analyzing the December 1981 version of the ZIP + 4 directory tapes, the official concluded that most of the problems had been corrected.

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[5]/We reviewed the Service-wide sampling plan and audit procedures which were used to audit city and selected noncity delivery zones, but not the actual audit work and its results. We believe, on the basis of our limited review, that if the preparatory operations, code assignments, sampling plan, and audit procedures had been followed in every delivery zone, the Service could have met its goal of producing a 99-percent accurate National ZIP + 4 Directory.

Update information from delivery units is critical to proper maintenance of the ZIP + 4 and other Address Information Systems. Delivery units managers are responsible for providing update information in an accurate and timely manner. Audits performed in two postal regions by the Address Information Systems personnel disclosed that, due to a lack of training, delivery unit managers were often unable to accurately read and understand ZIP + 4 maps and/or computer listings. These documents are used to update the ZIP + 4 directory.

A training segment on ZIP + 4 file maintenance has been established at the Postal Management Academy for both postmasters and delivery unit managers. In addition, plans were being made for Address Information Systems personnel to teach delivery unit managers how to read ZIP + 4 maps and computer listings. According to a postal official, unless delivery unit managers are given this training it will be impossible to keep the ZIP + 4 file current.

Training of postmasters and delivery unit managers should improve ZIP + 4 updating. It is essential, however, that all delivery unit employees (clerks, carriers, and their supervisors) who will be directly or indirectly involved in ZIP + 4 maintenance understand the ZIP + 4 program and the importance placed on the timely and accurate submission of update information. The Service should ensure that these employees receive the necessary indoctrination. 6/

Letter carriers could be a source of accurate and timely ZIP + 4 update information. For example, the amount of mail a firm receives daily could increase to the level where the firm would be eligible for its own unique ZIP + 4 code. In such an instance, the letter carrier would be the first postal employee to notice the increase and could inform the appropriate postal supervisor.

This point was demonstrated by the Postal Inspection Service during an audit of the ZIP + 4 directory. Although not using a statistically valid sample, the Inspection Service asked at least 50 percent of the letter carriers in three cities to identify the firms on their routes which received a sizeable volume (20 or more pieces daily) of letter mail. Comparing the responses with the ZIP + 4 directory, the Inspection Service determined that approximately 30 percent of the firms identified by the carriers were not listed in the directory as having unique nine-digit codes. However, in accordance with the ZIP + 4 File Maintenance Procedures at the

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6/Delivery unit personnel should receive the indoctrination for public relations purposes as well. Letter carriers, for example, would undoubtedly be asked questions about the ZIP + 4 program by postal patrons.

Another check of the ZIP + 4 directory's accuracy was performed by the contractor that will provide the toll-free telephone service for the ZIP + 4 program (see p. 93). To provide the toll-free telephone service the contractor had to develop an automated ZIP + 4 inquiry system using the National ZIP + 4 Directory. As a part of this development process the contractor reviewed the ZIP + 4 directory to ensure that each ZIP + 4 record contained all necessary data elements (such as complete addresses and valid five-digit ZIP Codes) and no obvious errors (such as transposition errors in street and apartment unit ranges). The contractor, during its initial review of the ZIP + 4 directory, identified errors in approximately 380,000 ZIP + 4 records. These records represented a ZIP + 4 directory error rate of 1.9 percent. Many of the errors were apparently due to inaccurate five-digit ZIP Codes. As of November 1982, the Postal Service had reduced the number of ZIP + 4 errors to approximately 42,000, or less than 1 percent of the ZIP + 4 directory.

To further examine the ZIP + 4 directory's completeness, the Service plans to match, via computer, its employee address files against the ZIP + 4 directory and determine the reasons for any nonmatches. The Service's employee files contain the addresses of over 600,000 postal employees located throughout the country. While this approach will not directly gauge the accuracy of the entire ZIP + 4 directory, it may provide an indication of the directory's completeness. The Postal Service expects the results of the match and resolution of nonmatches to be available in February 1983.

Maintenance training for delivery unit personnel would help ensure the directory's accuracy

The Postal Service had identified problems in updating its Address Information Systems, which consist of the National ZIP + 4 Directory, Carrier Route Information System, and the National Five-Digit ZIP Code Directory. A cause of the problems, according to the Postal Service, is a lack of knowledge at the delivery unit level concerning file maintenance procedures.

The Service established Address Information Systems units at the management sectional center level to ensure proper Address Information Systems maintenance. These Address Information Systems units had only recently been established at the time the above problems were identified. With additional operating time, Address Information Systems units should improve file maintenance.

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

B-206332

To the President of the Senate and the
Speaker of the House of Representatives

This report assesses automated mail processing equipment the U.S. Postal Service is buying and the nine-digit ZIP Code system (ZIP + 4) the Service plans to implement.

We made this review at the joint request of nine Members of Congress. (See appendix I.) However, we are issuing the report to the Congress, rather than to individual requesters, in view of (1) widespread congressional interest in the ZIP + 4 issue, (2) congressional actions delaying implementation of the ZIP + 4 system, and (3) the decision of the fiscal year 1981 budget reconciliation conference committee to request the General Accounting Office study of ZIP + 4.

Certain issues discussed in the report remain unresolved. As events of the next several months unfold, we intend to do additional work and report to the Congress regarding results of (1) the Service's equipment performance tests and (2) an evaluation of recent Postal Service market research on potential mailer usage of ZIP + 4.

We are sending copies of this report to the congressional requesters; other interested Members of Congress; the Director, Office of Management and Budget; and the Postmaster General.

Charles A. Bowsher

Comptroller General
of the United States

time of the Inspection Service's audit, firms receiving a minimum of 10 pieces of letter size mail per day qualified for unique ZIP + 4 codes. (In connection with the assignment of unique ZIP + 4 codes, a postal official, in commenting on our draft report, said measures had been taken to ensure that all eligible firms are assigned unique ZIP + 4 codes. One of these measures is checking with letter carriers.)

CONVERSION ASSISTANCE APPROPRIATE BUT SHOULD BE MORE FLEXIBLE

To promote the conversion to ZIP + 4, the Postal Service plans to provide mailers several means through which they can obtain ZIP + 4 codes. All of the means appear conceptually appropriate. One, however, should be made more flexible and possibly continue for a longer period of time to aid a greater number of mailers who may want to use ZIP + 4.

A brief description of each of the means follows:

--The ZIP + 4 directory on computer tape, available on either a national or State-by-State basis. The tapes have been available since June 1981 and are loaned without charge.

--A toll-free "800" telephone inquiry service to provide a maximum of three ZIP + 4 codes per call. Although businesses and householders could both use the telephone service, it was designed primarily for householders. (This service was discussed earlier on pp. 28 and 29.)

--A one-time list conversion service for mailers who have 500 or more addresses which are maintained manually. Under this program, the Service would "look up" the appropriate ZIP Codes for the mailer. However, a gap in postal assistance would exist for mailers with fewer than 500 addresses but too many to make practical the use of the telephone service. To qualify for this service, these mailers would have to combine their lists with other mailers to meet the 500 minimum.

--The licensing of firms to provide and sell various ZIP + 4 directories in printed and micrographic form. A directory could cover, for example, the Nation, a State, or a metropolitan area. The Service currently licenses firms to sell five-digit ZIP Code directories.

Each of the above means is directed to a particular group, with the computer tapes directed to volume mailers, the Service's primary ZIP + 4 target group.

A toll-free telephone service: justified from a public service standpoint

The Postal Service believes that after the ZIP + 4 program begins, householders and businesses will telephone local postal facilities to request ZIP + 4 codes. While the volume of such requests is difficult to forecast, we have no doubt that such calls would be made. We believe that if the ZIP + 4 program is implemented, a telephone inquiry service will be appropriate and desirable as a public service and as a means of encouraging the use of ZIP + 4. However, concern has been expressed by businesses and members of Congress about the cost effectiveness of the program and the adequacy of the telephone service's call capacity.

Today, nearly 20 years after the ZIP Code program began, the Service receives thousands of local telephones calls daily from businesses and householders requesting five-digit ZIP Codes. Most post offices have a printed ZIP Code directory for use in answering these calls. The printed National ZIP + 4 Directory is expected to contain approximately 57,000 pages, compared with approximately 1,800 pages of today's five-digit directory. Therefore, the national directory would be impractical for postal employees to use in answering telephone inquiries. Also, because of the directory's size and cost, the Service does not plan to place directories in post office lobbies (as it now does the five-digit directory).

In May 1981, the Service awarded a contract to First Data Resources, Inc., to answer up to 100,000 telephone calls daily (16 hours) from businesses and householders requesting ZIP + 4 codes. The service is intended primarily for householders, although a Postal Service study indicated that businesses call requesting five-digit ZIP Codes much more frequently than householders.

The 100,000-call capacity was based on statistically questionable data--the volume of calls requesting five-digit ZIP Codes received by post offices in six cities. 7/ The number of calls was sampled to determine the average daily number of calls per 100 persons in the six cities. This ratio was then projected to the population nationwide. However, the populations of the six cities may not be statistically representative of the Nation's general population. Nevertheless, Service officials believed another study was unnecessary

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7/The six cities were selected because they had automated ZIP Code retrieval systems. Post offices in eight cities have automated systems today. The offices are linked to computers at bulk mail processing centers. These computers could not accommodate the National ZIP + 4 Directory without modification.

because, they said, no correlation exists with certainty between the number of calls received currently and the number that would be received under the ZIP + 4 program. They said that because the estimate was inherently "soft", flexibility was built into the contract to double the call capacity in 90 days if necessary.

The planned system could not be extended much beyond 200,000 calls unless additional measures were taken, including adding more equipment. The Service, in commenting on our draft report, said it will track call volume and evaluate the need to increase total call capacity to maintain appropriate service levels.

However, the Service suggested that total call capacity may not need to be expanded. It said the number of calls received will be greatly influenced by the actions postal management takes to generate telephone inquiries. And, because ZIP + 4 is intended primarily for business use, the Service does not intend to aggressively promote the telephone service among householders.

After the telephone service becomes operational, the contract cost will be determined, in part, by the number of calls received each day. [8]/ Charges will be based on a sliding scale, with the cost per call decreasing as the volume of calls increases. At the time of contract award, the operating cost would have been approximately $42 million if 100,000 calls for ZIP + 4 codes were received every day for 3 years. However, the operating cost is affected by changes in the tariff for telephone lines. Because of actual and anticipated tariff changes, the Service, in July 1982, estimated the potential operating cost would be over $60 million if 100,000 calls were received every day from January 1983 through September 1985.

Postal officials told us that because of the escalating cost of the telephone service, alternative concepts for providing a similar service at a lower cost would be evaluated. The Service expected to decide what course to take by fiscal year 1985, the final full year of the current contract. The contractor was scheduled to have the toll-free lookup service developed by January 1983, and postal management will decide later when the Service will be available to the public.

As will be discussed later, studies have shown that householders are willing to use the ZIP + 4 code. It will also be shown later that, although not critical to success of

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[8]/The cost to establish the system was approximated at $1 million. The system would be used for both the telephone inquiry service and the one-time, manual-list conversion service.

the ZIP + 4 program, householders' use of their correspondents' ZIP + 4 codes would help reduce the Service's processing costs. If ZIP + 4 were implemented, one way the Postal Service could encourage household use would be to make available an easy and direct way to obtain needed ZIP + 4 codes. On the other hand, we believe householders would be understandably frustrated and angered if they called the Postal Service and were told they could not be provided requested ZIP + 4 codes. Such a response would also discourage--or at least lessen--the use of ZIP + 4 on general correspondence (such as individual letters) sent by businesses.

One-time, manual-list conversion service is too limited

The one-time, manual-list conversion service will be available to mailers (businesses and householders) who submit 500 or more addresses and whose lists meet certain criteria. This service was designed essentially to aid small businesses which maintain address files by manual (or a combination of manual and mechanical) means. The requirement of 500 or more addresses is based on the Service's proposed criterion of 500 or more First-Class letters to qualify for a ZIP + 4 rate incentive. ZIP + 4 codes for manual-list addresses will be "looked up" by the same contractor who will operate the toll-free telephone service.

We believe greater flexibility should be built into the conversion service and that close monitoring should occur to ensure that any significant increase in the workload can be handled without unreasonable delays. The Service said it planned to receive weekly reports from the contractor to monitor workload.

If the ZIP + 4 program is implemented, the scope of the manual-list conversion service should be broadened to allow more businesses to convert their address files to ZIP + 4. Enlarging the scope would allow the Postal Service to maximize ZIP + 4 benefits. The following presents two examples of changes needed to encourage the use of, or broaden, the conversion service:

--The list conversion service was developed to aid businesses with noncomputerized address files. However, some businesses, including smaller ones, have acquired or are acquiring minicomputers which are unable to use the National ZIP + 4 Directory tapes. For example, one mailer, who said he had approximately 15,000 addresses and mailed 20,000 pieces of metered First-Class Mail in 1981, told us that he had requested the ZIP + 4 directory tapes only to find that his minicomputer could not use them.

The Postal Service will accept address lists generated by minicomputers as long as the list submission criteria are met. Postal Service literature on the ZIP + 4 program should be amended to clarify that address lists generated by computers too small to use the ZIP + 4 directory tapes can be submitted under the manual-list conversion service. For example, Postal Notice 186 (dated January 1982), "ZIP + 4 WHAT'S IN IT FOR BUSINESS MAILERS," says a one-time list conversion service will be offered for mailers with manually maintained lists. A handout at the September 1982 Postal Forum said only that "non-computerized mailers" will be able to convert their address files by using the manual-list conversion service. To encourage conversion to ZIP + 4, the Service should make clear that address lists generated by small computers can be submitted under the list conversion service.

In commenting on our draft report, the Service agreed. It said that the "noncomputerized" criterion will be changed to the term "machine generated." The new term, the Service said, will include address lists printed by minicomputers, word processors, and typewriters. It will not include large computerized address lists that are more efficiently updated through use of the ZIP + 4 directory tapes.

--The list conversion service would not be available to businesses with less than 500 addresses unless two or more businesses' address lists were combined to meet the 500 minimum. Short of combining their address lists with those of other businesses, businesses with less than 500 addresses which wanted to use ZIP + 4 would have to obtain codes through (1) the toll-free telephone service, (2) the purchase and use of a ZIP + 4 directory in printed or micrographic form, and/or (3) mail received from correspondents. Codes could be obtained gradually over time or all at once.

Postal management wants to target the list conversion service to businesses with 500 and more addresses because they would be eligible for the proposed ZIP + 4 rate incentive and, therefore, would be more likely to convert to ZIP + 4.

We believe that if a business with less than 500 addresses wanted to simultaneously convert all of them to ZIP + 4, the Service should encourage its doing so by making the list conversion service available. A senior postal official said that there was no reason why the Service could not eventually provide the manual-list service to businesses with less than 500 addresses.

The list conversion service would be provided to a business only once. After that, the business would be expected to use other means (such as mail from correspondents) to keep its changing address files updated with ZIP + 4 codes. However, local postmasters would have the discretion to update a business' address list and to provide the codes for the less-than-500 address list. We believe that rather than leaving this service to local discretion, the Postal Service should establish a consistent policy.

The Service plans to track the volume of addresses received the first year the manual-list service is available and then decide whether it should continue beyond that year. (The Postal Service currently has a 3-year contract to provide the service.) We believe a longer observation period is necessary before a decision is made because some businesses which would use the service may take a wait-and-see approach to ZIP + 4, as suggested by the responses to our questionnaire (see pp. 106 and 109). Moreover, the manual-list service may be needed beyond the 3-year contract period if householders are not informed of their ZIP + 4 codes and cannot, therefore, assist business mailers in keeping their address lists current. As of November 1982, the Service was uncertain about whether it would notify households of their ZIP + 4 codes.

The Service's contractor will look up as many as 70,000 manual-list addresses a day. Whether this look-up capacity would be adequate to handle the number of addresses the Postal Service would receive is uncertain. However, the contractor would have the capacity to handle more addresses. As the contract is written, the contractor's equipment would be scheduled for use only 16 hours each day. This leaves an additional 8 hours that could be made available if the contract were modified. A contractor's representative said he believed, from a conservative viewpoint, that the contractor could easily handle at least 150,000 manual-list addresses per 24-hour day.

The Service, in commenting on our draft report, said the one-time rule for updating address lists was not intended to indicate an inflexible position for the future. Although mailers should continue to assume responsibility for address file maintenance, the Service would be willing to consider multiple requests based on valid customer needs.

BUSINESSES HAVE TAKEN A WAIT-AND-SEE POSITION

Essential to the success of the ZIP + 4 program is its use by the Nation's businesses, especially those which send First-Class Mail in volume. To use the expanded codes, businesses must add them to their address files and, in many cases, make other changes. This means an out-of-pocket expense. In deciding whether to use ZIP + 4, businesses must

weigh their overall costs to adopt ZIP + 4 against benefits perceived.

Because of cost considerations, there appears little likelihood that many large-volume mailers we surveyed would use ZIP + 4 without an adequate rate incentive (also referred to by many as a postage discount). Conversion costs among businesses we surveyed varied widely.

Most of the large-volume mailers we surveyed, who were in the Service's prime ZIP + 4 target group, had taken a wait-and-see approach toward ZIP + 4 use. They said they would decide after the rate incentive was known, or after the program began, or both. Some businesses, however, voiced either strong support for or opposition to the ZIP + 4 program.

On the basis of what businesses told us, it appears that a need exists among mailers for more and clearer information about the ZIP + 4 program--what it will do and what businesses will be required to do, for example.

All of this suggests that the Postal Service has some distance to go to induce businesses to adopt ZIP + 4 on a large scale. According to postal officials, the Service has not aggressively promoted ZIP + 4 since the summer of 1981 in order to comply with the intent of the 1981 Omnibus Budget Reconciliation Act. The Service now plans to implement programs to further promote ZIP + 4 among businesses.

Many among the prime ZIP + 4 target group are undecided

We sent a questionnaire to approximately 400 large-volume mailers of First-Class Mail to learn their views of--and possible costs associated with--the ZIP + 4 program. (See app. XIII for the questionnaire, and app. XII for details on how we obtained the sample of large-volume mailers.) Questionnaire recipients are among the businesses which the Postal Service would turn to first for use of the ZIP + 4 code. We surveyed this group because program success would be difficult to achieve--if not unlikely--without their participation.

Of the approximately 400 questionnaires we mailed, we received 315 usable responses. The respondents, generally, had mailed one million or more pieces of First-Class Mail in 1981, and had some or greater familiarity with the ZIP + 4 program. Most were from four different business categories--utilities, banking (including savings and loan institutions), retail trade, and insurance.

Questionnaire respondents perceived both possible advantages and disadvantages in using ZIP + 4, although a sizeable

--The organization will believe the ZIP + 4 program when it sees it.

More and clearer information about the ZIP + 4 program is necessary

Although most respondents believed the information they received from the Postal Service explained the ZIP + 4 program satisfactorily [15], some respondents' comments suggest that the Service still needs to provide mailers more and clearer information about the program.

For example, as reported earlier (see p. 100), some respondents incorrectly believed all ZIP + 4 mail would be delivered faster. Some respondents said they wanted more information. We asked questionnaire recipients whether they had any comments or suggestions to make regarding the ZIP + 4 program. Of the 106 respondents who provided comments or suggestions, about 19 percent said they wanted more or clearer information or their comments indicated such a need. [16] Some of the comments made about information follow.

--"Please discuss how the nine-digit ZIP might replace P.O. Boxes or Unique ZIPS. How would the mail be presented to us by the Post Office?"

--"Clear and thorough information from the Post Office would be helpful on the specifics of the program."

--"We have not received sufficient information about the nine-digit ZIP Code pros and cons to make a truly informed decision either to convert or not convert."

--"We hope the USPS will address and resolve the many specific questions raised at various meetings and seminars around the country far enough in advance of implementation of ZIP + 4 for intelligent decisions to be made regarding participation in the program."

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[15] About 275 respondents had received information from the Service explaining the ZIP + 4 program. The questionnaire asked recipients to rate the information in terms of its explaining the program. Of the 275, 75 percent rated the information satisfactory or very satisfactory, 18 percent rated it neither satisfactory nor unsatisfactory, and 7 percent rated it unsatisfactory or very unsatisfactory.

[16] Other comments made, for example, supported the need for a postage rate incentive for ZIP + 4 use and outlined assistance the Service should provide. Of these 106 respondents who commented, about 11 percent made comments favoring ZIP + 4 and about 11 percent made comments opposing it.

reduction in the organization's postage costs. Listed as an advantage by 64 percent of the 155 respondents who cited possible advantages, the rate incentive was the most cited advantage.

--Improved mail service. This category included such improvements as a reduction in missorted mail, more accurate mail delivery, and faster mail delivery. Some respondents commented that quicker delivery of statements to and payments from customers would improve their cash flow. Improved mail service was cited by about 51 percent of the respondents who cited an advantage.

Faster mail delivery was frequently perceived as an advantage of the ZIP + 4 program. One respondent, in explaining faster delivery, said mail would get to the letter carrier quicker because postal automation would speed up mail processing. While not all respondents explained their perceptions of faster delivery, the Postal Service does not claim ZIP + 4 would produce faster service. According to the Service, automation and ZIP + 4 would enable it to process mail more efficiently. That efficiency would result in cost savings but would not cause ZIP + 4 mail, in general, to be delivered faster. Automation and ZIP + 4 would, however, reduce the number of letters sorted to the wrong destination and therefore enable such letters to be delivered on time. (See pp. 127 to 129 for further discussion on the question of faster delivery.)

--Improved internal sorting of incoming mail by businesses. The Postal Service may assign a business two or more ZIP + 4 codes at a single location, depending on the volume of incoming letter size mail. The business which receives multiple codes could use them to identify internal organizational units that receive mail. This use, the respondents indicated, would enable more efficient internal sorting of incoming mail. Some respondents commented that they would use machines to read the barcoded ZIP + 4 number on the incoming mail. About 22 percent of the respondents who listed one or more possible advantages cited improved internal sorting of incoming mail.

--Reduced amount and/or frequency of future rate increases. About 22 percent of the respondents who cited possible advantages agreed with the Postal Service that ZIP + 4 should help the Service hold down its operating costs and, in turn, reduce the amount and/or frequency of future postage rate increases.

--Other. Of the respondents who cited possible advantages, about 22 percent [10]/ listed one or more other possible advantages. These advantages included use of ZIP + 4 information to (1) help identify geographic areas for marketing purposes when the information is combined with demographic data, (2) provide increased security over mailed negotiables through less handling (3) improve the dispatching of delivery trucks to customers' homes, and (4) update address files when such files are converted to ZIP + 4.

Some respondents were uncertain about advantages or perceived none

Of the 286 respondents who were familiar with the ZIP + 4 program, about 21 percent said they were uncertain about possible advantages, if any, the nine-digit ZIP Code offered their organizations. Another 25 percent perceived no advantages in ZIP + 4 use. One explanation for the uncertainty about or lack of perceived advantages may rest in the degree of familiarity the respondents had about the ZIP + 4 program. The greater the familiarity, the more likely respondents were to cite possible advantages.

Cited disadvantages of using ZIP + 4

Whereas 54 percent of the respondents claiming familiarity with ZIP + 4 perceived possible advantages in its use, about 75 percent perceived one or more possible disadvantages. About 9 percent perceived no disadvantages, while another 16 percent were uncertain about possible disadvantages.

The larger percentage of respondents who perceived disadvantages is not surprising. Businesses generally know they would incur some cost to use the ZIP + 4 code. Among the possible disadvantages respondents cited, costs and cost implications were emphasized most often.

The possible disadvantages most frequently cited by respondents fell into the following categories (figures shown are the approximate percentages of respondents whose answers fell into each category):

--The costs associated with the changeover to ZIP + 4. (55 percent)

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[10]/The percentages provided for the five categories do not add to 100 because some respondents listed advantages that fell into more than one category.

--The tasks or changes necessary to convert address files (for example, expansion of computer records to accommodate the longer ZIP Code and changes to computer programs which utilize converted files). (25 percent)

--Problems and costs in maintaining or using files after conversion (for example, the cost to periodically add the code to new accounts or changed addresses). (24 percent)

Other possible disadvantages were cited but with less frequency. The categories included:

--The need to change (or reformat) letterheads, envelopes, forms, and/or computer-generated reports.

--The greater chance for error in using a longer ZIP Code.

--The need to train employees to use the ZIP + 4 code.

--The possible impact of ZIP + 4 use on First-Class Mail presort programs already in use (for example, the cost of modifying presort equipment to read and sort nine-digit ZIP Code mail and the requirements the Postal Service will impose to qualify for the ZIP + 4 rate incentive when presorted mail is a mix of five- and nine-digit ZIP Coded mail).

Reported conversion costs varied greatly; followup maintenance costs generally unknown

The Postal Service wants businesses to add the expanded ZIP Code to their address files in order to generate large quantities of ZIP + 4 coded mail. The costs that businesses would incur to add the code would depend on many factors, including the number of addresses to be converted and the method used to store the addresses (for example, computerization or mechanization). We asked questionnaire recipients to estimate their costs to add the hyphen and four new ZIP Code digits to those address files that would have a reasonable possibility of being converted.

We received cost information from 141--about 61 percent --of the approximately 230 respondents who could have possibly provided such data. Of the 141, most (about 71 percent) had based their cost estimates on an "educated guess." About 31 percent had based their estimates on studies or some type of conversion experience such as the cost for an outside service firm to add carrier route numbers to addresses. (For analysis

purposes, we placed reported cost data into two groups--studies and educated guesses.) [11]/

Two apparent reasons for the lack of cost data resulting from studies were the uncertain status of the ZIP + 4 program and the expense involved in carefully determining conversion costs. One respondent wrote, for example:

> "* * * detailed planning which would take monies (approx. $25,000) to come up with approximate conversion costs can not be expended nor are we willing to guess on a project of this magnitude."

Our analysis of the cost data received for converting computerized files showed the overall average estimated cost per address to be about 4 to 5 cents. However, the average cost varied by the number of addresses a respondent said he would possibly convert. We divided the number of addresses into two volume categories--fewer than 1.5 million, and 1.5 million and greater. The average cost per address in the large-volume category was much closer to the Postal Service's overall 2-cent estimate than was the average cost per address in the smaller volume category. A wide gap did not appear between costs resulting from a study and those resulting from an educated guess. The table below shows the results of

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[11]/The percentages add to more than 100 percent because some respondents provided both study-based and educated-guess-based costs. That is, for some files, a study was performed (including conversion experience), and for other files, an educated guess was made. In determining the number of respondents who could have possibly provided cost data, we counted those respondents who actually provided cost estimates and those who provided the number of addresses that could be converted but did not provide costs.

our analysis of data received on the cost of converting computerized addresses to the nine-digit ZIP Code. [12]/

	Average Reported Conversion Cost Per Computerized Address	
	Study	Educated guess
All addresses	04 cents	05 cents
Less than 1.5 million addresses reported by respondent	29 cents	32 cents
1.5 million or more addresses reported by respondent	03 cents	03 cents

Relatively few respondents provided estimates of what their annual maintenance costs would be for the nine-digit ZIP Code compared with the five-digit code. Among those who did, the results were mixed. After address files were converted, addresses would be received bearing no nine-digit code, an incorrect code, or a new code. Given such circumstances, we asked questionnaire recipients who estimated their ZIP + 4 conversion costs (see above) to also estimate their costs to keep address files current with the nine-digit code compared with the five-digit code. Of the 64 respondents [13]/ who provided these estimated costs, about 23 percent forecasted no difference between their potential nine-digit and five-digit code maintenance costs. The median difference, however, was about a 100-percent increase to keep files current with nine-digit ZIP codes.

The cost data and analyses presented above must be viewed with caution. The cost estimates we received were not all finely tuned, and some are subject to uncertainties. For example, one respondent listed several address files and provided conversion costs for each of them. However, on the basis of each file's estimated payback period, probably only one file would actually be converted. Moreover, this firm

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[12]/We analyzed only computerized files because few respondents--15 in total--provided cost information on other types of files. The analysis excludes the costs received from six respondents who did not provide the related number of affected addresses.

[13]/Four other respondents provided statements--but no cost figures--to indicate relative maintenance costs. Two of these believed there would be no cost difference or very little. The other two believed the costs for maintaining the nine-digit codes would be much higher than for the five-digit code.

could purchase conversion services or products from an outside company if doing so would lessen overall conversion costs. In another instance, the respondent's cost study was--as the respondent called it--"quick and dirty;" therefore, it may not have included cost items other respondents' studies included.

A rate incentive is critical to ZIP + 4 usage

According to questionnaire responses, the availability of a postage rate incentive is critical to obtaining significant ZIP + 4 usage. Of the 315 questionnaire respondents, about 200 (64 percent) said they would probably not (34 percent) or definitely not (30 percent) use the nine-digit ZIP Code if no rate incentive were offered. 14/

We asked respondents to explain why they would or would not use the nine-digit ZIP Code without a rate incentive. Almost all who said they probably or definitely would not use the expanded code provided explanations. The following answers are similar to and typical of most of the answers received:

--A rate incentive would be necessary to offset or justify the cost to implement or use the ZIP + 4 program.

--The costs to convert to and/or use the ZIP + 4 code would be a concern.

--There would be little or no incentive for or advantage in implementing the program without a rate incentive.

The respondents who gave these and other similar answers appeared to be communicating the same message; that is, that a rate incentive is the key to their use of ZIP + 4, in view of their costs and the absence of other tangible, offsetting benefits.

Fifty-seven respondents (about 18 percent) were uncertain about whether they would use the nine-digit ZIP Code without a rate incentive. When asked to explain why they were uncertain, nearly all of the 57 respondents provided reasons, most of which fell into the following categories:

--The cost to convert to or use the ZIP + 4 code would be a concern.

14/Other (approximately 5 percent) respondents also said they would probably not or definitely not use the ZIP + 4 code without a rate incentive. However, other answers they provided suggest they would not use the code even with an incentive.

--The cost effectiveness of implementing the ZIP + 4 program had not yet been determined.

--The program might be used without an incentive under certain circumstances or for certain reasons (for example, to keep postage rates from increasing; if mail delivery would be expedited; if changeover could occur when convenient and at no cost; or in keeping with a "good citizen" policy).

Thirty-eight respondents (12 percent) said they would probably (10 percent) or definitely (2 percent) use the nine-digit ZIP Code without a postage rate incentive. The most often-cited reason was to gain improved mail service from the Postal Service (some said faster mail delivery).

In commenting on our draft report, the Service said that using ZIP + 4 will have other advantages for businesses besides a rate incentive. It said, for example, that businesses can use the National ZIP + 4 Directory to make their mailing lists cleaner and more productive by identifying nonexistent addresses. It said that a clear understanding of this and other advantages can help influence mailers to get involved in the ZIP + 4 program.

Most respondents were waiting for more information to make their ZIP + 4 decisions

By far, the bulk of the respondents were waiting for more information before deciding whether to add the ZIP + 4 code to addresses used for First-Class Mail. About 72 percent said they would make their decision after:

--The amount of the postage rate incentive was known. (54 percent)

--The program began and others had converted their address files. (13 percent)

--Both of the above had occurred. (5 percent)

In contrast, about 6 percent said they had already added the nine-digit code to some or all of their addresses or would do so regardless of the amount of the postage incentive, if any. Another 5 percent said they did not expect to add the code to their addresses.

About 14 percent of the respondents checked the "Other" category on the questionnaire regarding their position on converting to ZIP + 4. They checked this answer alone or in combination with other answers. It was generally checked alone.

--The organization will believe the ZIP + 4 program when it sees it.

More and clearer information about the ZIP + 4 program is necessary

Although most respondents believed the information they received from the Postal Service explained the ZIP + 4 program satisfactorily [15], some respondents' comments suggest that the Service still needs to provide mailers more and clearer information about the program.

For example, as reported earlier (see p. 100), some respondents incorrectly believed all ZIP + 4 mail would be delivered faster. Some respondents said they wanted more information. We asked questionnaire recipients whether they had any comments or suggestions to make regarding the ZIP + 4 program. Of the 106 respondents who provided comments or suggestions, about 19 percent said they wanted more or clearer information or their comments indicated such a need. [16] Some of the comments made about information follow.

--"Please discuss how the nine-digit ZIP might replace P.O. Boxes or Unique ZIPS. How would the mail be presented to us by the Post Office?"

--"Clear and thorough information from the Post Office would be helpful on the specifics of the program."

--"We have not received sufficient information about the nine-digit ZIP Code pros and cons to make a truly informed decision either to convert or not convert."

--"We hope the USPS will address and resolve the many specific questions raised at various meetings and seminars around the country far enough in advance of implementation of ZIP + 4 for intelligent decisions to be made regarding participation in the program."

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[15] About 275 respondents had received information from the Service explaining the ZIP + 4 program. The questionnaire asked recipients to rate the information in terms of its explaining the program. Of the 275, 75 percent rated the information satisfactory or very satisfactory, 18 percent rated it neither satisfactory nor unsatisfactory, and 7 percent rated it unsatisfactory or very unsatisfactory.

[16] Other comments made, for example, supported the need for a postage rate incentive for ZIP + 4 use and outlined assistance the Service should provide. Of these 106 respondents who commented, about 11 percent made comments favoring ZIP + 4 and about 11 percent made comments opposing it.

When it was checked in combination with other answers, the other answers usually included the need to know the rate incentive. In explaining what they meant by "Other", the respondents often said, in effect, that they were simply undecided or required more information (such as knowledge of "all requirements" or the results of cost-benefit analyses) to decide. Among the remaining explanations, several respondent said, in effect, that

--others (such as other firms that maintain their computerized address files) would have to make or aid in making the decision;

--they did not plan to add the expanded code to their address files (preferred carrier route presort, for example);

--their computerized files were being or would be changed to include the nine-digit ZIP Code.

In addition to the percentages already given, another 3 percent of the respondents provided other combinations of postions regarding conversion to ZIP + 4.

Although we cannot predict how many respondents would ultimately decide to use the nine-digit ZIP Code on their outgoing First-Class Mail, their comments indicate that usage buildup would be gradual, at least for many of them. For some, a rate incentive of 1/2 cent, if established, would provide sufficient benefit to use the nine-digit code on one or more of their address files. For others, a larger incentive amount may be necessary. For example, about 6 percent of the 315 respondents volunteered, in their narrative comments, that an incentive amount greater than 1/2 cent would be necessary to encourage their conversion to ZIP + 4. However, for about 18 percent of the respondents, the decision regarding whether and when to use ZIP + 4 will require more than knowledge of the incentive amount. For example, several respondents made one or more of the following comments (here paraphrased):

--More information about the benefits of using ZIP + 4 is necessary.

--The organization is unlikely to take a lead role in converting to ZIP + 4 but would like to first learn from the conversion problems others faced.

--The organization has not studied all that would be involved in file conversion. It will have a better idea later about what would be involved.

--The organization wants to wait and see how the rate incentive works.

--"Many questions must be answered. For example: Impact on delivery."

--"It is my feeling that projects such as this one should be coordinated with the users to provide a clean understanding of what the goals are. The Postal Service should also listen to the users. As with every new project there is a cost factor involved, and this can't be neglected. You give us a good understanding of this program and offer us a good incentive and we will definitely sit down and discuss it."

By design, the Postal Service did not aggressively market the ZIP + 4 program during the past fiscal year (fiscal year 1982), and not all specifics of the program will be established until the Postal Rate Commission's proceedings for considering the ZIP + 4 subclass are completed. Nonetheless, mailers do need more and clearer information to dispel misconceptions and strengthen their understanding of the program and its potential impact. Such information might reduce the large number of respondents who perceive no advantage to ZIP + 4 use or are uncertain about whether it offers any advantages.

In commenting on our draft report, the Service agreed that mailers need more information on ZIP + 4, but pointed out that it had cancelled aggressive ZIP + 4 education and information programs to comply with the intent of the 1981 Omnibus Budget Reconciliation Act. It said such programs would be reinstated.

The primary messages the questionnaire respondents conveyed about the ZIP + 4 program were that:

--Because of cost considerations associated with conversion to ZIP + 4, an adequate postage rate incentive would be necessary to provide the impetus to convert.

--Generally, they were taking a wait-and-see position on whether and when to convert to ZIP + 4. Primarily, they were waiting to see what rate incentive would be offered, if any.

--Some of them needed clearer and more detailed information about the proposed ZIP + 4 program than they had been provided.

Other businesses which commented were also deferring decision

The questionnaire was also completed by businesses not in our sample group. Personnel from these businesses learned of the questionnaire, obtained a copy, and submitted it--88 useable responses were received. Because the businesses were not

part of an identified universe of businesses, their views must be treated as their own rather than representative of any particular business group.

Among these businesses were some which believed the Congress should not impede ZIP + 4 implementation and some which believed ZIP + 4 should be--in the words of one--"trash canned." The majority, however, said they would make their ZIP + 4 decision at a later date. Twenty-one of the businesses provided the number and estimated conversion costs of computerized addresses which had a reasonable possibility of being converted to ZIP + 4. Costs were usually based on an "educated guess." On a business-by-business basis, the average cost per address for

--seven businesses was under 5 cents;

--six businesses, 5 cents or more but less than 15 cents;

--five businesses, 15 cents or more but less than 30 cents; and

--three businesses, 30 cents to approximately 9 dollars.

Consistent with the pattern of responses from our sample group discussed earlier, the overall average cost per address for those among the 21 businesses that reported 1.5 million or more addresses was significantly lower than the overall average cost for those businesses that reported fewer than 1.5 million addresses. However, use of this finding is subject to caution because of the small number of businesses which provided costs.

The businesses included manufacturers, educational institutions, health care centers, publishers, retailers, banks, insurance companies, utilities, and businesses that provide mailing services. Of the 81 businesses that provided mail volume data, about half mailed less than one million pieces of First-Class Mail in 1981 and half mailed more. Almost all said they had some or greater familiarity with the ZIP + 4 program.

Of the 88 businesses, 85 provided their current position on adding the ZIP + 4 code to their addresses used for First-Class Mail. Approximately 9 percent said they had added or would add the ZIP + 4 code to their addresses regardless of the amount of the rate incentive, if any. Another 9 percent said they did not expect to convert their address files.

Most, however, said they would not decide until after any rate incentive was known (about 32 percent), or the program began and others converted (22 percent), or both (8 percent). Altogether, about 62 percent of the businesses answered in

this manner. Some that said they would wait until others converted may have taken this position because of anticipated or uncertain costs to convert compared with perceived advantages. A manufacturer said to "please forget [ZIP + 4]" because of perceived large conversion costs. The representative of a utility company said the:

> "Cost of converting our present system is too costly at the present time, maybe eventually we will make our decision after the program begins and others will convert and start using it, and if it is advantageous to us."

Neither business provided its estimated conversion costs.

Another 19 percent of the businesses provided other positions or combinations of positions. For example, one business did not expect to convert its addresses but said it would be influenced by the amount of any rate incentive and what others did. Another said not enough information was available to reach a decision. Still another, a mail order photograph finishing firm, said it would be unable to use ZIP + 4 codes unless customers supplied them. (This firm also believed it would be placed at a disadvantage with competitors who had computerized files and received a ZIP + 4 postage discount.) Another, a publishing firm, said it may convert a 12,000-name file of addresses mailed monthly.

Some of the answers and statements made by the businesses suggest that misinformation or insufficient information may have influenced their understanding of the ZIP + 4 program. For example, 22 businesses said ZIP + 4 would speed up mail delivery (not so, according to the Service) or said they were uncertain about advantages of using ZIP + 4. Several said they would make their ZIP + 4 decision after the amount of any rate incentive is established even though they would seemingly benefit little, if any, from an incentive (for example, on the basis of the data they supplied, they would appear to require a very long period to recover estimated conversion costs).

Federal agencies have limited knowledge of costs to convert to ZIP + 4

A major advancement for the ZIP + 4 program would be for the Nation's largest mailer, the Federal Government, to use the ZIP + 4 code. However, on the basis of our discussions with 13 agencies, we believe Federal agencies generally have done insufficient analysis to determine conversion costs and make an informed decision on voluntary ZIP + 4 conversion. At our request, five agencies determined what would be necessary to convert an automated address file and estimated the related cost.

We asked the five agencies to each estimate the cost of converting one of their frequently used computerized address files to ZIP + 4. We did not attempt to obtain conversion costs for all files because of the differences among files within an agency and the time involved to reasonably develop such costs. Moreover, Federal agencies we talked to had generally not done sufficient analysis to fully decide which files, if any, would be converted under a voluntary ZIP + 4 program. (See p. 130 for the Service's position on Federal agencies' use of ZIP + 4.)

The cost estimates we received varied considerably because of file size, file use, and the amount of effort required for conversion. The table on page 113 shows the conversion costs and other information for the five files. The conversion costs per address were well within the range of costs estimated by questionnaire respondents in the non-Federal sector.

In the table, "matching" includes activities such as preparing the file to accept four more digits, comparing each address in the file to those on the National ZIP + 4 Directory tapes to identify the ZIP + 4 code, and inserting the code into the address. The estimated matching costs were relatively small in comparison with other conversion costs because the Postal Service plans to provide Federal agencies with the "software"--computer operating instructions--to compare computerized address files with the ZIP + 4 directory tapes and assign the ZIP + 4 code numbers. This would save Federal agencies money inasmuch as they would not need to develop the software on their own or purchase it from private vendors. The five agencies excluded this expense in developing their computer matching costs. 17/

Other operations associated with converting addresses to ZIP + 4 would account for the major portion of the conversion expense in both money and time. One of the operations which would involve significant effort and cost to agencies would be the analysis and modification of computer programs that use the address files. Agencies use the files for various purposes and have computer programs to search the files for

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17/To help the agencies develop their costs, we provided each a copy of the following Postal Service-prepared documents: "ZIP + 4 National Directory File Definitions" (Revised 6/81), a draft manual on how to use the Postal Service's matching software, and an overview of how the software would work. We also provided, from Postal Service data, information on how long agency computers may be expected to run when using the matching software to convert address files to ZIP + 4.

Five Federal Agencies' Estimated Costs to Each Convert One Address File to ZIP + 4 (note c)

System or file (and responding agency)	Number of addresses	Number of affected programs	Costs: Computer matching costs	Costs: Other conversion costs	Costs: Total conversion costs	Conversion cost per address
Black Lung Beneficiary File (Social Security Administration, Department of Health and Human Services)	481,000	9	$11,113	$10,158	$21,271	$0.04
Federal Employee Retirement Master file (Office of Personnel Management)	1,800,000	50	120,254	a/ 976,527 b/ (52,944)	1,096,781 (173,198)	0.61 (0.10)
Health Insurance Master file (Health Care Finance Administration, Department of Health and Human Services)	40,000,000	651	150,000	247,377	397,377	0.01
Mail List System (Government Printing Office)	2,500,000	160	88,604	186,520	c/ 275,124	0.11
Payroll and Financial Management Information System (General Accounting Office)	36,000	47	15,966	23,011	38,977	d/ 1.08

a/OPM's estimate is relatively high because all but one of the other agencies included none of the following costs: modification of Treasury Department's OPM annuitant file ($22,498); manual resolution of problem addresses ($439,285); updating, over a 5-year period, address changes received without ZIP + 4 codes ($61,800); and replacement of existing stocks of forms if ZIP + 4 implementation requires immediate replacement ($400,000). Whether the other agencies would incur similar levels of costs is unknown.

b/OPM's estimate minus the costs not included by all agencies.

c/Due to the design of its Mail List System, the GPO estimate is based on converting all of the System's 37 address files to ZIP + 4 rather than a single file.

d/Part of the reason for GAO's relatively high per-address cost is the relatively small number of addresses it would have to convert. GAO also included costs to manually resolve problem addresses.

needed information. If a file were changed, each program that searched the file would have to be identified, the impact of the change on the program analyzed, and, if necessary, the program modified. Similarly, if a file to be converted were interrelated with other files, the process of identifying, analyzing, and, if necessary, modifying programs would be required for each affected file. For four of the five agencies in the table above, costs associated with the analysis and modification of computer programs comprised the greater part of the "other conversion costs."

Another major expense associated with other conversion costs could be the cost to obtain ZIP + 4 codes for addresses that do not match the ZIP + 4 directory. How much cost an agency would incur would depend on factors such as the number of nonmatched addresses, the method used to resolve nonmatches, and the amount of resources applied to the effort. For example, OPM, in developing its cost estimate, said that it would use a special mailing to resolve its nonmatches. It would ask annuitants whose addresses were not found in the ZIP + 4 directory to provide their ZIP + 4 codes. Three of the five agencies we surveyed did not consider this cost in their estimates.

The Federal Government's cost to convert address files to ZIP + 4 would vary from file to file and agency to agency. An agency cannot determine its ZIP + 4 conversion costs for computerized address files until a thorough analysis has been performed of its automated address files and related programs. Moreover, an agency must determine the benefits, if any, to be derived from ZIP + 4 use. Once the above analyses are completed the agency can properly assess the cost effectiveness of adding ZIP + 4 codes to its address files. [18]/ In view of Federal agencies' general lack of knowledge and detailed work done to date regarding ZIP + 4 file conversion, the total cost of such a conversion for the entire Federal Government could not be reasonably estimated.

The Postal Service, in reviewing our draft report, said that the estimated conversion costs we received from some agencies appeared to be overstated. It said further that ZIP + 4 had a myriad of potential uses for Federal agencies that should be pointed out; for example:

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[18]/In some cases, the agencies that incurred the conversion costs would not necessarily benefit from any postage incentives offered for ZIP + 4 use. For example, the Treasury Department, using names and addresses provided by other agencies, disburses the Government's checks, and for those checks it mailed, would receive the postage incentive, although the providing agencies would have borne the address conversion costs. Perhaps, in such cases, arrangements could be made for agencies actually incurring the converion costs to recover these costs.

"internal mail distribution . . . crime reports . . . disease control . . . emergency reports . . . census tracking . . . no end to the infinite degree of specificity that ZIP + 4 demographics could supply."

More views and practical situations from the business community

In addition to seeking mailers' views by questionnaire, we discussed the ZIP + 4 program with members of the business community. Some were leading proponents and some were leading opponents of the program. Others were neither but were concerned about the program's impact on their businesses.

Interviews with businesses about ZIP + 4

Among those interviewed were representatives of 24 businesses which were selected to obtain a mix of business types, sizes, and views on ZIP + 4. The businesses were located in various parts of the country. Although not all businesses made the same statements, enough common responses emerged from the interviews to enable us to offer several first-hand impressions about conversion to ZIP + 4. These impressions, listed below, may have more widespread applications than in the individual businesses interviewed. 19/

--Businesses differ in the practical problems they face, if any, in converting their address files. For example, businesses vary in what they mail, when they mail, and the method (computerized or mechanical, for instance) used to store addresses. Some have address files which they deem confidential (and, therefore, cannot be given to anyone outside the firm to convert); others do not.

--Businesses generally appear to lack knowledge of the ZIP + 4 program.

--The potential costs to convert to ZIP + 4 have, generally, not yet been fully explored. Therefore, the costs may be smaller or greater than current estimates.

--Conversion costs may appear relatively small in absolute dollars but may be significant to the business' ZIP + 4 decision.

19/ We used various sources to obtain the names of those interviewed; for example, lists of businesses that had been represented at Postal Service briefings on ZIP + 4. The views of the interviewees cannot be projected beyond the 24 individual businesses.

--The type of business and the mail volume have a direct bearing on the economic feasibility of conversion. For example, much of the First-Class Mail sent by a moving company we interviewed would not qualify for a ZIP + 4 incentive because the mail pieces--which contain invoices--are too thick. The mail volume may be too small to permit a business to qualify for a ZIP + 4 rate incentive or, if qualified, to recover conversion costs in a reasonable time. In such cases, businesses must perceive other advantages to convert voluntarily.

--Adding ZIP + 4 codes to forms and stationery would be generally inexpensive if done when inventories were depleted and new stock reordered. There would be exceptions, however, in certain circumstances. For example, one interviewee told us his firm had six unique ZIP + 4 codes, each to be used on different stationery. This firm's stationery costs would increase by perhaps $4,000 annually because the discount once obtained from ordering in volume would be diminished.

--The Postal Service needs to aid businesses in their conversion efforts and their efforts to keep files updated with nine-digit ZIP Codes.

Following are highlights from a cross-section of the interviews.

A small medical corporation--several doctors and approximately 600 patients--which mails an estimated 8,400 letters annually. The office manager would look to the Postal Service for conversion assistance, although the corporation would probably not convert unless forced to by practical problems. For example, if patients began to provide their ZIP + 4 numbers, the corporation would want to use the numbers when corresponding with them. Patient records are kept on a small computer, which is programmed and maintained by a computer service company. The computer cannot accept a nine-digit ZIP Code and would need to be reprogrammed. A list of the 600 patient addresses would be given to the Postal Service and the ZIP + 4 codes requested. The codes would then be manually "keyed in" to the reprogrammed computer. According to the office manager, the estimated cost would be perhaps $3,000, which would not be recoverable--or not recoverable in a reasonable period--through a ZIP + 4 rate incentive because only 700 letters are mailed during a month.

A manufacturing company with 16 employees that mails approximately 17,000 pieces of First-Class Mail annually. The company did not plan to add the ZIP + 4 code to its address records. Approximately 17,000 addresses are kept on typed cards. To add the ZIP + 4 code to the cards would require employee time and a gradual process. The company does not believe it would benefit from any rate incentive that requires

mailing in lots of at least 500 First-Class letters. It mails only about 75 to 100 pieces of mail daily, including private delivery, First-, third-, and fourth-class mail. During the company's annual advertising campaign, some 2,500 letters are mailed at one time and presort rates are obtained.

A regional liquor wholesaler that mailed approximately 130,000 pieces of First-Class Mail in 1981. The company would use ZIP + 4 in order to improve mail delivery service. The company would add the ZIP + 4 code to about 12,000 computerized addresses and 250 addresses on cards. The estimated cost--an educated guess--would be about $8,000. The largest part of the cost would be incurred to manually look up codes for computerized addresses that did not match the Service's computerized ZIP + 4 directory. While not discounting a rate incentive to recover its costs, the company saw a larger benefit if ZIP + 4 would speed mail delivery. (Recovery of the $8,000 would take more than a dozen years if all 130,000 pieces of First-Class Mail qualified for a postage incentive annually and if the incentive were 1/2-cent.)

The company wants its statements to reach customers as quickly as possible so that payments can be returned faster. State law prohibits credit sales of liquor to customers who have failed to pay their accounts on time. Although the company mails only to a small geographic area, statements sometimes take several days to reach some customers. ZIP + 4 would lessen this time if it pinpointed geographic locations better and, thus, reduced missorts.

A regional department store with an estimated 20,000 accounts receivable and 240,000 pieces of First-Class Mail sent annually. The interviewee, the credit manager, emphasized the effect of today's economic conditions on any decision to implement ZIP + 4. Because the general economic downturn has adversely affected sales, the store examines very, very closely every proposed change that costs money. If the costs to change to ZIP + 4 would take longer than 1 year to recover, the store would not make the change. The costs involved in such a change have not been examined. The store may replace its computer in a few years if business improves. Conversion to ZIP + 4 could occur then.

A county government serving over 200,000 people and mailing an estimated 500,000 to 600,000 pieces of First-Class Mail annually. The county would like to participate in the ZIP + 4 program because automation is seen as a viable way to improve postal operations. However, potential costs to implement ZIP + 4 and the potential lack of offsetting benefits were major obstacles to participation. The county maintained a number of different computerized files (for example, real estate parcels, registered voters, and vendors) and used equipment with television-like screens to quickly recall and display filed information. Each file was formatted differently and each had

an attendant set of computer programs (instructions). The real estate file, for example, was used for several purposes, and each purpose had a related program.

The new ZIP + 4 add-on digits would have to be added to a file and all the accompanying input documents and programs changed as necessary. The county believed changing all the programs would be the most costly item. The potential cost, $10,000 to $30,000, was viewed as substantial but really a rough estimate because the detailed study necessary to determine cost had not been done.

A 1,500-student educational institution of theology that mailed an estimated 1 million pieces of First-Class Mail in 1981. The institution has made plans for possible ZIP + 4 use. In 1980, the institution computerized its address lists and provided space to accommodate a nine-digit ZIP Code. To add the code, the institution would "match" its addresses against the Postal Service's National ZIP + 4 Directory tapes. The institution believed it would cost about $1,000 in labor and computer time to add the code to an estimated 300,000 addresses. With a 1/2 cent postage rate incentive, the institution could recover the $1,000 estimated cost in less than 1 year. The institution hoped that the ZIP + 4 program would enable the Postal Service to hold down postage costs and provide more accurate mail delivery.

What leading proponents and opponents said about ZIP + 4

We studied the congressional testimony and/or published statements of leading proponents and opponents of ZIP + 4, and we talked with several of them. These people and associations agreed on the importance of a healthy Postal Service, and agreed that automation of letter sorting is essential to the Postal Service's ability to keep pace with growing mail volume and curtail costs. However, they differed on what sortation system, when combined with automation, would result in the greatest possible savings for the Postal Service at the least expense to the public.

Following is an amalgamation of arguments on both sides of the issue:

Proponents of ZIP + 4 argued that:

--ZIP + 4 can be undertaken without adverse impact on the general public. ZIP + 4 use would be voluntary and, moreover, is intended for business mailers who can recover their ZIP + 4-related costs by taking advantage of the expected rate incentive.

--Converting computerized address files to ZIP + 4 can be accomplished at relatively small costs, using computer

processing techniques. For businesses whose files are not computerized, the Postal Service will look up the ZIP + 4 codes for their addresses. In addition, benefits beyond the rate incentive are available to mailers from ZIP + 4 use.

--Householders should not be concerned about using the ZIP + 4 codes of their correspondents. In this regard, the Service's toll-free telephone service (which was developed so householders can obtain ZIP + 4 codes) should be eliminated.

--Much more mail can be ZIP + 4 coded and processed by automation than the mail that the Service has assigned to the program. Letter-size pieces of second-class and third-class mail could be ZIP + 4 coded and eligible to receive a rate incentive. A large portion of third-class mail is not carrier route presorted. [20]/ Also, billions of pieces of reply mail, which is preprinted with the receiving business' address, can be ZIP + 4 coded--bar codes could be preprinted to represent the nine digits--and processed by automation.

--Carrier route presorting is another option available to mailers but not a preferred alternative to ZIP + 4, because carrier routes change often and many mailers cannot meet all the requirements to participate in the presort program.

--ZIP + 4 would enable the Service to save more money than does the five-digit code. The five-digit code, coupled with automation, would still require mechanical or manual sorting to the carrier route. ZIP + 4 would reduce the need for such sorting.

Opponents of ZIP + 4 argued that:

--ZIP + 4 requires the Service to (1) spend millions of dollars; for example, to issue a ZIP + 4 directory of over 20 million codes and provide a telephone service to supply codes; and (2) reduce claimed savings by millions of dollars by providing an incentive to obtain usage.

--ZIP + 4 coding--with numbers for floors, offices, apartment ranges, and different sides of the street--would generate confusion and be very troublesome for businesses to use. Also, the Service lacks a good

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[20]/Carrier route presorted mail will bypass the automated mail processing system and, as a result, the Postal Service does not intend to offer an incentive to place ZIP + 4 codes on such presorted mail.

track record in developing directory tapes for other programs.

--The public's cost to use ZIP + 4 would prevent widespread usage. This could cause the Service to force its use. Mailers must obtain codes and change address files and stationery, for instance, and from all indications, the costs would be tremendous. Moreover, once converted, files would require costly updating. The cost would hinder ZIP + 4 usage unless businesses believed nine-digit mail received better service than five-digit mail.

--Not every business could recoup its costs, or recoup them in a reasonable period, through a ZIP + 4 rate incentive. For example, businesses that send mail primarily to other businesses would not generate large quantities of mail and, therefore, would not recover their costs or recover them within a reasonable period. Furthermore, a ZIP + 4 postage discount would provide large-volume mailers an economic advantage over their smaller counterparts.

--The Service could force ZIP + 4 usage by requiring the ZIP + 4 code as a condition to receiving postage discounts, such as the discount for carrier route presorting. Third-class mail is already heavily presorted to carrier route, which gets the mail to letter carriers the same as ZIP + 4 would.

--Approaches other than ZIP + 4 are available to contain Postal Service costs. The carrier route presort program gets mail to letter carriers the same as ZIP + 4, and it is already in place and being used. Business mailers, for an incentive, could place the two-digit carrier route numbers on non-carrier presorted mail, which could then be processed by automation. Moreover, use of the carrier route program would cost the Postal Service and the public much less than ZIP + 4. For example, there would be no need for the Service to maintain a massive directory and no need to involve all mailers.

--Five-digit ZIP Code mail can be processed by automated equipment--the Service says it can achieve a 22 percent ROI from processing such mail. Reply mail could be processed by the automated equipment. The Service could also improve other aspects of its operations to save money; for example, it could close small post offices and improve revenue controls.

Postal Service encouraged by results of its market study on ZIP + 4 use

In 1982, in preparation for refiling with the Postal Rate Commission for a ZIP + 4 rate incentive, the Postal Service conducted, using a private firm, a market research study to determine the portion of large-volume, First-Class Mail that would be converted to ZIP + 4 and receive a ZIP + 4 postage discount. On the basis of interviews with about 800 mailers, the Service concluded that mailers would respond positively to a rate incentive of 1/2 cent, and it estimated that, if a 1/2-cent incentive were offered, the volume of First-Class Mail receiving the incentive would reach at least 12 billion pieces annually in 1984 and would continue to increase. The Service believed that additional First-Class Mail not qualifying for the discount would also bear ZIP + 4 codes by 1984. Because we received the study report in November 1982 at the time we were finalizing this report, we were unable to conduct an in-depth assessment of the study's methodology and results. We will evaluate the study and report the results to the Congress.

LIMITED HOUSEHOLD USE OF ZIP + 4 IMPORTANT TO PROGRAM'S SUCCESS

Householders have generally found little or nothing to like about the ZIP + 4 code, but their voluntary use of the code assigned to their own addresses is important to the ZIP + 4 program. The usage level the Service wants to achieve will be made more difficult to attain if householders do not provide their ZIP + 4 codes to their business correspondents; for example, when completing an application for credit.

Use of ZIP + 4 codes on household-to-household mail is not critical to the financial success of the ZIP + 4 program. As of November 1982 the Postal Service was uncertain as to whether it would directly notify all households of their ZIP + 4 codes. If householders are notified, the Service plans to request that they use, on a voluntary basis, the ZIP + 4 code in their return addresses on all correspondence. 21/

21/On the matter of householders using the ZIP + 4 code in return addresses, the Service has not differentiated between their writing to businesses and to other households. Although the Service's primary objective would be to persuade householders to use the ZIP + 4 code in their return addresses in business correspondence, a Service official said it would confuse householders to ask them to use ZIP + 4 in one instance (writing to businesses) and not the other.

According to a senior postal official, the extent to which the Service promotes householders' use of ZIP + 4 in return addresses would depend on the public's reaction to ZIP + 4 after seeing the codes on mail received from businesses.

Postal Service wants householders to use ZIP + 4 in their return addresses

The Service wants householders to use the ZIP + 4 code in their own return addresses when corresponding with businesses. In this way, businesses can obtain codes to convert and update their address files and generate ZIP + 4 coded mail.

ZIP + 4 use by businesses of all sizes is important in maximizing potential postal savings. In planning the ZIP + 4 program, the Service assumed that 90 percent of all machinable First-Class Mail would be addressed with ZIP + 4 codes, and that both small and large businesses would contribute to that volume. The program's estimated savings, for example, were based on the assumption that small mailers would contribute to the 9 billion pieces of bundled metered mail that would be OCR/CS-processed from 1987 onward. (The 9 billion pieces represented 25 percent of the 37 billion pieces of mail that would be OCR/CS-processed.)

Further, when the Service developed its ZIP + 4 subclass proposal in 1981, it identified several categories of potential ZIP + 4 users, and included as one category commercial organizations that mail small daily volumes of metered mail. The Service assumed that most of this mail would be (1) generated by small organizations and (2) addressed with ZIP + 4 codes by 1987. For this category, the Service expected that

> "* * * ZIP + 4 code usage will initially be low, reflecting (1) the extent to which receivers of such mail provide originators with their ZIP + 4 codes and (2) the extent to which originators obtain and use ZIP + 4 codes for outgoing general business correspondence."

In order to keep address files up to date, many of the businesses we interviewed now depend on householders and/or other businesses to furnish their five-digit ZIP Code and would depend on them to furnish ZIP + 4 codes. When addresses are received without a ZIP Code, some of the businesses interviewed attempt to find and add the missing code. They said they would follow the same procedure for missing ZIP + 4 codes. However, as suggested by Postal Service data, the five-digit ZIP Code is commonly used. We do not know whether the businesses interviewed would attempt to obtain missing ZIP + 4 codes if householders and small businesses were unaware of or did not use their ZIP + 4 codes. Other businesses we interviewed do not now attempt to find missing codes and

would not attempt to locate ZIP + 4 codes because of the employee time and expense that would be involved.

Some large-volume mailers told us they would not depend on householders to furnish ZIP + 4 codes. These mailers would first computerize new addresses and then match the addresses with the ZIP + 4 directory tapes to add the proper ZIP + 4 code. However, there are large-volume mailers who would want householders to furnish their ZIP + 4 codes. One large mailer who responded to our questionnaire said:

> "It will be very important for customers to accurately record their 9-digit ZIP on application forms. With the large number of changes in customer addresses inherent in a large business such as ours, files will quickly become outdated unless the customer knows and uses his 9-digit ZIP, or [unless] the USPS will periodically update our files."

The respondent added that the Postal Service should ensure that householders know their nine-digit ZIP Codes.

Householders' use of correspondents' ZIP + 4 codes would be beneficial

The Postal Service would like householders, when corresponding with businesses and other householders, to use the correspondent's ZIP + 4 code. Such use would reduce processing costs.

According to postal officials, the Service does not plan to ask householders to use their correspondents' ZIP + 4 codes. Nevertheless, the Service would like such use to occur and increase over time, just as use of the five-digit ZIP Code has become widespread.

In fiscal year 1979, according to a University of Michigan study, householders sent about 27 percent (about 16 billion pieces) of the total First-Class Mail--10 percent household-to-household and 17 percent household-to-nonhousehold. 22/ Much of the household-to-nonhousehold mail (i.e., business mail) reportedly has the correspondent's address preprinted on the envelope.

Householders' mail with the ZIP + 4 code would eventually cost less to process than such mail with the five-digit code. Operators of letter sorting machines would be able to sort the ZIP + 4 mail to carrier route using the last four digits instead of relying on scheme knowledge. According to postal

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22/Nonhousehold Mailstream Study, Final Report, July 1980, Institute for Social Research, the University of Michigan, p. 6.

plans, this change would take place only after ZIP + 4 reaches a substantial level of use. The cost difference would be greater because all five-digit mail would, after complete implementation of the ZIP + 4 system, be manually sorted to the carrier route.

Many householders view ZIP + 4 negatively but would use it

Since 1980, the Postal Service has asked householders their views on the ZIP + 4 code and whether they would use it. Although their views were often negative, they generally said they would use it.

The Service interviewed five samples of householders over the April 1980 to April 1982 period. 23/ The samples ranged in size from 1,005 to 1,020 householders over the age of 18. Essentially the same questions were asked each sample group.

Results of the householder interviews follow.

--Less than half of the householders interviewed in each sample were aware that the Postal Service planned to extend the ZIP Code to nine digits.

--When asked what they might like about the nine-digit ZIP Code, about one-fifth from each sample said better mail service and/or faster mail service. (The percentage of those who said better or faster service ranged from 17 to 21 percent, with 21 percent the most recent percentage.)

--At least half of the householders from each group found nothing to like about the nine-digit ZIP Code. (About 69 percent of the householders in the latest sample felt this way. The percentage was 50 percent in the four earlier samples.)

--When asked what they might not like about the nine-digit code, more than half said there were too many numbers to remember. (At least 56 percent of each sample group said too many numbers.)

--About half of the householders from each sample group said nine-digit ZIP Codes would be difficult to remember no matter how often they were used. (The

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23/The interviews were conducted and the data compiled by a firm under contract to the Postal Service. The interviews were conducted every 6 months. The ZIP + 4 questions were part of a larger series of questions asked to gauge the general public's attitude toward the Postal Service.

percentage of householders in each sample who said too difficult to remember ranged from 48 to 57 percent.)

--When asked how likely they would be to use the nine-digit ZIP Code in their return addresses, about three-fourths of each sample group said very likely. (The percentage of householders who said very likely ranged from 72 to 79 percent; the percentage has dropped over the last three samples to 72 percent.)

--When asked how likely they would be to use the nine-digit ZIP Code when addressing letters and envelopes to others, most householders said very likely. (The percentage of each sample group saying very likely ranged from 69 to 77 percent.)

--Householders in the latest sample group were asked their perceptions as to whether use of the five-digit and nine-digit ZIP Codes was voluntary. The following table shows the results.

	Five-digit code (percent)	Nine-digit code (percent)
Voluntary	44	27
Mandatory	45	54
Uncertain	11	19

The results of the householder interviews suggest a need for greater awareness and understanding among the general public about the ZIP + 4 program and the voluntary nature of ZIP + 4 use. A good portion of the householders interviewed said they would use the nine-digit code in their own addresses and in the addresses of others. Whether the portion would be as large if more people were aware that ZIP + 4 use would be voluntary is unknown.

Postal Service is uncertain about notifying households directly

The Service has told many businesses and some householders their ZIP + 4 codes. The Service, however, has not decided whether it will directly inform all postal customers of their codes.

In 1981, the Service gave 15 million businesses and post office box holders their ZIP + 4 numbers. Post office box holders included businesses and householders. This notification was the initial step in implementing the ZIP + 4 system at that time.

Postal Service plans to notify households of their ZIP + 4 codes in early 1982 were postponed because of the congressionally imposed delay in ZIP + 4 implementation. The Service has also postponed plans to notify all postal customers--businesses, households, and post office box holders--in early 1983. Postal officials, as of November 1982, were uncertain whether householders would be directly notified and, if notified, exactly when and by what method.

Although notification was uncertain, the Service continued to plan for a direct notification of all postal customers, including those previously notified. The plans have provided for a direct mailing to each postal customer to explain the ZIP + 4 program and to provide the code. In preparation for such a mailing, the Service was testing an approach to determine the number of notices to print and, concurrently, gauge the likelihood that every customer would receive the right code. The test requires letter carriers to identify delivery locations within each ZIP + 4 code range. An element of the initial test was to determine the clarity of the instructions, which were to be followed by letters carriers and their supervisors. The test showed that these employees had difficulty understanding the instructions.

Even without a direct mailing, households and businesses would, directly and indirectly, obtain their respective ZIP + 4 codes. For example, whenever a household or business moves, the Service, as part of its mail forwarding system, plans to provide the ZIP + 4 code for the new address to the household or business. As businesses convert to ZIP + 4, the mail they send would bear the addressee's ZIP + 4 code. (The addressee would undoubtedly be confused, however, if that mail contained different ZIP + 4 codes.) The Service's toll-free telephone service would also provide a limited means to obtain codes.

MEASURES TO ENSURE THAT USE OF ZIP + 4 IS VOLUNTARY

Issues related to the question of whether the use of ZIP + 4 would, in fact, remain truly voluntary include:

--The difference, if any, between quality of service that would be provided to ZIP + 4 mail and non-ZIP + 4 mail.

--The imposition of ZIP + 4 use as a condition to receiving other preferential postage rates.

--Use of ZIP + 4 by Federal agencies.

Controls will be necessary to ensure delivery of five-digit ZIP Code mail is not delayed

Some mailers believe they could be forced to use ZIP + 4 because of Postal Service delays in delivering five-digit ZIP Code mail. The Postal Service says that service for five-digit mail would not decline. The Service, however, should take measures to ensure that processing of five-digit ZIP Code mail would not be adversely affected when the ZIP + 4 system becomes fully operational.

The Service claims that ZIP + 4 would not result in any degradation of current service for mail bearing a five-digit ZIP Code. Neither is ZIP + 4 viewed by Postal Service management as a change in service for mailers who convert to nine digits. Current delivery standards for First-Class Mail would remain the same for both five-digit and nine-digit mail. 24/

According to the Service, however, mail addressed with ZIP + 4 codes would be missorted less frequently than five-digit mail because of automated processing. Fewer missorts, which would result in fewer letters being missent, should improve consistency in meeting current delivery standards, but, in general, delivery times for the two kinds of mail--ZIP + 4 and five-digit--should not differ because of fewer missorts. Only in the more accurate sorting of ZIP + 4 mail--not in speedier delivery of ZIP + 4 mail after it is sorted--does the Postal Service view ZIP + 4 as an improvement in mail service. This position appears realistic.

When fully operational, the planned ZIP + 4 mail processing system would require manual sorting of five-digit ZIP Code mail to carrier routes. All mail would be processed through the same distribution network by OCR/CSs, BCSs, and LSMs until the point where sortation to carrier route occurs. At this point, five-digit coded mail would be separated and manually sorted because

--the automated equipment would be unable to sort to carrier route without the four-digit add-on, and

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24/The Service has three delivery standards for First-Class Mail; overnight, 2-day, and 3-day delivery. The standards are based on distance between mail origin and destination. The Service's goal is to deliver at least 95 percent of the correctly ZIP Coded mail within the given time standard. The Service expects ZIP + 4 to result in its more consistently meeting the 2-day and 3-day delivery standards.

--LSM operators would sort to carrier route by keying the four-digit add-on rather than by relying on scheme knowledge.

The change to manual sorting of 5-digit coded mail is not scheduled to occur immediately after ZIP + 4 is implemented but, according to the Service, would take place when justified by large enough volumes of ZIP + 4 mail. This occurrence would vary by postal location.

The Service does not believe that the eventual switch to a 100-percent-manual carrier route sort would cause five-digit ZIP Code mail to miss delivery standards. Postal officials told us the amount of five-digit mail that would eventually be sorted manually would decline significantly in comparison with the large volume now sorted manually to the carrier route. [25]/ They explained that:

--Some mail must be manually sorted now because not enough processing time is available on LSMs to meet deadlines. (Sufficient time is unavailable because the machines are used to capacity.) With the addition of BCSs and the continued use of LSMs, the volume of manually sorted mail would decrease.

--Mail addressed with five-digit ZIP Codes and going to zones that receive little mail is now sorted manually rather than on LSMs. Not enough mail goes to these zones to make it worthwhile for machine operators to learn the necessary scheme knowledge. Eventually, scheme knowledge would not be necessary to machine process nine-digit coded mail to these zones.

Although a large percentage of First-Class Mail is sorted manually, the Service's present system for providing information about mail delivery standards does not specifically identify manually sorted mail. (The system tracks mail by ZIP Codes and postmarks.) This is in keeping with the Service's operating philosophy that all properly ZIP Coded mail should meet delivery standards. The Service's record in meeting delivery standards varies by region, delivery standard, and time period. Nonetheless, more than 75 percent of stamped and

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[25]/The volume of First-Class and third-class letter mail manually sorted to carrier route approximated 54 percent in major postal facilities during the first 11 accounting periods of fiscal year 1982. According to a Service official, the percentage of letter mail sorted manually to carrier route is greater in nonmajor postal facilities. While not all of the manually sorted letter mail was addressed with a five-digit ZIP Code, much of it probably was.

metered First-Class Mail met the standards during the past several years. 26/ However, because of the tracking system's design, it is not known what portion of the manually sorted five-digit mail failed to meet delivery standards.

If ZIP + 4 is implemented, postal management will need to take steps to ensure that delivery of five-digit mail is not delayed because of the planned change in sorting. The modification of the LSMs to handle nine-digit mail will have to be closely monitored to make sure that enough capacity (i.e. employees with scheme knowledge) will be available to timely sort five-digit mail to the carrier route. A Service-wide directive will be needed to provide guidance on when five-digit ZIP Code mail should be switched to a 100-percent-manual carrier route sort and to emphasize that sufficient capability must be retained to handle such mail. The Service should establish a separate control over five-digit ZIP Code mail to ensure that delivery times do not fall below current levels.

Although, as presented above, the nine-digit ZIP Code is not expected to result in faster delivery for ZIP + 4 mail generally, automation may eventually offer the potential of faster delivery for both five-digit and nine-digit ZIP Code mail. If faster delivery should come about because of OCR/CS processing, the important aspect of the mail piece would be its OCR readability, inasmuch as the Service plans to OCR-process both five- and nine-digit mail. No changes in delivery service are now planned, but the Postal Service intends to study the automated mail processing system after it becomes operational to learn whether other benefits such as faster delivery for both five- and nine-digit mail are attainable.

Legislation was introduced to ensure the voluntary nature of ZIP + 4

If the ZIP + 4 program is implemented, and if it works as planned, mailers need not convert to ZIP + 4 out of fear that delivery service would decline for five-digit ZIP Code mail. They can, therefore, base their decision to use or not use ZIP + 4 on the course that is more economically advantageous to them.

However, among members of the business community, there are those who believe the Postal Service may eventually require ZIP + 4 use, regardless of the economic advantages or disadvantages to the mailer. The reasons for this belief include the concern that a voluntary program would not generate

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26/As noted, the Service's record in meeting the delivery standards varies. For example, about 95 percent of stamped First-Class Mail met the overnight standard during the past several years.

enough ZIP + 4 mail to support the program and the general sense that the Service would require ZIP + 4 use by all mailers once the program was underway rather than operate a dual ZIP Code system. Some mailers were concerned that, to increase ZIP + 4 mail volume, the Service would require ZIP + 4 use as a condition for their continuing to receive preferential postage rates for mailer-presorted mail. The Service has maintained that ZIP + 4 use would be voluntary and that large-volume mailers would generate sufficient volumes of ZIP + 4 mail to justify the program. Moreover, postal management has stated that the incentive-based presort programs are separate from ZIP + 4 and that these programs and ZIP + 4 all represent options which will remain available to mailers.

A 1965 presidential memorandum directed Federal executive agencies to comply with Postal regulations requiring use of the five-digit ZIP Code on all their official mail. [27]/ According to a Postal Service legal official, the Service was advised not to rely on the memorandum to require Federal ZIP + 4 use unless it first (1) obtained a detailed analysis of the cost of conversion for Government agencies, (2) obtained the agencies' reactions to a mandatory conversion, and (3) determined the political and rate implications of an attempt to impose a mandatory conversion. However, the 1965 memorandum expressly refers only to the five-digit ZIP Code. Unless it is modified, we do not believe it could be relied on to direct the use of ZIP + 4 by Federal agencies.

A senior postal official said that Federal agencies' use of ZIP + 4 should be voluntary. He said that the Service's position is that each Federal agency should make its own decision on the basis of its unique mailing situation and its assessment of ZIP + 4's cost and effectiveness.

Because of public apprehensions discussed above and costs associated with conversion to ZIP + 4, a bill, S.678, was introduced in the 97th Congress to assure that the Postal Service's ZIP + 4 program would remain a voluntary, incentive-based program. As reported by the Senate Committee on Governmental Affairs, S.678 would place business, household, and Federal agency use of ZIP + 4 on a voluntary basis and would preserve presort discount programs without requiring the use of ZIP + 4 as a prerequisite. [28]/

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[27]/Official mail is penalty and franked mail authorized by law to be transmitted without prepayment of postage. The regulations do not apply to mail for which postage is prepaid (for example, by metered imprint).

[28]/Senate Report No. 97-258, 97th Cong., 1st Sess., pp. 6 and 7.

CONCLUSIONS

The Postal Service must gain the cooperation of business mailers to make the ZIP + 4 program succeed. In order for the Service to save money through the program, businesses must spend money to convert to ZIP + 4. This suggests that the Service must provide businesses with adequate information to understand the program and inducements to participate in it. Further, although the Service claims that use of ZIP + 4 will be voluntary, businesses need to be assured that they will not be ill effected if they elect not to participate. Many businesses are waiting for such information, inducements, and assurances.

An accurate ZIP + 4 directory is also essential to business mailers' participation in the program. Overall accuracy of the national directory is uncertain, but indications to date suggest that the directory is reasonably accurate, at least in terms of completeness. To keep the directory updated, local postal employees involved in mail delivery should be made more aware of the ZIP + 4 program and how they can help keep the directory updated.

The Service is providing or has plans to provide appropriate assistance to businesses in converting to ZIP + 4. However, we believe that the scope of the manual-list conversion service should be made more flexible to accommodate more mailers who may want to convert to ZIP + 4. We believe there is a need to provide reasonable aid to all businesses which are willing to convert. In this regard, local postmasters should be given specific, uniform guidance regarding ZIP Code look-up service they are to provide, so that customers are treated consistently.

It is difficult to forecast the daily volume of requests the toll-free telephone service will receive for nine-digit ZIP Codes, but the volume may be high. The Service will need to decide what to do if and when a buildup of calls exceeds 200,000 per day.

Although large-volume mailers' (including Federal agencies') reported costs to convert to ZIP + 4 either vary widely or their costs have not been estimated, a general perception among such mailers we surveyed is that conversion will be expensive and, therefore, an adequate rate incentive will be necessary to provide the impetus to convert. Without an adequate incentive, large-volume mailers are not likely to make significant use of ZIP + 4.

On the basis of comments from some large-volume mailers who responded to our questionnaire, we believe that ZIP + 4 use, to the extent it occurs, would develop gradually and that the Service may be unable to reach its 90-percent usage goal

in the approximate 6-year period initially planned. One reason for the possible delay may be that mailers believe they lack adequate information. There are indications that the Service needs to provide businesses more and clearer information about the program.

Although the Service has said the ZIP + 4 program is targeted to large-volume business mailers, ZIP + 4 use by businesses which mail less than 500 letters at a time is also important to the Service in achieving its ZIP + 4 usage goals.

Unlike business use, householders' use of ZIP + 4 in their correspondents' addresses is not critical to success of the ZIP + 4 program. But householders' use of their own ZIP + 4 code (in their return addresses) in correspondence with businesses would be important to some businesses; it would assist the businesses in converting and updating their address files, thereby generating more ZIP + 4 mail. Therefore, this limited use of ZIP + 4 by householders would be important to the success of the program.

The Service can mitigate the concern of some mailers that, from a practical standpoint, they may be compelled to use ZIP + 4 because of delays in delivery of five-digit ZIP Code mail. When the new automated mail processing system is fully installed, the Service can ensure that enough employees with scheme knowledge are retained to timely sort to letter carriers mail that contains a five-digit, rather than a nine-digit, ZIP Code. Management can also monitor delivery times of five-digit mail, so it can act to correct any early evidence of a slowing of five-digit ZIP Code mail delivery.

RECOMMENDATIONS TO THE POSTMASTER GENERAL

We recommend that if ZIP + 4 is implemented the Postal Service:

--Provide local delivery unit employees the necessary indoctrination to understand the ZIP + 4 program and the training to assist in keeping the National ZIP + 4 Directory updated.

--Broaden the eligibility criteria for the manual-list conversion service in order to aid more mailers.

--Provide uniform guidelines for local postmasters to follow in honoring customers' requests for ZIP + 4 codes in order to provide consistent treatment of customers' requests.

--Modify the Service's information system to track delivery times of five-digit ZIP Code mail when the switch to full manual sortation of such mail occurs, and make the resulting information a matter of postal

management review to ensure that delivery times for five-digit ZIP Code mail do not fall below current levels.

--Provide businesses (and householders if they are to be included) with more and clearer information about the ZIP + 4 program (such as its benefits, prerequisites for participation, expected impact on delivery times, and effects on other programs).

AGENCY COMMENTS

In comments on our draft report, the Service agreed to implement our recommendations. The Service:

--Agreed that delivery unit personnel play an important role in maintaining the ZIP + 4 directory and said ZIP + 4 program and maintenance orientation will be provided to these employees.

--Said it believes that a 500-address minimum for the manual-list conversion service would be appropriate for most mailers. However, it said that conversion service to mailers with less than 500 addresses will be provided as well. (See p. 176.)

--Agreed that postmasters should follow uniform guidelines to update address lists. (See p. 176.) Such guidelines will be issued when the manual-list conversion service procedures are released, and the guidelines will be designed to ensure equal treatment to all mailers.

--Agreed that delivery times of five-digit ZIP Code mail should be measured and should be a matter of postal management review when the switch to full manual sortation of five-digit mail to carrier routes occurs. The Service said it intends to monitor delivery times of manually sorted five-digit mail and will take the necessary management action to protect the quality of service on such mail. The Service plans to track five-digit mail through an exception measurement system and use the results to determine whether its continuous tracking system should be modified. (See pp. 176 and 177.)

--Agreed that mailers need more information about the ZIP + 4 program and said there is a need to expand upon and implement promotional programs that will support more understanding among major mailers. To that end, the Service developed an "Automation Marketing Plan" for fiscal year 1983. The plan provides the objectives, strategies, and tactics the Service will use to market (1) the change to automated mail processing and (2) ZIP + 4 as an element of

automation. The Service said industry and customer profiles will be developed to identify customers who may need assistance in converting to ZIP + 4, and added emphasis will be placed on helping businesses determine their full and accurate costs to convert and understand all of the benefits attainable from ZIP + 4. The promotional program, according to the Service, will be supported by technical conversion assistance, direct contact with business mailers, sales literature, and other promotional material.

CHAPTER 6
OTHER CONCERNS EXAMINED

Expanding the five-digit ZIP Code and automating the letter-sorting process raise other concerns in areas within, as well as outside, the Postal Service. Four such concerns are:

--The possible conflict of ZIP + 4 and the First-Class Carrier Route Presort program.

--The possibility of cost savings if businesses print a bar code on business and courtesy reply mail.

--The potential effect of automation on the Postal Service's current labor force.

--The possibility that the large expenditures for automation may be detrimental to other Postal Service capital investment programs.

Although these issues are significant and, therefore, merit evaluation, our review effort was primarily concentrated on the issues discussed in previous chapters of this report. Our assessment of the above four issues is based on limited work.

ZIP + 4 AND FIRST-CLASS CARRIER ROUTE PRESORT: SOME CONFLICT EXISTS

The ZIP + 4 and Carrier Route Presort programs are two means of sorting mail down to the carrier, and both programs are designed to reduce costs to the Postal Service. Contrary to the Service's position, however, both programs are targeted, to some extent, to the same group of mailers and thus are not as conflict-free as the Service contends. In particular, if the Carrier Route Presort program for First-Class Mail is highly successful, it will attract mail volume that would otherwise be processed by the automated system and cause the projected ROI for processing mail by automation to be lower. However, this conflict need not necessarily preclude the Service from offering both programs to its customers, because the use of either alternative reduces costly manual and MPLSM sortations. It also does not preclude mailers from availing themselves of both programs, because residue mail from the Carrier Route Presort bearing the ZIP + 4 codes may qualify for the ZIP + 4 discount.

Success of First-Class Carrier Route Presort program would lower ZIP + 4 savings

In early 1981, the Service introduced the First-Class Carrier Route Presort program, which is designed primarily for

mailers sending a high volume of mail within a specific five-digit ZIP Code delivery area. Utilities, retailers, and financial institutions--which account for about one-third of total business First-Class Mail volume--and other high-density mailers are able to take advantage of this program. However, the Postal Service, when calculating its projected ROI for processing ZIP + 4 coded mail, assumed that more than 90 percent of these customers' mail would bear ZIP + 4 codes by 1987 and would be processed by the proposed automated equipment. If large numbers of these mailers elect instead to use the First-Class Carrier Route Presort program, the volume of their mail available for processing in the proposed system would decrease and, in turn, reduce the Service's projected ROI.

Offering choice of programs may attract more mailers to aid in reducing costs

As stated above, both ZIP + 4 and the First-Class Carrier Route Presort program are designed to reduce costs to the Postal Service. Both programs offer reduced postal rates to customers who help the Service to either simplify or eliminate certain mail processing operations. Offering such alternatives will more likely attract additional mailers to aid the Service in reducing its costs. The extent of the impact on the projected ZIP + 4 savings will ultimately be decided by the marketplace--as mailers select the program which is more economically advantageous to them. Thus, although the two programs are in competition, we do not view this competition as detrimental to the Postal Service.

ARE THERE POTENTIAL COST SAVINGS IF BUSINESSES PRINT A BAR CODE ON BUSINESS AND COURTESY REPLY MAIL?

When householders correspond with businesses they often use envelopes and postcards furnished by the businesses and preprinted with the businesses' addresses. (For example, envelopes are often furnished householders for use in mailing payments.) This mail, referred to as business and courtesy reply mail [1/], is part of the Service's collection mail stream, and may help the Service save processing costs if

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[1/]Business reply mail differs from courtesy reply mail mainly with regard to who pays the postage. Postage for business reply mail is prepaid by the business. Postage for courtesy reply mail is paid by the householder, who affixes a stamp to the card or envelope. Businesses also send business and courtesy reply mail, but to a lesser extent than households.

sorted by automated equipment. The following issues are associated with possible savings from business and courtesy reply mail:

--Usefulness of businesses' preprinting of bar codes representing their ZIP Code numbers.

--The need for the Service to offer a financial incentive to encourage preprinting of bar codes.

Under the planned automated processing system, business and courtesy reply mail--hereafter referred to as reply mail --would be sorted on MPLSMs unless identified and pulled out of the collection mail stream for OCR/CS processing. (A more detailed discussion of the mail processing system was presented in chapter 2.) Identification and extraction would occur in two possible ways:

--Businesses would preprint a special mark on the reply envelope or postcard--a facing identification mark (FIM) which facer-canceler equipment would detect. (Such equipment automatically arranges letter-size mail and cancels stamps.) Detection would cause the marked mail to be separated from other collection stream mail.

--The Postal Service may add a special device to the M-36 facer-canceler to identify and separate apparently OCR readable mail, such as reply mail. This would be accomplished without the need for a FIM. However, a facing mark would give added assurance that the M-36 would identify a mail piece.

As now planned, all mail entering the automated mail system must pass through the OCR/CS, which will read the ZIP + 4 code and print a corresponding bar code. If a bar code is preprinted, the OCR/CS will read it without printing another bar code. OCRs can read a preprinted bar code more accurately than a series of numbers. [2/] This means the mail piece has a better chance of staying in the automated mail processing stream and thereby saving processing costs. For the business that provides reply envelopes and cards, preprinting the bar code may enable it to lessen or avoid the expense of making changes that might be necessary to make the envelope or card OCR readable (such as changing the address location on the envelope and removing or relocating the company's logo).

Many large-volume mailers would preprint the bar code on their reply envelopes and postcards without a financial incentive from the Postal Service. We asked questionnaire addressees (see pp. 159 and 167) whether they planned to print,

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2/Our analysis of the Service's OCR/CS and BCS test data indicated that the OCR/CS read rate for pre-barcoded mail may be 10 or more percentage points higher than for non-barcoded mail.

by 1984, ZIP + 4 bar codes on the reply envelopes and postcards they provide for their correspondents. About 44 percent of the 309 respondents who answered the question said yes. [3/] Only 14 percent said no or said they did not provide reply envelopes and postcards. Another 42 percent were uncertain. Of those who said no or were uncertain and explained why, 33 respondents (about 26 percent) specifically mentioned the need for a financial incentive or stated concern about the cost of adding the bar code to their envelopes.

It appears that ZIP + 4 bar codes, properly preprinted on business and courtesy reply mail, have some potential to save the Service processing costs because of the difference in OCR read rates between barcoded and non-barcoded mail. However, the amount of such savings is clouded because there are insufficient numbers of M-36 facer-cancelers--which would separate reply mail from other collection mail--to take full advantage of processing reply mail by automation.

We have not examined in detail the costs to businesses to add the bar code or the extent of possible savings that could accrue to the Service in processing barcoded reply mail. However, an incentive to encourage businesses to bar code their reply mail does not appear necessary at this time. Many businesses appear interested in printing bar codes without requiring an incentive, and this interest should be fully explored. The Service's 1983 marketing plan schedules such an exploration. One of the plan's objectives for fiscal year 1983 is to have "* * * 50 percent of all major accounts print their Business Reply and Courtesy Reply envelopes with Bar Codes and FIM." Although the Service has not heavily promoted bar coding of reply mail because of the delay in ZIP + 4 implementation, an estimated 5,000 firms, according to a postal official, have already requested facing identification and ZIP + 4 bar code pattern sets. (The patterns are used for printing FIMs and bar codes on reply mail and are furnished by the Service without charge.)

CAN REDUCTION IN LABOR FORCE BE ABSORBED BY ATTRITION?

The Postal Service assumed that the reduction in labor force resulting from automation could be accomplished through attrition. On the basis of Service-wide statistics on attrition, this assumption seems valid.

Examination of Postal Service employee separation statistics shows that the annual attrition rates for full- and part-time postal clerks between 1976 and 1981 ranged from about 7.5

[3/] Since the early 1970s, the Service has operated a limited program to process barcoded reply mail. Some of the large-volume mailers who responded to our questionnaire may be participants in this program. Service officials told us that the program was being phased out, however.

to 9.5 percent. We estimate that use of ZIP + 4 with automation could reduce the number of mail sorting related workyears by about 15,760, or about 12.5 percent of the number of full-time mail-sorting clerks employed as of October 1981. Since the automation and resultant reduction in the work force will be phased in over about 6 years, the annual attrition rates should well exceed the projected reductions.

However, the Service had not yet determined the impact that a reduction in the labor force will have on individual postal facilities scheduled to receive automated equipment. A detailed Service study to assess the impact on the labor force at facilities receiving equipment during Phase I of the project was still in progress at the conclusion of our review. Therefore, we were unable to measure the impact that a reduction in the labor force would have on each facility individually.

WILL LARGE EXPENDITURES FOR AUTOMATION BE DETRIMENTAL TO OTHER CAPITAL INVESTMENTS?

If favorable conditions affecting Postal Service operating revenues and expenses continue as they were in the first half of fiscal year 1982, the Service's financing of automated mail processing equipment over the planned 5-year period (1982-1986) should not be detrimental to other capital investment plans. However, if these conditions deteriorate, some capital investments may be deferred in favor of the proposed automated mail processing equipment.

Postal Service net income from operations for the first half of fiscal year 1982 was 15 percent higher than planned and a substantial improvement over the first half of fiscal year 1981. This improvement has placed the Service in a position to finance planned capital investments internally and has reduced the possibility that the Service will be forced to borrow funds during a period of high interest rates.

Income from operations, which, in turn, affects postal rates, is heavily influenced by inflation and mail volumes. If inflation increases, then wages, which comprise the bulk of the Service's operating expenses, will also increase. At the same time, if mail volume drops, revenue will also decline. For these reasons, it is difficult to accurately predict the Service's ability to finance capital investments in the future.

The Service's planned $900 million investment in automated mail processing equipment, the bulk of which is to be committed during the 5-year period, fiscal years 1982 to 1986, represents approximately 20 percent of the total capital investments planned for that period. However, these 5-year

plans are flexible and are revised every year, so the relationship of the investment in automation to other capital investments could change in the future.

Actions taken by the Service in 1981 indicate that plans for investment in automated equipment had priority over other capital investment plans at that time. In June 1981, the Service deferred some planned fiscal year 1982 capital investment commitments in order to reduce fiscal year 1982 cash outlays by $200 million. However, plans to purchase automated equipment were not deferred.

The Service's financial picture has improved during fiscal year 1982. However, if financial conditions should dictate further alterations of capital investment plans over the next 5 years, and if the Service holds to its 1981 practice, it is likely that the plans for investment in automation will remain intact, possibly at the expense of other capital investment plans, which consist primarily of facility projects.

CHAPTER 7

OVERALL CONCLUSIONS AND AGENCY COMMENTS

Detailed conclusions and recommendations are presented in individual, preceding chapters. This chapter presents the "bottom line" of our review--a statement of our overall conclusions.

In chapter 3, we showed that the ZIP + 4 program's ROI is strongly influenced by the extent of mailers' use of ZIP + 4. In chapter 4, we identified risks associated with the OCR equipment the Postal Service is acquiring to process mail. In chapter 5, we discussed mailers' uncertainty about participating in the program. On the basis of foreign licensors' demonstrated expertise in optical character reading technology, we believe the equipment presents the lesser risk. Mailer usage of ZIP + 4 is, in our view, the principal uncertainty.

OVERALL CONCLUSIONS

Given the ROI's extreme sensitivity to ZIP + 4 usage levels, and the uncertainty of mailer cooperation at this time, GAO lacks a basis to give an unqualified endorsement to the program or, conversely, to rule out the chances of its success.

The major uncertainties regarding mailer usage concern

--whether the Postal Service will be successful in establishing a postage rate incentive to offer ZIP + 4 mailers; and

--whether the amount of such an established incentive would be sufficient to result in a usage rate which, in turn, would be adequate to make the ZIP + 4 program cost effective.

However, on balance--and having considered the above risks and uncertainties--we believe that:

--The Postal Service should proceed with its plans to acquire the new automated equipment, provided it demonstrates that the equipment will perform adequately (that is, performs at contract specifications). Use of the equipment with the five-digit ZIP Code alone would justify this acquisition.

--The Postal Service should proceed with ZIP + 4 if and when--in addition to having demonstrated that the equipment will perform adequately--the Service has (1) an established postage rate incentive and (2) reasonable assurance that the incentive will result in ZIP + 4 usage sufficient to make the system cost effective. The potential incremental gain to the

Postal Service in moving from automated use of the five-digit code to automated use of the nine-digit code is so great in comparison with the incremental cost that if these conditions are met, the move to ZIP + 4 would be more than justified.

--Use of the nine-digit ZIP Code by householders would not be absolutely necessary to make the ZIP + 4 program succeed.

AGENCY COMMENTS AND OUR EVALUATION

Postal Service comments on our draft report appear in appendix XIV. We discussed the Service's comments in individual chapters of the report.

We recommended Postal Service actions to:

--Improve the OCR readability of mail. (See p. 60.)

--Improve the testing and evaluation of new equipment. (See pp. 71 and 72.)

--Broaden assistance to mailers in converting their mailing lists to ZIP + 4. (See p. 132.)

--Ensure that at least the current quality of delivery service for five-digit ZIP Code mail is maintained after ZIP + 4 is implemented. (See pp. 132 and 133.)

--Provide mailers necessary information about the ZIP + 4 program. (See p. 133.)

The Postal Service concurred in general with our recommendations and described current and planned actions to comply with them. In one significant decision, the Service accepted our recommendation to extend the testing of new equipment and said it would conduct its own 8-to-12-week test on one of the first OCRs delivered to a postal facility from each contractor. Data from these tests will enable the Service to better assess the performance and reliability of the new equipment.

Regarding our conclusion that business mailers lacked necessary information about the ZIP + 4 program to enable them to make informed decisions about whether to convert to ZIP + 4, the Service agreed. It said that following enactment of the 1981 Omnibus Budget Reconciliation Act, it had cancelled aggressive ZIP + 4 education and information programs to comply with the intent of the act. It said such programs would be reinstated.

Although the potential ROI which we calculated was favorable for the ZIP + 4 project, the Postmaster General considered it understated, primarily because of the methodology we

used in calculating the ROI. The Postmaster General disagreed with our treatment of the assumed one-half-cent rate reduction for ZIP + 4 mail as a program cost in computing the ROI. He held the view that the rate reduction represents a distribution of savings to mailers, as required by law, and that it should not diminish the ROI.

We hold the position that because the proposed rate reduction is a necessary incentive to induce large-volume mailers to use ZIP + 4, it should be treated as a program cost for purposes of computing the ROI. The Service is, in effect, buying mailers' usage of the nine-digit code. Without this usage, the program would not succeed, and there would be no savings to distribute.

However, the benefits measured by the GAO-calculated ROI are understated by the extent to which the cumulative amount of the rate reduction received by mailers, over time, exceeds mailers' costs of adding the ZIP + 4 code to their address files. We cannot estimate such costs but it is reasonable to expect that most mailers will not add the ZIP + 4 code to their address files unless they can realize savings from repeated use of the expanded code.

The Postal Service disagreed with our assumption that the Service's contract for a toll-free "800" telephone inquiry service would remain in force for the full 16 year project evaluation period at a total cost of $500 million. As we stated earlier (see p. 30), there is no evidence to support the Service's assumption that the volume of calls requesting nine-digit ZIP Codes would drop markedly after fiscal year 1985, causing costs for this service to drop.

The Postal Service contended that, although we recognized in our draft report a number of additional savings potentially available through the use of automation and ZIP + 4, we failed to include these savings in our ROI calculations. As we pointed out earlier (see pp. 48, 49, and 53), we did not include these potential additional savings in our ROI calculations because it was not possible to quantify them with sufficient accuracy. Most of them depended on planned actions which were still uncertain and tenuous at the close of our review. Where possible, we did indicate the possible magnitude of savings on the basis of available information, but we continue to believe it was not prudent to include them in the ROI calculations. For the same reasons, we did not include in our ROI calculations certain potential additional costs to the Postal Service which we identify in the report.

APPENDIX I

House of Representatives
Committee on Post Office
and Civil Service
Washington, D.C. 20515

October 1, 1981

The Honorable Milton J. Socolar
Acting Comptroller General
General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Socolar:

Public Law 97-35 prohibits the U.S. Postal Service from final implementation of its proposed ZIP + 4 program before October 1, 1983. This legislation was passed in part because of the concerns of some Members that the added cost to the Postal Service and the business mailers by the additional four digits may not be offset by the estimated cost savings and proposed rate discount.

The Congress wanted to be assured that the optical charater readers and the bar code readers will work as claimed by the Postal Service and that the savings assumed in the use of the additional four digits to the present ZIP Code are correct. In addition, we are interested in the accuracy of the Postal Service's return on investment calculations and the value of the whole proposed system.

The Conference Report on this legislation requested the General Accounting Office to study these issues in order to help Congress resolve these questions. The study should not only focus on the accuracy and reliability of equipment used in the nine digit system, but on all other aspects of the system, including possible benefits to the mailers and consumers.

APPENDIX I

Your findings and suggested improvements, if any, are requested by December 1, 1982.

With best wishes.

Sincerely,

Hon. William D. Ford, M.C.

Hon. Edward J. Derwinski, M.C.

Hon. William L. Clay, M.C.

Hon. Mickey Leland, M.C.

Hon. William V. Roth, Jr., U.S.S.

Hon. Thomas F. Eagleton, U.S.S.

Hon. Ted Stevens, U.S.S.

Hon. Charles McC. Mathias, Jr., U.S.S.

Hon. David Pryor, U.S.S.

APPENDIX II

ASSUMPTIONS USED BY POSTAL SERVICE IN 1980 ECONOMIC ANALYSIS

The following assumptions were used by the Postal Service in its 1980 economic analysis supporting its proposal for acquisition of automated equipment to be used in conjunction with the nine-digit ZIP Code:

1. Assumed average annual wage rate escalation factor: 7.42 percent.

2. Assumed average annual escalation factor for equipment purchase in Phase II and all spare parts purchase costs: 10 percent.

3. Equipment (EZRs, OCR/CSs, and BCSs) assumed deployed during fiscal years 1981 through 1986.

4. No change in First-Class Mail volume assumed above or below 1980 level.

5. Only existing First-Class Mail volumes, processed during the Postal Service's 1980 mail flow study at selected facilities, were used in the flow. No changes assumed in area mail processing or mail transfer network. Existing mail dispatch times were assumed.

6. No enricher for M-36 Facer-Canceler assumed. The M-36 was assumed to be fully operational and used to separate meter and facing identification mark (FIM) tagged mail from stamped mail in the collection mail operation.

7. Metered and FIM mail from the collection mail operation, along with all machinable meter mail and large-volume meter mail volumes, will be processed on OCR/CSs. Stamped mail from collection mail stream will be processed either manually or on MPLSMs.

8. OCR/CS rejects will be sent to MPLSM processing. One-hour delay between OCR and MPLSM assumed.

9. No change in presort mail volume levels of 1980.

10. Incoming mail with three-digit make-up with bar code already affixed would be processed on OCR in a "channel only" mode in order to separate into BCS programs.

11. Managed mail and three-digit mail received at a facility will be divided between the OCR/CS and BCS operations by

APPENDIX II

the percentage of successfully bar coded mail at that facility in the originating mail stream.

12. Until the usage rate of the nine-digit ZIP Code has reached 60 to 80 percent, all five-digit mail, and nine-digit mail which is not processed by the automated system (script and other non- OCR/CS readable mail) will be processed to carrier route by MPLSM or manual operators using scheme knowledge. Thereafter, nine-digit mail not processable by the automated equipment will be processed to carrier route on EZR-equipped MPLSMs, and five-digit mail will be processed to carrier route by manual operators using scheme knowledge.

13. Assumed OCR accept rates:

--Large volume meter mail: 80 percent.
--Meter belt mail: 70 percent.
--Meter and FIM mail in the collection stream: 60 percent.

14. With the exception of New York, it was assumed that in the baseline system 50 percent of First-Class Mail volume to be sorted to carrier route was done so on MPLSMs, unless actual ratios were higher in a given postal facility.

15. Assumed BCS accept rate: 98 percent.

16. Assumed equipment performance:

Equipment	Throughput Pcs./Hour	Productivity Pcs./Workhour
OCR/CS	28,000	10,000
Large BCS	36,000	4,000
Small BCS	14,000	4,000
MPLSM Primary	34,000	*
MPLSM Secondary	27,000	*

* Actual productivity used for each test site.

17. Third-class mail volumes not included. It was assumed that this mail would be processed through the system during a slower time of day and that therefore no additional equipment would be necessary.

APPENDIX III

GAO METHODOLOGY USED IN ASSESSING POTENTIAL COSTS AND SAVINGS TO POSTAL SERVICE

We generally followed the Postal Service's approach in analyzing costs and savings. Our costs and savings were based on the Postal Service Capital Investment Committee proposal; on interviews with local, regional, and headquarters officials; and on a GAO projection of savings based on 30 statistically selected postal facilities nationwide. We developed a computer model to represent each facility and performed sensitivity analyses using these models. We analyzed Postal Service assumptions underlying the proposal and inherent in the Service's cash flow analysis, and we revised the analysis where necessary. We developed GAO-adjusted cash flow schedules to represent the original ZIP + 4 proposal and to represent projected costs and savings associated with an automated system using the current five-digit ZIP Code. In addition, we separated the original proposal into three separate projects as required by Postal Service guidelines and to better identify costs and benefits. Using conventional methods we also developed return-on-investment computations for each of the projects.

On the basis of projections and actual studies, the Postal Service had identified equipment needs and work-hour savings in 208 postal facilities nationwide. From these facilities we statistically selected the following 30 facilities to verify operational savings under the proposed ZIP + 4 system:

Postal Facilities Included in our Review

New York, NY	North Suburban, IL
Bronx, NY	South Suburban, IL
Hicksville, NY	St. Paul, MN
Paterson, NJ	St. Louis, MO
Pittsburgh, PA	Mid-Missouri
Charleston, WV	Fort Worth, TX
Atlanta, GA	Waco, TX
Tampa, FL	San Antonio, TX
Nashville, TN	Los Angeles, CA
Chattanooga, TN	Van Nuys, CA
Jackson, MS	San Diego, CA
Cleveland, OH	Fresno, CA
South Bend, IN	Oakland, CA
Detroit, MI	Portland, OR
Chicago, IL	Honolulu, HI

APPENDIX III

At each of the above facilities we (1) reviewed actual mail volume and productivity records, (2) verified the total hours per day needed to process mail using current equipment, and (3) verified the amount of equipment and daily work-hours needed to process mail under the proposed nine-digit program. We identified errors made by the Postal Service in determining mail volumes and mail densities, in simulating the mail flow, and in calculating the hourly savings. We made adjustments for errors in the mail flow simulation and hourly savings computations.

We discussed the results of our review with postal officials in each of the 30 facilities and with regional and headquarters officials. On the basis of these discussions and our analysis, we developed a computerized mail flow model representing each of the 30 facilities and used the model to project national savings for the Service's ZIP + 4 program, to identify savings from an automated five-digit ZIP Code program, and to perform various sensitivity studies.

At Postal Service headquarters we analyzed the assumptions used to develop the proposal and obtained documentation used to identify costs. Where appropriate, we adjusted the costs as a result of our work and projected costs throughout the 16 year evaluation period. We included in our cost estimates ZIP + 4 related costs which were excluded from the Service's analysis.

We developed adjusted cash flow schedules to represent the original ZIP + 4 proposal and to represent an automated mail processing system using the current five-digit ZIP Code.

We determined that the original ZIP + 4 proposal contained costs and benefits associated with (1) improvement in current equipment, (2) automation, and (3) expansion of the ZIP Code. We therefore separated the proposal, as required by the Service's own capital investment guidelines, into the following three projects: (1) improvements in the current mail processing equipment, (2) automation using the current five-digit ZIP Code system, and (3) further automation, with expansion of the five-digit ZIP Code to nine digits.

Cash flows were developed for each of the proposals and ROI computations were made using conventional methods. These conventional methods require that all costs and benefits resulting from an investment be included in determining the cash flows. We therefore included in our ROI computations the Postal Service-assumed one-half cent rate incentive for each piece of properly prepared ZIP + 4 mail. We presented ROI computations assuming that (1) the one-half-cent-per-piece incentive would remain fixed and (2) the incentive would escalate annually over the 16 year evaluation period at the same rate--7.42 percent--at which the Postal Service assumed that labor costs would escalate.

THE POSTAL SERVICE'S ZIP + 4 RELATED COSTS
(in million of dollars)

COST DESCRIPTIONS	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	Total
Assignment of codes and address file maintenance (staff-hours, ADP support, and loan of file tapes to mailers.)	$23.0	$6.8	$6.5	$7.0	$7.6	$8.1	$8.7	$9.3	$10.0	$10.8	$11.6	$12.5	$13.4	$14.4	$15.4	$16.6	$181.7
Telephone inquiry service and conversion of address lists.	--	--	18.5	23.5	25.1	27.0	29.0	31.1	33.4	35.9	38.6	41.4	44.5	47.8	51.3	55.2	502.3
Code retrieval for mail forwarding service (staff and equipment.)	--	--	17.7	13.9	11.2	8.0	6.3	3.5	2.5	2.1	4.1	1.5	1.7	1.8	5.4	2.1	81.8
Printed directories for internal Postal Service use.			1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.8	25.8
Advertising and promotion.	1.0	.4	—	—	--	—	—	—	—	—	—	—	—	—	—	—	1.4
Notification of ZIP + 4 code mailed to every address in the Nation, including those notified in 1981.	2.6	.8	12.7	--	—	—	—	—	—	—	—	—	—	—	—	—	16.1
Total	$26.6	$8.0	$56.5	$45.6	$45.2	$44.5	$45.5	$45.5	$47.6	$50.6	$56.3	$57.5	$61.9	$66.4	$74.7	$76.7	$809.1

*Since the majority of the above costs are staff related, we applied the projected annual labor wage rate escalation factor of 7.42 percent used by the Service in its 1980 economic analysis.

APPENDIX IV

GAO-PREPARED TABLE SHOWING ZIP + 4 INVESTMENT CASH FLOW WITH FIXED INCENTIVE

(USPS COST & REVENUE ACCOUNTS IN $MILLIONS FOR YEARS 1981-1996)

USPS-PROJECT YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
CALENDAR YEAR	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	*****
HARDWARE INVESTMENT	-13.	-129.	-126.	-169.	-186.	-138.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-762.
PROGRAM EXPENSE COSTS	-6.	-28.	-21.	-26.	-29.	-22.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-132.
MAINTENANCE LABOR	-59.	-72.	-89.	-102.	-116.	-130.	-133.	-143.	-154.	-165.	-178.	-191.	-205.	-221.	-237.	-255.	-2452.
MAINTENANCE TRAINING	-6.	-12.	-11.	-12.	-11.	-6.	-4.	-4.	-5.	-5.	-5.	-6.	-6.	-6.	-7.	-7.	-114.
MAINTENANCE PARTS	-4.	-5.	-8.	-11.	-16.	-22.	-27.	-30.	-33.	-36.	-40.	-44.	-48.	-53.	-58.	-64.	-496.
EXPANDED ZIP CODE RELATED COST	-27.	-8.	-57.	-46.	-45.	-45.	-46.	-46.	-48.	-51.	-56.	-58.	-62.	-66.	-75.	-77.	-809.
SUB-TOTAL OF COSTS	-115.	-254.	-312.	-365.	-404.	-363.	-210.	-223.	-239.	-257.	-279.	-298.	-321.	-346.	-377.	-403.	-4765.
OUTGOING CLERK SAVINGS	0.	2.	24.	50.	79.	114.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	269.
SYSTEM CLERK SAVINGS (INTERIM)	0.	0.	22.	73.	166.	311.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	572.
SYSTEM CLERK SAVINGS (TOTAL)	0.	0.	0.	0.	0.	0.	616.	662.	711.	764.	821.	882.	948.	1018.	1093.	1174.	8691.
SUB-TOTAL OF SAVINGS	0.	2.	45.	124.	245.	425.	616.	662.	711.	764.	821.	882.	948.	1018.	1093.	1174.	9532.
TOTAL ALTERNATIVE A	-115.	-252.	-266.	-242.	-159.	62.	407.	440.	473.	508.	542.	584.	626.	672.	716.	771.	4767.
LESS BASELINE COSTS	67.	74.	79.	85.	92.	99.	106.	114.	123.	132.	143.	153.	165.	178.	191.	206.	2009.
LARGE FCM RATE-REDUCTION	0.	-39.	-55.	-77.	-96.	-120.	-140.	-140.	-140.	-140.	-140.	-140.	-140.	-140.	-140.	-140.	-1789.
NET CASH FLOW	-48.	-217.	-241.	-233.	-163.	41.	373.	414.	455.	500.	545.	597.	651.	709.	767.	837.	4987.

ROI 26.1 Percent

APPENDIX V

GAO-PREPARED TABLE SHOWING ZIP + 4 INVESTMENT CASH FLOW WITH ESCALATED INCENTIVE

(USPS COST & REVENUE ACCOUNTS IN $MILLIONS FOR YEARS 1981-1996)

USPS-PROJECT YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
CALENDAR YEAR	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	****
HARDWARE INVESTMENT	-13.	-129.	-126.	-169.	-186.	-138.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-762.
PROGRAM EXPENSE COSTS	-6.	-28.	-21.	-26.	-29.	-22.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-132.
MAINTENANCE LABOR	-59.	-72.	-89.	-102.	-116.	-130.	-133.	-143.	-154.	-165.	-178.	-191.	-205.	-221.	-237.	-255.	-2452.
MAINTENANCE TRAINING	-6.	-12.	-11.	-12.	-11.	-6.	-4.	-4.	-5.	-5.	-5.	-6.	-6.	-6.	-7.	-7.	-114.
MAINTENANCE PARTS	-4.	-5.	-8.	-11.	-16.	-22.	-27.	-30.	-33.	-36.	-40.	-44.	-48.	-53.	-58.	-64.	-496.
EXPANDED ZIP CODE RELATED COST	-27.	-8.	-57.	-46.	-45.	-45.	-46.	-46.	-48.	-51.	-56.	-58.	-62.	-66.	-75.	-77.	-809.
SUB-TOTAL OF COSTS	-115.	-254.	-312.	-365.	-404.	-363.	-210.	-223.	-239.	-257.	-279.	-298.	-321.	-346.	-377.	-403.	-4765.
OUTGOING CLERK SAVINGS	0.	2.	24.	50.	79.	114.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	269.
SYSTEM CLERK SAVINGS (INTERIM)	0.	0.	22.	73.	166.	311.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	572.
SYSTEM CLERK SAVINGS (TOTAL)	0.	0.	0.	0.	0.	0.	616.	662.	711.	764.	821.	882.	948.	1018.	1093.	1174.	8691.
SUB-TOTAL OF SAVINGS	0.	2.	45.	124.	245.	425.	616.	662.	711.	764.	821.	882.	948.	1018.	1093.	1174.	9532.
TOTAL ALTERNATIVE A	-115.	-252.	-266.	-242.	-159.	62.	407.	440.	473.	508.	542.	584.	626.	672.	716.	771.	4767.
LESS BASELINE COSTS	67.	74.	79.	85.	92.	99.	106.	114.	123.	132.	143.	153.	165.	178.	191.	206.	2009.
LARGE FCM RATE-REDUCTION	0.	-42.	-63.	-95.	-127.	-172.	-215.	-232.	-249.	-267.	-287.	-308.	-331.	-356.	-382.	-411.	-3537.
NET CASH FLOW	-48.	-220.	-250.	-251.	-194.	-11.	298.	323.	347.	373.	398.	429.	460.	494.	525.	567.	3239.

ROI 19.8 Percent

APPENDIX VI

GAO-PREPARED TABLE SHOWING FIVE-DIGIT INVESTMENT CASH FLOW

(USPS COST & REVENUE ACCOUNTS IN $MILLIONS FOR YEARS 1981-1996)

USPS-PROJECT YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
CALENDAR YEAR	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	*****
HARDWARE INVESTMENT	-13.	-114.	-126.	-158.	-181.	-60.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-651.
PROGRAM EXPENSE COSTS	-6.	-24.	-21.	-25.	-28.	-9.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-114.
MAINTENANCE LABOR	-59.	-72.	-87.	-100.	-113.	-129.	-139.	-150.	-161.	-173.	-186.	-200.	-215.	-231.	-248.	-266.	-2526.
MAINTENANCE TRAINING	-6.	-12.	-11.	-11.	-11.	-6.	-5.	-6.	-6.	-7.	-7.	-8.	-8.	-9.	-10.	-10.	-133.
MAINTENANCE PARTS	-4.	-5.	-8.	-11.	-15.	-22.	-25.	-28.	-31.	-34.	-37.	-41.	-45.	-49.	-54.	-60.	-467.
EXPANDED ZIP CODE RELATED COST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SUB-TOTAL OF COSTS	-89.	-227.	-252.	-304.	-348.	-225.	-170.	-183.	-198.	-213.	-230.	-248.	-268.	-289.	-312.	-336.	-3891.
OUTGOING CLERK SAVINGS	0.	2.	24.	50.	79.	114.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	269.
SYSTEM CLERK SAVINGS (INTERIM)	0.	0.	1.	13.	34.	70.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	117.
SYSTEM CLERK SAVINGS (TOTAL)	0.	0.	0.	0.	0.	0.	214.	230.	247.	265.	285.	306.	329.	353.	380.	408.	3017.
SUB-TOTAL OF SAVINGS	0.	2.	25.	63.	113.	184.	214.	230.	247.	265.	285.	306.	329.	353.	380.	408.	3404.
TOTAL ALTERNATIVE A	-89.	-225.	-228.	-241.	-235.	-41.	44.	47.	49.	52.	55.	58.	61.	65.	68.	71.	-487.
LESS BASELINE COSTS	67.	74.	79.	85.	92.	99.	106.	114.	123.	132.	143.	153.	165.	178.	191.	206.	2009.
LARGE FCM RATE-REDUCTION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET CASH FLOW	-21.	-151.	-149.	-156.	-143.	57.	150.	161.	172.	185.	198.	212.	226.	242.	259.	277.	1522.

ROI 17 Percent

APPENDIX VII

GAO-PREPARED TABLE SHOWING INCREMENTAL EZR INVESTMENT CASH FLOW

(USPS COST & REVENUE ACCOUNTS IN $MILLIONS FOR YEARS 1981-1996)

USPS-PROJECT YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
CALENDAR YEAR	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	****
HARDWARE INVESTMENT	0.	0.	-6.	-6.	-2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-14.
PROGRAM EXPENSE COSTS	0.	0.	-1.	-1.	-1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-3.
MAINTENANCE LABOR	-22.	-23.	-25.	-25.	-26.	-28.	-30.	-32.	-34.	-37.	-39.	-42.	-46.	-49.	-53.	-56.	-566.
MAINTENANCE TRAINING	-1.	-1.	-1.	-1.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-8.
MAINTENANCE PARTS	-2.	-2.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-2.	-2.	-2.	-2.	-21.
EXPANDED ZIP CODE RELATED COST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SUB-TOTAL OF COSTS	-24.	-26.	-34.	-34.	-30.	-29.	-31.	-33.	-36.	-38.	-41.	-44.	-47.	-51.	-55.	-59.	-613.
OUTGOING CLERK SAVINGS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SYSTEM CLERK SAVINGS (INTERIM)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SYSTEM CLERK SAVINGS (TOTAL)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SUB-TOTAL OF SAVINGS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL ALTERNATIVE A	-24.	-26.	-34.	-34.	-30.	-29.	-31.	-33.	-36.	-38.	-41.	-44.	-47.	-51.	-55.	-59.	-613.
LESS BASELINE COSTS	24.	26.	28.	30.	33.	35.	38.	41.	44.	47.	51.	55.	59.	64.	68.	74.	718.
LARGE FCM RATE-REDUCTION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET CASH FLOW	-0.	-0.	-6.	-4.	3.	7.	7.	8.	8.	9.	10.	11.	12.	13.	14.	15.	105.

ROI 47.9 Percent

APPENDIX VIII

GAO-PREPARED TABLE SHOWING INCREMENTAL FIVE-DIGIT INVESTMENT CASH FLOW

(ASSUMING AFFIRMATIVE DECISION MADE ON EZR INVESTMENT)

	(USPS COST & REVENUE ACCOUNTS IN $MILLIONS FOR YEARS 1981-1996)																
USPS-PROJECT YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
CALENDAR YEAR	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	*****
HARDWARE INVESTMENT	-13.	-114.	-120.	-152.	-178.	-60.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-637.
PROGRAM EXPENSE COSTS	-6.	-24.	-20.	-23.	-28.	-9.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-111.
MAINTENANCE LABOR	-0.	-7.	-18.	-27.	-36.	-46.	-50.	-54.	-58.	-63.	-68.	-73.	-78.	-84.	-91.	-98.	-853.
MAINTENANCE TRAINING	-2.	-7.	-6.	-6.	-6.	-1.	-0.	-0.	-0.	-0.	-0.	-0.	-1.	-1.	-1.	-1.	-33.
MAINTENANCE PARTS	0.	-0.	-3.	-6.	-11.	-17.	-20.	-22.	-24.	-27.	-29.	-32.	-35.	-39.	-43.	-47.	-354.
EXPANDED ZIP CODE RELATED COST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SUB-TOTAL OF COSTS	-21.	-152.	-167.	-215.	-259.	-133.	-71.	-77.	-83.	-90.	-97.	-105.	-114.	-124.	-134.	-145.	-1988.
OUTGOING CLERK SAVINGS	0.	2.	24.	50.	79.	114.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	269.
SYSTEM CLERK SAVINGS (INTERIM)	0.	0.	1.	13.	34.	70.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	117.
SYSTEM CLERK SAVINGS (TOTAL)	0.	0.	0.	0.	0.	0.	214.	230.	247.	265.	285.	306.	329.	353.	380.	408.	3017.
SUB-TOTAL OF SAVINGS	0.	2.	25.	63.	113.	184.	214.	230.	247.	265.	285.	306.	329.	353.	380.	408.	3404.
TOTAL ALTERNATIVE A	-21.	-151.	-142.	-152.	-146.	51.	143.	153.	164.	176.	188.	201.	215.	230.	246.	263.	1416.
LESS BASELINE COSTS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LARGE FCM RATE-REDUCTION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET CASH FLOW	-21.	-151.	-142.	-152.	-146.	51.	143.	153.	164.	176.	188.	201.	215.	230.	246.	263.	1416.

ROI 16.3 Percent

APPENDIX IX

GAO-PREPARED TABLE SHOWING INCREMENTAL NINE-DIGIT INVESTMENT CASH FLOW

(ASSUMING AFFIRMATIVE DECISION MADE ON EZR AND FIVE-DIGIT INVESTMENTS

AND ASSUMING FIXED INCENTIVE)

(USPS COST & REVENUE ACCOUNTS IN $MILLIONS FOR YEARS 1981-1996)

USPS-PROJECT YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
CALENDAR YEAR	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	****
HARDWARE INVESTMENT	0.	-15.	-1.	-11.	-6.	-79.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-111.
PROGRAM EXPENSE COSTS	0.	-3.	-0.	-2.	-1.	-12.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-19.
MAINTENANCE LABOR	0.	-0.	-1.	-2.	-3.	-2.	6.	6.	7.	7.	8.	9.	9.	10.	11.	11.	75.
MAINTENANCE TRAINING	0.	-1.	-0.	-0.	-0.	-1.	1.	2.	2.	2.	2.	2.	2.	2.	3.	3.	19.
MAINTENANCE PARTS	0.	0.	-0.	-0.	-1.	0.	-2.	-2.	-2.	-2.	-3.	-3.	-3.	-3.	-4.	-4.	-29.
EXPANDED ZIP CODE RELATED COST	-27.	-8.	-57.	-46.	-45.	-45.	-46.	-46.	-48.	-51.	-56.	-58.	-62.	-66.	-75.	-77.	-809.
SUB-TOTAL OF COSTS	-27.	-27.	-59.	-61.	-56.	-138.	-40.	-39.	-41.	-44.	-49.	-50.	-54.	-58.	-65.	-67.	-873.
OUTGOING CLERK SAVINGS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SYSTEM CLERK SAVINGS (INTERIM)	0.	0.	21.	60.	132.	241.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	454.
SYSTEM CLERK SAVINGS (TOTAL)	0.	0.	0.	0.	0.	0.	402.	432.	464.	499.	536.	576.	619.	664.	714.	767.	5674.
SUB-TOTAL OF SAVINGS	0.	0.	21.	60.	132.	241.	402.	432.	464.	499.	536.	576.	619.	664.	714.	767.	6128.
TOTAL ALTERNATIVE A	-27.	-27.	-38.	-1.	76.	104.	363.	393.	423.	455.	487.	526.	565.	607.	648.	700.	5255.
LESS BASELINE COSTS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LARGE-FCM RATE-REDUCTION	0.	-39.	-55.	-77.	-96.	-120.	-140.	-140.	-140.	-140.	-140.	-140.	-140.	-140.	-140.	-140.	-1789.
NET CASH FLOW	-27.	-66.	-93.	-77.	-20.	-17.	222.	253.	283.	315.	347.	386.	425.	467.	508.	560.	3466.

ROI 36.4 Percent

APPENDIX X

GAO-PREPARED TABLE SHOWING INCREMENTAL NINE-DIGIT INVESTMENT CASH FLOW

(ASSUMING AFFIRMATIVE DECISION MADE ON EZR AND FIVE-DIGIT INVESTMENTS

AND ASSUMING ESCALATED INCENTIVE)

(USPS COST & REVENUE ACCOUNTS IN $MILLIONS FOR YEARS 1981-1996)

USPS-PROJECT YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
CALENDAR YEAR	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	*****
HARDWARE INVESTMENT	0.	-15.	-1.	-11.	-6.	-79.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-111.
PROGRAM EXPENSE COSTS	0.	-3.	-0.	-2.	-1.	-12.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	-19.
MAINTENANCE LABOR	0.	-0.	-1.	-2.	-3.	-2.	6.	6.	7.	7.	8.	9.	9.	10.	11.	11.	75.
MAINTENANCE TRAINING	0.	-1.	-0.	-0.	-0.	-1.	1.	2.	2.	2.	2.	2.	2.	2.	3.	3.	19.
MAINTENANCE PARTS	0.	0.	-0.	-0.	-1.	0.	-2.	-2.	-2.	-2.	-3.	-3.	-3.	-3.	-4.	-4.	-29.
EXPANDED ZIP CODE RELATED COST	-27.	-8.	-57.	-46.	-45.	-45.	-46.	-46.	-48.	-51.	-56.	-58.	-62.	-66.	-75.	-77.	-809.
SUB-TOTAL OF COSTS	-27.	-27.	-59.	-61.	-56.	-138.	-40.	-39.	-41.	-44.	-49.	-50.	-54.	-58.	-65.	-67.	-873.
OUTGOING CLERK SAVINGS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SYSTEM CLERK SAVINGS (INTERIM)	0.	0.	21.	60.	132.	241.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	454.
SYSTEM CLERK SAVINGS (TOTAL)	0.	0.	0.	0.	0.	0.	402.	432.	464.	499.	536.	576.	619.	664.	714.	767.	5674.
SUB-TOTAL OF SAVINGS	0.	0.	21.	60.	132.	241.	402.	432.	464.	499.	536.	576.	619.	664.	714.	767.	6128.
TOTAL ALTERNATIVE A	-27.	-27.	-38.	-1.	76.	104.	363.	393.	423.	455.	487.	526.	565.	607.	648.	700.	5255.
LESS BASELINE COSTS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LARGE FCM RATE-REDUCTION	0.	-42.	-63.	-95.	-127.	-172.	-215.	-232.	-249.	-267.	-287.	-308.	-331.	-356.	-382.	-411.	-3537.
NET CASH FLOW	-27.	-69.	-101.	-95.	-52.	-69.	147.	161.	175.	188.	200.	218.	234.	251.	266.	290.	1718.

ROI 23.5 Percent

APPENDIX XI

HOW WE SELECTED MAILERS TO RECEIVE OUR QUESTIONNAIRE

The Postal Service developed, as a general sales monitoring tool, a list of large-volume mailers it considered important to the success of the First-Class Mail presort programs. [1]/ The list contained the names of 538 "Key Accounts." Because of their large mail volumes, the Service said these key account mailers would be important to the success of the ZIP + 4 program as well. We sent our questionnaire to 416 businesses on the list, which had been updated in 1981 before we began our review.

Eighty-five of the 538 key accounts were not sent a questionnaire essentially because the decision as to whether to use ZIP + 4 would be made elsewhere. The construction of the key account list helps to explain this. The names of some mailers appeared more than once on the list because different business locations or organizational elements of the same organization were considered separate postal customers (accounts) for sales purposes. Working from a Postal Service-provided list of names of possible ZIP + 4 decisionmakers, we attempted to learn whether one location or unit (for example, a headquarters unit) would answer for the others and, if so, we sent that location or unit the questionnaire.

Another 37 accounts were not sent questionnaires for various reasons, including the following:

--The account name was illegible.

--The account was a Federal agency.

--The name and address of the person to whom the questionnaire should be sent were not readily available.

While we did not send Federal agencies a questionnaire, we did contact them about ZIP + 4. (See p. 111.)

[1]/The list was originally developed to monitor sales activity in connection with the five-digit ZIP Code presort program for First-Class Mail. However, the Service will also use the list to monitor sales progress for the First-Class Mail Carrier Route Presort program, which began March 1981.

APPENDIX XII

We received 315 usable responses (about 76 percent) to the 416 questionnaires mailed. As indicated by our source list, the respondents were generally large-volume mailers of First-Class Mail. Of the 306 respondents who provided their First-Class Mail volumes for 1981, about

--7 percent mailed less than 1 million pieces,

--23 percent mailed 1 million to less than 5 million pieces,

--46 percent mailed 5 million to less than 20 million pieces, and

--24 percent mailed 20 million pieces or more.

These mail volumes include First-Class Mail that some respondents (such as mailing services) mailed for other businesses.

While the key account list was the best listing of large-volume mailers readily available within the Postal Service, it was by no means an exhaustive inventory of organizations that generate large volumes of First-Class Mail. Further, the data collected from questionnaire responses cannot be statistically projected beyond the 315 respondents. However, on the basis of other information we collected, we suspect that the basic messages the respondents provided (see p. 109) may have wider application among organizations that generate large volumes of First-Class Mail.

APPENDIX XIII

SURVEY OF U.S. POSTAL SERVICE USERS REGARDING THE PROPOSED NINE-DIGIT ZIP CODE

Reprinted on the next few pages is a facsimile of the questionnaire we used to survey large-volume mailers of First-Class Mail to learn their views of--and possible costs associated with--the ZIP + 4 program. Where practicable, we have shown the number of respondents who answered a question and the percentage who selected each possible answer. The percentages for some questions add to more than 100 because respondents selected more than one answer.

APPENDIX XIII

U.S. GENERAL ACCOUNTING OFFICE

SURVEY OF U.S. POSTAL SERVICE USERS REGARDING THE PROPOSED 9-DIGIT ZIP CODE

Introduction

The U.S. General Accounting Office, an agency of the Congress, is studying the U.S. Postal Service's proposed addition of a hyphen and 4 digits to the present 5-digit ZIP Code. The USPS calls the proposal "ZIP + 4" and intends its use to be voluntary. As part of our study, we are contacting a sample of potential code users, like your organization. Among other things, the questionnaire asks about your costs and benefits associated with the possible use of the expanded Code, and your willingness to use it. At the end of the questionnaire, there is space for you to add any comments you may have on the proposed 9-digit ZIP Code.

The term "your organization" refers to the unit for which the decision to use, or not use, the 9-digit ZIP Code will be made. If the decision will be a central one covering the entire company, the term refers to the entire company that received this questionnaire. If the decision is a decentralized one, the term refers to the department or branch that received this questionnaire.

This questionnaire should be completed by the person most knowledgeable about whether or not your organization will use the 9-digit ZIP Code. If you are not that person, please give it to the appropriate person.

Your responses will be combined with the responses from all others in our report to the Congress. Should individual answers appear in the report, they will not include information to identify the individual respondents. The number appearing at the top of the questionnaire is only to aid us in our follow-up efforts, and will not be used to identify you with your responses.

Throughout the questionnaire there are numbers printed within parentheses to assist in coding responses for computer analysis. Please disregard these numbers.

Please return the completed questionnaire in the enclosed pre-addressed, postage-paid envelope within 10 days. In the event the envelope is misplaced, the return address is:

Mr. Tony Assia
U.S. General Accounting Office
Room 3866
441 G Street, N.W.
Washington, D.C. 20548

If you have any questions about the survey, please call Mr. Assia, collect, at (202) 245-5397.

Your Organization's Mailing Practices

1. About how many pieces of first-class mail did your organization mail, and/or have mailed for you, in 1981? *(Fill in number.)*

						0	0	0	Pieces of first-class mail

(5-10)

2. Approximately what percentage of your first-class mail is prepared/mailed for your organization by a mailing house or service bureau? *(Check one.)* *(11)*

(314 respondents)

4.4 1. ☐ 100 percent
6.7 2. ☐ 75-99 percent
4.1 3. ☐ 50-74 percent
3.5 4. ☐ 25-49 percent
26.8 5. ☐ 1-24 percent
54.5 6. ☐ 0 percent

3. Of your outgoing first-class mail in 1981, about how many pieces did you mail, under contract, for others? *(Fill in number or check box.)* (308 respondents)

						0	0	0	Pieces of first-class mail

(12-17)

87.7 ☐ None *(18)*

4. The Postal Service currently has two programs in which mailers receive postage discounts to presort their outgoing first-class mail: (1) presort by ZIP Code and (2) presort by postal carrier route.

Do you presort any of your first-class mail? *(Check one box in each row.)* (315 respondents)

		Yes	No	
1.	By Zip Code	92.4 ☐	☐	7.6 *(19)*
2.	By carrier route	8.3 ☐	☐	91.7 *(20)* [a]

[a] We marked the answer as "no" if respondent did not state whether the organization carrier route presorted First-Class Mail.

APPENDIX XIII

5. Your volume of first-class mail may change over the coming years because of business conditions, postal rates, electronic transmission of letters, etc.
Keeping such factors in mind, do you think your present volume of outgoing first-class mail will increase, decrease, or remain unchanged by 1984? *(Check one.)* (314 respondents) *(21)*

16.2 1. ☐ Increase substantially
61.2 2. ☐ Increase somewhat
10.5 3. ☐ No change
(Skip to Question 7.)
6.7 4. ☐ Decrease somewhat
1.9 5. ☐ Decrease substantially
3.5 6. ☐ Uncertain or don't know *(Skip to Question 7.)*

6. If you believe your volume of first-class mail will decrease by 1984, which of the following explains why? *(Check all that apply.)* (26 respondents) *(22-27)*

38.5 1. ☐ Change to other classes of mail
42.3 2. ☐ Change in general business conditions
38.5 3. ☐ Change in your business practices
26.9 4. ☐ Change in first-class mail postage rates
34.6 5. ☐ Change to use of electronic transmission of letters
11.5 6. ☐ Other *(Please specify)* _____

9-Digit Zip Code Familiarity

7. Which of the following best describes your familiarity with the proposed 9-digit ZIP Code program? *(Check one.)* (314 respondents) *(28)*

14.0 1. ☐ Thorough familiarity
40.1 2. ☐ Considerable familiarity
37.6 3. ☐ Some familiarity
6.7 4. ☐ Little familiarity
1.6 5. ☐ No familiarity
(Skip to Question 13.)

8. From what sources did you gain your information about the 9-digit ZIP Code program? *(Check all that apply.)* (287 respondents) *(29-33)*

97.2 1. ☐ U.S. Postal Service
56.1 2. ☐ Trade and professional publications and meetings
39.7 3. ☐ General news media (e.g., newspaper)
16.7 4. ☐ Word-of-mouth
5.9 5. ☐ Other *(Please specify)* _____
(Skip to Question 11.)

9. From which of the following Postal Service sources did you receive information about the 9-digit ZIP Code program? *(Check all that apply.)* (276 respondents) *(34-38)*

82.2 1. ☐ Discussions with USPS customer service representatives
61.2 2. ☐ USPS postal forums
57.2 3. ☐ USPS postal customer councils
75.4 4. ☐ USPS literature
6.9 5. ☐ Other *(Please specify)* _____

10. Overall, how would you rate the Postal Service's information in terms of explaining the program? *(Check one.)* (275 respondents) *(39)*

15.3 1. ☐ Very satisfactory
59.6 2. ☐ Satisfactory
17.8 3. ☐ Neither satisfactory nor unsatisfactory
6.6 4. ☐ Unsatisfactory
.7 5. ☐ Very unsatisfactory

APPENDIX XIII

11. What benefits or advantages, if any, do you perceive the 9-digit ZIP Code offers your organization compared to the 5-digit ZIP Code? *(If no benefits or advantages are perceived, write "None." If uncertain, write "Uncertain.")* *(40)*

(286 respondents)

25.2 None

20.6 Uncertain

54.2 Provides one or more possible benefits/advantages

12. What disadvantages, if any, do you perceive the 9-digit ZIP Code offers your organization compared to the 5-digit ZIP Code? *(If no disadvantages are perceived, write "None." If uncertain, write "Uncertain.")* *(41)*

(284 respondents)

8.8 None

16.6 Uncertain

74.6 Provides one or more possible disadvantages

APPENDIX XIII

Potential Cost to Convert to 9-Digit ZIP Code

13. One step in converting to the 9-digit ZIP Code would be to add the hyphen and 4 new digits to your address files used for first-class mail. The cost, if any, to make the conversion may include planning and preparation.

Please complete the following table for the most important files *(up to 12)* which have a **reasonable possibility** of being converted. Please include files you keep for others, by contract, **only** if **you** would make the conversion decision.

If the conversion cost for a file has not been estimated, please give us your best educated guess as to the conversion cost and place a "4"—"educated guess"—in the "Estimation Method" column. *(If you cannot estimate the cost, enter a "5"—"cannot estimate"—in the Estimation Method column but also fill in the Storage Form, Frequency Used, and Number of Addresses columns.)*

If no file has a reasonable possibility of being converted, write "None" on the first line. If you are uncertain about conversion possibilities, write "Uncertain" on the first line. If you do not maintain address files, write "Not applicable" on the first line. *(If "None," "Uncertain," or "Not applicable," skip to Question 17.)*

File	Storage Form[1]	Frequency Used[2]	Approximate Number of Addresses	Approximate Conversion Cost	Estimation Method[3]
1				$	
2				$	
3				$	
4				$	
5				$	
6				$	
7				$	
8				$	
9				$	
10				$	
11				$	
12				$	

[1] Storage form: use appropriate number

1 - Computer tape
2 - Computer disk
3 - Word processing equipment
4 - Mechanical system *(Please specify)* _____
5 - Other *(Please specify)* _____

[2] Frequency used: use number that represents the highest frequency of file use

1 - Daily
2 - Weekly
3 - Bi-weekly
4 - Monthly
5 - Quarterly
6 - Semi-annually
7 - Annually

[3] Estimation method: use appropriate number(s)

1 - Study done by this organization
2 - Study done by outside firm
3 - Actual conversion experience
4 - Educated guess
5 - Cannot estimate
6 - Other *(Please specify)* _____

APPENDIX XIII

14. In total, how many files used for first-class mail do you have that have a reasonable possibility of being converted? *(Fill in number.)*

			Files

(43-45)

15. After file conversion to the 9-digit ZIP Code, addresses may be received which have no 9-digit code, an incorrect code, or a new code.

For all those files listed in Question 13 which have a reasonable possibility of being converted, and for which conversion costs have been estimated, please enter the estimated annual cost to keep all those files current with 9-digit ZIP codes.

(If this cost has not been estimated, please give us your best "educated guess.") (Fill in amount or check box.)

$						0	0

(47-51)

☐ Cannot estimate

(52)

16. Overall, what would be the estimated annual cost to keep all those files current with <u>5-digit</u> ZIP codes? *(If this cost has not been estimated, please give us your best "educated guess.") (Fill in amount or check box.)*

$						0	0

(53-57)

☐ Cannot estimate

(58)

Rate Discount For 9-Digit ZIP Code Use

17. Last spring the Postal Service proposed a new subclass of first-class mail. It would have given mailers who mailed in volume and used the 9-digit ZIP Code a postage rate discount of 1/2 cent for each qualifying letter and postcard. (The proposal was submitted to the Postal Rate Commission but later withdrawn; however, the Postal Service plans to resubmit a discount proposal.)

Under the withdrawn proposal, several criteria would have been used to determine whether a mailer could receive a discount. One was the volume of first-class letters and postcards mailed. A discount would have been allowed when 500 or more letters/postcards were mailed at a time. No minimum number of pieces was required to go to any one place.

Another criterion was whether each piece of mail was of proper size, thickness, and weight to be processed by machine—"machinable." (USPS machinable letters, for example, in 1981 ranged in size from 3 1/2" x 5" to 6 1/8" x 11 1/2" and from .007" to .25" in thickness.)

► Of the first-class mail you mailed and/or had mailed for you in 1981, about what percentage was machinable and mailed in volumes of 500 or more pieces at a time? *(Please exclude from your 1981 volume any pieces presorted to carrier route.) (Please fill in number.)* (296 respondents)

_____ Percent

(59-61)

90.0 percent = median

18. Would you use the 9-digit ZIP Code on your outgoing first-class letters and postcards if there were no rate discount? *(Check one.)* (311 respondents) *(62)*

1.6	1.	☐ Definitely yes
10.6	2.	☐ Probably yes
18.3	3.	☐ Uncertain
35.1	4.	☐ Probably no
34.4	5.	☐ Definitely no

APPENDIX XIII

19. Please explain why you would use, not use, or are uncertain about using the 9-digit ZIP Code if there were no rate discount. *(63)*

21. If you do not plan to print or are uncertain about printing the vertical bar code on your courtesy and business reply mail by 1984, please explain why below. *(65)*

Other Information

20. Your organization may provide customers or potential customers with "courtesy" (self-addressed) or business reply envelopes and postcards. When supplies of such envelopes and postcards are ordered, a series of vertical bars and half bars representing your ZIP Code can be printed along with your address.

The Postal Service is acquiring more machines that can read these bar codes. It is providing, without charge, bar code patterns for 9-digit ZIP codes and the Facing Identification Mark, or FIM. The FIM pattern is placed at the top and near the right corner of mail pieces to enable automatic detection of the bar coded ZIP number.

Do you plan to have the vertical bar code representing your 9-digit ZIP Code printed on your courtesy and business reply mail by 1984? *(Check one.)* *(64)*

(309 respondents)

43.7 1. ☐ Yes *(Skip to Question 23.)*

9.7 2. ☐ No

42.4 3. ☐ Uncertain

4.2 4. ☐ Not applicable. We do not provide courtesy and business reply envelopes/postcards. *(Skip to Question 24.)*

22. Without regard to the bar code, do you plan to have your 9-digit ZIP Code printed on your courtesy and business reply mail by 1984? *(Check one.)* *(66)*

(157 respondents)

10.8 1. ☐ Yes

22.9 2. ☐ No

66.3 3. ☐ Uncertain

23. Approximately how many pieces of courtesy and business reply mail did your organization receive in 1981? *(Fill in number or check box.)*

						0	0	0

(67-72) Pieces of courtesy and business reply mail

☐ Unknown *(73)*

APPENDIX XIII

24. Which of the following statements describes your organization's current position on adding the proposed 9-digit ZIP Code to addresses used for first-class mail? *(Check all that apply.)* *(74-79)*
(313 respondents)

1.0 1. ☐ We have already converted some or all of our files.

8.0 2. ☐ We will convert our address files when the Postal Service goes ahead with the program, regardless of the discount, if any.

65.5 3. ☐ We will make our decision after we know what the postage discount amount will be.

20.1 4. ☐ We will make our decision after the program begins and others have converted their address files.

5.8 5. ☐ We do not expect to convert our address files.

14.1 6. ☐ Other *(Please specify)*_____

Note: For question 24, some respondents checked more than one answer. Because of the various combinations of answers, the percentages shown above are not identical to those in the report body.

25. Which of the following best describes the primary activity of your organization? *(Check one.)* *(80-81)*
(314 respondents)

24.8 1. ☐ Banking

2. ☐ Business services

3. ☐ Credit agency other than bank

7.0 4. ☐ Government

11.8 5. ☐ Insurance

6. ☐ Mailing services

7. ☐ Printing and publishing

25.2 8. ☐ Public utility

13.4 9. ☐ Retail trade

10. ☐ Other *(Please specify)*_____

17.8 All respondents who checked a box other than banking, government, insurance, public utility and retail trade.

PLEASE CONTINUE TO THE NEXT PAGE

APPENDIX XIII

26. If you have any comments or suggestions regarding the proposed 9-digit ZIP Code, please use the space provided below. *(82)*

Optional Information

Please provide below the name, title, address, and telephone number of the person completing this questionnaire in case any clarification is necessary. (This information is voluntary and will ultimately be separated from the questionnaire.)

Name: _____

Title: _____

Address: _____

_____

_____

Telephone: _____
Area code Number

Please check here if you would like a copy of our final report.

☐

APPENDIX XIV

THE POSTMASTER GENERAL
Washington, DC 20260-0010

November 16, 1982

Dear Mr. Anderson:

This refers to your proposed report entitled, "Automation of Mail Processing Should Continue; The Postal Service Should Adopt Nine-Digit ZIP Code If Certain Conditions Are Met."

We are pleased to read that:

- GAO does endorse the new equipment and its use to process five digit ZIP coded mail, provided that the Postal Service demonstrates that the equipment will perform adequately.

- GAO believes that the potential incremental gains to the Postal Service in moving from automated use of the five-digit ZIP code to automated use of the nine-digit ZIP Code is so great in comparison with the incremental cost that if certain conditions are met, the move to ZIP + 4 would be more than justified.

You may be sure that the new equipment will perform adequately and we will take whatever steps are necessary to see that it does, including the more extended testing which the report recommends.

You may also be sure that the necessary conditions for the success of ZIP + 4 will be firmly established before we go forward, including a rate incentive sufficient to ensure that the system's benefits will exceed the costs.

At the December meeting of our Board of Governors, management will propose filing with the Postal Rate Commission a rate incentive of one-half cent per piece for qualifying First Class Zip + 4 mail. Our market research indicates that mailers will respond positively to this discount rate.

We have also developed a program to provide appropriate technical conversion assistance, direct contact with business mailers, and other material that will clearly explain to business mailers the advantages Zip + 4 has to offer.

APPENDIX XIV

The total return on investment (ROI) developed in the report for the ZIP + 4 program more than justifies our investment, but in our view this ROI is understated. There are several reasons for this, but the one to which we call particular attention is the report's treatment of our one half cent rate reduction as a program benefit.

Under the law, any savings the Postal Service nets from any investment in improved efficiency must ultimately be passed through to the mailers via the rate structure. But to follow the logic of the report's ROI methodology, when we pass a benefit through, e.g., as a rate decrease, we must treat this benefit as a cost and charge it against ROI. There is some anomaly in a methodology whereby benefits diminish ROI and become a disincentive to investment.

Since the report's ROI's are still quite favorable, we will not pursue all the reasons why we believe they should be higher. Our concern is that the report dwells so extensively on revising ROI calculations that it may distract readers from the report's overall conclusions which we regard as quite positive. As the report itself notes, ROI is not the complete picture.

The above points and several others are discussed at greater length in the attached USPS staff comments and have also been discussed with your staff.

Your report deals with a complex planning effort and your staff has had to work against tight deadlines in accomplishing their research. We commend the industry, expertise and fairmindedness they have brought to their task and welcome their helpful recommendations.

With any large undertaking there are always some risks and uncertainties, but with ZIP + 4 we believe they are minimal and the potential benefits are enormous. We are confident that those who read your report with the attention it deserves will see the importance of the Postal Service's pressing forward with this program.

Thank you for the opportunity to offer our comments.

Sincerely,

William F. Bolger

Mr. William J. Anderson
Director, General
Government Division
U.S. General Accounting Office
Washington, D. C. 20548

Attachment

Chapter 3 - pp. 25-30 and Appendix IV

GAO

ZIP + 4 related costs which could exceed $800 million were excluded from the economic analysis.

USPS RESPONSE

We cannot agree with the assumptions GAO has made in projecting ZIP + 4 related costs over the 16-year evaluation period.

Of the $800 million identified in Appendix IV (ZIP + 4 Related Costs), $500 million are associated with the toll free inquiry system. This contract is for a three-year period when demand for a service of this nature will be at its highest. GAO has assumed that the contract will remain in force for the full duration of the evaluation period. The Postal Service does not plan to extend, at the same level, a contractual telephone inquiry system beyond the initial three year contract period. While we agree with the need to retain a customer inquiry system on a continuing basis, the Postal Service believes the demand for this service will taper off markedly in future years. In the long term, the Postal Service will use its existing network of personnel currently providing 5 digit ZIP Code information to the public. This existing network will assume responsibility for ZIP + 4 inquiries using microfilm/microfiche and computer retrieval systems. Hardware costs will not be significant since we will tie into the same microfilm/microfiche computer hardware being deployed in our computer forwarding system.

On the basis of the above reasoning, the Postal Service projects ZIP + 4 related costs at $379.4 million over the evaluation period as opposed to the $809.1 million projected by GAO. This variance of $429.7 million dollars stems from GAO's assumption that on-going ZIP + 4 costs are likely to remain at a level equivalent to that of the start-up period. This is contrary to the experience of the Postal Service and to other organizations which have similarly incurred high initial costs to generate support for, and acceptance of, major systems changes. Accordingly, we believe the GAO should reassess its cost projections.

Chapter 3 - p. 35

GAO

The ROI rates are different because GAO determined net cash flow by considering anticipated reductions in revenue caused by a proposed rate incentive, as required by the conventional method for computing an ROI, which further lowers the ROI to 25.1 percent or 18.6 percent depending on whether the proposed rate incentive remains fixed or is escalated for inflation.

(GAO Note: In the finalized report, these ROIs read "26 percent" instead of "25.1 percent" and "20 percent" instead of "18.6 percent.")

USPS RESPONSE

The USPS disagrees with the concept of including the rate incentive in the cash flows used for equipment justification. As will be shown, the conventional method outlined above is not applicable to the USPS because all net positive changes in cash flows must be returned to our customers. This return will occur in the form of specific incentives for use of the ZIP + 4 code and in the form of a general reduction in the USPS costs.

APPENDIX XIV

Including this proposed rebate of USPS savings as a program cost in the ROI analysis renders the analysis meaningless. In fact, if rate reductions resulting from a program were treated consistently as costs all program savings would have to be deducted from the cash flow. Of course, this action would produce an ROI with a value of zero or even a negative, and no cost reduction programs based on capital investments would be attempted by the USPS. Therefore, once the initial investment and its related cost of capital are saved, any additional savings are returned to Postal customers. The GAO notes on page 47 , that the incentive or rate reduction is returned to the mailers in the form of benefits totaling $1.8 billion while leaving the Postal Service a net cash flow of $3.4 billion.

As noted above, the USPS disagrees with this practice of deducting the rate reduction from the cash flow. Since the Service is required to return all program savings to its customers, both the $1.8 billion as well as the $3.4 billion will be returned and the ROI will be zero. This example illustrates that the conventional method of subtracting revenue reductions from cash flows is not appropriate when analyzing USPS programs.

GAO Note: In the finalized report, the dollar amounts mentioned in the above two paragraphs read "$3.54 billion" instead of "$3.4 billion" and "$1.72 billion" instead of "$1.8 billion."

APPENDIX XIV

Chapter 4 - pp. 56-60

GAO

Improve the OCR readability of mail through (1) a test program to develop data for better OCR readability guidelines, (2) clear procedures to apply these guidelines, and (3) the collection of data on mailer reactions.

USPS RESPONSE

We agree with the recommendation that a test program be developed for improving the OCR readability of the mail base. We also agree that this program should be developed using proper test equipment and with personnel who are trained and experienced in OCR equipment.

Guidelines and procedures are now being evaluated for the proposed rate filing which will specify how the readability guidelines will be administered for incentive qualifications.

Acceptance criteria have been established that the Postal Service will present to the Postal Rate Commission as eligibility requirements for mailers to receive the discount. Our rate case will specify that mail would have to meet the five requirements stipulated below before it qualifies for the ZIP + 4 discount:

- bear a ZIP + 4 code;
- be tendered in minimum 500 piece volumes and presented in trays;
- have postage not requiring cancellation;
- be compatible (i.e., readable/machinable) with Optical Character Reader and Bar Code Sorter mail processing equipment, and
- be presented and marked as required by the Postal Service.

These criteria may change based on actual experience with the equipment, which might result in revised requirements for machine readability.

A plan will be developed to train postal acceptance clerks on the above-stated criteria between now and the time that the discount is implemented.

Market Research will be conducted and feedback from the Mailers Technical Advisory Committee and our national network of Customer Services Representatives will be analyzed to identify mailer reaction to voluntary addressing changes on mail that does not qualify for the discount.

APPENDIX XIV

The Service plans to monitor the performance of 5-Digit ZIP code mail through an exception measurement system similar to the systems used to measure certain segments of parcel post, Mailgram and particular first-class markets. Through this approach the Service can ascertain service levels and possibly reassess its decision not to maintain a continuous tracking system for 5-Digit ZIP code mail.

APPENDIX XIV

Chapter 7 - pp. 141 and 142

GAO

Mailer behavior is the principal uncertainty.

USPS RESPONSE

In context, "uncertainty" implies that mailers may not respond to the Postal Service program. Based on our marketing experience we believe we understand the behavior and needs of our customers. We realize that customers will respond only if they see advantages to their businesses. We have planned the ZIP + 4 program with customer needs uppermost in our minds, and our ultimate decisions will reflect this as evidenced by input received and used already from mailers and their associations.

The General Accounting Office findings and recommendations fall in line with the ZIP + 4 marketing plans for Fiscal Year 1983. ZIP + 4 will be positioned as the logical extension of the current five-digit ZIP Code, an important part of the Postal Service's overall automation story, and a method for allowing the Postal Service to provide more accurate, consistent mail service to its customers.

Industry and user profiles will be developed for identifying and assisting First-Class business customers with voluntary conversion to ZIP + 4.

The mailers' costs for converting to ZIP + 4 are minimal when compared to the savings they can realize through long-term rate stability, more accurate and consistent mail service, and a ZIP + 4 usage rate discount. Mailers will be informed of the long-term and short-term benefits from ZIP + 4 conversion.

To increase mailer awareness of ZIP + 4, the Postal Service will continue to disseminate information through the various avenues available, including: the Mailers' Technical Advisory Committee (MTAC), Postal Customer Councils (PCC), postal seminars, regional and national postal forums, business and trade media and the various mailer associations. This comprehensive promotional program will be supported by technical conversion assistance, direct contact with business mailers, sales literature, and other promotional materials.

Chapter 7

GAO

Overall conclusions.

USPS RESPONSE

GAO's analysis addressed Postal Service actions and assumptions quantified in the 1980 analysis. There are a number of program improvements which have occurred since 1980, and these modifications will serve to increase the return-on-investment. In fact, the following major items have been recognized by GAO but were not included in their economic calculations.

APPENDIX XIV

Chapter 4 - pp. 61-75

GAO

The USPS should have an extended First Article test program prior to delivery of production units. Acceptance test procedures are too short to obtain reliable results concerning the machine's design and performance.

USPS RESPONSE

We agree that an eight week test is a better indicator of machine reliability and durability, and accept GAO's recommendation. We plan to conduct a special 8 - 12 week test and evaluation effort on one of the first OCR's delivered under the two contracts. This will not only include monitoring contract related performance but an evaluation of reliability, maintainability, and equipment support functions, i.e., spares, etc.

The OCR acceptance procedures being pursued will provide equipment that is operationally sound and performs as predicted. We plan to continue with our on-site live mail testing and acceptance approach. This is the only way we can assure ourselves that each machine is tuned specifically to the mail base at the site of installation.

For future automated equipment, the USPS agrees that all significant engineering changes will be tested and evaluated prior to incorporation into the equipment.

APPENDIX XIV

Chapter 5 - pp. 92, 95-97, and 132

GAO

Conversion assistance is appropriate but should be more flexible.

One time manual list conversion is too limited. Broaden the eligibility criteria for manual list conversion in order to aid more mailers.

Local postmasters would have the discretion to update a business address list and to provide the code for the less than 500 address list. Rather than leaving this service to local discretion, the Postal Service should establish a consistent policy. Provide uniform guidelines for local postmasters to follow in honoring customers' requests for ZIP + 4 codes.

USPS RESPONSE

The maximum volume criteria of 500 addresses is a manageable base that will be appropriate for most mailers. At the time this criterion was established, the Postal Service lacked information on the demand for ZIP + 4 conversion assistance among small mailers. However, if sufficient interest is generated from mailers with less than 500 addresses, a lower minimum volume can be instituted without difficulty. The Postal Service will still correct lists below this level. Mailers will send minimum volume lists to their local postmasters where lists will be batched and sent to the list conversion center. Uniform guidelines will be issued to postmasters.

The "noncomputerized" criteria will be changed to the term "machine generated." This term includes address lists printed by minicomputers, word processors and typewriters, but would exclude large computerized address lists that are more efficiently updated by tape.

The one time rule is not intended to indicate an inflexible position for the future. While mailers should continue to assume responsibility for maintenance of their internal address files, the USPS would be willing to consider multiple requests based upon valid customers' needs.

Chapter 5 - pp. 132 and 133

GAO

Modify the Service's information system to track delivery times of manually sorted five-digit mail, when the switch to full manual sortation occurs, and make the resulting information a matter of postal management review and a basis for corrective actions.

USPS RESPONSE

We agree that the delivery times of manually sorted five-digit mail should be measured and a matter of postal management review. We intend to monitor the performance of mail with these characteristics and will take the necessary management actions to protect the service on five-digit mail.

APPENDIX XIV

1. The decision to use all small bar code channel sorters (SBCS) has already been made (p. 48). This action alone will reduce initial capital investment requirements by $225 million while also doubling operational productivity for this piece of automation.

2. While stating on page 41 of the report that "the proposed rate incentive should improve the acceptance rates for nine-digit mail" and by charging the incentive to the program, the GAO failed to increase acceptance rates of the OCR. It should be noted that in order for a mailer to receive the incentive, the mail must be OCR readable and a ZIP + 4 code must be printed on the envelope. These requirements will therefore serve to increase the overall OCR acceptance rates by approximately 13% and significantly increase savings.

3. The USPS will have lower than anticipated wage rates for operators of the new equipment. This action will result in a $270 million savings over the program period. Although this action was noted on page 49 of the report, it was not included in GAO's economic calculations since it is still subject to discussion with the unions.

4. The USPS will use a mixture of different level employees to maintain the equipment. Originally only one level of maintenance personnel was projected. This action will reduce costs by $40 million over the next 16 years. (Page 49)

5. The original USPS cost calculations were based on processing all mail volume on the existing multiposition letter sorting machines (MPLSM). In fact, a portion of this volume is presently processed on manual cases. Therefore, the costs in the baseline are understated. Projected savings will be greater than anticipated.

6. Additional savings will be provided by a reduction in manual and MPLSM scheme training. With the proposed automated ZIP + 4 system, there will be significant reductions in the requirement to initially train and retrain distribution clerks.

7. To be conservative and provide for a relatively long phase-in period, the 1980 USPS analysis showed maintenance labor cost being incurred in the same year in which the automation was installed. However, corresponding mail distribution savings were not taken until the next year. In actual operation, labor savings will be realized within the first weeks of operation. For example, equipment operators are to be trained in only one week. Then once the machines are installed, immediate savings will be realized.

8. Increased savings will also be returned to the Postal Service when third class volume is processed on the automated equipment. Based on estimates provided in the 1980 Postal Service analysis, this action would increase savings by four percent or $359 million over the 16 year period.

9. With the new automated equipment, fewer errors will be made and USPS rehandling will be reduced. This action will result in lower processing costs. This action would result in increasing the projected savings by another 4 percent and would also provide $359 million to the USPS over the total period.

10. As noted on page 136 of the GAO report, additional mail could be identified and processed through the automated sytem. This mail will be printed with a special facing identification mark (FIM) code and separated from the collection mail by the cancelling machines. When this additional mail is entered into the automated system, savings are increased.

In summary, the above items demonstrate that there will be additional savings available from the automated system. GAO did not include these points in their final ROI calculations although they mentioned many of them in their report.

While the USPS does not agree with the GAO cash flow which presents an ROI of 18.68 percent, if only two of the above items are included a significantly higher ROI is obtained. That is, when the change from large bar code channel sorters (LBCSs) to all SBCSs and the increased acceptance rates, due to the incentive, are included into the cash flow, then an ROI of 35.6 percent is obtained. The other items noted above would serve to further increase the return on investment.

Many of the above items will also serve to increase the ROI on five-digit processing. That is, if the USPS decision to utilize only SBCSs and not purchase LBCSs is considered, the GAO return-on-investment (ROI = 16.3%) presented in Appendix IX will increase to 25.3 percent. The USPS had originally projected an ROI of 22 percent, and already in Phase I of the program $50 million has been saved because the above program improvement has been made. Therefore, when all of the above favorable items are considered, it is anticipated that the GAO projections of ROI can be significantly increased.

GAO Note: Page numbers have been changed to correspond to the final report.

DOCUMAIL SYSTEMS DIVISION
9801 Industrial Boulevard, Lenexa, Kansas 66215 (913) 888-8775
BELL & HOWELL

November 9, 1982

Mr. William J. Anderson
United States General Accounting Office
General Government Division
Washington, D.C. 20548

Subject: GAO Report to Congress - Zip + 4 Program USPS Contract 104230-82-D-0606.

In the draft of subject report the General Accounting Office (GAO) suggests that the lack of a contractual requirement to perform a "standard first article test" on the Small Bar Code Sorter (SBCS) is a weakness in the Zip + 4 Automation Program. It is Bell & Howell's position that this criticism is unfounded. There are numerous aspects of the overall SBCS project both contractual and program related, which assure that the Postal Service will receive a quality product -- not only for the first sorter but also for the 248th. While these points were covered in earlier discussions with the GAO, perhaps we should reiterate them here for the record.

We feel that there are adequate safeguards specifically addressed in the contract to assure that a quality SBCS is delivered to the Postal Service. Under the terms and conditions of the contract, the vendor must meet the requirements of MIL-I-45208. To comply with this, a formal Quality Program has been established. At the basis of the Program are written procedures covering incoming inspection, in-process inspection and final test of the sorter. These procedures have been communicated to the Postal Service in the form of our Quality Control Manual. It is our feeling that quality assurance is a process and not an end in itself. The entire program yields the end result. In order to better monitor adherence to our Quality Procedures, the Postal Service has delegated plant cognizance to the Defense Contract Administration Service (DCAS). Currently, there are resident inspectors from DCAS assigned to the program at both our Chicago and Lenexa facilities. This provides adequate coverage to assure compliance.

The contract also call out a rigorous acceptance test plan which is to be met not only on the first machine but on all machines. The acceptance test mirrors the test performed in Chicago, Illinois in August, 1981, in which our sorter was "qualified" for the SBCS Program. By Contract each production sorter must attain 95% of the performance demonstrated in the earlier test for each criteria measured. The test will be conducted at the installation site and attested to by the Postal Service Quality Assurance Function. The

implication here is that all units delivered will be subjected to testing which resembles "first article." For your review we are attaching the contractual provisions of the acceptance test plan. While we have every expectation that our equipment will meet or exceed these requirements, we acknowledge that the tests will be very demanding.

There are certain other elements of the SBCS program which should be reiterated to underscore the attention devoted to quality. Shortly after receiving the award of the contract Bell & Howell undertook the construction of a second "prototype" of the RA-9 sorter. To establish that the documentation on the machine was correct, we produced a sorter from vendor supplied parts that were produced to our drawings. In this way we qualified our vendors and surfaced any problems in the documentation. Although this was the "long route" to get into production we felt that it was necessary to the end of consistency of the manufacturing process. To be sure this was not covered in the contract. However, through preaward negotiations the Postal Service was well aware of our "prototype" plan and, indeed, closely monitored the progress of the prototype assembly.

Beyond the requirements stated thus far, the most significant aspect of the program which establishes the acceptability of the end product is our Final Test Plan. This plan calls for us to run from one million to two million pieces of test mail through each machine before it leaves our manufacturing plant. To this end we have purchased over $500,000 of test mail of varying sizes and thicknesses, bar coded and non-bar coded. We are currently running Q. C. final test on two shifts six days per week. At the end of this test process we have each machine accomplish the same acceptance test that will be conducted at installation in the Post Office. All testing may be observed by the resident DCAS inspector. It should be noted that we are already conducting this testing on our first production machines. For example, serial number 2001 has run over three million pieces of mail prior to shipment to Norman, Oklahoma. Here again, the Postal Service was aware of our intent to subject our equipment to this extensive testing procedure. The cost to preform these tests was a major item in the audit of our proposal pricing. Consequently, the procedures were discussed at considerable length in pre-contract negotiations.

Finally, as stated in the GAO draft, the equipment to be produced under the SBCS contract is based on a fairly well established technology. Production configuration does closely match that of the first machine tested; the technology is our own; we have been producing like equipment for the commercial market place.

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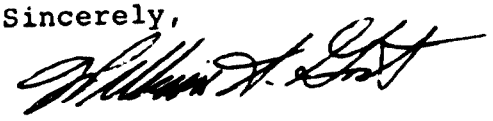
United States General Accounting Office
November 9, 1982
Page Three

Based on all of these contractural and program elements we feel that the Postal Service is more than adequately protected in this procurement without a formal first article. In fact, we at Bell & Howell know of no other procedure that could be added to the program to measurably enhance what is already taking place. We would be pleased to discuss our program with you should you still have questions.

Sincerely,



William T. Gost
Contract Administration

WTG/st
Attachment

GAO Note: We did not reproduce the attachment.

Burroughs Corporation

FEDERAL AND SPECIAL SYSTEMS GROUP
P.O. Box 517 • Paoli, Pennsylvania 19301

10 November 1982
14600-FJZ-487

Mr. Warren J. Anderson
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Anderson:

In keeping with your request in letter dated 27 October 1982, Burroughs offers the following comments to those portions of the draft report provided therewith.

Need for a First Article Test

Burroughs has no comments relative to the need for a first article test under the OCR contract. However, we believe certain comments should be made, clarifying various statements made by the report author relative to the design of our machine. The author is correct in stating that there are differences in the design of the OCR machine purchased under Contract 104230-81-W-1597 and the release/loan machine, however, as required in this contract, said OCR machine is functionally identical to the release/loan machine. Burroughs and NEC have incorporated changes which, in most cases, have been tested in both the 60 Stacker machine presently at Burroughs and/or other NEC postal equipment.

Test of Training Machines not an Adequate First Article Test

Burroughs finds this section to be almost totally inaccurate. The machines we are using for training were both manufactured by NEC and not Burroughs. The bulk of the training has been and is being performed on a 60 Stacker machine which has been at Burroughs Cedar Hollow facility since mid-June of 1982. The other training machine is the release/loan machine which has been at Burroughs since December 1980. Burroughs has run live mail from the Philadelphia post office through the 60 Stacker and it has performed as expected.

Late Development of Basic Information and Manuals

This section also contains some inaccuracies which, we believe, must be corrected. The operation and maintenance manuals provided by Burroughs were preliminary manuals which were delivered per the contract schedule. Final O&M manuals were delivered on schedule in October of 1982. Burroughs has never been formally

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notified that our manuals were of poor quality. We have continually communicated to the Postal Service that any comments concerning the data provided to them would be welcomed. To date, Burroughs is not aware of any extensive revisions required or performed by the USPS.

If at all possible, Burroughs would be pleased to receive a copy of the final report.

Very truly yours,

BURROUGHS CORPORATION

Frank J. Zinicola
Manager, Contract Administration
Automation Systems Division

sc

cc: Warren Denise, USPS, Washington, D.C.
John X. Simmons, USPS, Washington, D.C.
Robert Hadley, GAO, Washington, D.C.

APPENDIX XV

Pitney Bowes
Director, OCR/CS Program
OCR Scanner Division

November 8, 1982

Mr. W. J. Anderson, Director
U. S. General Accounting Office
General Government Division
Washington, DC 20548

Dear Mr. Anderson:

We sincerely appreciate the opportunity to review those portions of the GAO draft report (October 27, 1982) to the Congress concerning our participation in the OCR/CS portion of the Postal Service's automation program to implement ZIP + 4. We do not believe that it would be appropriate for us to comment on the GAO's opinion on First Article Testing and related subjects. However, within the contex of the GAO's stated opinions, there appears to be an implication that the task of technology transfer and the ability to deliver quality OCR systems to the USPS taxed the ability of both ELSAG and PB. We would like to point out that the difficulty of this task was fully recognized by both parties at the outset and sizeable resources of both companies were committed to both an orderly transfer of technology and the creation of an ambitious - yet achievable - implementation plan. On this point, Messrs. Hadley and Grubb both recognized these facts and complemented both ELSAG and PB management on the manner in which we addressed these needs from a contract and working relationship point of view.

We would also like to point out that the "extensive modifications" that ELSAG was reported to have made for release loan were not very extensive at all. To meet the specifications for the Release Loan Tests, ELSAG had to replace its contact printing bar code printer with a commercial ink jet printer and add a commercial bar code verifier. Both of these changes were required changes and had low level technical difficulty associated with this implementation.

We also feel that some amplification of the final paragraph concerning late development of basic information and manuals is in order. In a letter of April 27, 1982, to Mr. John Simmons, Mr. Kehle discusses the status of manuals and training materials. This letter is attached for your information and Paragraphs 2, 3, 4 and 6 are of particularly interest. Also attached is a copy of our O&M Manuals and Training Materials enhancement plan which was designed and implemented so that manuals and training materials delivered to the USPS would reflect the experience gained in U. S. Postal Service/Pitney Bowes classroom training sessions. Our training was completed on schedule and manuals were supplied to the U. S. Postal Service in adequate time to meet their November 8,

Commerce Park, Danbury, CT 06810 203 792-1600

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1982 scheduled date for starting in-house training. In summary, the delayed delivery benefitted the United States Postal Service by providing a higher quality manual than would have been achievable if they were delivered prior to the start of training. We believe this explanation places the manuals and training documents subject in proper prospective.

We will be pleased to answer any question you may have on the subject matter contained in this letter.

Very truly yours,

L. J. Keough
Director, OCR/CS Program
/agf
Attachments

APPENDIX XV

RECOGNITION EQUIPMENT INCORPORATED
POST OFFICE BOX 222307
DALLAS, TEXAS 75222
TELEPHONE 214/579-6000
TELEX 73-0653

CARPENTER FREEWAY
AT GRAUWYLER ROAD
IRVING, TEXAS

Recognition

November 11, 1982

Mr. William J. Anderson
Director
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Anderson:

Thank you for your letter of October 27, 1982, containing portions of your draft report to Congress on the ZIP+4 program.

Recognition Equipment Incorporated does not find in this portion of the draft report any disclosure of proprietary information. Further, we believe the report to contain factual data and to present the capabilities of the multi-line read equipment in a straightforward, simplified manner.

Recognition's comments directly concerning the report relate first to the portion, beginning on Page 80, as to why the Service elected to buy single-line read OCR equipment. At the time of their decision, the four reasons stated were perhaps valid. However, Recognition believes that the report could be expanded to address these four points today. With respect to each reason, Recognition offers the following comments.

-- Multi-line read equipment has now been tested by the Service and is available without further development

-- In a recent unsolicited proposal to the Service the multi-line read equipment appeared to be price competitive with single-line equipment already purchased

-- Performance of multi-line equipment under development by the Service has been recently recorded. The Service should comment as to the level of performance achieved.

-- The internal definition of the ZIP+4 within the Service has defined and standardized address directory data bases nationwide. This definition has simplified significantly the development and maintenance of address directories for multi-line equipment.

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Page Two
November 11, 1982
Mr. William J. Anderson

Second, concerning the last sentence of the fourth paragraph on Page 81, it is true that outgoing mail for offices outside of the local area, when coded with only the five-digit bar code, must be processed again through multi-line equipment to add the additional four digits for carrier route sorting. However, no other equipment is in existence today that can add the additional four digits. Without the four digits the mail must be processed manually or through use of multi-position letter sorting machines, neither method applying the four digits in bar code form for multi-pass fine sorting.

Recognition appreciates the opportunity to respond to your draft report and hopes that you will take into consideration the above comments.

Yours sincerely,

Frank Bray

Frank Bray, Manager
Postal Programs

GAO Note: Page numbers have been changed to correspond to the final report.

(220850)

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