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Evaluation**

Evaluation of the Off-Line
Electronic Benefits Transfer
Demonstration

**The Impacts of the
Off-line EBT Demonstration
on the Food Stamp Program**

**Volume III - System Design,
Development, and
Implementation**

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on the Food Stamp Program**

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Development, and Implementation**

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THE IMPACTS OF THE OFF-LINE EBT DEMONSTRATION ON THE FOOD STAMP PROGRAM

The evaluation of the off-line electronic benefits transfer demonstration is presented in three volumes and an Executive Summary.

The Executive Summary presents a concise review of the evaluation and the major findings.

Volume I provides an analysis of the economic impact of off-line EBT on food stamp operations. It also looks at the financial impact of expanding the demonstration.

Volume II describes the costs and other impacts of the off-line EBT system on retailers, recipients, and financial institutions. This research includes both qualitative and quantitative impacts and provides a comparative assessment of off-line EBT versus the paper coupon system.

Volume III describes the off-line EBT system design, development and implementation process; system operations; and, lessons learned. The purpose of this volume is to provide guidance for other EBT development efforts.

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Chapter 1

INTRODUCTION

In the middle to late 1980s, the Food and Nutrition Service (FNS) recognized that off-line electronic benefits transfer (EBT) technology might present an effective mechanism to enhance the delivery of food stamp benefits. After determining that an off-line EBT system was conceptually and technically feasible, FNS initiated an off-line EBT system demonstration.

In September, 1990, the Food and Nutrition Service (FNS) awarded a contract¹ to National Processing Company (NPC) of Louisville, Kentucky, and its subcontractors to design, develop, implement, and operate a demonstration off-line EBT system in Dayton, Ohio. The purpose of the demonstration project, referred to as the PayEase project, was to provide a test of off-line EBT technology for delivering food stamp benefits in a demonstration environment, as was done initially with on-line EBT technology in the Reading Demonstration.

This volume provides a description of the design, development, implementation, and operation of the off-line EBT system. The process and events involved in the demonstration are documented to provide a basis for identifying the factors that contributed to the successful development and implementation of an off-line EBT system. The experiences from this demonstration are expected to provide guidelines for future EBT system development efforts.

Since this volume does not contain a full description of the functional capabilities of the off-line EBT system, readers should refer to Chapter 2 of Volume I which describes the functionality of the off-line EBT system. It also compares the functionality of the paper coupon, off-line EBT, and on-line EBT systems for the following five functions:

- authorizing access to benefits;
- delivering benefits to recipients;
- crediting retailers and financial institutions for food stamp redemptions;

¹ Contract No. 53-3198-0-081 was awarded following a competitive bidding process in response to RFP No. FNS-89-037BC.

- managing retailer participation; and
- reconciling and monitoring benefit issuance and redemption.

In this volume, project-specific and EBT terminology, as well as acronyms, are defined at first use; however, Appendix A contains a glossary of important terms for easy reference.

RESEARCH DESIGN

Data from various sources were compiled for this report. These data sources consisted of:

- vendor-provided documentation, much of it in the form of project deliverables, including the system design document, test plans and reports, monthly progress reports, vendor invoices, and system performance and transaction statistics;
- in-depth, in-person interviews with contractor personnel and key program officials throughout each phase of the demonstration; and
- site visits to the demonstration area and observations of the operations of the off-line EBT system, including discussions with recipients and retailers at the time of the observations.

This report documents the history of the project. It is important for the reader to understand that in examining system development in retrospect, issues and problems can be seen in perspective with the entire project rather than in isolation. As a result, the relative importance of issues may change from the original perception. For example, an original design criteria was the ability for the smart card to maintain and process a separate personal identification number (PIN) for an alternate shopper. This attribute was eliminated due to practical, technical and procedural difficulties. At the time, this modification to the design underwent considerable deliberation; however, in retrospect, not having this capability had little impact on the acceptability of the system.

LEVEL OF EFFORT

The design, development, implementation, and subsequent operations period involved the direct efforts of many organizations. Over 44 person-years of effort were reported by these organizations through December 31, 1992. Exhibit 1-1 presents a summary of the level of effort spent by each organization in each phase. Additional information regarding the level of effort by phase is provided in Chapter 2 and 3 of this volume.

Exhibit 1-1					
LEVEL OF EFFORT SPENT DURING THE DESIGN, DEVELOPMENT, IMPLEMENTATION, AND OPERATIONS PHASES					
(In Person-years)					
Component	Design^a	Development	Implementation	Operations^b	Total
Demonstration Contractor (NPC) ^c	4.02	12.70	13.22	6.63	36.57
Montgomery County	0.18	0.36	1.30	1.96	3.80
State of Ohio	0.53	0.37	0.21	0.15	1.26
Food and Nutrition Service ^d	0.73	1.30	0.44	0.20	2.67
Total	5.46	14.73	15.17	8.94	44.30

Notes: ^a Does not include level of effort prior to contact award (pre-award period).
^b Including time spent during June through December, 1992 for operations activities.
^c Includes time spent by subcontractors.
^d Includes time spent by evaluation team for technical assistance.

LESSONS LEARNED FROM THE DEMONSTRATION

The off-line EBT demonstration answered some important questions about the feasibility of using off-line EBT technology to deliver food stamp benefits. The demonstration also provided guidelines for future system development efforts. Important general lessons, as well as lessons specific to certain points in the development process, were learned during the PayEase demonstration. Detailed below are the lessons learned from the effort to design, develop and implement the off-line EBT demonstration system. These lessons are categorized by administrative, technical, retailer, and recipient issues.

Administrative Issues

Important lessons pertaining to administrative issues encountered during the off-line EBT demonstration include:

- A separate project team -- consisting of program and systems personnel at the state or local agency responsible for maintaining the system used for Food Stamp Program (FSP) administration -- facilitates the EBT development process and provides dedicated resources to deal with unexpected situations that occur once EBT operations begin.
- During the design and development phases, deliverable schedules need to be considered in the context of overall project objectives. A schedule that requires the contractor to submit drafts of certain documents -- such as a Functional Demonstration Plan or an Acceptance Test Plan -- while the project Design Document is at a preliminary stage of development creates the need for extensive editing and multiple iterations of several documents. Unnecessary document production may be detrimental to the project to the extent that it increases costs or diverts personnel from design and development tasks.
- Expectations regarding the content of each deliverable, including the required level of detail, must be made clear to the contractor in advance. Decisions regarding deliverable content should consider the different needs of the contractor and the FNS. If the contractor produces a Design Document in the format and with the emphasis that is most appropriate for its external audience, the document often cannot be used by programming staff without extensive revision. This can result in delays in system development.
- Developing an EBT system concurrent with the implementation of a public assistance system -- a system that supports the administration of the Food Stamp Program and other programs such as Aid to Families with Dependent Children -- can lead to management information system (MIS) resource conflicts and an extra burden on workers. Also, changes made to the public assistance system or missing functionality in it may require unexpected changes in the EBT system being developed. For these reasons, it is preferable to design and develop EBT systems to interface with operational, stable public assistance systems.
- The establishment of a separate channel -- that does not involve caseworkers -- for EBT support at the county or local office that administers the FSP can be desirable. This approach is beneficial to caseworkers because it prevents them from being overwhelmed with EBT-related inquiries, and it provides a single point of contact for recipients who have EBT questions or problems.

Technical Issues

Important lessons related to technical issues encountered during the off-line EBT demonstration include:

- In an off-line EBT system, POS code is more complex because it performs more functions than on-line point of sale (POS) code. Because of its increased functional role, well-developed POS code is critical in an off-line system. Off-line POS code development, therefore, requires special expertise and progress must be closely monitored during system development.
- More extensive and different types of system testing are needed in order to implement systems with fewer initial problems. Suggested improvements to the testing process include: placing more emphasis on running tests over multiple system cycles, testing month-end cycles thoroughly, performing more destructive testing, and expanding the amount of live field testing that is done prior to conversion.
- The communications infrastructure of an area should be examined when considering an EBT system since telephone line technology, in particular, can have a significant impact on the performance of an EBT system.
- Providing the benefit issuance data separately from the primary account number (PAN), the number used to uniquely identify each PayEase card, requires the EBT processor to associate the two data sources to provide benefits to recipients. The need to associate the two data sources can create problems under some circumstances (e.g., when PayEase cards are replaced or recipients' case numbers change). To alleviate potential problems, the PAN should be provided in the same file as the benefit information.

Retailer Issues

Retailer issues encountered during the demonstration provide the following lessons for EBT system development, implementation, and operations:

- A good relationship with the retailer community is an important factor in the success or failure of an EBT project. The relationship between retailers and the EBT project team can be developed by involving retailers in the EBT project from the beginning.

- Retailer training should be provided immediately before system implementation and should focus on teaching cashiers to perform basic system functions and resolve common problems.
- Retailer management training should emphasize basic reconciliation procedures in addition to EBT system functions.
- The following factors are important in providing effective and efficient support to retailers: well-structured procedures for customer service agents to follow in diagnosing problems; the availability of field technicians to ensure timely retailer support; and the capability to download software changes from the EBT host to reduce overall field maintenance personnel costs.

Recipient Issues

The primary lesson that the off-line EBT demonstration provides with respect to recipients is that the general effectiveness of recipient conversion and training is directly impacted by the time and effort devoted to its planning. The PayEase project team believes this to be especially true when conversion and training is to occur over a relatively short time period, as was the case in Dayton.

Limitations of Demonstration Lessons

While the off-line EBT demonstration provided a number of important lessons relevant to both on-line and off-line EBT systems, there were a number of areas in which the PayEase demonstration did not provide much insight because of the limited nature of the demonstration system. For example, the geographic area and the number of participants was fairly limited; therefore, the types of issues associated with a state-wide implementation of an off-line EBT system did not arise in the Dayton demonstration. In order to develop lessons in these areas, further study must be conducted.¹

¹ In February, 1994, the State of Ohio issued a request for proposal to expand the food stamp off-line EBT demonstration state-wide in order to test the technical feasibility of operating the system on a large scale and assess the economies of scale associated with such operations. It is anticipated that there will be an evaluation of this system that will focus on these two issues of technical feasibility and administrative cost impacts.

ORGANIZATION OF VOLUME III

Volume III is comprised of four chapters, including this introduction. Chapter 2 describes the activities involved in the PayEase system development process, which includes system design, development, and implementation. This chapter also provides a brief description of the activities involved in RFP development, proposal review, and the formation of the NPC-led project team. For each project phase, the important activities, level of effort, issues, and decisions are presented.

Chapter 3 describes system operations after implementation had been completed. It addresses the important activities, issues, decisions, and design modifications that occurred during the period. In addition, it provides some operational data and performance statistics for the system.

The final chapter of the report identifies useful lessons to be learned from the project. This chapter is based on the observations of project participants, as conveyed to the evaluation contractor, and our own observations. This chapter is included to provide guidance to other EBT development efforts.

In addition, two appendices are included to assist the reader by providing background information in a concise format. Appendix A contains a glossary of abbreviations and acronyms used throughout this document. Appendix B provides a chronology of important demonstration events.

could be expected to be received positively by participants. The study suggested that the off-line approach was comparable to the on-line approach and offered significant advantages over a paper-based system. The study recommended that if FNS wanted to pursue an off-line approach, an off-line demonstration should be conducted to provide conclusive evidence about the feasibility, specific information about how functional problems could be solved, cost information, and cost-reduction strategies.

Developing the Solicitation and Evaluating Responses

As a result of the feasibility study, the agency decided to issue a request for proposals (RFP) for an off-line EBT demonstration that would serve as the test of off-line technology. Other states would not be allowed to develop off-line food stamp EBT systems until the results of the off-line demonstration were known. FNS also decided that the demonstration should be limited to a single site and be fully funded by the government to make the test parallel to the initial on-line EBT demonstration in Reading, Pennsylvania. The results of the demonstration would be used to determine whether any clarifications or changes in FNS's policy regarding EBT were warranted.

The objectives of the off-line EBT demonstration and the separate evaluation effort included: proving the technological capabilities of off-line technology; determining whether an off-line EBT system would be accepted by participants; and determining whether the technology was cost effective. With respect to the issue of cost effectiveness, FNS wanted to examine the perceptions that off-line systems offered:

- lower telecommunications costs, but required a higher initial investment than on-line systems; and
- better security than on-line systems.

Preparation of the RFP began in February, 1989. The RFP development team included FNS headquarters staff representing the following agency divisions: Management, Program Development, and Financial Management. FNS also used contractor assistance to provide technical assistance in developing the RFP. The solicitation, RFP FNS-89-037BC, was issued

Chapter 2

SYSTEM DEVELOPMENT PROCESS

The development process for an electronic benefits transfer (EBT) system typically involves several major phases, in which the system design life cycle approach is used to create, test, and implement the new system. Because the PayEase system was a FNS demonstration project, the major project phases and milestones were clearly stated, and the PayEase project team was contractually obligated to meet the designated schedule. The description of events in this chapter is structured by project phase: design, development, and implementation. An introductory section describes relevant activities that preceded the contract award.

PRE - AWARD PERIOD

FNS officials indicated that in 1985, several factors had been identified supporting the position that on-line EBT systems had a better chance of success than off-line systems in a food stamp benefit delivery application:

- retailers were currently using on-line point-of-sale (POS) systems and there was the feeling that there would be reluctance among the retailer community to accept an alternative technology;
- off-line technology was immature; and
- off-line EBT was believed to have high costs and low technical reliability.

FNS wanted to maintain momentum for implementing on-line EBT systems, but at the same time, did not want to eliminate off-line EBT from future consideration. As a result, FNS sponsored an off-line EBT feasibility study. The report, completed in September, 1987, addressed the feasibility of off-line systems in four primary areas: conceptual, technological, cost, and user impact.¹ The findings indicated that an off-line EBT system was conceptually and technically feasible, appeared to be comparable to on-line approaches from a cost perspective, and

¹ Paul Coenen et al., The Feasibility of an Off-Line Electronic Benefit Transfer System for the Food Stamp Program, Atlanta, Georgia: Electronic Strategy Associates, Inc., September, 1987.

on June 16, 1989. The solicitation identified requirements in a number of areas including: characteristics of the demonstration site and participants; essential features and performance standards; EBT components; application specifications; functional components; and special Food Stamp Program (FSP) requirements. Some key requirements for the demonstration project included:

- use of an integrated circuit (IC) or "smart card" as the access device;
- state agency involvement in the planning process and the selection of a demonstration site with a population of 8,000 (+/- 25 percent) food stamp households;
- a demonstration site that was a contained shopping area with the following types of retail establishments: major supermarket chains, convenience store chains, and individually owned stores;
- written commitments to participate from all major participants including retailers, the concentrator bank, retail trade associations, and any other agencies teamed with the contractor; and
- a concentrator bank that was a Federal Reserve member bank and was capable of transmitting an ACH file to the Federal Reserve using electronic funds transfer (EFT) technology.

The statement of work also specified that the demonstration would be divided into five phases: design; development; implementation; operations; and either continuation of EBT operations during the period in which the state assumed responsibility for the project, or support for the phase-out of the demonstration system. In addition, bidders were given the opportunity to respond to an optional task: designing an EBT system to provide both food stamp benefits and cash benefits for recipients participating in the Aid to Families with Dependent Children (AFDC) program.

A pre-proposal conference for potential bidders was held on July 17, 1989 at FNS headquarters in Alexandria, Virginia. Following several amendments that changed both proposal requirements and the submission dates, proposals were submitted to FNS on October 4, 1989. Over the next nine months, FNS officials reviewed proposals, asked additional technical questions of bidders, and evaluated responses to these questions. In June, 1990, FNS invited selected

vendors to make oral presentations and requested a best and final offer (BAFO). An award was made to National Processing Company, Inc. (NPC) of Louisville, Kentucky in September, 1990. FNS officials indicated that NPC's technical proposal was determined to be the strongest. Further, FNS officials identified two factors that distinguished the NPC-led team from competing vendors: NPC's prominence as a high-volume off-line transactions processor; and NPC's collaboration with other organizations -- both public and private -- to create a strong partnership for the PayEase team.

Preparing the RFP Response

The PayEase partnership had its beginnings before the FNS RFP was issued. In early 1989, NPC began to examine the feasibility of building on its experience in off-line bank card processing by expanding into EBT. At the same time, the Montgomery County Department of Human Services (MCDHS), the agency that administers the Food Stamp Program and other assistance programs in the Dayton area, was working with consultants and the Public Service Institute (PSI) to study ways of improving client service and benefit delivery.¹ As part of its examination of service delivery alternatives, MCDHS contacted the First National Bank of Dayton (FNBD). This bank, like NPC, was a subsidiary of National City Corporation (NCC). Shortly after, NPC and FNBD, the Ohio Department of Human Services (ODHS), MCDHS, PSI, a Retail Merchant Group, and an assortment of community groups joined together to form the PayEase public/private partnership. Combining the technical data gathered by NPC in their EBT feasibility study and the participant characteristics data and community input gathered by MCDHS and PSI, the PayEase team developed a response to the FNS solicitation.

The PayEase team proposal discussed the establishment of an off-line EBT demonstration system to be tested in an area comprising six zip codes in Dayton, Ohio. The original technical proposal, submitted on October 4, 1989, was supplemented and modified by responses to technical questions during March, 1990 and June, 1990 and NPC's BAFO submitted to FNS on June 29, 1990.

¹ PSI, a non-degree instructional center established to link educational, private sector, and human services resources in response to community needs, played an important role in gathering data for the MCDHS study.

identified below focus on design changes resulting from policy decisions, cost considerations, and technical considerations. Modifications addressed in NPC's June, 1990 BAFO and the underlying issues are described below.

- **Manual transactions and liability** - NPC modified its technical and business proposals to pass the risk of losses resulting from overdrafts on manual transactions to the retailer community, where appropriate and customary with other payment systems. Also, NPC budgeted additional costs, under the category of fraud risk estimates, for non-customary situations that result in uncollectible losses. These two changes were made in response to FNS's clarification, regarding liability on manual transactions, that "the FNS will not accept any liability for losses resulting from the off-line system ...".
- **Change in POS platform** - In NPC's October 4, 1989 proposal, a Leroux Pitts & Associates POS platform was proposed for the development of EBT enhancements. Between October, 1989 and June, 1990, NPC developed an in-house Tandem/SQL POS platform that it planned to use for EBT enhancements. This change was made for several reasons. The Tandem/SQL POS platform offered technical advantages, and cost savings could be realized with the change as well. This change also had an impact on subcontractor usage and NPC facilities cost, since development hours budgeted for Leroux Pitts were replaced by an increased role for NPC staff and use of Tandem contract programmers. The change in POS platforms resulted in the need for software upgrades, which increased both software and software maintenance agreement costs.
- **Change in terminal choice for single-lane retailers** - In the original proposal, the 512K Tranzit XPe terminal was designated for use in the local area network (LAN) environment required to support multi-lane retailers, and a 128K ZONII/XPe terminal was designated for use as a stand-alone terminal in single-lane retailers because it was less expensive and provided the required functionality. In the BAFO, NPC changed the approach and decided to use the Tranzit XPe terminal in all stores. This decision was made after NPC re-examined the estimated cost of developing and coding a second terminal device. NPC determined that for the purposes of a demonstration limited to the Dayton pilot area, the savings in development costs realized by developing a single terminal instead of two terminals would more than offset the increased equipment costs of installing the more expensive terminal in single-lane stores. NPC estimated that the cost savings resulting from this change would be over \$50,000.
- **Change in photo identification (ID) card process** - Since the time the proposal was written, DataCard introduced a new photo ID process for chip cards. NPC decided to change from the proposed Polaroid photo ID process to the DataCard process, which was expected to improve developing speed and reduce photo ID costs.
- **Elimination of the magnetic stripe on the smart card** - The magnetic stripe was included in the original proposal to allow for AFDC disbursements through ATMs.

In the instructions for preparing the BAFO, FNS required that all costs for alternate tasking (e.g., AFDC program) be eliminated. This modification resulted in a cost savings of \$0.10 per card.

PHASE I - SYSTEM DESIGN

Phase I, System Design, began in September, 1990 and was completed on March 5, 1991. The focus of activities in this phase was to build on the foundation established in the proposal and develop a detailed system design document, that includes functional flows, and other required project deliverables. This section describes the activities that comprised this phase, the level of effort involved, and the important issues, decisions, and design modifications that occurred during the period.

Design Phase Activities

The project kick-off meeting was held at FNS headquarters in Alexandria, Virginia on September 29, 1990. The meeting was attended by representatives of FNS, NPC and other PayEase partnership groups, and the evaluation contractor that had been selected to conduct an independent evaluation of the demonstration. The discussion at the meeting included an overview of Design Phase activities and deliverables. NPC provided a project plan indicating that the following required deliverables would be provided during the Design Phase: Detail Design Document, Functional Demonstration Plan, Acceptance Test Plan, and Retailer Survey.

The proposal contained a detailed preliminary design, and following the project kick-off meeting, NPC and its partners began development of a Detail Design Document. As an integral part of the design process, a number of meetings were held with various groups to solicit input and share knowledge. During the Design Phase, bi-weekly project status meetings were held. Individuals representing NPC, MCDHS, and ODHS always attended, and some meetings also were attended by individuals representing NPC's subcontractors, FNS, and the evaluation team.

Several subcontractors were part of the NPC-led public/private partnership. Two organizations -- PSI and Astra Communications -- were based in Dayton. The organizations and their areas of involvement included:

- Public Service Institute - PSI's area of primary responsibility was defined to include: providing assistance in the development of training materials; managing recipient conversion site activities, including hiring and training staff, scheduling clients, training recipients to use the EBT system, and issuing smart cards to recipients; and providing EBT orientation and training for MCDHS staff;
- MicroCard Technologies, Inc. (MCTI) - MicroCard's responsibilities included providing the smart cards, the card reader/writer devices, and programming support for these peripheral devices;
- VeriFone, Inc. - VeriFone, a leading POS terminal manufacturer in the U.S., was contracted to supply POS terminals for the EBT demonstration and to provide terminal software design and development support to NPC;
- AGS Information Services - AGS was contracted to provide development support to modify the State of Ohio's automated public assistance system, CRIS-E, as required to support the EBT demonstration;
- Advanced Information Systems (AIS) (Tandem/SQL Programmers) - Contract programmers experienced with the Tandem system were identified to provide assistance in developing EBT enhancements for NPC's proprietary POS platform; and
- Astra Communications - Astra was contracted to provide support in retailer site preparation activities. Astra was responsible for installing terminals and dealing with problems related to wiring and telecommunications.

In addition to the subcontractor organizations, community and retailer groups were actively involved in refining the system design. Regular meetings were held with the two retailer groups: the Retailer Store Operations Group and the Retailer Policy Group. The operations group consisted of store operations managers from small, independent stores, large supermarkets, and convenience store chains. Its purpose was to provide feedback to the PayEase project team on issues related to detailed operating procedures for the EBT demonstration. The policy group consisted of representatives of various grocer associations and other industry representatives, including retailer-management personnel. The focus of this group is on broad retail policy issues and concerns. In addition, the Community Advisory Council, which consisted of representatives of various community and client advocacy organizations, was formed and met regularly with the PayEase project team throughout the Design Phase. The FNS Cincinnati Field Office (FO) also was involved in several meetings about retailer issues and the field office's role in the EBT system.

Detail Design Document

NPC submitted the *Draft 1 Detail Design and System Specification* to FNS on December 4, 1990. The document contained detail flow diagrams, screen layouts, report formats, file layouts, and system flows. Due to a delay in finalizing a subcontracting agreement with AGS Information Services, the detail design for the CRIS-E interface was not completed before the first draft was submitted to FNS. At the Design Phase Mid-Point Project Status Meeting on January 9 - 10, 1991, FNS provided comments on the December 4th draft document. NPC submitted the *Draft 2 Detail Design and System Specification* to FNS on January 18, 1991. FNS comments on the January, 18 draft were provided to NPC on February 1 and were incorporated into the *Final Draft Detail Design and System Specification*, which was submitted to FNS on February 18, 1991. At the End of Phase I Wrap-up Meeting at FNS headquarters on March 4 - 5, 1991, participants agreed that NPC would need to maintain a master copy of the *Detail Design and System Specification* document and update it throughout the Development Phase. The PayEase project team and FNS agreed that a final document should be distributed just before the acceptance test was conducted.

Retailer Survey

The retailer survey, which was to be conducted with all retailers in the demonstration area and some surrounding area retailers, had several purposes. It was intended to provide retailers with information about the PayEase demonstration, find out what concerns they had, and determine whether or not retailers were considering participation. The survey was initiated on November 14, 1990. Site surveys, to determine equipment requirements and installation logistics, were conducted at the same time that the survey was administered. A total of 66 demonstration area retailers and 11 retailers outside the demonstration area were contacted for the survey.

The results were presented in the *Retailer Survey* document that was submitted to FNS on January 31, 1991. A total of 74 retailers responded to the survey, including eight retailers that were located outside the six zip code demonstration area. Virtually all (approximately 96 percent) of the surveyed retailers were expected to participate in PayEase.

In addition to presenting the retailer survey results, the *Retailer Survey* document also presented preliminary findings from a recipient shopping survey that was being conducted to determine shopping patterns of food stamp recipients residing in the demonstration area. The survey, conducted with a sample of recipients who visited the MCDHS office for other activities, indicated that there were a number of stores outside the demonstration area that should be given the opportunity to participate because the stores met criteria of being within Montgomery County and receiving at least one percent of recipient selections. The shopping survey was still being conducted at the time the report was prepared, but the preliminary results, which were presented in the January, 31 report, were based on surveys of 1,011 recipients.

Functional Demonstration Plan and Acceptance Test Plan

The Functional Demonstration Plan provided written documentation describing the schedule, procedures, and test data to be used in demonstrating the major system functions outlined in the *Detail Design and System Specification*, while the Acceptance Test Plan outlined further tests for the EBT system. The focus of the Functional Demonstration Plan was to present the inputs, steps to follow in testing the function, and expected outputs. The test scripts provided in the Acceptance Test Plan were designed to go beyond the basic functions tested during the functional demonstration and focus on: stress testing, regression testing, security testing, recovery testing, requirements testing, error handling and destructive testing, and "what-if" testing.

The development and submission of the two plans occurred simultaneously. The *Draft 1 Functional Demonstration Plan* and the *Draft 1 Acceptance Test Plan* were completed and submitted to FNS on December 21, 1990. The contents of each plan were discussed with FNS at the Mid-Point Project Status Meeting on January 10, 1991, and comments were provided to NPC on January 18, 1991. NPC submitted the *Final Draft Functional Demonstration Plan* the *Final Draft Acceptance Test Plan* to FNS during February, and following the provision of additional comments by FNS, NPC incorporated comments and submitted the *Final Functional Demonstration Plan* and the *Final Acceptance Test Plan* to FNS on March 4, 1991.

While discussing the *Acceptance Test Plan* at the End of Phase I Wrap-up Meeting, FNS and the evaluation contractor made suggestions for enhancements to the *Acceptance Test Plan*

which was scheduled to be updated during Phase II. These suggestions included cross-referencing test functions to the *Detail Design* table of contents, modifying scripts to detail expected inputs and outputs, and providing both card- and terminal-based scripts.

Level of Effort

Organizations involved during the Design Phase of the off-line EBT demonstration project spent 5.46 person-years. This figure included the reported time spent by PayEase project team members from NPC, subcontractor organizations, MCDHS, and ODHS; and FNS staff at headquarters, the Midwest Regional Office, and the Cincinnati Field Office as discussed during meetings with evaluation team members. Evaluation contractor technical assistance task time was also included in this figure. The approximate amount of time spent by each organization follows:

- NPC staff spent 3.88 person-years;¹
- NPC's subcontractors spent 0.14 person-years;²
- MCDHS spent 0.18 person-years;
- ODHS spent 0.53 person-years;
- FNS headquarters staff spent 0.53 person-years;
- FNS MWRO staff spent 0.04 person-years;
- FNS Cincinnati Field Office staff spent 0.02 person-years; and

¹ Staff members from NPC maintained daily timesheets on which they recorded the actual number of hours worked on the off-line EBT demonstration. This was done in order to capture the total amount of time required to develop the EBT system because NPC did not bill FNS for time worked by an individual in excess of 40 hours per week. The additional time worked by NPC and FNBD staff during the Design Phase that was not billed to the government consisted of 0.70 person-years, representing approximately 18 percent of the time spent by NPC for the Design Phase.

² Person-years include only those organizations that provided a breakdown of hours worked by labor category; other subcontractors had contracts with NPC in which they were paid flat fees for their participation in specific deliverables and/or tasks and were not required to submit detailed information on time worked on the project to NPC. As examples, subcontractor time for AGS Information Services, which provided re-design support of the interface between CRIS-E and the EBT system, and some technical support time provided by MicroCard Technologies, Inc.

- Evaluation team technical assistance resulted in 0.14 person-years of time spent in support of designing the off-line EBT system.

Issues, Decisions, and Design Modifications

Throughout the Design Phase, a number of issues were raised. Decisions were made to resolve these issues, and in some cases these decisions resulted in design changes. Important decisions and changes are classified by type and are described in the following sections.

Organizational Decisions

Organizational decisions were made regarding project management and the division of responsibilities among and within the PayEase project team organizations.

Issuance Site Changes. The design in the NPC technical proposal required recipients to visit MCDHS in order to change their issuance site selections. Upon further consideration, the project team became concerned that this would result in unnecessary visits to the county office. In November, 1990, the problem was resolved by changing the design to allow recipients to change their issuance site selections by calling the NPC customer service's toll-free number.

MCDHS PayEase Support. During January, 1991, several changes were made in the plans for performing customer service functions at MCDHS. Decisions were made that involved both staffing and equipment location within the county. The project team decided to separate EBT support from other recipient support, both physically and procedurally. Plans to accomplish this included: placing all EBT equipment outside the intake and ongoing casework areas, and limiting EBT involvement to the Assistance Control Office (ACO) personnel, Fiscal Control Office (FCO) personnel, and individuals in the MCDHS Fiscal Department. This represented a departure from the technical proposal, in which the PayEase project team planned to install balance inquiry terminals in the intake and on-going caseworker areas and involve caseworkers in the resolution of recipient balances and related functions.

Procedural Decisions

Several procedural decisions were made during the Design Phase. The underlying issues and decisions involved specific functions in the system.

Return of Benefits. One issue that was the focus of a great deal of attention related to the development of procedures for returning EBT benefits to the state when benefits expired because recipients did not add the benefits to their PayEase cards within the allotted time period.¹ During October, 1990, the project team agreed that Ohio would provide an expiration date on every issuance record; the expiration date would be used to determine when an unredeemed issuance (i.e., one that had not been added to the recipient's card) could be pulled from the issuance terminal and returned to ODHS.

Expedited Issuances. A decision to change the process for expedited benefit issuance was made during October, 1990. This change resulted from a new understanding of the requirements related to expedited benefit availability. The initial design presented in the technical proposal assumed that immediate issuance processing would be required at the Montgomery County Fiscal Control Office (FCO). As a result, the PayEase project team proposed applying issuances manually before receiving the authorization from CRIS-E. Upon further discussion during the Design Phase, the project team determined that Ohio regulations required that expedited benefits be made available within 24 hours of certification. The decision was made to meet this requirement by downloading CRIS-E issuance files to the FCO in addition to the three retailers selected by the recipient.² This change eliminated the need to apply issuances

¹ In Ohio, regular monthly food stamp benefit issuances, both EBT and paper coupons, must be picked up between the recipient's issuance date and the end of that month. Once the coupons have been picked up or the EBT issuance has been added to the smart card, there is no limitation on when the benefits can be used to purchase food, and the ability to differentiate benefits from current and previous allotments is lost.

² Downloading the issuance file to the FCO ensured that expedited issuances would be available the next business morning after certification. Recipients could obtain expedited issuances at retailers too, but benefit availability could be delayed depending on when retailers settled since issuance files are provided to retailers during settlement.

manually before CRIS-E authorization was received and then reconcile these issuance advances to authorizations received from CRIS-E after the issuance had been posted to recipients' cards.

Establishment of an Electronic Cash Drawer. A design change was made that related to the issue of providing refunds in the EBT system. Refunds presented a potential problem in the off-line EBT system, because unrestricted refunds could result in the unacceptable situation where an end of day settlement total for a retailer was negative (requiring a debit to the retailer's account rather than a credit) if the retailer processed more refunds than purchases. The refund transaction, therefore, represented a potential security risk to the EBT system. To control this risk, the PayEase project team determined that in order for a retailer to make a refund, the store must have unsettled purchase transactions sufficient to cover the amount of the refund transaction. However, denying the recipient an immediate refund, in the event that the store did not have unsettled EBT purchases to cover the refund amount, would be unacceptable to the retailer. As a solution, NPC added a design feature referred to as an "electronic cash drawer", which enables retailers to retain a pre-established amount of their settlements for the purpose of providing refunds to recipients.¹ The electronic cash drawer was designed to be analogous to the retailer keeping some cash and \$1 food coupons on hand each day, instead of depositing the entire amount of the store's daily proceeds at the bank, allowing the retailer to provide refunds and make change.

Retailer Certification and Decertification. During the Design Phase, the PayEase project team identified procedures for functions that had not been specifically addressed in the proposal. One example was the process for managing retailer participation changes. The PayEase project team decided to manage retailer certification and decertification activity through the FNS Cincinnati Field Office. The *Detail Design* document indicated that the Field Office would have direct, secure access to the EBT host to accomplish these actions.

¹ The electronic cash drawer option was provided to all retailers, but the vast majority of participating retailers elected not to have this option incorporated into their contracts with NPC. The feature is used by some retailers; however, and there have not been any reconciliation problems reported that can be attributed to this function.

Concentrator Bank Reimbursement. The method used for concentrator bank reimbursement was changed from NPC's original proposal. NPC had proposed to initiate a wire transfer to withdraw funds from FNS's U.S. Treasury account to cover the amount credited to retailers through the ACH. However, in order to maintain consistency with existing disbursement and funds drawdown procedures, FNS required NPC to use the Payment Management System (PMS) of the Department of Health and Human Services (HHS). The reimbursement request is initiated to PMS through a communication protocol called SmartLink. This necessitated changes in NPC's planned cut-off times for retailer settlement.

Requirement for Voice Password. In November, 1990, the PayEase project team determined that a telephone (voice) password would be collected and used for recipient identification. Password information -- which would be used by NPC customer service and the MCDHS ACO to ensure that they were dealing with the appropriate individuals in situations such as issuance site changes and reports of lost or stolen cards -- was to be entered into the CRIS-E system. The project team decided to modify CRIS-E to accept three additional pieces of information that would be used, along with the recipient's date of birth, as an identifier. The additional data elements to be collected from recipients included: the first name of the recipient's oldest child, the maiden name of the recipient's mother, and the recipient's eye color.

Stale Dating Cards. During the Design Phase, FNS and the PayEase project team agreed that a stale dating procedure should be developed for dealing with inactive cards. A decision was reached to soft lock a card that had not been used for at least 90 days. The procedure that was developed involved the EBT host passing information about cards that had not been used back to the CRIS-E system. On the 60th day after the last use, the CRIS-E system would generate a notice to be mailed to the recipient informing him or her that the card would be locked, precluding further use, if it was not used by the specified stale lock date (90 days from last use). The actual lock of the card would be executed on the 95th day after its last use. The five-day grace period was added at the request of ODHS to make it consistent with grace periods used with other state notices.

Manual Transaction Liability and Representation. Decisions also were made to define procedures for handling situations involving representations. Representation procedures, which

enable retailers to be reimbursed, from future recipient benefit allotments, for overdrafts on manual transactions, were developed. FNS's decision, that the government would not accept any liability for losses resulting from the off-line system, required the PayEase project team to develop procedures to effectively manage the risks to retailers and NPC. The FNS decision to limit representation amounts to \$50 per recipient in the first month and the greater of \$10 or 10 percent of the benefit allotment in subsequent months also was a factor in subsequent project team decisions. NPC proceeded to design the PayEase system to accommodate manual transactions with a five business day settlement delay for all manual transactions. The settlement delay was required because in the off-line environment, sufficient time must be allowed for settlement of other valid purchase transactions. Retailers were informed that payment on manual transactions was not guaranteed, and that the retailer was liable if it accepted manual transactions. NPC also recommended that retailers limit manual transactions to two outstanding transactions totalling \$50 for a single recipient; retailers supported this recommendation. NPC also decided to design the EBT system so that it would batch and settle manual transactions separately to facilitate retailer reconciliation.

Other Procedural Changes. At the End of Phase I Wrap-up Meeting, the discussion of the *Final Draft Detail Design and System Specification* document, dated February 18, 1991, focused on several areas where procedural changes had been made during the Design Phase. These areas included: changes in the pre-personalization and application of a primary account number (PAN) to support serialized inventory control at the MCDHS; the decision to provide negative file updates to retailers only when retailer settlement occurs; and extensive revision of the reconciliation and general ledger sections. Changes in the last area included expanding the general ledger from four accounts to a detailed system, adding an automated reconciliation feature and designing the system to reconcile card balances to host-derived balances on a daily

basis instead of monthly as had been planned previously.

Technical Decisions

Recertification and Next Issuance Notifications. In November, 1990, the project team made plans for printing on the recipient's receipt information concerning pending expiration of certification and the date that the next issuance would be available. They agreed to have CRIS-E pass notification of pending expiration of certification to the EBT host.¹ At the host, the notification would be converted to a negative file message and transmitted to retailers to update the recipient's card the next time the card was used. When the card was presented, a flag would be set to print a message on the receipt to warn the recipient of pending certification expiration. After the recipient was recertified, CRIS-E would send another message to the EBT host, which would be sent to the POS to remove the flag that resulted in the warning.

The PayEase project team also wanted to be able to print the date that the next issuance would be available on recipients' receipts as a means to reduce any confusion that recipients may have had regarding when their benefits would be available. At the time, benefit issuances were made available to recipients on the same working day each month, but the calendar date varied. In November, 1990, the PayEase project team decided to establish a calendar file in the EBT host to record the specific date each month that issuance would be made available. The calendar file would pass the information to the POS, where it could be printed on receipts.²

Delivery Merchant Participation. Throughout the Design Phase, the PayEase project team attempted to identify a solution to enable special categories of retailers -- such as "Meals on Wheels" programs, food pantries, and food cooperatives (all of whom do not have stationary checkout equipment) to participate in the PayEase project. In November, 1990, the PayEase project team agreed to equip Meals on Wheels and food pantries with portable terminals as necessary. They also agreed to approach senior citizen feeding centers about participation. Upon further examination of the situation, the PayEase project team decided to use procedures similar to manual transactions -- which are referred to as forced debit transactions -- to enable these retailers to participate. This decision was conveyed to FNS in a December 14, 1990 letter from

¹ ODHS does not pass this message information to NPC; therefore, notices about pending expiration of certification are not printed on receipts.

² Ultimately, the project team decided to make benefits available to a recipient on the same calendar day each month, eliminating the need for the date to be printed on the receipt.

NPC. NPC explained that the forced debit transaction would be used for delivery merchants, thereby eliminating the need for portable terminals.

PayEase Card Issuance. The original design correctly assumed that card issuance in the EBT system required access to the CRIS-E certification screen in order to capture and move certification data and the authorization number to the EBT host.¹ At the beginning of the Design Phase, NPC identified the need to develop contingency procedures for allowing card issuance if CRIS-E was inoperable for any reason. During February, 1991, the project team reached the conclusion that card issuance could not be performed when the CRIS-E system was down because the CRIS-E architecture does not allow a manually generated authorization number to be entered as an override of the computer generated authorization number.

In addition, the *Final Draft Detail Design and System Specification* document reflected a design change that was made involving the FCO terminal and the DataCard issuance terminal. The revised design provided for interconnecting two personal computer (PC) terminals. One terminal is used for CRIS-E emulation and card pre-personalization, and the second terminal is used only for PayEase card photo processing.

Communications Protocol.² At the beginning of the Design Phase, NPC planned to modify the on-line VISA 2 protocol -- used for communications between POS devices and central computers -- to function in the off-line environment. After additional consideration, however, NPC decided to use a proprietary protocol -- developed internally by NPC -- instead of a standard industry protocol for retailer and FCO communications.³

¹ The authorization number is the PayEase system equivalent of the CRIS-E case number. It is used by the PayEase system as a household identifier and was developed to link the PAN and the CRIS-E case number because ODHS believed that using the actual case numbers in the NPC system raised security issues.

² A communications protocol consists of the procedures required to initiate and maintain communications. A protocol defines the rules governing the format, timing, sequencing, and error control and may include facilities for managing a communications line.

³ The details for this protocol were not defined until the Development Phase. The protocol is discussed further in the section focusing on technical decisions that occurred during the

POS Platform Change. During the Design Phase, NPC and its subcontractor, VeriFone, determined that the VeriFone XPe LAN controller proposed for use as POS terminal platform should be replaced with the VeriFone 1200C LAN controller and PC configuration. The change was discussed in detail on March 5, 1991 at the Phase I Wrap-up Meeting. NPC indicated that there were several important reasons for making this change including:

- Technical obsolescence - VeriFone indicated that the XPe product line was mature, no further enhancements were planned, and it was anticipated that production would be discontinued in the near future;
- Maximum lane constraint - The VeriFone XPe controller can drive only 15 Trans 340s, the cashier terminals selected for the demonstration;
- Code development time - Differences in processing time, memory capacity, and language constraints for the XPe development favor the 1200C LAN controller/PC solution because code development can be done more quickly and at a lower total development cost;
- Transaction speed at the POS - The XPe utilizes a single processor chip to handle memory management and LAN functions, while the 1200C/LAN configuration uses two processor chips, which can divide the activities and perform at greater than twice the speed of the single chip in the XPe;
- Backup and restoral - The use of a PC-based file server allows transaction data to be backed up on the hard disk; these records could be automatically restored in the event of terminal failure; and
- File storage - The XPe is limited to 512K random access memory (RAM), which is somewhat limiting for large issuance files and daily transaction storage for high-volume retailers. The 1200C/PC configuration expands capacity significantly by providing two megabytes (MB) of RAM and at least 20 MB of disk storage.

NPC also indicated the following disadvantages associated with changing from the XPe configuration to the 1200C/PC configuration:

- Terminal costs - The 1200C/PC solution costs per unit would be approximately \$200 higher than the XPe configuration presented in the best and final offer (BAFO) of June 29, 1990;

- Telephonic communication capabilities - The XPe contains the built-in capability for telephonic communication with the EBT computer center, while the 1200C/PC solution does not have this capability; and
- Security of terminal code - The XPe requirement to use a proprietary code (ZAP-D) makes the terminal code somewhat less vulnerable to tampering attempts by computer hackers than the use of "C" language with the 1200C/PC solution.

Overall, the consensus of the PayEase project team was that the advantages of the 1200C/PC solution far outweighed the disadvantages. FNS agreed to the change in the POS platform.

PHASE II - SYSTEM DEVELOPMENT

Phase II, System Development, officially began on March 5, 1991 and was concluded on November 30, 1991. The Development Phase focused on developing the PayEase system and preparing for system implementation. This section describes the activities that comprised this phase, the level of effort involved, and the important issues, decisions, and design modifications that occurred during the period.

System Development Activities

During March, 1991, the PayEase project team shifted its emphasis from design to development of the PayEase system. The system coding effort was initiated during March. During April, the majority of the code for the following functional areas was developed: CRIS-E enhancement coding, the command set code, the retailer authorization system, and EBT host screens. On April 18, the completed software to be used for retailer authorization and deauthorization support was demonstrated at the Cincinnati Field Office. Card personalization and balance inquiry terminal code was completed by MicroCard and delivered to VeriFone and NPC on May 15, 1991. Also, virtually all of the on-line customer service screens, card issuance, and photo ID code were completed during May. During a June 17 meeting, MicroCard and VeriFone development progress in the areas of card programming, card reader code, and limited terminal functionality were successfully demonstrated.

During June, additional progress was made in the following areas: coding on-line programs for customer service, ACO, and FCO; completion of the ODHS acceptance test of CRIS-E on-line code enhancements; developing data encryption standard (DES) code and testing, debugging, and integration testing other card and card reader code; developing terminal, PC, and controller code; integrating the card issuance and FCO terminals; and completing code development for nearly all FCO functions.

As planned, further changes were made to the *Final Functional Demonstration Plan* submitted March 4, 1991. In preparation for the planned functional demonstration, NPC made revisions to the *Functional Demonstration Plan* document during June to reflect changes in the Detail Design as well as progress in coding the system. On July 2, a revised *Functional Demonstration Plan* was delivered to FNS.

Further system development occurred during July. Additional development during the month was focused on DES code, terminal code, PC and controller code, and FCO code for on-line interaction with the EBT host. The functional demonstration was originally planned for July 17, but it was delayed until August 13 due to software problems with the terminal code. The VeriFone code delivered on July 1 contained several software bugs; on July 29, following further debugging and testing, VeriFone demonstrated debugged code that, with some modification, was deemed acceptable for the functional demonstration. Following the NPC review, a detailed list of problems was provided to VeriFone. In addition, tests were conducted that successfully demonstrated the capability to transfer batch files between CRIS-E and the ODHS host in both directions. During July, changes also were implemented in the production CRIS-E system to require the input of voice password data for all new recipients and recertifications.

Following the completion of the functional demonstration on August 14, the PayEase project team targeted a number of undeveloped or partially developed system elements for completion prior to acceptance testing. These elements included: card encryption and DES, terminal code, line handler, FCO terminal, ODHS to NPC direct circuit, FCO terminal direct to CRIS-E, general ledger system, ACH file, and DES server for message authentication code (MAC) generation on the EBT host.

Development activities conducted through the end of August included new code development and the modification of existing code to correct identified discrepancies. Primary areas of development activity included:

- completion of all card and card reader code including DES code by MicroCard;
- delivery of revised EEPROM (electronically erasable programmable read only memory) code, which would be used to store information on the smart card, from MicroCard to NPC on August 30;
- completion of card personalization code that would be used to create DES cards and perform DES functions in the CTU-140 in conjunction with the VeriFone code;
- debugging of VeriFone code and joint testing with NPC in Louisville on August 20 - 21;
- completion of FCO terminal code development by NPC;
- completion of the EBT host code related to the general ledger system; and
- completion of initial code for the line handler and initiation of debugging activities.

The development effort in these areas continued. To reflect changes made to the system during the Development Phase, NPC provided a *Final Detail Design* to FNS on September 6, 1991. During September, the PayEase project team performed the following development activities: debugged terminal code; made modifications to EBT host and FCO code to incorporate FNS comments from the functional demonstration; completed line handler code; and tested settlement, data transfer between ODHS and NPC, and ACH data transfer between NPC and Bank Ohio. During October, the PayEase project team began integration testing, which combines and tests system components that previously have been tested alone or in a more limited context, and continued to work on debugging terminal code. Due to problems with finalizing terminal code and conducting integration testing, NPC requested that the start of the acceptance test be delayed until November 18, with a corresponding shift in the start date for the Implementation Phase to December 1. The PayEase project team successfully tested the issuance file download process during October by sending a test CRIS-E file containing 2,600 issuance records from ODHS to the EBT host. Subsequently, NPC simulated retailer settlement and downloaded 2,000 issuance

records to a single retailer. Integration testing continued during November prior to the acceptance test. NPC also continued to work with the terminal code and the host code responsible for reporting functions to resolve outstanding problems. In addition, NPC identified system enhancements that it planned to make before system implementation.

Functional Demonstration

The functional demonstration was conducted on August 13 - 14 at NPC's facilities in Louisville. FNS representatives from headquarters (Program Development Division and the Office of Analysis and Evaluation), the MWRO, and the Cincinnati Field Office were in attendance. Other attendees included representatives of NPC, ODHS, MCDHS, and the evaluation contractor. Test scripts to demonstrate system functionality were performed during the two day test period. Following the testing, the group met to provide comments on the system. The Development Phase Mid-Point Status Meeting was held in conjunction with the functional demonstration on August 13. NPC reported the findings in the *Functional Demonstration Report*, which was submitted to FNS on August 28, 1991.

Acceptance Test

Acceptance test planning activities were conducted beginning in July, 1991. At that time, retailers were selected to participate in the acceptance test. A *Final Acceptance Test Plan*, detailing the procedures that would be followed to test the system, was submitted to FNS on September 13. At the end of October, NPC provided detailed test scripts to FNS and the evaluation contractor. Further efforts were also made to plan for recipient participation in the acceptance test; the project team decided to provide 10 recipients with PayEase cards to use during the test. A pre-test for the acceptance test was conducted on November 7 - 8 at MCDHS. During the next week, additional modifications were made, and the code was frozen.

The acceptance test was conducted during the week of November 18, 1991. PayEase project team members, FNS personnel, and the evaluation contractor attended and participated in the testing and comprised the "test" team. The first two days of the acceptance test were conducted at NPC's facilities in Louisville, and the final two days of testing were in Dayton.

Testing generally consisted of entering transactions as detailed on test scripts into POS terminals (arranged in various retailer configurations) by members of the test team. Actual results were compared to the expected results indicated on test scripts. At the end of each system "cycle," system settlement and general ledger reports were reviewed for content and accuracy.

Two retailers were trained and equipped and 10 recipients were trained so that live operations could be included in the test. In addition, stress testing was conducted during the final day of the acceptance test. Following completion of the test, acceptance test participants remained in Dayton and the Phase II Wrap-up/Phase III Kickoff meeting was conducted on November 22. A list of 32 acceptance test exception items, all requiring resolution before system implementation, was presented and discussed. FNS expressed concern over the large number of exception items and the fact that the development system was used for testing rather than the production system. FNS agreed to provide conditional acceptance of the system so that the Implementation Phase could begin on December 1, but required that a regression test be performed within six weeks to demonstrate that all noted exception items had been corrected. NPC documented the results of the four days of testing in the *Acceptance Test Report*, which was submitted to FNS on November 25.

Implementation Planning Activities

Concurrent with system development, NPC proceeded with implementation planning and resolution of implementation issues. On March 19, 1991 the *Draft 1 Implementation Plan* was submitted to FNS. A *Final Draft Implementation Plan* was completed and submitted to FNS on May 31, and a *Final Implementation Plan* was submitted on June 3.

Another area of implementation planning initiated during the Development Phase was related to training materials development. This effort included writing training manuals for all participant groups, developing course outlines, and developing a video to be used to support recipient training. On April 4, the *Draft 1 User Manuals* were submitted to FNS. The initial draft included the full text for retailer and recipient manuals, but the FNS, MCDHS, and customer service manuals were not complete. In May, the *Draft 2 User Manuals* were completed and submitted to FNS; this draft contained the full text of each of the manuals. Three options

for retailer training were discussed at the May 22 meeting of the Retailer Policy Group; these options included: "train the trainer" sessions, in-store training, and centralized classroom training. In addition, a preliminary retailer contract was prepared by NPC and reviewed by the policy group. At the June 4 Retail Operations Committee meeting, draft versions of the retailer clerk and retailer manager manuals were reviewed by the group; the consensus was that the amount of material presented to cashiers in the manual and in the training session should be reduced to the basic functions necessary to operate the system. More detailed information on exception handling and customer service should be provided in manager manuals and training sessions. During June, further development was done on retailer and customer service materials, and client panels were convened to review and comment on the training format, user manual, and video script. The *Draft 1 Training Materials* were submitted to FNS on June 27. During July, FNS provided comments to be incorporated into the second draft, and *Draft 2 Training Materials* were submitted to FNS on August 19. The second draft contained the complete set of training guides and other materials. *Final Draft Training Materials* and *Final Draft User Manuals* were submitted to FNS on November 18.

In addition to deliverable and training material development, NPC made arrangements for network communications and retailer setup. During May, NPC finalized contract negotiations with Astra Communications, the subcontractor responsible for performing retailer setup and store wiring activities. On May 31, 1991, NPC reached an agreement with CompuServe in which CompuServe would provide network communications for the off-line EBT demonstration. A CompuServe test system was installed on August 29 to facilitate testing.

Attention also was given to making advance preparations for retailer participation. During August, site surveys were completed with all retailers that had been identified as probable participants. As recipient surveys continued during the development period, it became apparent that shopping patterns had changed. NPC adapted its planned coverage to incorporate these changes. Activities related to the retailer participation agreements, which are contracts between each retailer and NPC, also were initiated during the Development Phase. All agreements were between NPC and participating retailers; neither the State of Ohio nor third party processors were involved in retailer contract negotiations. Contract negotiations with retailers were initiated in

August. At the end of November, contracts had been signed by the vast majority of retailers, including retailers in the demonstration area and eligible fringe retailers.

Because of the long lead time sometimes required with equipment purchases, some agreements were made, and orders were placed during the Development Phase. In August, NPC placed a preliminary order for card reader devices that required eight weeks advance time.

During implementation planning, activities were performed to select a site to be used for recipient training during the conversion period. The project team determined that an acceptable conversion site must be in close proximity to the MCDHS office; accessible to the public; approximately 4,500 - 5,000 square feet; and able to support the telecommunication, security, and state interface requirements. MCDHS took primary responsibility for finding the site and making lease arrangements. A suitable site was identified, and during July, the project team: developed a site implementation plan; developed a preliminary floor plan; and ordered communications lines. During September, data lines were installed and contractor bids were taken for site improvement work. The county signed a lease for the space during November.

The plans for recipient conversion by zip code were finalized during October. The implementation approach provided for beginning training and card issuance activities during the month prior to the recipient's first EBT issuance. Conversion plans included:

- beginning recipient training in February, 1992; and
- providing initial EBT issuances for recipients residing in one zip code during March, two during April, two during May, and one during June.

Additional detail on the conversion schedule is provided in the section describing system implementation.

Level of Effort

Organizations involved during the Development Phase of the off-line EBT demonstration project spent 14.73 person-years. Reported time spent by PayEase project team members from NPC, subcontractor organizations, MCDHS, and ODHS; and FNS staff at headquarters, the Midwest Regional Office, and the Cincinnati Field Office. Evaluation contractor technical assistance task time was also included in this figure. The approximate amount of time spent by each organization follows:

- NPC staff spent 8.21 person years;¹
- NPC's subcontractors spent 4.49 person-years;²
- MCDHS spent 0.36 person-years;
- ODHS spent 0.37 person-years;
- FNS headquarters staff spent 0.96 person-years;
- FNS MWRO staff spent 0.05 person-years;
- FNS Cincinnati Field Office staff spent 0.05 person-years; and

¹ NPC staff maintained daily timesheets on which they recorded the actual number of hours worked on the off-line EBT demonstration. The additional time worked by NPC and FNBD staff during the Development Phase that was not billed to the government consisted of 1.66 person-years, representing approximately 20 percent of the time spent by NPC for the Development Phase.

² Person-years include only those organizations that provided a breakdown of hours worked by labor category; other subcontractors had contracts with NPC in which they were paid flat fees for their participation in specific deliverables and/or tasks and were not required to submit detailed information on time worked on the project to NPC. As examples, subcontractor time for AGS Information Services, which provided programming support for the interface between CRIS-E and the EBT system, and programming support related to the smart card code provided by MicroCard Technologies, Inc.

VeriFone development staff also spent considerably more time working on the off-line EBT project than the time reflected in their billed hours. Monthly progress reports from June, 1991 and August, 1991 indicated that in those two months almost .30 person-years of staff time spent to develop the EBT system were not charged to the government. In addition, VeriFone did not charge any direct labor during the September through November period, although VeriFone staff continued to work with NPC to complete development and debugging during this period.

participation would increase project costs; therefore, NPC submitted a change request to FNS. The purpose of this request was to adjust costs to reflect the need for additional smart cards and additional resources required for the conversion process with a larger caseload. FNS agreed to these changes, and funding was increased to allow for three additional staff members for recipient conversion.

CRIS-E Conversion. Another issue that required close monitoring during the development period was the status of recipient conversion to the CRIS-E system. The conversion to Ohio's new multi-program, automated CRIS-E system in Montgomery County was expected to be completed long before EBT system implementation; however, CRIS-E conversion problems were prevalent, and the conversion effort was behind schedule. The PayEase project team decided to take actions to ensure that CRIS-E conversion was completed before EBT implementation began. MCDHS took the lead in this effort by authorizing overtime and dedicating blocks of time during the business day for caseworkers to convert cases. In addition, MCDHS gave a higher priority to the conversion of cases in the demonstration area than cases outside the demonstration area zip codes in Montgomery County. The one-month delay in the EBT implementation schedule and the extra effort at MCDHS ensured that all demonstration recipients were converted to CRIS-E before the EBT system was implemented.

Restore Transaction. The PayEase system was designed to provide the capability to restore POS transactions that are lost as a result of terminal or communications system failures. The February 18 *Detail Design Document and System Specification* indicated that the process of restoring transactions -- by re-entering transaction data into the system -- was to be performed by the retailer. During the Development Phase, the PayEase project team decided that the entry of transaction data to be restored should be performed by FNBD rather than the retailer to provide internal control over the process. The procedures for restorals were changed so that retailers would provide transaction receipts to FNBD, and bank personnel would use a special PC-based program to enter the transactions into the PayEase system for settlement to the retailer.

Procedural Decisions

Several procedural decisions were made during the system Development Phase. The underlying issues and decisions involved specific functions in the system.

PayEase Card Issuance During Conversion. During the Design Phase, the PayEase project team agreed that PayEase card issuance would not be done while the CRIS-E system was down; however, they agreed that for conversion, there needed to be a mechanism for issuing cards off-line. During March, 1991, the project team agreed that this would be accomplished through the use of a file downloaded from CRIS-E to the EBT host following the execution of the CRIS-E month-end cycle. NPC would then download to the FCO terminals the file containing CRIS-E data for recipients scheduled for conversion and training during the following month, and the file could be used if CRIS-E was not available on-line. The PayEase project team also decided to set the flag indicating the change from CRIS-E to EBT issuance at the same time that the CRIS-E system created this file.

During meetings of the PayEase project team and the Advisory Council, concern was expressed about issuing cards to clients when they come in for their training sessions. Because training could occur several weeks before benefits were available, there would be an increased likelihood that recipients would lose their cards or forget their personal identification numbers (PINs). The decision was made to hold cards at the conversion site for recipients who attend training sessions after the fifth and before the twenty-fifth day of the month. These recipients would return to the conversion site to pick up cards on the day before or the day of benefit availability. At the Mid-Point Status Meeting on August 13, a concern was expressed about holding PayEase cards and PINs at the conversion site. It was agreed that the most secure method of accommodating this would be to hold the card and PIN separately, and have two different individuals available for distribution.

Voice Password Identification. A decision also was made regarding the issue of recipient identification at the conversion site and use of the voice password identifier. Because the voice password data for most recipients would not be in the system at the time of conversion, the project team agreed to accept the recipient's case number and date of birth as an identifier.

If the voice password information was not already in the system, it would be captured while the recipient was at the conversion site, and a batch file containing this information would be uploaded to CRIS-E daily. During an April 30 project team meeting focusing on conversion issues, it was agreed that AGS would make programming changes in CRIS-E so the system would default to the date of birth on the case record if the voice password screen had not been populated.

Training for Authorized Representatives. During May, the project team resolved the issue of training for authorized representatives. The decision was made to send scheduling letters to the primary food stamp contact for the household only. In addition, authorized representatives who arrived at the conversion site in place of the recipient would be trained only if they could prove that they were the recipient's authorized representative. In this situation, the authorized representative's picture would be captured on the PayEase card, voice password data would be collected from the authorized representative, and the names of both the recipient and the authorized representative would be printed on the card.

Changing CRIS-E Case Numbers. During the finalization of the Detail Design document, the PayEase project team identified the need for additional design effort related to the situation in which CRIS-E case numbers change due to a household restructuring that occurs when the individual to whom a PayEase card has been issued leaves the household. That individual, the primary payee, would be entitled to remaining benefits on the card and possible future benefits under a new case number, and remaining household members could be eligible for benefits as well. But, this could not be accommodated in the PayEase system because the system design had assumed that only one PayEase card would be issued for each authorization number -- the PayEase system equivalent of the CRIS-E case number used by the PayEase system as a household identifier. Two needs were identified: to be able to issue more than one card to a single authorization number, thereby allowing the individual who left the household to use remaining benefits on card and allowing another card to be issued to remaining household members; and to disassociate an active PAN from the CRIS-E authorization number, to enable the individual leaving the household to obtain benefits using the same PayEase card with a new case number in future months. In November, 1991, the PayEase project team agreed that

MCDHS would be responsible for identifying changes in primary payees within a household and performing a transaction to change the information in the EBT system.

Return of Unredeemed Benefit Allotments. Benefits which expire because the recipient does not add an allotment to his or her card prior to the allotment's expiration are considered unredeemed benefit allotments by the PayEase system. These unredeemed allotments were immediately returned to the State of Ohio. It was noted however that if a recipient redeemed (added the benefit to the PayEase card) the benefit allotment just prior to its expiration, but the retailer did not settle until after its expiration, NPC would have erroneously sent the allotment back to the state. Procedures were necessary to accommodate these situations when they occurred.

Upon further examination of this situation, ODHS determined that it would not be able to return the benefit allotment to NPC in these circumstances. The PayEase project team decided that the best way to handle this situation would be for NPC to hold unredeemed benefit allotments for at least five to seven days following their expiration date before returning them to the state. The implementation of this procedure would provide all retailers sufficient time to settle.

Technical Decisions

Several decisions were made during the Development Phase to resolve technical issues related to the off-line EBT demonstration.

CRIS-E Mass Change for EBT Demonstration. Several CRIS-E interface issues were examined in greater detail during the Development Phase, including the mass change procedure to be developed by ODHS for recipient conversion. At the April 30 conversion meeting, NPC presented a plan for converting recipients on a zip code basis over four months. The procedure required a mass change within the CRIS-E system to modify the issuance method -- from coupon pickup ("P") to smart card ("S") -- and create the authorization number that would be provided to the PayEase system. At the same time, CRIS-E would provide a mailing label extract file that NPC could use for scheduling and as a backup file to permit card issuance if the CRIS-E system

was down. The project team agreed that this approach was generally feasible. However, an open issue remained whether ODHS or AGS would develop the code for performing the mass change and generating the extract file.

Communications Between ODHS and NPC. Another interface issue addressed during the Development Phase concerned the method to be used for communication between ODHS and NPC for the purpose of batch transmission of data. During May, the project team determined that an existing communications link (a 56Kb line between NPC in Louisville and its affiliate, Bank Ohio, in Columbus) could be used. This method also would require the establishment of a local connection between ODHS and Bank Ohio; the project team agreed to investigate establishing this connection. During June, the decision was made to install a dedicated virtual circuit between ODHS and NPC. The circuit was installed at the end of July, and plans were made to test its ability to handle batch file transfers during August. The PayEase project team decided that for the functional demonstration and acceptance test, NPC would use dial-up communications to the CRIS-E developmental system rather than using the dedicated circuit.

Communications Between MCDHS and NPC. The method for connecting the ODHS controller to the FCO at MCDHS also was determined. During June, the project team decided that the FCO terminals would interface with CRIS-E through the state owned Telex controller, and that a modem would be utilized for FCO terminal dial-up access to the EBT host.

Communications Protocol. NPC decided to develop a proprietary protocol for file transfers between retailers and the EBT host and the FCO and the EBT host rather than modify existing on-line protocols. NPC designed the protocol to optimize the efficiency of the communications (X.25) network, minimize the required connection time, and provide error correction and recovery capabilities during data transmission.

POS Changes. During system development in July, a problem was identified in the use of expanded memory by the LAN file server used at the POS. This problem was attributed to incompatibility between the VeriFone PC code and the PC motherboard. The solution developed resulted in the need to install an expanded memory card in the PC file server.

During October, the POS configuration was finalized. Two decisions were made: to change the operating system used at the POS, and to upgrade the PCs. The PayEase project team decided to replace the multi-DOS operating system with a Quarterdeck operating system called Desqview. This change was made to resolve terminal problems encountered during testing, in which settlement attempts resulted in the locking up of the PC. The PC upgrade was possible because of PC cost reductions from March to October that enabled NPC to obtain 80386 microprocessor Mitsuba PCs instead of 80286 microprocessor Mitsuba PCs for approximately the same cost.¹

Smart Card Transaction Storage. The September 6, 1991 *Detail Design Document and System Specification* reflected a design change related to transaction areas on the smart card. Previously, NPC had planned to maintain two data areas on each card for transaction data -- one for issuances (value-adding transactions) and one for purchases and other transactions -- in order to ensure that a value-adding transaction could not be overwritten in the data area and subsequently re-posted to the smart card. The PayEase project team determined that a single data area for food stamp transaction data would be sufficient as long as precautions were taken to prevent the overwriting of issuance transactions. The modification entailed allowing the oldest transactions on the smart card -- which maintains 100 transactions in memory -- to be overwritten. An exception, however, was made for value-adding transactions which could not be overwritten for seven days. The seven-day delay in erasing the transaction was judged to be a sufficient precaution because the value-adding transaction would have been included in a settlement already.

Elimination of Alternate PIN. Another change was made during October to resolve problems encountered in system testing. The alternate PIN -- which was included to allow recipients to designate a separate PIN for use by an alternate shopper -- was eliminated as a design feature. The reason for making this change was that, in testing, incorrect entry of the alternate PIN resulted in a card error and a soft card lock. NPC believed that the additional

¹ NPC selected Mitsuba PCs in order to keep POS equipment costs reasonable; however, NPC attributed some system problems to the reliability of the Mitsuba PCs. During March and April, 1993, NPC replaced Mitsuba PCs deployed in some large, high volume stores with NCR PCs because NPC believed that the NCR PCs offer higher reliability and better performance than the Mitsuba PCs.

security benefits provided by an alternate PIN were not sufficient to offset the costs of further development to correct the problem or allow the alternate PIN code to be implemented with the problem that was likely to create a higher number of card locks. Eliminating the alternate PIN required coding changes in the card reader and terminal code and narrative changes in training materials.

Elimination of Interim Settlement. Near the end of the development period, NPC decided to eliminate the capability for retailers to perform interim settlements. The interim settlement, a separate transaction from the end of day settlement, was developed so that retailers could perform multiple settlements during the day to minimize the risk of transactions being lost and ensure that the transaction activity did not exceed the terminal's storage capacity. NPC determined that the interim settlement capability was not necessary, and it was eliminated from the system.¹

PHASE III - SYSTEM IMPLEMENTATION

According to the FNS contract with NPC, the Implementation Phase of the off-line EBT demonstration began on December 1, 1991 and concluded at the beginning of June, 1992. In practice, however, implementation activities continued during the first months of months of the Operations Phase. Value transactions through the EBT system, including benefit issuances and purchases, began at the end of February. During the first five working days of June, the actual EBT conversion process was completed as the last group of recipients received EBT benefit issuances. The implementation period discussed in this section coincides with the period specified in the contract. This section discusses the activities that comprised the Implementation Phase, the level of effort involved in implementing the system, and the important issues, decisions, and design modifications that occurred during this period.

¹ The capability still exists for retailers to perform multiple settlements during an EBT host settlement cycle; retailers accomplish this by performing the end-of-day (EOD) settlement function more frequently than once a day. The difference between interim and EOD settlement functions pertains to processing at the EBT host. Interim settlements were held until an EOD settlement function was performed by the retailer. Then all interim settlements were combined and processed during the EBT host cycle, generating a single ACH credit for the retailer. For multiple EOD settlements within the same host cycle, each EOD settlement is processed and generates a separate ACH credit.

Preparation Activities

Before actual system operations were initiated, the PayEase project team completed the activities necessary to operate the system in the production environment, installed equipment and software at retailer sites, trained retailers to use the EBT system, prepared for recipient training and conversion, and established the mechanisms for on-going support during the demonstration.

System Development and Testing

As previously discussed, FNS authorized NPC to begin the Implementation Phase on December 1, despite the existence of some unresolved system problems. During December, NPC, VeriFone, and MicroCard continued development and testing activities required to prepare for the regression test. Their primary focus was to correct problems identified during the acceptance test and implement some planned enhancements. NPC prepared and submitted its formal *Regression Test Plan* to FNS on December 20. ODHS also continued development activities related to the mass change program, which uses zip codes to flag the CRIS-E issuance records for recipients in the demonstration area. During December, this program was tested successfully, and the resulting file was sent to NPC.

Regression Test. A regression test was conducted on January 6 - 7, 1992 in Louisville. PayEase project team members, FNS personnel, and the evaluation contractor were present for the regression test. While the test demonstrated that all the acceptance test problems had been fixed, several new problems were identified. The results of the regression test were documented in the *Regression Test Report*, which was submitted to FNS on January 17, 1992.

Quality Assurance Testing. NPC conducted quality assurance (QA) testing between January 20 - 31, 1992 to test newly developed system enhancements and to retest the discrepancies identified during the regression test. At the end of QA testing, all regression test discrepancies had been resolved, and the newly implemented enhancements had been successfully demonstrated.

After the completion of QA testing, NPC then froze the code and began migrating the system from the development environment to the production environment. Migration was completed during early February. National City Corporation (NCC) auditors conducted a final system audit February 20 - 21 and discovered no major problems. NPC and its partners planned to implement several system enhancements -- involving changes at the EBT host as well as changes in the point-of-sale (POS) system -- during the demonstration period.

Retailer Preparation Activities

Retailer preparation activities involved installing retailer equipment, installing system software, and training cashiers and store managers prior to the beginning of actual operations. Retailers had the option of receiving training at the retailer's site or at a training center established at FNBD. Retailers also were given the option of having all their employees attend training or having selected employees attend a "train the trainer" session and subsequently train other store employees. Separate training sessions were provided for cashiers and managers.

At the beginning of December, approximately 72 retailers had signed agreements to participate in the EBT demonstration. Site preparation and retailer training were conducted during December, January, and February. Software for the retailer POS system was installed at participating stores during the week of February 10, 1992.

Recipient Preparation Activities

Before recipient conversion activities began, physical improvements were made at the temporary site that had been leased for recipient training and conversion activities, the conversion site staff was hired and trained, and the recipient scheduling process was initiated. In addition, MCDHS employees -- primarily caseworkers and other income maintenance workers who would not have responsibilities related to operating the EBT system, but who might be asked questions about PayEase -- attended training sessions designed to provide an overview of the PayEase system.

System Support

Two organizations shared responsibility for providing support to PayEase participants: NPC customer service and the MCDHS PayEase office.

NPC Customer Service. Before system startup, NPC made final arrangements for providing 24-hour customer service support to PayEase recipients and retailers through a toll-free number. NPC completed development of system functions, installed equipment and communications lines, and hired and trained NPC customer service agents to staff the toll-free number and serve as the contact to retailers and recipients. These agents were trained to perform a wide variety of functions including referring recipients to the MCDHS office if appropriate, dispatching technical support teams to resolve retailer problems, and providing system information to retailers and recipients.

MCDHS PayEase Office. MCDHS employees who had been selected to work as members of the PayEase office staff were trained for their new responsibilities. Unlike NPC customer service, the PayEase office staff assisted only EBT recipients. PayEase office personnel included assistance control office (ACO) staff and fiscal control office (FCO) staff.¹ ACO was established to provide recipient support for the PayEase project, while FCO was responsible for functions related to establishing recipient cases in the PayEase system and issuing PayEase cards.

PayEase Conversion and Operations

PayEase conversion began in the middle of February, 1992, when retailers received PayEase software and recipient training began. EBT transactions at the POS began at the end of February. Important system, retailer, and recipient activities through the end of May, 1992 are described in this section. Operational and performance statistics for the PayEase system during this period are provided in Chapter 4 of this report.

¹ During conversion, FCO functions were performed by temporary personnel hired by PSI. The PayEase office, with ACO and FCO operated and staffed by MCDHS, was not established until the Operations Phase.

System Development

Throughout the implementation period, the project team continued to make system changes to improve system functionality and performance and correct identified problems. Important system modifications included: installation of upgraded POS software at all retailers during April, addition of disk space on the Tandem EBT host computer to improve processing performance, and modification of FCO code to include a diagnostic capability for damaged cards as well as the ability to repair some out-of-balance cards.

Other significant system problems identified and corrected during the period included: communication difficulties between the EBT host and retailers, incorrect transfer of value transactions, host-related problems building the issuance file, incorrect reduction of PAN- derived balances (i.e., card balance rather than host balance) for issuances that had not been added to the PayEase card, and card pre-personalization failures. In addition, the following problems, related to the CRIS-E interface with the EBT system, were corrected: incorrect benefit dates on recurring files, incorrect end dates on issuance records, non-unique identifiers on issuance records, and modification of file search procedures using voice password data.

Retailer software problems, equipment problems, and settlement problems were identified during early EBT operations. The POS software upgrade installed during April corrected some problems including: transactions that were not sent to the host because the cashier hit the "clear" key while the transaction was being processed; and incorrect batch numbers on the end of day totals receipt. In addition, the new software resulted in improvements in the success rate for settlement.

Retailer Participation

During the implementation and early operations period, additional retailers began participating in the PayEase system. Several factors accounted for these participation changes.

February. Recipients living in zip code 45417 received initial benefits during the first five working days of March.

During conversion, approximately 10,500 households in the demonstration area were converted from paper coupons to the PayEase system. Recipient conversion was done by zip code. The first zip code received initial EBT benefit issuances in March, and the final two zip codes received PayEase benefits beginning in June. Newly certified households in converted zip codes were brought onto EBT at the time of certification. Recipients were converted to PayEase by zip code as indicated in the following schedule:

<u>Zip Code</u>	<u>Approx. Size¹</u>	<u>Training Start</u>	<u>First EBT Issuance</u>
45417	1,699	mid February	March
45406	2,408	early March	April
45416	225	early March	April
45405	1,440	early April	May
45408	1,902	early April	June
45407	2,188	early May	June

This actual schedule deviated from the planned schedule in one area only: recipients in zip code 45408 were supposed to receive initial EBT issuances in May. FNS and the PayEase project team agreed to delay implementation of this group for one month because of system problems that were identified during April.

The process for converting each zip code followed the same general pattern. As an example, the steps involved in converting recipients living in zip code 45406 were as follows.

¹ Approximate size refers to the number of food stamp households in the zip code area as of the end of January, 1992. Numbers were provided by ODHS based on CRIS-E counts at January cut-off. The difference between this total (9,862) and total EBT households trained is due to caseload increases in the demonstration area during the conversion period.

- At the end of February, the CRIS-E system generated a file that contained recipient name and address information for all food stamp households in the 45406 zip code.
- This file provided the input to an automated PC-based scheduling system used to generate letters to recipients notifying them about their appointments for EBT training.
- Appointment letters generally were mailed to recipients eight days prior to their scheduled appointments. Initial appointments for recipients in the 45406 zip code were scheduled for March 9.
- Throughout the month, recipients attended training sessions which consisted of several components:
 - In a group session, a trainer provided a brief introduction, and recipients were shown a video illustrating the PayEase system.
 - The video was followed by additional information from the trainer, a questions and answers period, and "hands-on" practice with the system.
 - During the group session, recipients also completed the shopping survey, which was used to determine the stores at which they shopped to ensure that fringe stores where large numbers of recipients shopped were equipped.
 - Recipients then were sent to the FCO area, where they selected a personal identification number (PIN), and the clerk entered their retailer issuance sites into the system and issued the recipient a PayEase card.
 - Cards generally were retained at the conversion site, until the time benefits would be available, if there was a significant interval between the time that the recipient attended training and the time his or her first EBT allotment would be available.
- During the month, follow-up letters were generated and mailed to recipients who had missed their appointments without attempting to reschedule them.
- After the cutoff date for April issuance (approximately March 23), the mass change program was run to switch the issuance method from CRIS-E to EBT for recipients living in the designated zip code.
- Beginning on the first working day of April, (Wednesday, April 1), recipients whose benefits were available for pickup returned to the conversion site and picked up their PayEase cards and personal identification numbers (PINs) in separate, sealed envelopes. Use of the PayEase card was reviewed, and recipients were encouraged to add benefits to their PayEase cards using one of the issuance terminals at the conversion center.

System Support

Support mechanisms for both retailers and recipients were implemented during this period as well. NPC customer service began operating in late February, but very few calls were received until March when PayEase system activity increased. Call volume increased as conversion progressed, and the percentage of calls initiated by recipients increased relative to the percentage initiated by retailers. Customer service calls were received through an automated call distributor (ACD) and directed to one of two agents on duty.

During the conversion period, all EBT activities, including ACO support, were concentrated at the conversion site. In addition to the support functions they provided throughout the demonstration, ACO personnel assisted conversion site staff in scheduling matters, distributing envelopes containing PINs to recipients, and other conversion related activities such as address inquiries. Some of the more common types of recipient support provided by ACO staff included:

- providing recipients information about when benefits would be available;
- helping recipients determine why benefits were not available and enabling them to obtain benefits;
- performing activities required to replace a lost, stolen, or damaged card;¹
- completing an authorization form that enables recipients to convert EBT benefits to paper coupons; and
- verifying the identity of recipients who needed to have a card unlocked or a PIN changed (both functions were performed by FCO staff).

Level of Effort

Organizations involved during the Implementation Phase of the demonstration spent approximately 15.17 person-years on EBT activities. This number included the reported time

¹ FCO -- not ACO -- actually was assigned the task of issuing replacement cards; however, the card replacement process required the recipient to report the missing or damaged card to ACO. ACO staff then obtained NPC authorization for the card replacement and completed an affidavit which the recipient was required to present to the FCO clerk in order to get a new card.

spent by PayEase project team members from NPC, subcontractor organizations, MCDHS, and ODHS; and FNS staff at headquarters, the Midwest Regional Office, and the Cincinnati Field Office. Evaluation contractor technical assistance task time was also included in this figure. The approximate amount of time spent by each organization follows:

- NPC staff spent 8.57 person-years;¹
- NPC's subcontractors spent 4.65 person-years;²
- MCDHS spent 1.30 person-years;
- ODHS spent 0.21 person-years;
- FNS headquarters staff spent 0.23 person-years;
- FNS MWRO staff spent 0.11 person-years;
- FNS Cincinnati Field Office staff spent 0.02 person-years; and
- Evaluation team technical assistance resulted in 0.08 person-years of time spent in support of implementing the off-line EBT system.

Issues, Decisions, and Design Modifications

During the implementation period, the PayEase project team was confronted with both new and recurring issues. This section describes some of the important issues that were raised, the decisions made by the PayEase project team to resolve these issues, and design clarifications and changes that resulted from these decisions.

¹ NPC time reflects time reported for the Implementation Phase. NPC staff maintained daily timesheets on which they recorded the actual number of hours worked on the off-line EBT demonstration. The additional time worked by NPC and FNBD staff during this period that was not billed to the government consisted of 1.38 person-years, or approximately 16 percent of time reported for this period.

² Subcontractor time reflects time billed to the Implementation Phase. Person-years include only those organizations that provided a breakdown of hours worked by labor category; other subcontractors had contracts with NPC in which they were paid flat fees for their participation in specific deliverables and/or tasks and were not required to submit detailed information on time worked on the project to NPC. For example, subcontractor time for Astra Communications' assistance with the installation of POS systems at retailer locations.

Organizational Decisions

Organizational changes were made regarding project management, project participation, and responsibility for specific system functions.

Inclusion of "Fringe" Retailers. Selection of fringe stores was re-examined by the PayEase project team and FNS in February, 1992 after several retailers in the fringe area who were not asked to participate in the EBT demonstration expressed concerns about the loss of business as a result of not participating. NPC responded to these concerns by surveying all recipients who came to the conversion site for EBT training. Recipients were given a list of all stores in Montgomery County and asked to indicate the stores at which they shopped. The purpose of this survey was to determine if the results of the original survey, conducted in early 1991, accurately reflected current recipient shopping patterns.

In March, 1992, FNS issued a clarification of the fringe store policy. The recipient survey would be conducted for the entire conversion period. Based on final survey results, additional retailers who met the fringe store criteria of receiving at least one percent of survey responses would be equipped for EBT participation. NPC also informed retailers of another option: NPC would sell POS equipment to retailers that wanted to participate but based on survey results, had not been included in the demonstration.

Client Grievance Procedures. During the Implementation Phase, the PayEase project team established formal procedures for dealing with client complaints brought before the Client Affairs Committee of the PayEase Advisory Council, the group responsible for hearing grievances and making recommendations to the PayEase project team. The PayEase project team decided that since resolution of client grievances involved policy issues, the Client Affairs Committee would provide its recommendation to MCDHS. If MCDHS needed assistance in resolving an issue, ODHS and/or FNS would be consulted.

Procedural Decisions

Several issues related to procedural matters were resolved by decisions made during the Implementation Phase.

Host Settlement Cycles. Before the start of system operations, the PayEase project team decided to use two daily EBT host cycles: one at 4:00 a.m. and another at 9:00 a.m. This decision was based, in part, on the time at which ODHS would be able to provide CRIS-E files to the EBT host. ODHS agreed to transmit the daily auxiliary file to the EBT host by 3:30 a.m., which enabled the host to process benefit issuances in the 4 a.m. settlement cycle, then download issuances to MCDHS so that benefits would be available to recipients at MCDHS by 8:00 a.m. The rationale for the second host settlement at 9:00 a.m. was to enable retailers who settled early in the morning to have their transaction activity included in the day's ACH file.

Settlement Monitoring. On Friday April 3, a problem caused the DES server on the EBT host to fail, preventing communications between the host and the retailers. The communications failure occurred around 7:00 p.m. on Friday, but it was not discovered until Saturday morning around 8:00 a.m. As a result, several retailers (single-lane and two-lane stores) were locked out of the system because they had not settled.¹ One of the corrective actions taken by NPC involved implementing new procedures for customer service that included hourly monitoring of retailer settlement activity. Because many retailers used the auto-settlement feature, which initiates settlement at a given time each day, hourly monitoring provided a mechanism through which customer service agents could identify the absence of expected settlement activity and notify systems personnel.

Recipient Conversion. The PayEase project team made adjustments in the procedures and timing of recipient conversion as needed during the Implementation Phase. One change involved the policy of holding recipient cards at the conversion site. During implementation

¹ To ensure that retailers settled daily, the PayEase system contained a "settle lock" function. When retailers failed to settle, the cashier terminal displayed a warning to settle. If the retailer did not perform settlement within an hour, the EBT host locked the retailer's system to prevent further transaction processing until the retailer performed settlement. As operations continued, the feature was deactivated because retailers generally settled in a timely manner.

planning, the PayEase project team had decided to hold cards at the conversion site for recipients who attended training before the 25th calendar day of the month and would not have benefits available until their issuance date the following month. Recipients trained on or after the 25th of the month would leave with their PayEase cards. During the end of March, however, some recipients tried to use their cards before April issuances were available, which created problems for both retailers and recipients. The PayEase project team decided that the conversion site should retain all PayEase cards -- except for recipients receiving expedited or pro-rated issuances that would be available before the beginning of the next month -- until the time that benefits would be available.

In the middle of April, the PayEase project team requested a conversion schedule change to delay the implementation of recipients residing in zip code 45408 for one month. The change request was made because retailers had been experiencing operational and system problems, and implementation of a POS software upgrade that would resolve some of these problems was planned for late April. The consensus of the PayEase project team was that existing problems should be resolved before this zip code, which contained a recipient population of approximately 2,000 households at the end of March, was converted. The request was approved by FNS, and recipients in zip code 45408 received their first EBT issuances in June rather than May.

Sequence Number Changes. Beginning in April, several cases were discovered in which the sequence number, which is part of the CRIS-E case number, changed from one month to the next. This created problems for the EBT system because the system design had assumed that the authorization number, the PayEase equivalent of the CRIS-E case number, passed to the EBT system on the issuance record being downloaded from CRIS-E would remain constant from month-to-month. When the CRIS-E case number changed, the authorization number also changed and then did not match the information already on the EBT host. During the Implementation Phase, NPC handled these situations by changing sequence numbers to the correct values through a time-consuming manual process. NPC also began developing program code to enable the changes to be made easily in the system.¹

¹ During the operations period, NPC completed code development and implemented software that enabled ACO staff to change the case number information by entering the information into PayEase terminals. This procedure was modified in November, 1992. Under these new

Expedited Issuances. During the Implementation Phase, the PayEase project team recognized that some changes were required in the sequence of events at the conversion site in order to provide expedited food stamp benefits to newly certified recipients within 24 hours. Initially some individuals who were approved for food stamps late in the afternoon at MCDHS were not able to go through training and card issuance at the conversion site until the next day, and as a result, did not receive benefits within 24 hours. The project team decided to allow recipients who arrived at the conversion site after the last training session began (at 3:30 p.m.), but before 5:30 p.m. to go directly to the FCO area that afternoon where card issuance and account setup activities were performed. The setup information was uploaded to the EBT host that evening, and the PayEase card was linked to the issuance record in the next overnight host settlement. The recipient was required to return to the conversion site the next day to attend the PayEase training session and to pick up the PayEase card. EBT benefits were available to the recipient at that time.

Retroactive Benefit Issuance. Different procedures were required to provide recipient benefits under certain conditions. The PayEase system could not provide benefits in situations where retroactive benefits were required in order to provide currently ineligible households with benefits that they were supposed to receive.¹ The PayEase project team explored the issue, but they could not identify a solution that would allow these cases to be handled through the EBT system. The decision was made to handle such cases by issuing an authorization-to-participate (ATP) card to the household and having the recipient exchange the ATP for food stamps at an issuance center.

Transfer of Value Transactions. Before June, 1992, there were several problems related to transferring card balances to replacement cards. Two problems involved the failure of the EBT host to update system balances to include the remaining value on the old card as well as staged transactions. The resolution of these problems required host programming changes. The other

procedures, ACO staff sent case number changes -- via facsimile -- to NPC, and NPC customer service personnel entered the changes into the EBT host.

¹ The PayEase project team uses the term "retroactive benefits" rather than the FSP term "restoration of lost benefits" to refer to benefits that are owed to recipients whose cases are no longer active.

transfer of value problem required the PayEase project team to make a decision about which balance -- the card balance or the host-derived balance -- should be transferred. Initially, the host balance was used as the value to be transferred to a new card; however, in situations where the host balance was higher than the card balance, this practice resulted in too high a value being transferred to the replacement card. When purchases were made with the replacement card and presented for host settlement, overdrafts due to non-sufficient funds (NSF) conditions at the EBT host could occur. NPC resolved this problem by modifying the code that transferred value between cards to compare the card balance to the host-derived balance and transfer the smaller value -- referred to as the undisputed balance -- to the new card.¹

Technical Decisions

Several decisions about technical issues related to the off-line EBT demonstration were made during the Implementation Phase.

Addition of Disk Storage. During the first week of April, available disk space on the EBT host dropped below the minimum acceptable level needed to support adequate system performance. On several occasions host processing time was extended so that the 4:00 a.m. cycle was not completed and issuances were not available to MCDHS by 8:00 a.m. Response time on customer service terminals was affected. Slow system performance also contributed to difficulties in retailer settlements. NPC and its partners decided to install additional storage capacity on the Tandem EBT host as one part of the solution to performance problems. NPC added 1,000 megabytes (MB) of additional disk storage by the end of April, bringing the total disk space to 1,648 MB.

Host Performance. Throughout the implementation period, system performance was monitored, and changes were made to correct problems or improve performance. Design changes were made to meet the objective of improved host performance. The activities undertaken as a

¹ This transfer of value process refers only to card replacements where the old card is available. Lost or stolen card replacement procedures require a 48 hour waiting period so the host-derived balance can be updated to reflect settlement of outstanding POS transactions. The balance used is the lower of the host-derived balance or the last reported card balance at the time of card replacement.

result of these decisions included: adding disk storage and reorganizing and restructuring files to make optimal use of the additional capacity; and implementing changes, as suggested by a Tandem expert, in database access for the main update program.

CRIS-E File Issues. Once recipients began receiving benefits through the PayEase system, several issues arose related to the CRIS-E interface and data passed to the EBT system. Several of the issues were solved by modifying program code to correct errors; however, the resolution of other problems involved file format modifications. The March recurring benefit file from CRIS-E contained two separate cases in which two records appeared to be duplicate issuances because the benefit amounts, benefit dates, and authorization numbers were the same. The records, however, were not duplicates. The EBT system could not make this determination and regarded the second issuance record as a duplicate and discarded it. To accommodate this situation, ODHS changed the CRIS-E file so that a unique benefit number, that changes each month, was created for each issuance record.

POS Upgrade. By the end of April, NPC completed the implementation of its POS upgrade to all participating retailers. NPC decided to upgrade the software to correct deficiencies identified after system operations began, to address retailer problems, and to enhance system functionality. Improvements resulting from the new POS software included:

- resolution of a problem in which a message requesting the retailer to settle did not clear after settlement had occurred;
- resolution of a software problem in which transactions were not written to the recipient's card if the cashier pressed the "clear" key at a particular point in transaction processing;
- correction of the condition that caused incorrect batch numbers to be printed on the end of day totals receipt; and
- enhancement of the auto-settlement feature to make four attempts to reach the host and settle over a two-hour period.

Some outstanding issues and planned enhancements were not addressed in this POS upgrade, so NPC began code development and testing for another software upgrade to be implemented during the Operations Phase.

Lost Settlement Batches. In April, several retailer settlement batches were lost after receipt by the EBT host due to a problem in the line handler, which is a component of the host communications system. A great deal of time and effort was spent trying to reconstruct lost batches to provide retailers with purchase credit. NPC decided to develop and implement procedures to facilitate the resolution of lost settlement batches. During the implementation period, NPC made system changes that would allow the reconstruction of lost batches from retailers' PCs and EBT host monitoring of the receipt of retailer settlement batches.

Card Diagnostics and Repair. Throughout the demonstration, there were significantly more smart card problems and failures than the PayEase project team had expected. These problems contributed to a card replacement rate that was considered to be unacceptably high. One of the steps taken to control card replacements involved the decision to develop a diagnostic tool that would eliminate unnecessary card replacements. NPC developed software that provided for card diagnosis -- to identify undamaged cards -- and repair of a specific out of balance condition caused by premature card removal from a POS terminal. This software was installed in FCO terminals during May.

Chapter 3

SYSTEM OPERATIONS

For many new systems, the transition from implementation to stable operation is made gradually over a period of time. During the interim period, full volume is achieved, but problems identified during implementation remain unresolved. This scenario occurred with the PayEase system. Although System Operations, Phase IV, of the off-line EBT demonstration project officially began in early June, 1992 -- when benefits were provided for all six zip codes through the PayEase system -- the beginning of the Operations Phase represented a "shake-down" period in which implementation problems were corrected and stable system operations were achieved. This period, spanning June and July, 1992, was distinguished from the remainder of the Operations Phase by referring to it as "Early Operations."

The end point that is used in discussions of the Operations Phase requires some clarification, as well. The project time frame called for the Operations Phase to continue through the end of February, 1993. Before the end of this period, FNS was to render a decision about whether the project should be expanded or terminated. However, discrepancies in the schedules for the demonstration and the evaluation meant that evaluation results would not be available to support a decision at that time. FNS, NPC, and Ohio agreed to extend the demonstration's Operations Phase through October, 1993. During the extended Operations Phase, FNS reimbursed 50 percent of the costs, and Ohio reimbursed the other 50 percent. For the purposes of describing system operations in this report, the period only included activities through March, 1993.¹

INTRODUCTION

This chapter presents an overview of PayEase operations. It describes the events that occurred during the Operations Phase of the off-line EBT demonstration and presents PayEase system operating level statistics.

¹ It should be noted however that for the purposes of the evaluation of administrative costs and participant impacts, the evaluation operations period was defined to include the months of August through December, 1992.

System Activities

System development efforts continued during the Operations Phase. During June, 1992, NPC completed coding and began testing a POS software upgrade. Beta testing for version 3.5 software was initiated at six stores and the ACO beginning on June 25. During July, 1992, some problems were identified in this software, changes were made, and beta test software was implemented at additional stores.

By the end of August, 1992, this new POS software (version 3.8) had been implemented at all participating retailers. The implementation of the new software represented the culmination of a planning and development effort that began during the implementation period. The POS software upgrade improved system performance, and no major POS modifications were made after this upgrade.¹

NPC also began to develop an alternative POS configuration for single-lane retailers. This effort was initiated to demonstrate the feasibility of eliminating the PC and LAN -- which are not needed for stores with only one checkout lane -- and using a lower-cost POS device. An OTT2000 terminal, manufactured by OKI, was selected to be used as an integrated cashier terminal and card reader device. Software development and internal testing were begun during the latter part of 1992 and were completed in early 1993. At the end of March, 1993, the terminal was deployed at two beta test retailer sites.² The new terminal also was deployed at MCDHS to replace a multi-lane configuration used for recipient training purposes.

¹ A couple of intermittent problems were discovered after version 3.8 software had been implemented. NPC made programming modifications to correct these problems and implemented changes to affected retailers during November and December, 1992.

² Additional OTT2000 terminals were deployed in three stores during April, 1993. An OTT2000 also was removed from one store where it had been deployed in March, 1993 because the store had experienced a problem with removing smart cards from the device and requested that it be replaced. As of the end of April, the single-lane terminal was being used at four retailer sites.

During March, 1993, NPC replaced Mitsuba PCs in some large, high-volume stores and one PC at the FCO with NCR PCs, because NPC believed that the NCR PCs provided better reliability and performance than the Mitsuba PCs.

NPC made several changes at the EBT host throughout the Operations Phase. Host changes were made for several reasons: to improve performance, correct system deficiencies, and enhance functionality. NPC also developed remote download capabilities, which enabled software modifications to be downloaded from the EBT host to the POS. The download capability was used to make some modifications to POS code to correct minor problems in version 3.8 software. An operating system upgrade also was installed on the Tandem host computer.

Procedural Activities

Several changes that would effect PayEase operational procedures were considered, and ultimately made, during the Operations Phase including:

- implementing a waiting period for PayEase card replacements;
- changing PayEase issuance dates to correspond to calendar dates rather than working days;
- removing ACO on-line access to the EBT host and changing ACO procedures accordingly;
- changing the method by which ODHS provides the monthly recurring benefit file to NPC from transmission to magnetic tape; and
- issuing PayEase cards that would not contain recipient photographs.

The "Issues, Decisions, and Modifications" section provides additional information and the decision made in each area.

Level of Effort

Organizations involved during the Operations Phase of the demonstration through December 31, 1992 spent 8.94 person-years. This figure included the reported time spent by

PayEase project team members from NPC, subcontractor organizations, MCDHS, and ODHS; FNS staff at headquarters and the Cincinnati Field Office, as discussed during meetings with evaluation team members; and MWRO staff, as indicated on daily logs provided to the evaluation team. Evaluation contractor technical assistance time was also included in this figure. The approximate amount of time spent by each organization follows:

- NPC staff spent 5.32 person-years;¹
- NPC's subcontractors spent 1.31 person-years;²
- MCDHS expended 1.96 person-years;
- ODHS expended 0.15 person-years;
- FNS Headquarters staff expended 0.08 person-years;
- FNS MWRO staff expended 0.09 person-years;
- FNS Cincinnati Field Office staff expended less than 0.01 person-years; and
- Evaluation team technical assistance resulted in 0.02 person-years of time spent in support of designing the off-line EBT system.

¹ Staff members from NPC maintained daily timesheets on which they recorded the actual number of hours worked on the off-line EBT demonstration. This was done in order to capture the total amount of time required to support the EBT project since NPC did not bill FNS for time worked by an individual in excess of 40 hours per week. The additional time worked by NPC and FNBD staff during the Operations Phase (June 1 through December 31, 1992) that was not billed to the government consisted of 0.80 person-years, representing approximately 15 percent of the time spent by NPC during the same period.

² Person-years include only those organizations that provided a breakdown of hours worked by labor category; other subcontractors had contracts with NPC in which they were paid flat fees for their participation in specific deliverables and/or tasks and were not required to submit detailed information on time worked on the project to NPC. For example, subcontractor time for Astra Communications to assist in remedying POS system problems at retailer locations.

Issues, Decisions, and Modifications

The PayEase project team considered several issues during the Operations Phase. This section discusses some of the important issues that were raised, the decisions made to resolve these issues, and any system changes that resulted from these decisions.

Organizational Decisions

During the Operations Phase, the PayEase project team made decisions that resulted in new responsibilities for PayEase project team members and FNS.

PayEase Office. In the middle of June, 1992, the conversion center was closed and responsibility for recipient training and PayEase card issuance was transferred to MCDHS. The PayEase office established at MCDHS was comprised of the ACO and the FCO. Two contractor employees from PSI -- who had issued PayEase cards and provided PayEase training at the conversion site -- were retained to perform these functions. MCDHS staff were selected to work in the FCO as well. ACO responsibilities and staff did not change, but ACO was relocated from the conversion site to the MCDHS building.

ACO Procedures. Changes were made in PayEase office operations to remove the need for ACO staff to have on-line access to the EBT host. Procedures were developed to enable ACO staff to perform the functions without on-line access to the system. In November, on-line host access was eliminated for performing recipient balance inquiries, obtaining authorizations for coupon conversions and return of benefits, and changing CRIS-E case numbers. In January, 1993, on-line access for remaining functions -- card replacement authorizations and PAN file inquiries -- was eliminated. The removal of on-line ACO access resulted in changes at the ACO and for NPC customer service. However, the change did not require recipients to do anything different. For example, if a recipient came to the PayEase office to have EBT benefits converted to paper coupons, ACO staff would call NPC customer service to obtain an authorization for the coupon conversion instead of using EBT terminals at MCDHS to access authorization screens in the EBT system. After the procedures had been changed and implemented, the two ACO terminals were removed from MCDHS.

Demonstration Extension. On February 26, 1993, the State of Ohio Controlling Board reviewed and approved the proposal for Ohio to enter into a sole-source contract with NPC to operate the PayEase system in the demonstration area through October, 1993. Under the terms of this agreement, NPC began submitting monthly invoices to ODHS. ODHS paid NPC and submitted a SF-269 addendum for the demonstration to FNS. FNS reimbursed ODHS at the 50 percent funding level through the SF-269 process.

Procedural Decisions

Several procedural changes occurred during the PayEase operations period. These changes reflected the shift from a conversion mode to an on-going operations mode as well as experience with the system.

Sequence Number Changes. Changing sequence numbers on CRIS-E cases created problems for recipients and the PayEase project team, because sequence number changes often delayed the availability of PayEase benefits. When the problem was discovered initially, NPC staff made manual changes in the system or MCDHS issued ATP cards to provide recipients with food stamp benefits. In July, 1992, NPC completed code development and implemented software that enabled ACO staff to change sequence numbers easily by entering the new information into the PayEase system (on-line). In November, 1992, the procedure was changed again. This change was necessary because ACO on-line access, which was required with the procedure implemented in July, was being removed from the ACO in November, 1992. With the implementation of these changes, ACO staff provided the sequence number changes to NPC via facsimile, and NPC customer service agents entered the information into the PayEase system.

Card Reconciliation. During the implementation and early operations period, NPC devoted a significant amount of effort to reconcile recipient accounts for which the card balance differed from the host-derived balance. As of the end of July, approximately 500 cards were out of balance; a majority of these imbalances were the result of lost settlement batches and other system problems that occurred during the implementation period. NPC determined that, due to the extensive effort required to reconcile card balances to host-derived balances, reconciliation would be performed only when a card balance exceeded the host-derived balance -- (card

overages) -- because this condition could indicate fraudulent activity. Differences would not be investigated for situations in which the host balance exceeded the card balance -- a card shortage -- because this type of difference does not present fraud or security risks to Ohio or NPC.

The resolution of this issue required NPC to make some procedural changes as well. During June and July, system inquiries had focused on card transactions at the POS, rather than host transactions reflected in host-derived balances. The decisions regarding card reconciliation along with the modification of the transfer of value code to compare the card balance to the host-derived balance and transfer the smaller value to the new card, made it imperative to monitor actual transactions that adjusted the balance on the host. NPC changed host code accordingly. NPC also deactivated the capability to request a POS transaction history, which reported the last 10 card transactions, remotely from the EBT host because of the negative impact it had on transaction processing speeds and the fact that it reflected POS transactions before retailer settlement and did not provide any information about host activity.¹

Retailer Reconciliation. The decision on card reconciliation had implications for retailers as well. Before the card reconciliation policy was changed, NPC identified card shortages -- which represent transactions for which retailers did not receive credit due to them -- and performed a transaction to decrement the recipient's host-derived balance for the amount of the transaction(s) and credit the retailer(s) involved. By eliminating the reconciliation of card shortages, increased reconciliation responsibility was placed on participating retailers. Specifically, to ensure that the store received proper credit, retailers were expected to reconcile end of day settlement totals to store receipts and notify NPC if there were any differences. NPC would investigate and take actions necessary to provide missing credit to the store.

As a result of the reconciliation problems that occurred, NPC made some enhancements to host reconciliation reporting capabilities. Reports were added to identify the following conditions that impacted retailer reconciliation: "VOID" and "SUSPECT" transactions; transactions suspended at the host; split batches, through the comparison of incoming batches to

¹ The ability to perform a transaction history from the POS terminal was not affected.

fully processed batches; and missing settlement batches, as described in the "Automated Settlement Monitoring" section.

Customer Service Support. During the implementation and early operations period, NPC identified a trend in the distribution of customer service calls -- less than five percent of calls occurred between 11:00 p.m. and 7:00 a.m. -- that resulted in the project team considering the possibility of automating customer service through the use of an audio response unit (ARU). Initially, the use of an ARU during the overnight time period was considered as a substitute for customer service agents. However, as the demonstration progressed, the project team decided that an ARU would be used as a supplement to, rather than a substitute for, customer service support. NPC examined different vendors' products during the operations period, and decided to select a system that provided voice recognition capabilities, which would enable the system to handle incoming calls from either rotary or touch-tone telephones. Initially, the functions that were to be supported through the ARU were a combined recipient last balance and issuance inquiry, a recipient card block command, and a retailer settlement inquiry. NPC identified a vendor, Syntellect, that agreed to provide equipment, and NPC staff began working to develop the interface between the ARU hardware and the Tandem EBT host. ARU implementation, as of the end of April, 1993, was scheduled for the middle of June.

Benefit Issuance Under Special Circumstances. During the Implementation Phase, the project team identified the need to modify benefit issuance procedures to accommodate special situations. One such situation was the issuance of retroactive benefits for inactive cases.¹ The PayEase project team did not find an EBT system solution for this problem. During August, 1992, however, the PayEase project team identified a solution for a related situation, the scenario in which a new recipient was eligible for only one month's benefits. In one-month eligibility cases, caseworkers would be required to open the case, authorize benefits, and close the case in the same session. If the recipient lived in the demonstration area, benefits could not be provided because the PayEase system does not allow the issuance of a PayEase card for a closed CRIS-E case. The solution identified and implemented by the PayEase project team involved having the

¹ The PayEase project team uses the term "retroactive benefits" rather than the FSP term "restoration of lost benefits" to refer to benefits that are owed to recipients whose cases are no longer active.

caseworker enter the MCDHS office address, instead of the recipient's residential address, into CRIS-E. Because MCDHS is outside the demonstration area, the zip code would indicate that the recipient should be issued paper food coupons rather than EBT benefits. The recipient's case would be handled like a regular paper coupon case in CRIS-E.

Waiting Period for Multiple Card Replacements. Throughout the implementation and operations period, the number of card replacements that were required exceeded the expectations of the PayEase project team. During the operations period, the PayEase project team began considering ways to reduce the number of card replacements. In examining card replacement data, cases were identified in which recipients had been issued multiple replacement cards. The project team examined the possibility of implementing a 10 day waiting period for recipients who requested a second (or subsequent) card replacement. The PayEase project team felt that the implementation of a waiting period might provide recipients with additional incentive to take care of their PayEase cards and reduce the number of cases for which multiple replacement cards are issued. FNS agreed to allow the project team to implement a waiting period for second or subsequent replacement cards. In September, 1992, however, the project team decided not to implement the waiting period because the number of replacements that would be impacted by such a change was small relative to total replacements. The project team determined that the costs -- in terms of potential negative reactions by the community -- would outweigh the benefits.

During November, the PayEase project team reversed its earlier position and decided to implement a ten day waiting period when providing the third (second replacement) and subsequent PayEase card to a recipient. Card replacement data maintained by the PayEase Office indicated that there had been a large increase in the number of cases for which multiple replacement cards had been issued since the issue was examined in September. As a result, the PayEase project team decided to implement the waiting period. In order to make this type of change, regulations required that recipients be notified of the change by mail. MCDHS and ODHS prepared a notification, and MCDHS subsequently mailed a copy of it to each EBT household during February, 1993. The ten day waiting period policy became effective March 1, 1993.

Monthly Recurring Benefit File. In October, 1992, the PayEase project team decided to change the procedures for the data transfer between ODHS and NPC. Beginning with the December benefit file, which was provided to NPC at the end of November, ODHS began providing the monthly recurring file on magnetic tape rather than transmitting it to NPC. The change was made for two reasons: it eliminated the difficulties associated with differentiating auxiliary files from the recurring file, and it demonstrated a more cost-efficient approach for EBT expansion scenarios in which transmitting larger allotment files would increase telecommunications costs.

PayEase Benefit Issuance Dates. During the fall of 1992, the PayEase project team decided to change issuance dates so that PayEase issuance would be staggered over the first five calendar days of the month rather than the first five business days. This change was implemented with January, 1993 benefits. The purpose of the change was to eliminate participant confusion about when benefits would be available each month.

POS Code Changes. During the fall of 1992, NPC changed the procedures used to implement code changes at the POS. In conjunction with the August POS upgrade, *PC Anywhere*, communications software that was needed to allow NPC to download code changes, was installed at retailer locations. In addition, EBT host code was changed to allow remote download capability. These changes were made to allow a more efficient and cost-effective means of implementing POS changes. After these changes were made, software changes could be downloaded to approximately 70 percent of participating retailers; incompatibility in the design of their telephone systems prevented successful remote download to remaining retailers.

Retailer Notices. The PayEase design required that notices be produced by NPC and sent to retailers to provide information about special situations, changes, problems, and exception processing. Notice generation was a manual process when the PayEase system was implemented; however, during the operations period, NPC began enhancing host code so that the system would automatically generate retailer notices. The implementation of automated notices began in October, 1992 and was completed in December, 1992. Code was developed to automatically generate retailer notices in the following situations: manual purchases, restorals (for transactions that are lost and must be reinstated through the entry of transaction data from store copies of

PayEase receipts), representation (forced debit) settlement, settlement batch adjustments, and retailer-financial institution relationship changes.

Technical Decisions

During the Operations Phase, several technical issues were addressed. Decisions were made that resulted in making changes to reflect experience with the system.

Host Performance. As the number of recipients participating in the system increased, so did the volume of transactions. This resulted in some problems with host performance. One problem was that batch processing following host settlement took longer to complete than the time available. On a few occasions during June, NPC was late in providing the retailer credit file to the concentrator bank, and as a result the concentrator bank was not able to meet the Federal Reserve cutoff for ACH file receipt. This resulted in a one-day delay in retailer credit. Several actions were begun during the early operations period to improve host performance. NPC estimated that the modifications made during June and July, primarily changes in database update procedures that involved improving methods for indexing and accessing the databases, improved host performance by 250 percent to 500 percent. Other changes to improve host performance during the operations period included: modifying the three main database update programs; eliminating one of the daily host cycles; writing reports to microfiche rather than paper; compressing files; and archiving old data to tape.

Host Processing Cycle Changes. A system design change was made on July 8, 1992 to switch from two daily host cycles -- one at 4:00 a.m. and another at 9:00 a.m. -- to a single host cycle at 4:00 a.m. The change was made to increase the length of the batch processing window to reduce the possibility of missing the Federal Reserve cutoff for ACH file receipt. Other reasons for making this change were related to its positive impacts on customer service response time and the ease of system reconciliation.

POS Upgrade. During the last week of August, 1992, POS software version 3.8 was implemented to all participating retailers. The new software provided the following enhancements to POS functionality:

- improved signaling between the card reader and the cashier terminal reduced by about 50 percent the time required for the card reader to request PIN entry (from six to seven to three to four seconds);
- prevented the POS system from sending duplicate transactions to the host;
- corrected the condition where the POS hangs up in processing by forcing the terminal to time out and recycle itself if the transaction cannot be completed;
- facilitated the identification of and recovery from errors associated with disrupted transaction processing, by displaying a "VOID" or "SUSPECT" message on the receipt to indicate transactions that had not been stored in the retailer's PC database;
- protected downloadable files from corruption (by creating a backup that can be restored if there is a power loss during settlement); and
- corrected the situation in which counts for incorrect PIN entry, card blocks, and terminal blocks were inaccurate.

Automated Settlement Monitoring. Several settlement batches were lost¹ during the implementation period, and a great deal of effort was required to reconstruct these batches to provide retailers with missing redemption credits and reconcile balances on recipients' cards with the host-derived balances. During the operations period, NPC decided that the solution required better settlement monitoring. NPC proceeded with developing and implementing changes in host code to improve the ability to identify missing retailer settlements in a timely manner. During August, 1992, NPC completed development activities and subsequently implemented host code to automatically monitor retailer settlement activity. Because each retailer's settlement batches are numbered sequentially when created at the POS, host code was developed to detect batches that were not sequential (for the given retailer) upon receipt at the host and produce a daily exception report indicating all such settlements. The report provided a control mechanism for identifying lost settlement batches.

Smart Card Performance Problems. The failure rate for smart cards far exceeded the expectations of NPC and the card manufacturer, MicroCard. Throughout the implementation and

¹ "Lost" batches refer to batches that are sent by the retailer during end of day settlement, but do not get processed at the EBT host. Batches can be lost in transmission or by the line handler (communications component) of the EBT host.

operations period, NPC and MicroCard performed analysis on failed cards. The results of this analysis suggested that the differences in the manufacturing process and the materials in the cards used for the demonstration -- compared to test cards used during system development -- contributed to the unacceptably high card failure rate. As a result, NPC required that MicroCard manufacture the last batch of demonstration smart cards at the facility where the test cards had been produced and modify the materials used and the manufacturing process accordingly.

The last batch of smart cards -- which consisted of approximately 5,800 cards produced at the facility in France where the test cards had been produced -- was received at NPC in January, 1993. These cards differed from earlier cards in both manufacture and design. The new smart cards were received from MicroCard with embossed PANs and pre-printed logos. At the time of card issuance, recipients' pictures were not included on the new smart cards.

FCO Configuration. Following the failure of the FCO LAN file server on November 20, the PayEase project team decided to remove the LAN and have the PCs function as stand-alone units containing individual databases. The changes were made by the end of November, 1992.

CRIS-E Development. During the operations period, several issues related to further CRIS-E development effort required to support the PayEase system were discussed, and changes were implemented by the project team. Two issues, however, were not resolved. One issue involved the feature that was included in CRIS-E to automatically freeze case information after the recipient's zip code is entered to prevent the caseworker from changing the issuance method. This had some unintended consequences; caseworkers were prevented from correcting errors and canceling cases. The second issue involved development of a mechanism for returning unused benefits or benefit overpayment to the state. This capability was not available during the demonstration period. Instead, EBT benefits to be returned to ODHS were converted to paper food coupons, which remove them from the PayEase system. ODHS retained the coupons and made the appropriate adjustments on CRIS-E to reflect the return of benefits.

SYSTEM OPERATING LEVELS

three exhibits provide a general overview indicating monthly system operational levels since PayEase operations began in February, 1992. As shown in Exhibit 3-1, recipient participation grew rapidly during the February, 1992 through June, 1992 period as the conversion effort progressed. Throughout the operations period, the monthly recipient count varied. The number of active households ranged between 10,478 in June, 1992 to 11,111 in December, 1992.

Data related to EBT benefit issuance are provided in Exhibit 3-2 and Exhibit 3-3. EBT benefit issuance over the period increased in proportion to participation growth. Monthly data indicating the total dollar amount of benefit issuances redeemed by recipient households is provided in Exhibit 3-2. Exhibit 3-3 provides a graphical representation of the number of issuances provided through the off-line EBT system each month.

More detailed data are presented for the period that coincides with the June and July early operations period, the August, 1992 through December, 1992 evaluation period, and the continuing operations period of January, 1993 through March, 1993. An overview chart -- which

Exhibit 3-1

Number of Participating Households

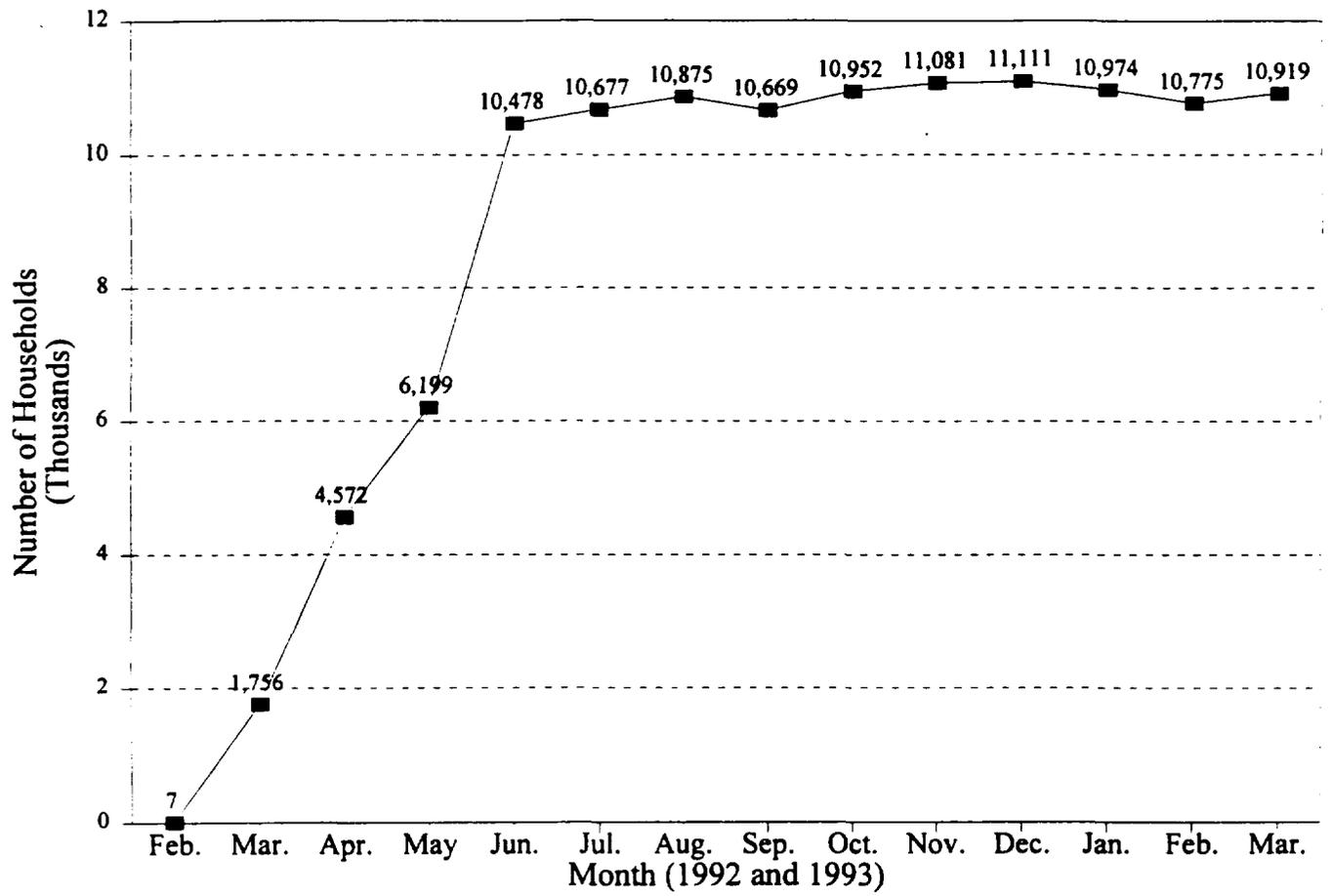


Exhibit 3-2

EBT Benefit Issuance Dollars

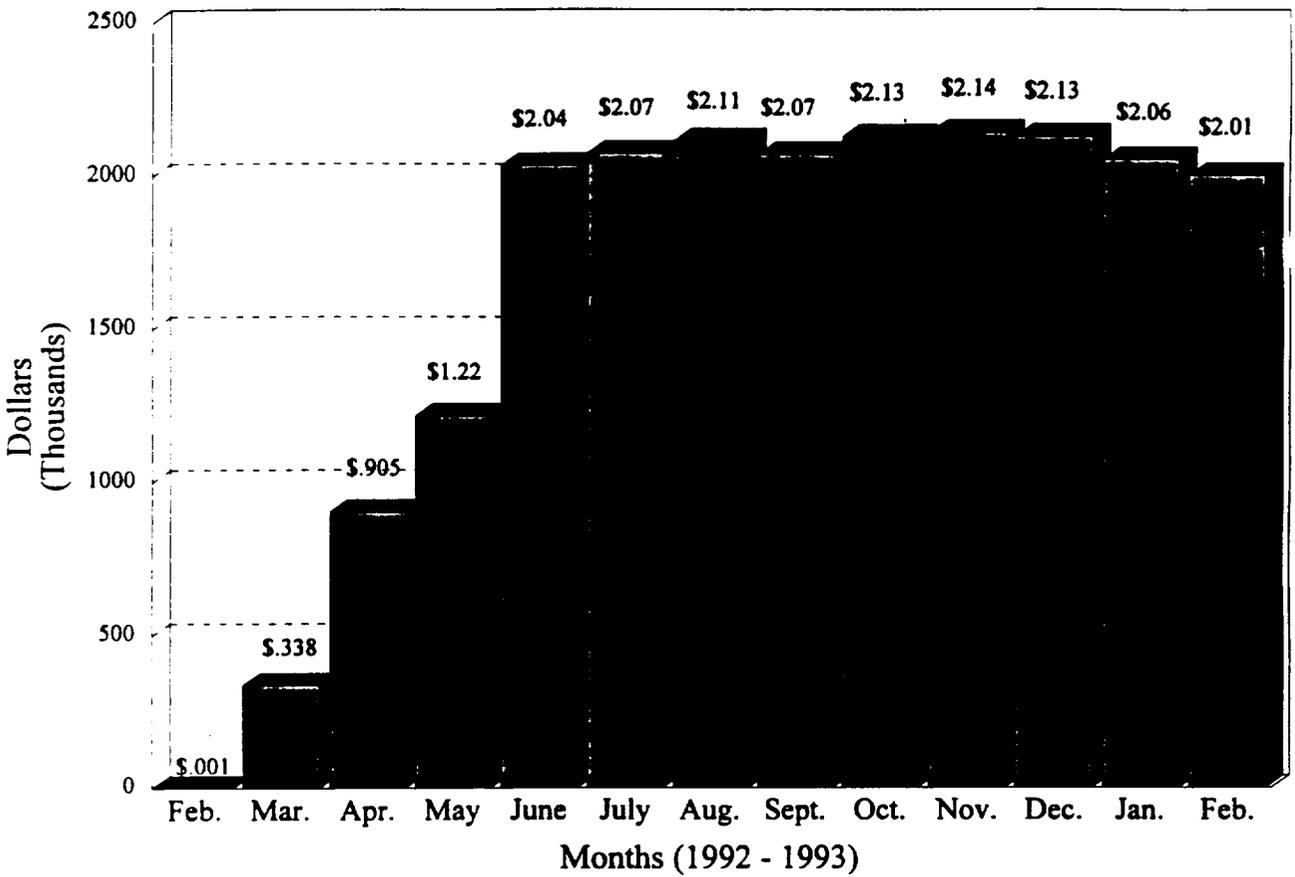


Exhibit 3-3

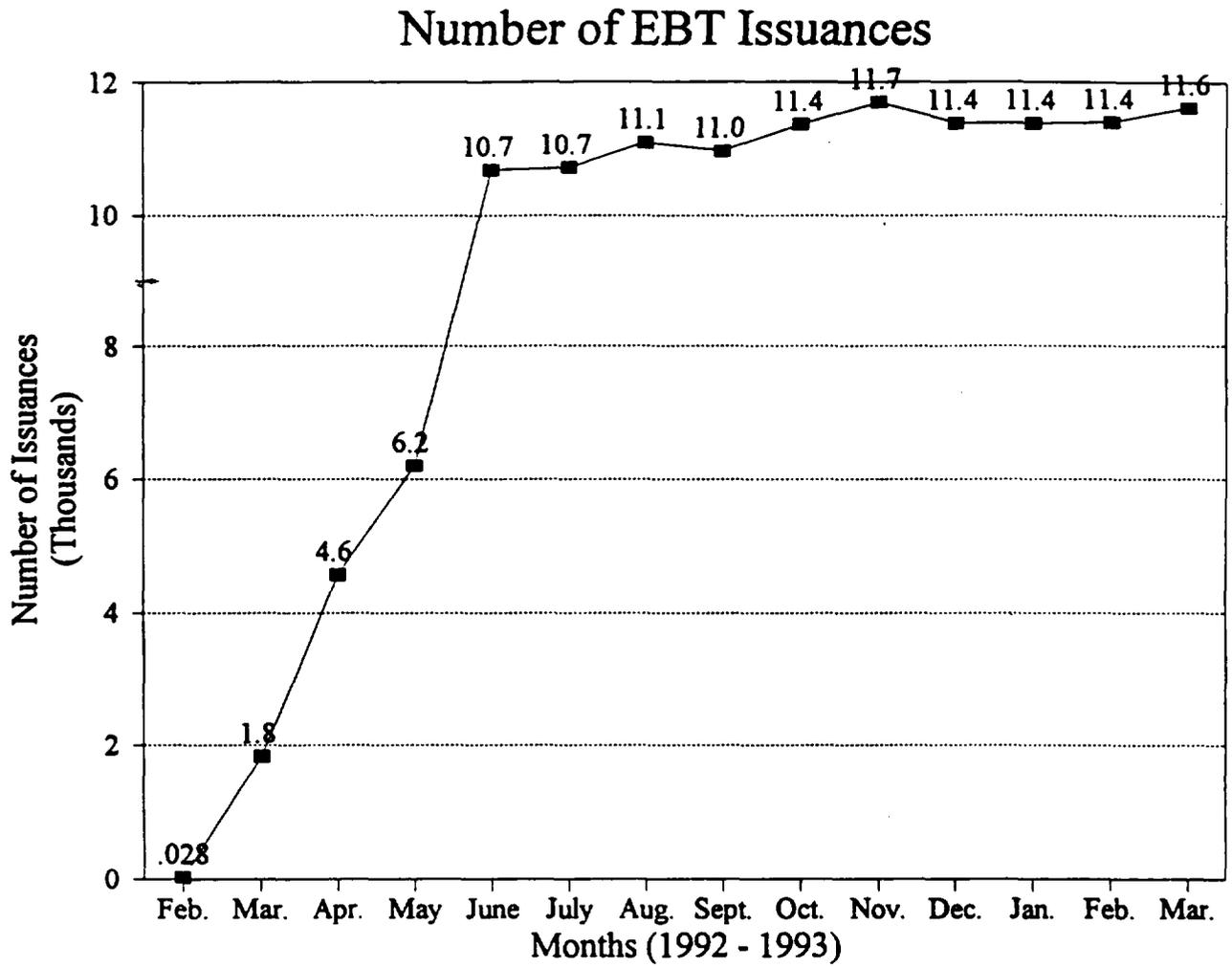


Exhibit 3-4

**OVERVIEW OF PAYEASE OPERATING STATISTICS
MONTHLY AVERAGES BY PERIOD**

Category	Early Operations (6/92-7/92)	Evaluation Period (8/92-12/92)	Continuing Operations (1/93-3/93)	Operations Summary (6/92-3/93)
EBT FSP households	10,578	10,938	10,889	10,851
Benefit issuances				
Number	10,699	11,307	11,472	11,235
Dollar value	\$2,054,990	\$2,117,294	\$2,030,067	\$2,078,665
EBT transactions ^a				
Number	113,243	112,415	104,023	110,063
Dollar value (net)	\$2,045,622	\$2,108,198	\$2,060,620	\$2,081,409
Purchase transactions ^b				
Number	112,315	112,290	103,922	109,785
Dollar value	\$2,078,613	\$2,111,300	\$2,063,707	\$2,090,485
Average number of purchases per household	10.6	10.3	9.6	10.1
Average dollar value per purchase	\$18.51	\$18.80	\$19.86	\$19.04
PayEase card issuance				
New	1,033	439	366	536
Replacement	409	594	622	565
Total	1,442	1,033	988	1,101
NPC customer service trouble tickets ^c	N/A	N/A	2,076	N/A

Notes: ^a Includes the following transaction types: purchases, purchase reversals, refunds, refund reversals, manual purchases, manual refunds, forced debits, and forced credits.

^b Includes purchases and manual purchases.

^c Data reported for the January through March, 1993 period only because programming errors in the EBT host trouble call reporting system resulted in total calls being under-reported prior to this period.

Graphs displaying monthly operating levels during the period from June, 1992 through March, 1993 for PayEase system value transactions are provided in Exhibits 3-5 through 3-10. Exhibits 3-5 presents data on the number of EBT transactions. EBT transactions are defined to include the following types of transactions: purchases, purchase reversals, refunds, refund reversals, manual purchases, manual refunds, forced debits, and forced credits.

Data related to specific types of transactions also are displayed in separate graphs. Exhibits 3-6 and 3-7 display the total number of purchase transactions each month and the total value associated with these transactions. Purchase transaction data includes both regular and manual purchases. Using recipient household data in combination with purchase data, the average number of purchases per household per month can be calculated. The data -- which are displayed in Exhibit 3-8 -- show a downward trend in the average number of purchases per month.

Exhibit 3-9 presents the net dollar amount of EBT transactions which is obtained by subtracting the amounts for transactions that result in value being added to the PayEase card (e.g., refund transactions). Net transaction value, as displayed in Exhibit 3-9, and EBT purchase value, as displayed in Exhibit 3-7, are similar in magnitude each month except July. On Exhibit 3-7, July includes \$63,000 of purchase reversal transactions that are not included in Exhibit 3-9. The unusually high value of purchase reversals during the month was attributed to PC software failures at several stores.

Manual purchases -- as a percentage of total purchases -- are provided in Exhibit 3-10. These transactions were significantly higher in June and July, and resulted primarily from two events. One was the on-going POS problems which created the need for retailers to transact purchases with manual process. A new software release (version 3.8) was implemented during August that resolved the problems. The other event involved a large retailer relocating the POS equipment during store renovations creating system down time. The retailer opted to transact purchases using the manual process.

Data concerning the average dollar amount of EBT purchases are provided in Exhibits 3-11 and 3-12. The average amount per purchase transaction -- shown in Exhibit 3-11 -- increases over time indicating a trend toward larger purchases. This trend is consistent with the

downward trend in the number of transactions presented in Exhibit 3-8. Exhibit 3-12 provides further insight into transaction distribution among stores by presenting the average transaction amount, total transaction amount, number of transactions, and percentage of transactions by store type.

PayEase card issuance data by reporting period are presented in Exhibit 3-13. The graph shows the volume of new card issuance and replacement card issuance separately and sums the two categories to provide total card issuance.

Another system statistic of interest is the volume of customer service calls. In the PayEase system, retailer and recipient support is provided through a toll-free customer service line. There are two measures of volume related to this customer service function -- the volume of calls answered by the automated call distributor (ACD) and the number of trouble tickets opened and resolved by customer service agents. From the perspective of examining system operations, the number of trouble tickets is the relevant measure. Detailed monthly data are not provided for the demonstration period because the available data prior to January, 1993 are not accurate.¹ Exhibit 3-4 provides the average monthly number of trouble tickets for the January through March, 1993 period.

¹ In March, 1993, NPC discovered a programming error in EBT host code that resulted in some trouble call tickets that were opened and closed in the same session not being included in trouble call report counts. Therefore, the number of trouble calls reported by NPC has been understating the total volume of trouble calls. NPC corrected the programming error and produced revised reports for January and February, 1993.

Exhibit 3-5

Number of EBT Transactions

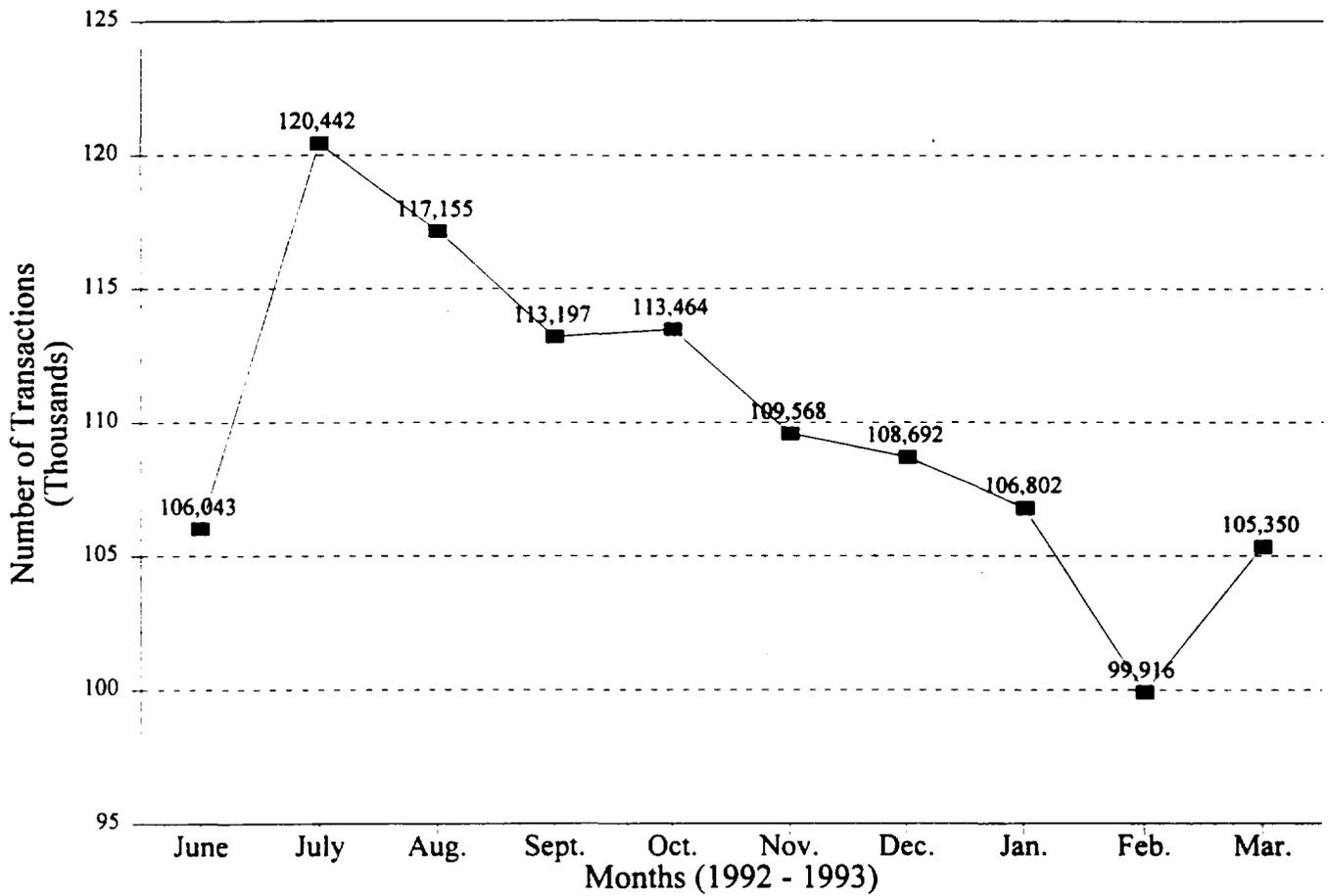


Exhibit 3-6

Total Number of EBT Purchases

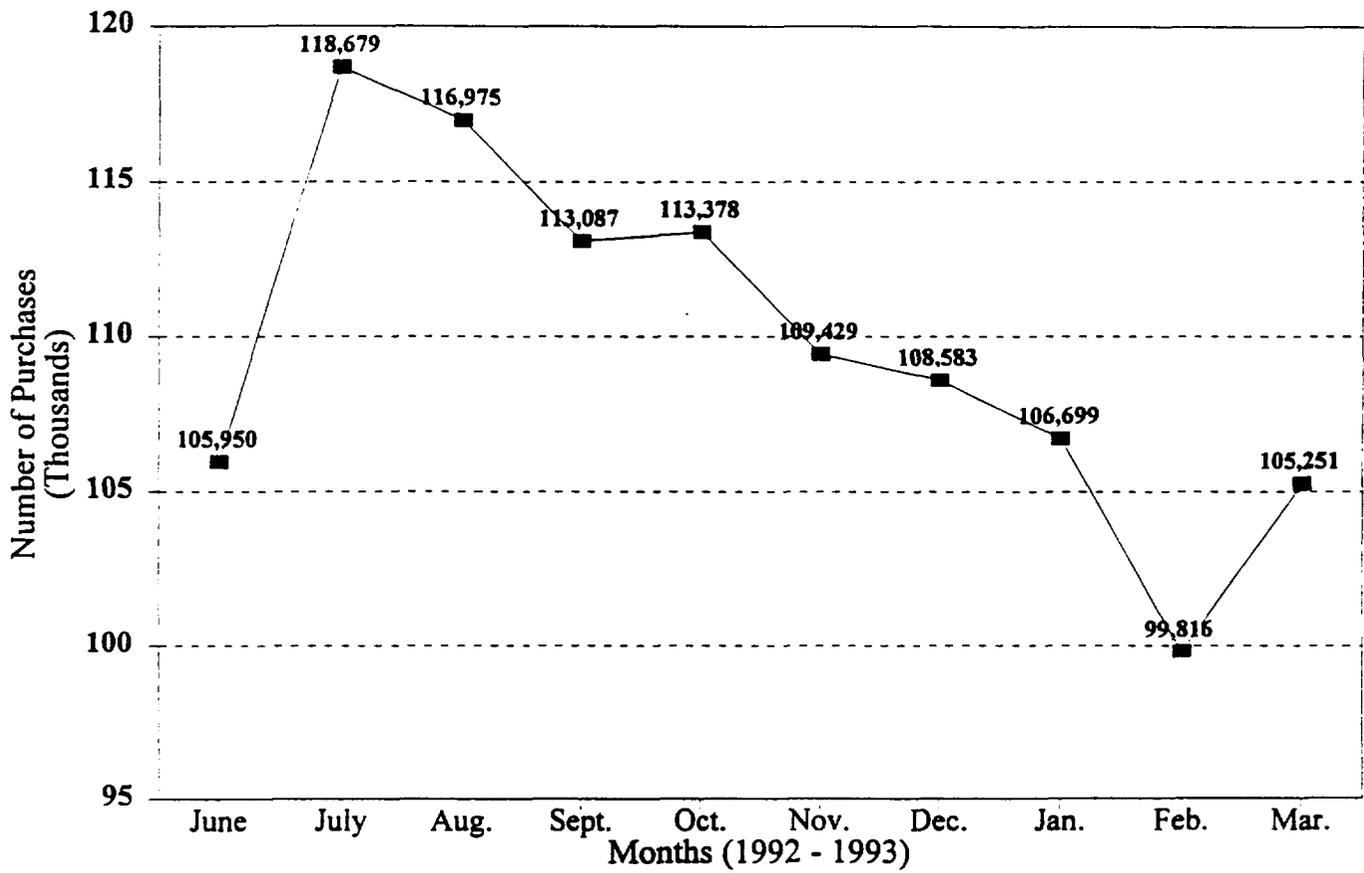


Exhibit 3-7

Dollar Amount of EBT Purchases

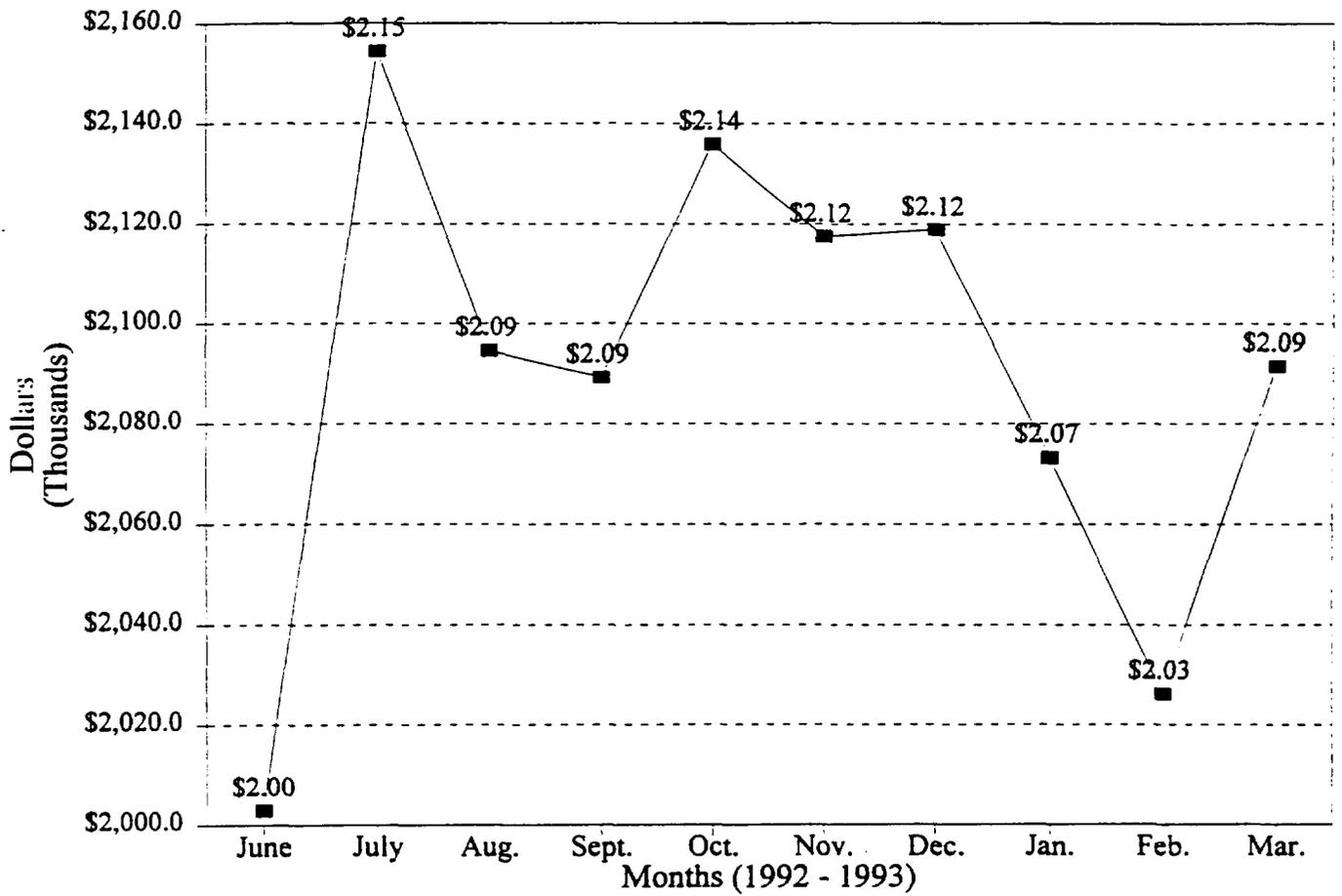


Exhibit 3-8

Average Number of Transactions Per Household

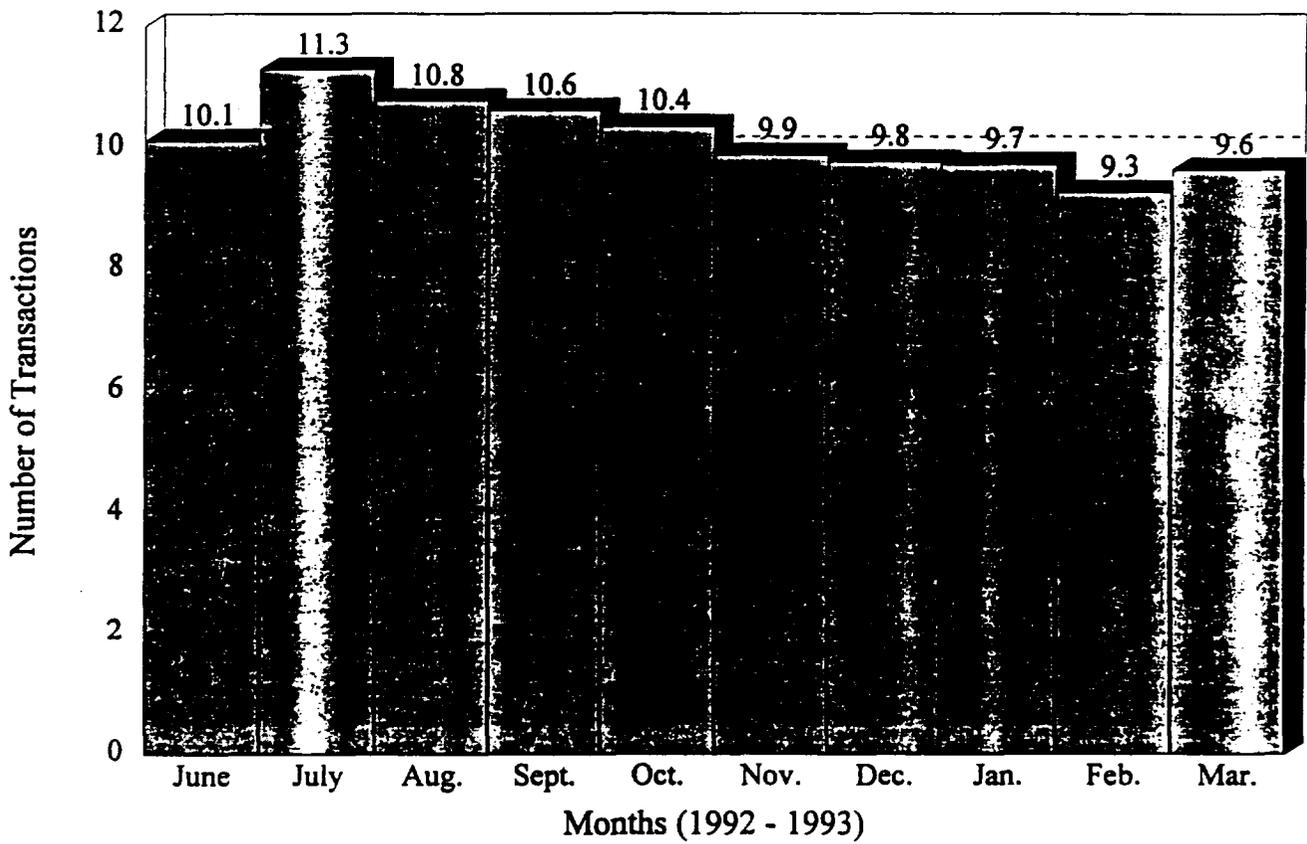


Exhibit 3-9

Net Dollar Amount of EBT Transactions

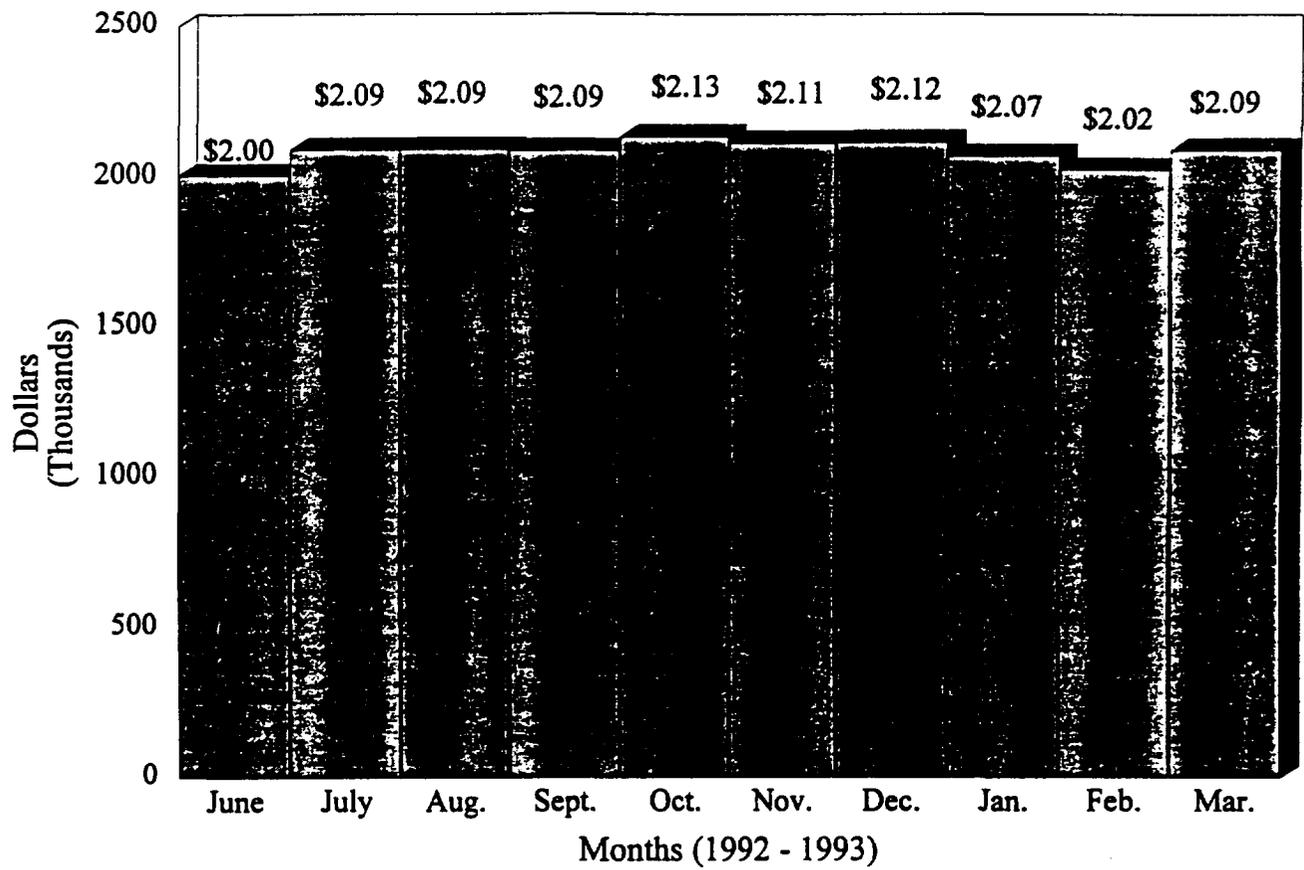


Exhibit 3-10

**Manual Transactions as a Percentage
of Total Transactions**

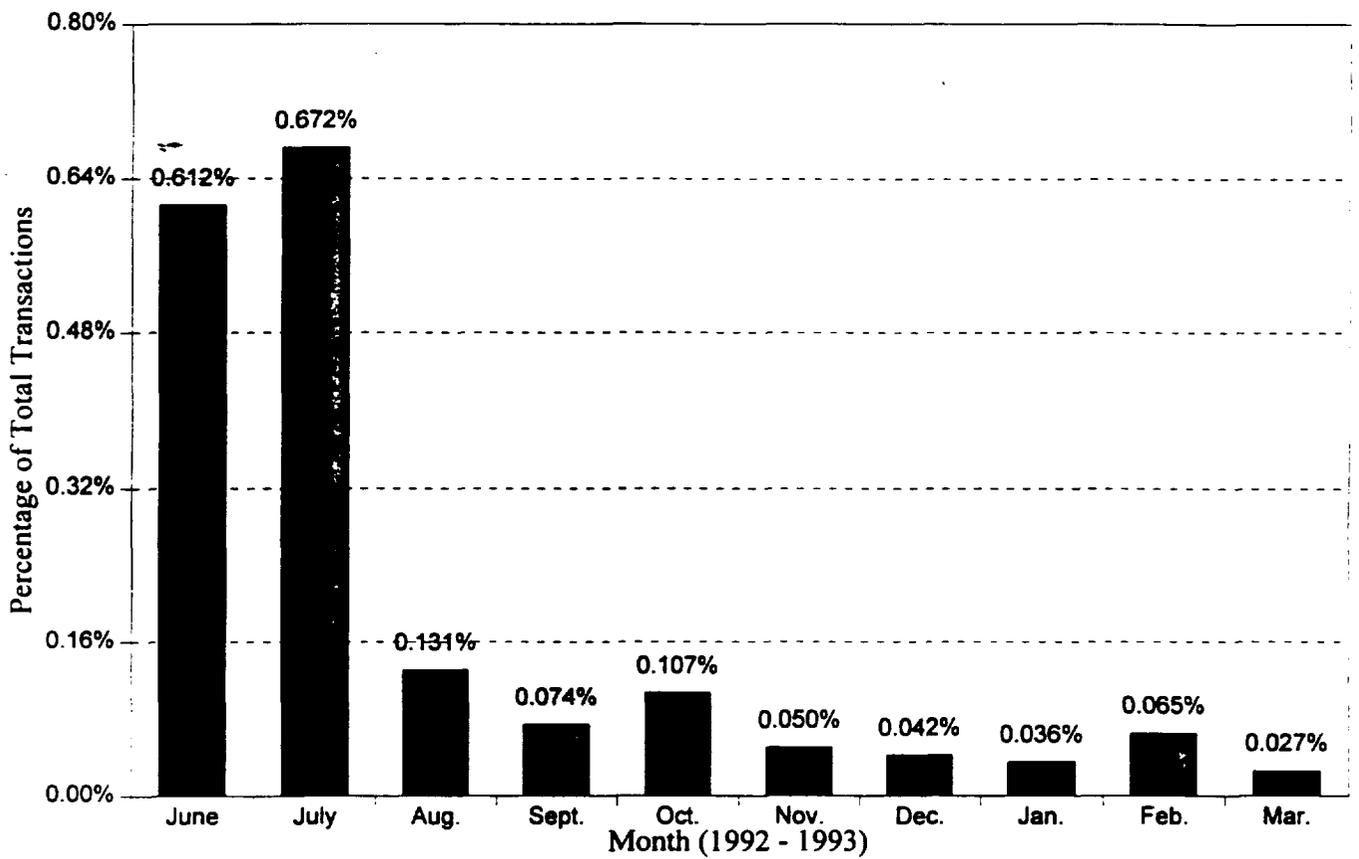


Exhibit 3-11

Average EBT Purchase Amount

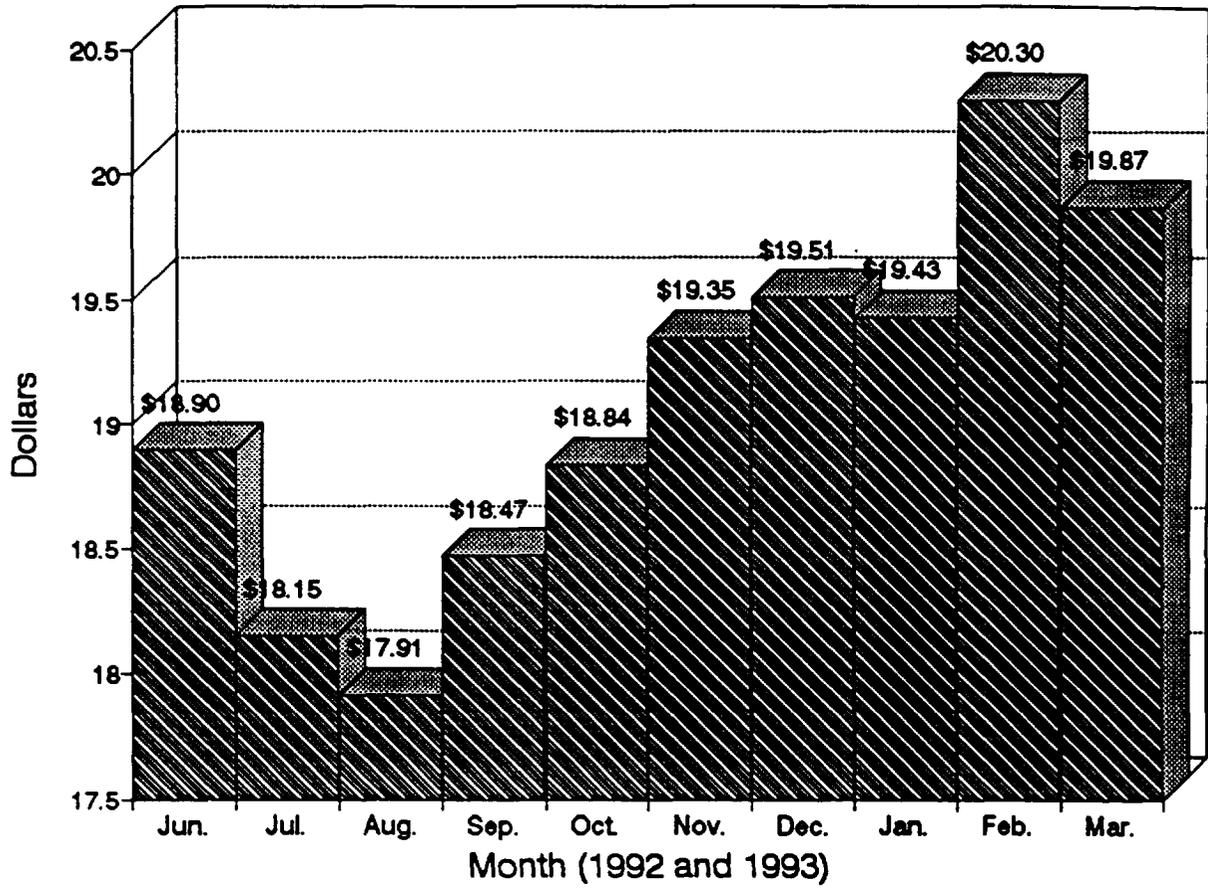


Exhibit 3-12

RETAILER TRANSACTION ACTIVITY BY STORE TYPE

	Aug. (1992)	Sept.	Oct.	Nov.	Dec.	Jan. (1993)	Feb.	Mar.
Store Type: Convenience Store								
Number of Trans.	7,013	6,306	6,443	6,330	6,218	6,537	5,838	6,344
Dollar Amount	\$33,218.18	\$29,583.25	\$30,911.45	\$31,180.29	\$32,083.52	\$34,899.93	\$31,133.47	\$36,212.51
Ave Trans Amt	\$4.74	\$4.69	\$4.80	\$4.93	\$5.16	\$5.34	\$5.33	\$5.71
% Total Trans	1.59%	1.42%	1.45%	1.48%	1.52%	1.68%	1.54%	1.73%
Store Type: Grocery/Gas Station								
Number of Trans.	2724	2,346	2,354	1,916	2,050	2,058	1,768	1,781
Dollar Amount	\$9,560.31	\$8,582.38	\$8,614.44	\$2,246.72	\$7,970.11	\$7,720.12	\$6,748.12	\$6,735.13
Ave Trans Amt	\$3.51	\$3.66	\$3.66	\$1.17	\$3.89	\$3.75	\$3.82	\$3.78
% Total Trans	0.46%	0.41%	0.40%	0.11%	0.38%	0.37%	0.33%	0.32%
Store Type: Grocery/Restaurant								
Number of Trans.	442	441	395	417	445	375	360	419
Dollar Amount	\$4,428.63	\$4,682.35	\$3,961.02	\$4,199.68	\$4,702.97	\$4,168.18	\$3,905.04	\$4,491.89
Ave Trans Amt	\$10.02	\$10.62	\$10.03	\$10.07	\$10.57	\$11.12	\$10.85	\$10.72
% Total Trans	0.21%	0.22%	0.19%	0.20%	0.22%	0.20%	0.19%	0.21%
Store Type: Other Combinations								
Number of Trans.	4,557	4,887	4,648	4,955	5,331	4,836	4,794	4,974
Dollar Amount	\$210,186.86	\$232,041.36	\$231,403.96	\$235,471.70	\$247,696.86	\$243,002.28	\$251,438.39	\$246,667.80
Ave Trans Amt	\$46.12	\$47.48	\$49.79	\$47.52	\$46.46	\$50.25	\$52.45	\$49.59
% Total Trans	10.04%	11.11%	10.84%	11.16%	11.70%	11.73%	12.42%	11.80%

**Exhibit 3-12
(Continued)**

RETAILER TRANSACTION ACTIVITY BY STORE TYPE

	Aug. (1992)	Sept.	Oct.	Nov.	Dec.	Jan. (1993)	Feb.	Mar.
Store Type: Produce Stand								
Number of Trans.	434	425	305	276	290	196	215	244
Dollar Amount	\$2,579.22	\$2,761.59	\$1,959.62	\$1,739.83	\$2,204.05	\$1,107.08	\$1,350.14	\$1,652.07
Ave Trans Amt	\$5.94	\$6.50	\$6.42	\$6.30	\$7.60	\$5.65	\$6.28	\$6.77
% Total Trans	0.12%	0.13%	0.09%	0.08%	0.10%	0.05%	0.07%	0.08%
Store Type: Milk, Bread, and Other Routes								
Number of Trans.	10	1	0	0	0	2	12	13
Dollar Amount	\$253.39	\$50.00	\$0.00	\$0.00	\$0.00	\$51.40	\$521.53	\$473.74
Ave Trans Amt	\$25.34	\$50.00	\$0.00	\$0.00	\$0.00	\$25.70	\$43.46	\$36.44
% Total Trans	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.02%
Store Type: Medium/Small Grocery Store								
Number of Trans.	19,176	18,253	18,169	16,409	17,011	16,220	15,271	16,462
Dollar Amount	\$131,606.21	\$131,691.77	\$130,593.68	\$127,067.54	\$129,401.18	\$127,292.11	\$120,468.14	\$127,899.96
Ave Trans Amt	\$6.86	\$7.21	\$7.19	\$7.74	\$7.61	\$7.85	\$7.89	\$7.77
% Total Trans	6.29%	6.31%	6.12%	6.02%	6.11%	6.14%	5.95%	6.12%
Store Type: Specialty Food Store								
Number of Trans.	4,638	4,350	4,581	4,297	3,996	4,199	4,030	4,136
Dollar Amount	\$85,938.43	\$84,122.77	\$90,600.99	\$83,942.13	\$73,915.19	\$81,202.04	\$85,622.57	\$86,847.89
Ave Trans Amt	\$18.53	\$19.34	\$19.78	\$19.54	\$18.50	\$19.34	\$21.25	\$21.00
% Total Trans	4.11%	4.03%	4.24%	3.98%	3.49%	3.92%	4.23%	4.16%

**Exhibit 3-12
(Continued)**

RETAILER TRANSACTION ACTIVITY BY STORE TYPE

	Aug. (1992)	Sept.	Oct.	Nov.	Dec.	Jan. (1993)	Feb.	Mar.
Store Type: Health/Natural Food Store								
Number of Trans.	110	101	133	113	113	101	109	116
Dollar Amount	\$1,704.20	\$1,473.84	\$1,576.81	\$1,722.76	\$1,584.93	\$1,373.74	\$1,564.64	\$1,806.53
Ave Trans Amt	\$15.49	\$14.59	\$11.86	\$15.25	\$14.03	\$13.60	\$14.35	\$15.57
% Total Trans	0.08%	0.07%	0.07%	0.08%	0.07%	0.07%	0.08%	0.09%
Store Type: Other								
Number of Trans.	0	5	0	0	0	0	11	7
Dollar Amount	\$0.00	\$366.01	\$0.00	\$0.00	\$0.00	\$0.00	\$284.24	\$163.50
Ave Trans Amt	\$0.00	\$73.20	\$0.00	\$0.00	\$0.00	\$0.00	\$25.84	\$23.36
% Total Trans	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
Store Type: Supermarket								
Number of Trans.	77,843	75,935	76,316	74,668	73,102	72,150	67,386	70,735
Dollar Amount	\$1,614,336.64	\$1,592,940.13	\$1,635,302.79	\$1,623,835.22	\$1,618,407.71	\$1,571,389.87	\$1,521,911.32	\$1,578,020.38
Ave Trans Amt	\$20.74	\$20.98	\$21.43	\$21.75	\$22.14	\$21.78	\$22.58	\$22.31
% Total Trans	77.13%	76.29%	76.62%	76.93%	76.43%	75.84%	75.17%	75.51%
Store Type: Wholesaler								
Number of Trans.	27	36	34	48	27	25	22	20
Dollar Amount	\$963.01	\$1,008.40	\$956.95	\$1,104.30	\$995.06	\$1,058.86	\$1,283.21	\$652.71
Ave Trans Amt	\$35.67	\$28.01	\$28.15	\$23.01	\$36.85	\$42.35	\$58.33	\$32.64
% Total Trans	0.05%	0.05%	0.04%	0.05%	0.05%	0.05%	0.06%	0.03%

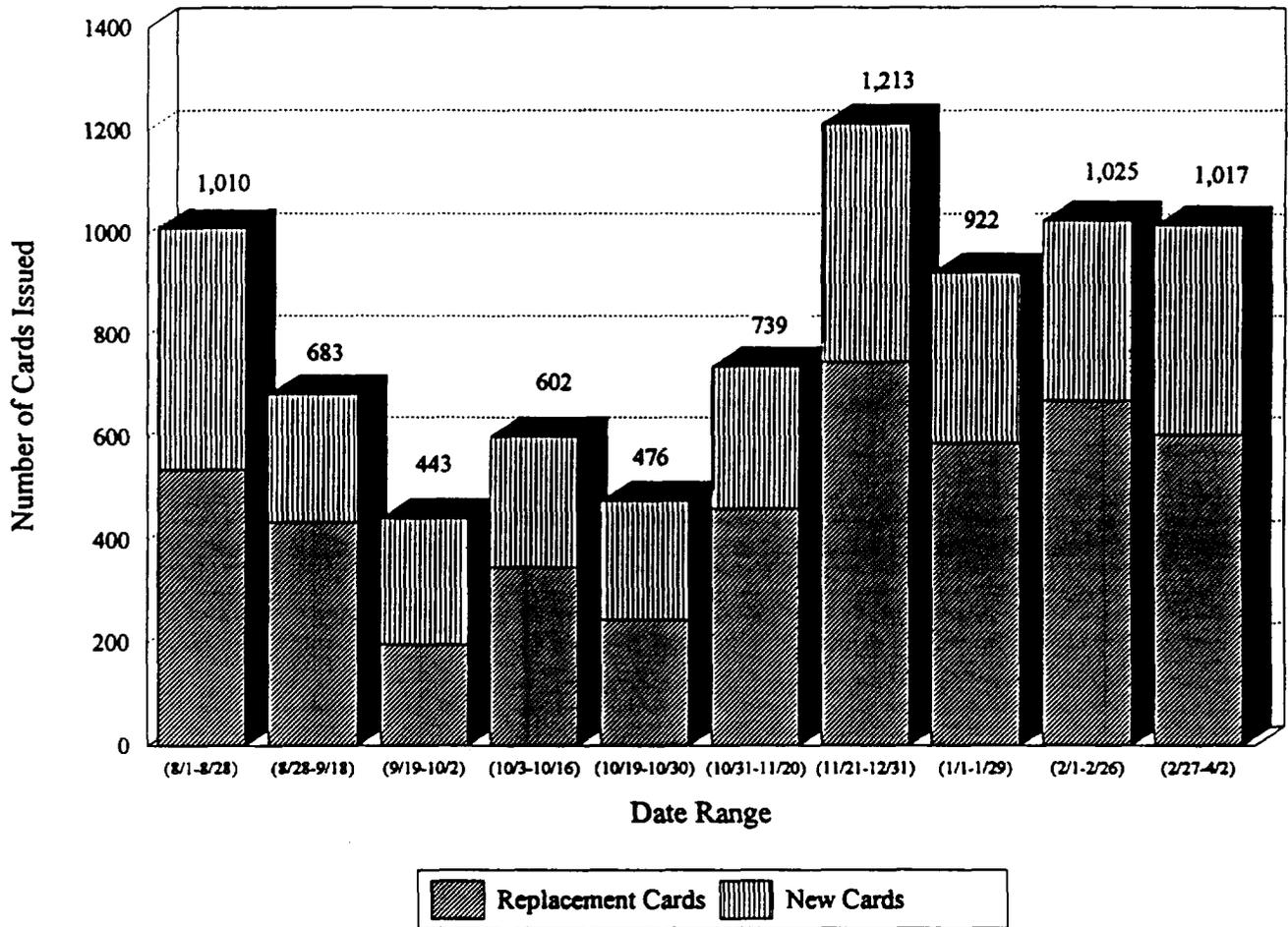
**Exhibit 3-12
(Continued)**

RETAILER TRANSACTION ACTIVITY BY STORE TYPE

	Aug. (1992)	Sept.	Oct.	Nov.	Dec.	Jan. (1993)	Feb.	Mar.
Store Type: Nonprofit Food Buying Coop								
Number of Trans.	1	1	0	0	0	0	0	0
Dollar Amount	\$8.46	\$19.28	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Ave Trans Amt	\$8.46	\$19.28	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
% Total Trans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TOTAL FOR ALL STORE TYPES								
Total Trans	116,914	113,035	113,294	109,365	108,519	106,647	99,756	105,184
Total Dollar Amt	\$2,093,128.34	\$2,087,898.29	\$2,134,353.90	\$2,110,836.41	\$2,117,425.65	\$2,071,940.87	\$2,024,715.17	\$2,089,866.58

Exhibit 3-13

Number of PayEase Cards Issued



Chapter 4

LESSONS LEARNED

As more EBT systems have been developed and become operational, the reservoir of available information on successes and failures, good and bad decisions, and other issues has increased. The PayEase project team was able to use this information while developing the off-line EBT system. Also, the experiences of the PayEase system have contributed to the overall base of EBT information. The PayEase demonstration answered some important questions about the feasibility of applying off-line EBT technology to deliver Food Stamp Program (FSP) benefits, and in the process of doing so, the demonstration provided some guidelines for future development efforts. While some of the lessons drawn from the PayEase demonstration were specific to off-line EBT systems, others were applicable to both off-line and on-line EBT systems.

INTRODUCTION

This chapter presents some of the important conclusions reached by members of the PayEase project team and the evaluation team as a result of their experiences and observations while the PayEase system was being designed, developed, implemented, and operated. The first section describes some general lessons about project organization and participants. The subsequent sections discuss the specific lessons that materialized during each phase of the project and provide insights that may be useful for other system development efforts.

GENERAL LESSONS

Because of the similarities between off-line and on-line EBT systems, general examples related to project organization and participants can be applied to both types of systems. Two general lessons of the PayEase project are the need to: establish a project team, consisting of program and management information systems (MIS) personnel, at the state or local agency level; and work closely with the local retailer community from the beginning of the project. Lessons regarding the selection of the EBT processor and concentrator bank also are discussed in this section.

Project Team at the State Agency

As indicated in Chapter 1 of this report, NPC led the project team that was responsible for designing, developing, implementing, and operating the off-line EBT demonstration in Montgomery County. NPC shared this responsibility with the Ohio Department of Human Services (ODHS) and the Montgomery County Department of Human Services (MCDHS). NPC also was supported by several subcontractors. The core group of the PayEase project team included the following: NPC Project Manager, NPC Systems Manager, NPC Operations Manager, ODHS Program Project Director, ODHS Technical Project Manager, MCDHS Income Maintenance Director, MCDHS Income Maintenance Administrator, and MCDHS Fiscal Officer.

The level of staff commitment differed for organizations that were members of the PayEase team. The design and development effort was performed primarily by NPC staff members -- who were dedicated to the PayEase project -- and by subcontractor staff. Until operations began, MCDHS's role in the project -- which consisted of providing design input, reviewing project deliverables, and participating in system testing -- did not require dedicated staff. ODHS's involvement throughout the project generally involved only the Program and Technical Project Managers. Although ODHS ultimately was responsible for making changes in Ohio's CRIS-E system to support the implementation of the EBT system, the lack of dedicated technical staff at the state level complicated this task. The PayEase project team decided to use a subcontractor for most of the programming necessary to develop the interface between CRIS-E and the PayEase system. This decision was made because of the shortage of MIS staff and competing demands at ODHS. State budget reductions at ODHS had left the MIS group -- which

PayEase system. There also were several instances in which last minute design changes in the PayEase system were required because the resources to modify the CRIS-E system, as planned in the system design, were not available. As operations began, unexpected situations required system changes to be made; these changes had to be made in the PayEase system rather than in the CRIS-E interface. Further, a number of changes have been identified that must be made in the CRIS-E system before the off-line system is expanded, but the staff resources to make these changes have not been available.

ODHS project management acknowledged the detrimental effect of not having a dedicated project team at the state agency. They suggested that other states considering an EBT project assign MIS and FSP staff to a separate project team. They believed that a separate project team would be beneficial because of the large amount of development effort associated with an EBT project.

Retailer Relationship with the Project Team and Involvement in the PayEase Project

Unlike the state-initiated EBT projects -- where the relationships between the EBT project team and the retailer community were complicated by problems -- the overall relationship between the PayEase project team and participating retailers in Montgomery County was good. Several factors -- some planned by the project team and some inherent in the nature of the demonstration -- contributed to this relationship.

From the time that the PayEase project team was formed to respond to the FNS request for proposals (RFP) for an off-line EBT system, the retailer community's input was solicited in designing the system. Project staff from ODHS and NPC believed that it was important to work closely with retailers and retailer associations from the inception of the project so that the retailer community would feel that they were an integral part of the PayEase project team. This relationship was formalized through the establishment of two retailer groups -- the Retailer Store Operations Group and the Retailer Policy Group. The operations group consisted of store operations managers from small, independent stores, large supermarkets, and convenience store chains. It provided feedback to the PayEase project team about the detailed operating procedures for the EBT demonstration. The Retailer Policy Group consisted of representatives of various

grocer associations and other industry representatives, including retail managers. This group focused on broad retail policy issues and concerns. These two groups met regularly with the PayEase project team to provide input as the system design was completed, were kept informed about the progress during the development and implementation periods, and were convened as needed during operations to discuss problems and proposed solutions. As a result of this involvement, the retailer community felt that it had a voice in the PayEase project. Therefore, retailers were more committed to the project's success than they would have been if they felt that the system had been developed without addressing their concerns and forced upon them.

While the early and continuous inclusion of the retailer community in the PayEase project obviously had a significant positive impact, part of the reason for the successful retailer-project team relationship was the structure of the demonstration. Since the PayEase project was a fully funded federal demonstration project, two issues that caused contention among retailers and EBT project teams in the state-initiated EBT projects -- cost sharing and partial lane equipage -- were not significant problems in the off-line EBT demonstration. For the demonstration, FNS determined that demonstration area retailers would not incur costs to participate and that all checkout lanes would be equipped.

The experience of a few retailers located in areas surrounding the Montgomery County demonstration area (fringe retailers), however, suggested that some retailer discontent is inevitable when retailer sites are partially equipped or when retailers are asked to bear some of the participation costs. A few partially equipped retailers in these areas indicated that additional lanes should have been equipped in their stores, and some retailers that were not provided PayEase equipment expressed the opinion that they should have been included. In some of these situations, retailers were willing to purchase equipment in order to preserve market share and compete effectively with PayEase retailers. As discussed in Chapter 2, recipient shopping patterns were used to determine which fringe retailers would be given the opportunity to participate in the PayEase demonstration, and the FNS policy provided for equipping half of the checkout lanes at each store. NPC and FNS responded to retailer discontent over the original selection of fringe stores by conducting another shopping survey (as discussed in Chapter 3) during recipient conversion; the policy adopted was that additional stores would be equipped if they met the original criteria for participation by fringe stores.

While the issue of which organization would be liable for losses on manual (backup) transactions had been a point of contention in the state-initiated EBT projects, it never was a significant issue in the off-line EBT demonstration. Unlike the state-initiated projects, where the state or EBT processor assumed some liability for manual transactions, in the off-line EBT demonstration, retailers had sole responsibility except in the case of system errors. Despite the tougher stance on liability, there was little debate about the liability issue for manual transactions. NPC presented manual transactions as an option that retailers could choose to exercise at their own risk, and the majority of retailers simply chose not to accept manual transactions as a matter of store policy.

EBT Processor Selection

The off-line EBT demonstration was a learning experience for all organizations involved because it represented the first use of off-line EBT technology to deliver FSP benefits. The project team found that the differences between on-line and off-line EBT systems required alternate approaches to some system functions. Sometimes, these differences were more significant than the project team had expected. As a result of this experience, ODHS project management felt that other states considering off-line EBT systems should consider off-line processing experience as one of the criteria in the selection of their EBT processors.

Concentrator Bank Selection

As discussed in Chapter 2, NPC's affiliates, First National Bank of Dayton (FNBD) and Bank Ohio, also were involved in the off-line EBT demonstration. Personnel from FNBD were responsible for EBT reconciliation and field support for retailers, while actual automated clearing house (ACH) processing was performed at Bank Ohio. There were several advantages to this arrangement. First, using a local financial institution provided NPC a means of providing timely response to retailer problems that required a technician's visit. In addition, approximately one-third of the participating retailers maintained accounts at FNBD. Since the credits for these retailers could be stripped off the EBT credit file before the file was sent to the ACH network -- which assesses a per-item charge for each credit or debit in the file -- cost savings were achieved. Cost savings also were realized because the concentrator bank was located in the same Federal

Reserve District as most of the retailers' financial institutions, and the intra-regional ACH charge per item was less than the inter-regional ACH charge per item. For these reasons, NPC recommended that the local presence of the concentrator bank and/or its affiliates in the EBT project area be considered when selecting a concentrator bank for other EBT projects.

DESIGN PHASE LESSONS

The problems experienced during the Design Phase of the off-line EBT demonstration were similar to problems encountered in designing on-line EBT systems. These problems provided several important lessons that could be applied to future EBT projects. The primary activities of the Design Phase involved gathering information and preparing several deliverables including the *Detail Design and System Specifications*, the *Functional Demonstration Plan*, and the *Acceptance Test Plan*. Throughout the period, the project team experienced difficulties associated with the content and schedule of these deliverables.

Deliverable Schedule

The project began at the end of September, 1990, and the PayEase project team was required to submit initial drafts of the *Detail Design and System Specifications*, the *Functional Demonstration Plan*, and the *Acceptance Test Plan* before the end of December, 1990. Before the end of the Design Phase in early March, 1991, two more iterations of each deliverable were submitted to FNS. In interviews with the evaluation team, NPC, ODHS, and FNS all indicated that the schedule for early deliverables was too condensed, and this had a negative impact on all parties. The quantity of deliverables forced NPC to expend time on document production rather than design activities, and the project schedule did not allow FNS adequate time to review and provide comments on deliverables. In addition, because the deliverables overlapped (e.g., drafts of the *Functional Demonstration Plan* and the *Acceptance Test Plan* were submitted before the *Detail Design and System Specifications* was completed) changes in one deliverable necessitated editing other deliverables and producing multiple iterations of several documents. NPC specifically mentioned the requirement to provide a draft *Acceptance Test Plan* during the Design Phase as an example of a schedule feature that had a negative impact on the design effort because document production demands diverted resources needed to complete the design effort.

Deliverable Content

The *Detail Design and System Specification* document was regarded by the PayEase project team and FNS as an extremely important document because it established the master plan for the off-line EBT system. Frustration developed at NPC and FNS, however, because each organization viewed the document as serving a different purpose, and the guidelines provided by FNS were not detailed enough for NPC to determine what areas FNS wanted to be emphasized. In discussions with the evaluation contractor, representatives of both organizations indicated that for future EBT development efforts, the government's specific expectations for major deliverables, such as the design document, should be clearly articulated to the project team so that the deliverables produced provide the desired level of detail and the desired focus. For instance, with the *Detail Design and System Specification*, the FNS audience was primarily interested in the functional specifications rather than system specifications. The majority of FNS questions and comments, as well as most of NPC's clarifications and expansion of ideas in future drafts, were related to these functional specifications.

DEVELOPMENT PHASE LESSONS

During the Development Phase of the off-line EBT demonstration, lessons were learned in a number of areas that included: project schedules, system development, system testing, and external factors.

Project Schedule and Deliverables

As described above, the *Detail Design and System Specification* focused on functional specifications to meet the requirements of the external audience, FNS. Because this document was directed toward an external audience, the format was tailored to this audience. As a result, the document did not provide the type of detailed specifications that were required by the internal audience, NPC and subcontractor systems personnel, who would use the specifications to develop system code. According to NPC project staff, the system development effort during the first month of the Development Phase was not as productive as it could have been if detailed specifications -- in the appropriate format for programmers -- had been available at the beginning

of the period. The relatively unproductive period at the beginning of the development period increased pressure on development staff later in the period.

The lessons to be taken from this experience and applied in future EBT development efforts included:

- if a document is intended to serve different purposes for different audiences, the project team and FNS must review the document to ensure that it meets the requirements of all groups; and
- given the external focus of the *Detail Design and System Specification* document, adequate time should be provided in the project schedule to enable the project team to complete detailed program specifications before beginning system coding.

The project schedule for the Development Phase required that NPC submit initial drafts of the *User Manuals* in April, 1991 and second drafts in May, several months before the functional demonstration was conducted in August. In the interim period, a great deal of development effort and system modification occurred. The changes from the latest system design required a rewrite of the *User Manuals* to update the information. NPC project staff indicated that it would have saved a great deal of time -- time spent modifying *User Manuals* to incorporate changes -- if the first draft of the *User Manuals* had not been required until system development had reached the functional demonstration stage.

System Development

In some areas, differences between off-line and on-line technology turned out to be greater than originally anticipated and resulted in the need for the project team to adopt different procedures for the off-line EBT system. Lessons related to POS code and communications are discussed in this section.

POS Code

In an off-line EBT system that uses smart cards as the access device, most transactions are performed without interaction between the POS and the EBT host. Therefore, more complex

POS code is required than in an on-line EBT system. The configuration used for the PayEase system adds even more complexity because it uses a separate card reader and cashier terminal at each checkout lane. These two components must interface with each other, the recipient's smart card, and the store's PC/LAN.

In interviews with the evaluation team, NPC staff indicated that the project team had underestimated the complexity involved, and the differences in POS code for an off-line system. NPC selected VeriFone, one of the leading POS terminal manufacturers in the United States, as a subcontractor to provide POS terminals and develop terminal code. The additional complexity of this coding effort became apparent during the development period as VeriFone encountered problems that affected their ability to deliver acceptable code to NPC as scheduled. In turn, this delayed the overall project schedule for integration testing, the functional demonstration, and acceptance testing by approximately one month.

In discussions with evaluation team members, NPC staff indicated that the lesson to be learned from their difficulties with POS code development was that in an off-line system, POS code development is critical to the success of the system. With an off-line system, greater emphasis must be placed on POS code development because the code performs many more functions than it does in an on-line EBT system. NPC project staff also emphasized the importance of the prime contractor maintaining tight control over POS code development. The solution favored by NPC involved handling POS code development in-house. POS development for an off-line system also could be done by a subcontractor; however, for this approach to be successful, NPC believed that it was important that the subcontractor's development effort be closely managed.

Communications Protocol

Rather than planning to develop a proprietary communications protocol for communications between retailers and the EBT host, NPC initially tried to adapt an on-line protocol -- the VISA 2 protocol -- so that it could be used with the off-line system. NPC encountered significant difficulties in trying to adapt this protocol to the off-line environment. After failed attempts to modify the on-line protocol, NPC decided to develop a proprietary

protocol. Based on this experience, NPC staff indicated that they recommend that off-line system developers do not try to use modified on-line protocols for communications between the POS and the host.

System Testing

Many of the problems experienced during system testing provided valuable information that can be used by developers of both off-line and on-line EBT systems. Timely implementation of the PayEase system was dependent on maintaining an ambitious schedule throughout the Development Phase. As was the case in the state-initiated EBT projects, there was not always time for adequate pre-testing and other preparation activities. Members of the PayEase project team from both ODHS and NPC indicated that they believed that several components of the testing process could have been improved. Based on their experiences with the off-line EBT system, adoption of the following recommendations could improve the system testing process for other EBT projects:

- Acceleration or simulation of host cycles would be useful for testing an EBT system because the long system cycle makes it difficult to go through the entire process and test transactions performed over a multiple day period.
- Extensive testing should be performed in the area of destructive testing, i.e., system testing that involves testing transactions in unusual sequences and other scenarios designed to test the system's performance under non-ideal circumstances.
- Adequate month-end testing should be performed to test specific functions that occur only in conjunction with monthly processes. In the off-line system, one such area was the transfer of value on card replacements. Transfer of value problems were not discovered until after system operations began.
- Adequate time should be spent on integration testing and acceptance testing. During the PayEase demonstration, a number of unresolved system problems remained after the acceptance test had been completed, and it was necessary to perform a regression test before proceeding with system implementation.
- Prior to implementation, some sort of live testing -- over an extended period of time -- should be performed to detect problems that occur in actual operations. Alternatives for a live test would include operating a limited live test consisting of a couple of retailers and 30 - 40 recipients, or converting recipients in a small zip code and running a pilot for a couple of months before bringing other recipients onto the system.

External Influences

External events created some problems during the PayEase demonstration that led project team members and FNS to suggest some general rules for future EBT system development efforts. The guidelines developed were related to the occurrence of project activities during specific project phases and the implementation of other system projects concurrent with EBT development.

Equipment Purchases

The project plan for the off-line EBT system designated that equipment would be purchased during the Implementation Phase. In some cases, however, manufacturers' requirements for lead times necessary to guarantee delivery by a specified date required NPC to make purchases during the Development Phase. In an interview with the evaluation team, FNS acknowledged this situation and indicated that because of long delivery times required for some equipment purchases, project timeframes and some activities may need to be modified to allow equipment purchases to occur early enough so that system implementation is not delayed.

Other System Projects

As mentioned previously, the implementation of the CRIS-E system in Ohio coincided with the design, development, and implementation of the PayEase system. The PayEase project team indicated that the status of the CRIS-E system created complications for the EBT system. For instance, the PayEase system was designed to accept benefit allotment information from CRIS-E; however, during the development period, there was considerable concern that all the recipient cases in the demonstration area would not be converted from Ohio's old food stamp system to CRIS-E before EBT implementation began. Although the CRIS-E conversion was completed before the beginning of PayEase conversion, the situation was uncertain for several months. More importantly, changes were being made to the CRIS-E system throughout its implementation period to correct system problems and add missing functionality. At the same time, the PayEase project team was developing the EBT system, which was to share data with the CRIS-E system. Some EBT development problems were encountered because all of the

CRIS-E data and formats had not been finalized. Also, the same MIS group supported the CRIS-E system and its interface with the PayEase system. The simultaneous occurrence of CRIS-E implementation and "shake-down", and PayEase development and operations meant that resources were not always available to make changes in CRIS-E to support the PayEase system.

The implementation of a new public assistance system and an EBT system in a short period of time could place a burden on workers in county or local offices who would have to learn both systems. This potential problem did not occur at MCDHS, because the PayEase project team decided to restrict EBT functions to the PayEase office staff. Nevertheless, MCDHS PayEase project team members advised that in the future, EBT systems should not be designed, developed, and implemented while a new public assistance system is being implemented or before it achieves stable operations.

IMPLEMENTATION PHASE LESSONS

The experiences of the PayEase project team provided some important lessons about retailer training, recipient training, and the overall conversion schedule.

Retailer Training

The experiences during the Implementation Phase led the PayEase project team to reach several conclusions about which aspects of training were successful and which could have been improved. The guidelines described below focus on when retailer training should be conducted, what functions should be emphasized in training, what can be accomplished with thorough training, and how the need for on-going training should be met.

NPC project team members indicated that retailer training should be provided immediately before the start of live operations. In the PayEase demonstration, most of the initial retailer training was conducted during December, 1991 and January, 1992, but actual system operations did not begin until the last week of February. NPC staff felt that retailers were trained too far in advance, and this resulted in some retailers forgetting how to use the system by the time recipients began using the system. This problem was exacerbated by the PayEase conversion

schedule because recipient shopping, particularly in the smaller stores, was concentrated close to recipients' residences. As a result, retailers that were located in zip codes in which recipients were converted last experienced several months after PayEase training when there was little EBT activity in the store.

NPC operational staff also acknowledged that changes in the content and emphasis of cashier training and manager training would have made the training sessions more effective. For both groups, NPC felt that greater emphasis should have been placed on performing basic system functions and resolving problems. While meetings with retailer groups had resulted in reductions in the amount of material presented during cashier training, the PayEase project team still believed that the training overemphasized seldom used system features and did not place enough emphasis on ensuring that cashiers could perform basic transactions, identify the types of errors that could occur, and know the procedures to follow to correct common errors.

Similarly, retailer management training provided a great deal of information about a wide variety of EBT system functions that required the use of a manager card. What it did not provide was specific, basic training on error handling and on reconciling EBT credits to bank statements to store receipts. NPC project team members indicated that they had not anticipated two situations that undermined early system operations. First, some retailers ran their businesses without having any formal accounting and reconciliation procedures in place and would require very basic training on recommended EBT reconciliation procedures. For example, early system problems resulted in several settlement batches being lost before retailers were credited for the purchases. A mechanism existed for handling this situation by entering information from retailers' copies of PayEase receipts and restoring the transactions. In several cases, however, retailers had not saved PayEase receipts, and the process of identifying and restoring missing transactions was made much more difficult.

The second problem associated with retailer reconciliation was caused by the different objectives of the EBT processor and some retailers, particularly large, high-volume stores. The demonstration illustrated that even with proper training, some retailers chose not to follow recommended reconciliation procedures. NPC believed that retailers would identify and work with NPC to resolve potential crediting discrepancies in a timely manner. Some stores, however,

made business decisions that the effort and costs required to perform daily reconciliation and reconcile small differences among store receipts, the end of day settlement total, and financial institution credits exceeded the benefits. As a result, several stores did not attempt to resolve small differences or did so weeks after the problem occurred. While increased emphasis during training on procedures for performing daily reconciliation and problem resolution activities would improve the effort of the first group of retailers, it would have little impact on retailers that made a business decision not to expend the resources to reconcile EBT proceeds to the penny.

A third area in which the PayEase demonstration provided a relevant lesson for retailer training focused on requirements for on-going training -- after a store has received initial EBT training -- to train new employees. Since retailer cashier turnover tends to be high, especially in larger stores, some type of on-going training capability was required for the EBT system. NPC operations personnel suggested that a training system of some type -- perhaps a training mode on the POS equipment -- would be useful to accommodate this situation.

Recipient Conversion and Training

As discussed in Chapter 2, recipient conversion to the PayEase system was accomplished over a four month period based on zip code. PayEase project team members agreed that this was a relatively short period in which to convert over 10,500 recipient households. Recipient conversion was accomplished within the allotted period, and there were few problems with recipient training. The general effectiveness of recipient training was attributed to the time and effort devoted to advance planning. MCDUS project staff indicated that they would advise other

allowed for recipient conversion was too condensed. NPC staff suggested that the conversion process would have been smoother if individual households were converted to EBT at the time that the household was recertified for the FSP. In effect, this would extend the conversion effort over a six month period. In addition, an extended conversion period would enable EBT transaction volume to be built up gradually. NPC staff indicated that this would be advantageous because it would help isolate system problems that result solely from increases in transaction volume, from other system problems.

OPERATIONS PHASE LESSONS

Lessons for future EBT systems can be drawn from the experiences of the off-line EBT demonstration during the Operations Phase in the following areas: retailer support, recipient support, local infrastructure, and technical and cost issues related specifically to an off-line system.

Retailer Support

Retailer support for the PayEase demonstration was provided at three levels: NPC customer service agents, local field technicians, and NPC systems and operations support personnel. NPC project team members indicated that they believed that retailer support functions worked quite well. NPC staff attributed this success to the establishment of well-structured steps for customer service agents to follow over the telephone to properly diagnose the problem, and to the availability of local support for retailers to ensure timely assistance. NPC staff indicated that they believed that other EBT systems would benefit by incorporating similar mechanisms for retailer support.

During the PayEase demonstration, several POS software upgrades were made, and until the fall of 1992, all POS upgrades required technicians to visit each store and install the new software. As a result, POS upgrades were time consuming and expensive. During the Operations Phase, NPC developed the capability for remote download of software from the EBT host to the POS. NPC project team members indicated that having the remote download capability from the time that live operations began would have enabled them to avoid two-thirds of the field

maintenance labor effort expended through September, 1992. For other EBT development efforts -- particularly off-line systems in which the POS software is complex -- NPC strongly recommended including the capability to allow remote software downloads.

Recipient Support

At MCDHS, recipient support for the PayEase system was centralized at the PayEase office, which consisted of the assistance control office (ACO) and the fiscal control office (FCO). In interviews with the evaluation team, MCDHS staff expressed the opinion that one of the best choices made by the PayEase project team was the decision to isolate responsibility for PayEase support within the PayEase office. Specifically, they indicated that the decision to establish the ACO and not involve intake or ongoing caseworkers in EBT support and problem resolution was good for clients and caseworkers. It protected caseworkers from being overwhelmed with inquiries about the EBT system, and it provided recipients with a single point of contact for PayEase questions and problems. The establishment of separate channels for EBT support at the county or local agency was viewed as a decision that would be beneficial for other EBT systems.

Local Infrastructure

Once live operations began, the project team learned an important lesson: the existing infrastructure of an area can impact the effectiveness of an EBT system. During early operations, participating retailers experienced some system problems that were attributed to poor electrical wiring and old telephone lines. The wiring caused some problems with in-store operations, and the telephone line quality -- combined with specific weather conditions -- affected retailer settlement. In addition, the telephone line technology in each store also affected the ability to download software changes from the EBT host. The proportion of touch-tone and rotary dial lines also influenced decisions made by the PayEase project team. Because a significant percentage of the Montgomery County area had rotary dial lines, NPC decided to develop a voice-activated ARU because traditional ARUs cannot handle calls from rotary telephones.

While the infrastructure caused only limited problems in the urban demonstration area, ODHS project team members indicated that the lack of infrastructure in some rural areas could

be a bigger problem in a state-wide expansion of the PayEase system. The lesson to be learned was that the telecommunications infrastructure in an area should be examined carefully for all EBT systems, especially on-line systems that are dependent on continuous, reliable telecommunications.

Cost and Technical Considerations

Although telecommunications costs for an off-line EBT system would be expected to be significantly lower than costs for an on-line system, the PayEase demonstration provided evidence that these costs still could be significant, requiring the EBT project team to take actions to manage telecommunications costs for an off-line EBT system. During the operations phase of the demonstration, NPC was able to reduce its telecommunications costs significantly by eliminating ACO on-line access to the EBT host and reducing the retailer on-line telecommunications costs by sending partial downloads instead of full downloads to each retailer at settlement.¹ With partial downloads, a smaller file was transmitted because only changed information (e.g. new issuances) was included; therefore, the transmission was faster and the costs were lower than with full downloads.

For the off-line EBT demonstration, PANs were uploaded to NPC from the FCO when cards were issued, and NPC maintained the PAN on the PayEase system; however, this procedure was adopted because the state could not make programming changes necessary to maintain the PAN on the CRIS-E system. Under these procedures, NPC was required to link information from the ODHS benefit files to the PAN. This procedure has created some difficulties, particularly when cards are replaced (resulting in PAN changes) or recipients' case numbers change. As a future enhancement to the PayEase system and a guideline for other EBT system development efforts, NPC project staff recommended modifying these procedures so that a single file sent by the state contains both benefit information and the PAN.

¹ Full downloads replace the entire store database and include all records relevant to the store (e.g., issuance, negative file and manual records). They are still used occasionally to ensure that the retailer's database remains current and aligned to the NPC host database. Once every month or two, NPC performs a full download to all retailers. In addition, a full download is sent if a retailer has not settled in 48 hours or longer.

AREAS NOT ADDRESSED

While the off-line EBT demonstration provided a number of important lessons relevant to both on-line and off-line EBT systems, there were a number of areas in which the PayEase demonstration did not provided much insight because of the limited nature of the demonstration system. For example, the geographic area and the number of participants was fairly limited; therefore, the types of issues associated with a state-wide implementation of an off-line EBT system did not arise in the Dayton demonstration. In order to develop lessons in these areas, further study must be conducted. Chapter 5, "The Feasibility of Continued or Expanded EBT Operations", in Volume I of this report, examined some areas not specifically addressed by the off-line EBT demonstration (e.g., an off-line EBT system that provides benefits for multiple assistance programs) from the perspective of determining the feasibility of continued off-line EBT operations.

Appendix A

GLOSSARY OF TERMS AND PARTICIPANTS

ACH	Automated clearing house. The financial network operated by either the Federal Reserve or a private organization that is used for processing electronic funds transfer transactions including EBT transactions.
ACO	Assistance control office. An office established at the Montgomery County Department of Human Services to provide PayEase assistance to recipients.
AFDC	Aid to Families with Dependent Children. A public assistance program administered by the U.S. Department of Health and Human Services that provides benefits in the form of cash (through EBT) or checks.
AGS	AGS Information Services. The NPC subcontractor selected to provide development support to modify the State of Ohio's CRIS-E system as required to support the EBT demonstration.
AIS	Advanced Information Systems. Tandem/SQL Programmers that worked as contract programmers for NPC to provide assistance in developing EBT enhancements for NPC's proprietary POS platform.
ARU	Audio response unit. An automated system that provides information to EBT participants without involving a customer service agent. While an ARU was not a feature of the PayEase demonstration system, ARU capabilities are being developed.
Astra Communications	The NPC subcontractor selected to provide support in retailer site preparation activities including terminal installation, store wiring, and telecommunications.
ATM	Automated teller machine. A device that enables individuals to make banking transactions using a magnetic stripe card as an access device. ATMs also can be used to deliver EBT benefits for AFDC and other cash-based public assistance programs.
Authorization number	The number derived from the CRIS-E case number that is used by the EBT system as the household's case number.
Bank Ohio	The NPC affiliate in the Columbus, Ohio area that provides ACH processing services for FNBD and other National City Corporation subsidiaries. Bank Ohio performs the ACH file processing

activities for the PayEase demonstration. Effective March 31, 1993, Bank Ohio's name was changed to National City Bank - Columbus.

Benefit number	A field in each PayEase issuance record that was added to ensure that each issuance could be identified by a unique number.
Card balance	Refers to the recipient account balance stored on the smart card itself. In an off-line EBT system, the card balance can be different from the host-derived balance because the host-derived balance does not show transactions until retailer settlement and daily host cycle processing has occurred.
Check digit	A number generated through a mathematical algorithm that is used to verify that the underlying number was entered into the system correctly.
Cincinnati FO	Cincinnati Field Office. The FNS Field Office responsible for authorizing retailers in the Montgomery County area to participate in the FSP and managing and monitoring participating retailers.
Communications protocol	The procedures required to initiate and maintain communications. A protocol defines the rules governing the format, timing, sequencing, and error control and may include facilities for managing a communications line.
Concentrator bank	A financial institution that receives retailer credit information from the EBT processor, processes the file to create an ACH formatted file, and submits the ACH file to the local ACH network.
CRIS-E	Client Registry Information System - Enhanced. The automated, integrated public assistance system in Ohio. CRIS-E determines eligibility and calculates benefit amounts for the food stamp, AFDC, Medicaid, and General Assistance programs. CRIS-E features interactive interviewing capabilities and supports many other functions including state-wide clearance and registration, benefit issuance, and claims establishment and collection.
DES	Data encryption standard. A security feature that encrypts certain information (e.g., issuance records) to prevent unauthorized attempts to alter information.
DHHS	Department of Health and Human Services. The federal agency that administers the AFDC and Medicaid programs.
EBT	Electronic benefits transfer. The application of electronic funds transfer and point-of-sale technologies to deliver government benefits.

EBT processor	The organization that operates the EBT transaction processing system. NPC is the EBT processor for the PayEase project.
EFT	Electronic funds transfer. A process by which funds are transferred electronically between financial institutions.
FCO	Fiscal control office. An office established at the Montgomery County Department of Human Services to provide PayEase training for recipients and issue PayEase cards.
FNBD	First National Bank of Dayton. The NPC affiliate in the Dayton area that provides technical support to retailers and also serves as the concentrator bank for the PayEase project. Effective March 31, 1993, FNBD's name was changed to National City Bank - Dayton.
FNS	Food and Nutrition Service. The organization within the U.S. Department of Agriculture responsible for administering the FSP.
Forced debit	A transaction within the PayEase system that serves two distinct purposes: it enables delivery merchants to participate in the PayEase demonstration without requiring the use of a mobile terminal, and it provides a transaction through which representations can be performed in the PayEase system.
FSP	Food Stamp Program. A federal government program established in 1964 to improve the nutrition of low-income households through the issuance of food stamp coupons. FSP administrative responsibilities are shared among federal, state, and local government agencies.
Host-derived balance	Refers to the recipient's account balance based on POS activity that has been settled with the EBT host. In an off-line EBT system, the card balance can be different from the host-derived balance because the host-derived balance does not show transactions until retailer settlement and daily host cycle processing has occurred.
Income Maintenance	The area within MCDHS responsible for administering the FSP and other public assistance programs.
LOC	Letter of Credit. The funding mechanism used for the off-line EBT demonstration. FNS's MWRO obligates funds to the LOC, and funds are disbursed to the concentrator bank in response to SmartLink/PMS requests.
Manual transaction	A system design feature that enables retailers to perform EBT purchase transactions when the EBT system is inoperable. Manual transactions also are referred to as "backup" transactions in some on-line EBT systems.

MCDHS	Montgomery County Department of Human Services. The county agency responsible for administering the Food Stamp Program and other public assistance programs in the EBT demonstration area.
MCTI	MicroCard Technologies, Inc. The NPC subcontractor that provided smart cards, the card reader/writer devices, and software and interface development for these peripheral devices.
MCSC	Minneapolis Computer Support Center. FNS computer center that supports EBT projects by processing weekly redemption data provided by the EBT processor and providing reports to FNS and external organizations.
MWRO	Midwest Regional Office. The FNS Regional Office with jurisdiction for Ohio. MWRO is responsible for certain EBT reconciliation functions and managing and funding the project LOC.
NCC	National City Corporation. The holding company that is the parent to several financial services organizations including NPC, FNBD, and Bank Ohio.
NPC	National Processing Company, Inc. The prime contractor and designated EBT processor for the off-line EBT demonstration.
ODHS	Ohio Department of Human Services. The state agency that oversees county administration of public assistance programs.
PAN	Primary account number. The number that uniquely identifies each smart card.
PayEase	The name selected for the off-line EBT demonstration in Montgomery County, Ohio.
PayEase card	The smart card used as the benefit access device for the off-line EBT system.
PayEase office	The term used to describe the entity consisting of both the assistance control and fiscal control offices.
PayEase project team	The organizations responsible for the off-line EBT demonstration system; the project team is comprised of NPC and its subcontractors, MCDHS, and ODHS.
PIN	Personal identification number. A number selected by each recipient household that must be entered into a PIN pad when the recipient is using his or her PayEase card to perform POS transactions. At the time the PIN is selected, it is encrypted on the PayEase card.

PMS	Payment Management System.
POS	Point-of-sale. A technology that provides for making electronic purchases at food retailers and other business establishments using an on-line or off-line card at a checkout terminal.
PSI	Public Service Institute. The NPC subcontractor with primary responsibilities in the areas of recipient training and conversion activities as well as MCDHS staff training.
Representation	An EBT system function that provides for reimbursing retailers for overdrafts caused by manual transactions that were not credited to retailers because the recipient did not have sufficient benefits at the time of manual transaction settlement. Under representation procedures, the EBT processor reduces future recipient benefit allotments to reimburse the retailer for the overdraft. FNS has established conditions under which representation can be performed and established maximum amounts that can be recovered from each benefit allotment.
Reversal	An EBT system POS transaction that enables a retailer to offset the last purchase or refund transaction. A purchase reversal is a credit for the same amount as the previous purchase transaction (debit), while a refund reversal is a debit for the same amount as the previous refund transaction (credit).
Smart card	An integrated circuit (IC) card that is used as the benefit access device in off-line EBT systems. The card contains a microchip and the recipient's balance is maintained and transactions are stored on the card as well as the EBT host.
SmartLink/PMS	The DHHS system to which the EBT processor interfaces and electronically requests reimbursement for the sum of retailer EBT credits.
System cutoff	The time that one daily EBT host cycle ends and another cycle begins. A 4:00 a.m. cutoff time is used for the PayEase system.
USDA	United States Department of Agriculture.
VeriFone, Inc.	The NPC subcontractor selected to supply POS terminals for the EBT demonstration and to provide terminal software design and development support to NPC.

Appendix B

OFF-LINE EBT SYSTEM CHRONOLOGY

Pre-Award Period

June 16, 1989	RFP FNS-89-037BC Issued
July 17, 1989	Pre-proposal conference held at FNS headquarters
October 4, 1989	NPC proposal submitted to FNS
March 2, 1990	Technical discussion questions provided to NPC by FNS
March 19, 1990	NPC responses to March 2 questions submitted to FNS
June 12, 1990	Additional FNS technical questions provided to NPC
June 21, 1990	NPC oral presentation made to FNS
June 29, 1990	NPC responses to June 12 technical questions and best and final offer submitted to FNS

Design Phase

September 26, 1990	Project Kick-Off Meeting held at FNS headquarters
December 4, 1990	Draft 1 Detail Design and System Specification submitted to FNS
December 21, 1990	Draft Functional Demonstration Plan submitted to FNS
December 21, 1990	Draft Acceptance Test Plan submitted to FNS
January 18, 1991	Draft 2 Detail Design and System Specification submitted to FNS
January 31, 1991	Retailer Survey (and Recipient Survey) submitted to FNS
February 18, 1991	Final Draft Detail Design and System Specification submitted to FNS
February 1991	Final Draft Functional Demonstration Plan submitted to FNS
February 1991	Final Draft Acceptance Test Plan submitted to FNS
March 4, 1991	Final Functional Demonstration Plan submitted to FNS
March 4, 1991	Final Acceptance Test Plan submitted to FNS

March 4-5, 1991

Phase I Wrap Up Meeting

Development Phase

March 19, 1991

Draft 1 Implementation Plan submitted to FNS

April 4, 1991

Draft 1 User Manuals submitted to FNS

April 15, 1991

Demonstration of MicroCard command set code in Dallas

April 18, 1991

Completion of code for retailer authorization system and demonstration to Cincinnati Field Office

May 15, 1991

Completion of card personalization and balance inquiry code and delivery at meeting in Dallas

May 31, 1991

Final Draft Implementation Plan submitted to FNS

May 1991

Finalization of contract arrangements for retailer installation

May 1991

Finalization of negotiations with CompuServe for retailer settlement network

May 1991

Draft 2 User Manuals submitted to FNS

May 1991

Completion of CRIS-E enhancement coding

June 17, 1991

Demonstration of VeriFone and MicroCard code at monthly meeting of development subcontractors in Dallas

June 27, 1991

Draft 1 of Training Materials submitted to FNS

July 2, 1991

Revised Functional Demonstration Plan submitted to FNS

July 29, 1991

Demonstration of debugged VeriFone terminal code

August 13-14, 1991

Functional demonstration conducted in Louisville

August 19, 1991

Draft 2 Training Materials submitted to FNS

August 29, 1991

Installation of CompuServe test system for line handler processing of POS upload and download

August 30, 1991

Delivery of revised EEPROMs and all card/CTU-140 code by MicroCard

August 1991

Functional Demonstration Report submitted to FNS

September 6, 1991	Final Project Detail Design submitted to FNS
Week of Oct. 21, 1991	Trial run of acceptance test in Dallas with VeriFone and MicroCard
November 7-8, 1991	Trial run of acceptance test in Dayton with ODHS/MCDHS
Week of Nov. 18, 1991	Acceptance test conducted
November 18, 1991	Final Draft User Manuals and Training Materials
November 25, 1991	Acceptance Test Report submitted to FNS
Implementation Phase	
December 20, 1991	Regression Test Plan submitted to FNS
December 1991	Retailer installation completed in 10 stores (13 lanes)
December 1991	Retailer training initiated
December 1991	Hiring of staff to conduct recipient training initiated
December 1991	Terminal hardware and smart cards ordered and received
December 1991	Training materials and user manuals printed
January 6-7, 1992	Regression test conducted
January 17, 1992	Regression test report (results) submitted to FNS
January 20-31, 1992	Quality assurance testing conducted
January 31, 1992	Code frozen
January 1992	Retailer equipment installed and retailer training conducted
January 1992	Customer service toll-free number and workstations installed and customer service staff hired
January 1992	Staff hiring for recipient training completed
January 1992	National City Corporation (NCC) auditors conducted preliminary review of testing plan, system documentation, and contingency plan
January 1992	User manuals typeset, printed, and distributed
February 3-10, 1992	Migration of system from development to production environment on Tandem

February 4-14, 1992	Conversion site staff responsible for recipient training and MCDHS ACO staff trained
Week of Feb. 10, 1992	POS code, PC code, and new electronically erasable programmable read only memory (EEPROM) installed at each participating store
February 13, 1992	EBT operations initiated at the conversion site; conversion site operations included recipient training and conducting the recipient shopping survey
February 20, 1992	Value transactions, i.e., recipient transactions such as purchases, began in the system
February 20-21, 1992	NCC auditors conducted final system audit
February 1992	Training conducted for, and cards issued to, 1,385 recipients (zip code 45417)
February 1992	Completion of retailer training for initial group of retailers
February 1992	Customer service personnel trained
March 16, 1992	FNS issued fringe store policy clarification
March 24, 1992	FNS Midwest Regional Office issued national press release on project
March 27, 1992	EBT media kickoff event conducted
March 1992	Benefits issued via EBT for zip code 45417
March 1992	Training conducted for, and cards issued to, recipients (zip codes 45406 and 45416)
Approx. April 15, 1992	Decision made to delay implementation (first EBT issuance) for zip code 45408 from May to June
Week of April 20, 1992	POS software upgrade beta tested at seven selected retailer locations
Week of April 27, 1992	POS software upgrade implemented at remaining retailer locations
April 1992	Benefits issued via EBT for zip codes 45406 and 45416
April 1992	Training conducted for and cards issued to recipients (zip codes 45405 and 45408)
May 1992	Benefits issued via EBT for zip code 45405

May 1992 Training conducted for and cards issued to recipients (zip codes 45407 and 45408)

Operations Phase

June 1992 Benefits issued via EBT for zip codes 45407 and 45408

June 1992 Recipient shopping survey completed; results indicated that there were six stores at which at least one percent of recipients indicated that they shopped; five of these stores were unequipped and one store had purchased equipment

June 12, 1992 PayEase operations at the conversion site ended

June 15, 1992 PayEase office functions (ACO and FCO) handled at the MCDHS Reibold building

June 25, 1992 Beta testing for new software (version 3.5) initiated at six retailers and the ACO

July 8, 1992 Host processing cycle changed from two daily host cycles, at 4:00 a.m. and 9:00 a.m., to a single host cycle at 4:00 a.m.

July 1992 Software versions 3.6 and/or 3.7 installed at several beta test stores

July 1992 Modifications of primary database update programs completed; these changes resulted in host performance improvements

July 1992 New retailers added to the demonstration as the result of two influences: recipient survey results indicating that at least one percent of recipients shop there, or retailer decisions to purchase equipment

July 1992 Third FCO terminal installed at MCDHS to alleviate backlog during peak periods

July 1992 Decision made to reconcile card balance to host balance only when card balance exceeds host balance; the host balance is considered the correct balance

Week of August 24, 1992 Upgraded POS software (version 3.8) implemented to all participating retailers in order to fix POS problems that had been identified

August 1992 Development of an alternative POS system for single-lane retailers initiated

September 23, 1992 Final Project Detail Design changes submitted to FNS

September 1992	Host changes designed to improve system performance (including changing batch programs and removing historical data from host and archiving to tape) made
October 29, 1992	Decision made to work towards removing on-line access from the county ACO to the EBT host
October 1992	Order for additional 5,000 smart cards, which are to be produced using a different manufacturing process, placed with MicroCard; other differences with new cards include: an embossed PAN

	number, pre-printed card logo, signature strip, and no photo ID on the card
October 1992	Decision made to change the method by which ODHS provides the monthly recurring file to NPC from transmission to data tape
October 1992	Host code implemented to automatically generate retailer notices when certain conditions occurred
November 4, 1992	Monthly recurring file erroneously processed a second time resulting in duplicate benefit issuances for recipients who had card replacements
November 16, 1992	Decision made to implement a ten-day waiting period on second and subsequent card replacements (policy was implemented effective March 1, 1993)
November 16, 1992	Decision made to switch PayEase benefit issuance from first five business days to the first five calendar days effective January 1, 1993
November 17, 1992	Procedural changes implemented and the need for ACO on-line access to the EBT host eliminated for several functions including host balance inquiries, CRIS-E case number changes, and authorizations for return of benefit and coupon conversion transactions
Week of November 24	FCO LAN and dedicated file server removed
November 1992	Third FCO terminal removed from the PayEase office
November 1992	Procedures implemented for sending the monthly recurring file

December 1992	Tandem operating system upgrade installed
December 1992	Programming fix implemented at retailer sites to correct a system bug that prevented successful settlement
December 1992	New password change procedure implemented to resolve problems that NPC had experienced in returning the redeemed/expired issuance file to ODHS
December 1992	500 warranty replacement smart cards received from MicroCard; remaining warranty replacement cards will be provided with the shipment of new cards in January
January 1, 1993	PayEase staggered issuance procedures modified so that benefit availability is determined by calendar days rather than business days
January 11, 1993	Need for ACO on-line access to the EBT host eliminated for the remaining two functions -- PAN file inquiries and card replacement authorizations
January 1993	Approximately 5,800 redesigned smart cards received at NPC
February 26, 1993	Plans for Ohio to enter into a sole source contract with NPC to continue operating the PayEase system through October 1993 approved by the Ohio Controlling Board
February 1993	Issuance of new smart cards (that do not contain recipient pictures) initiated and MCDHS card issuance procedures changed accordingly
March 1, 1993	New policy requiring a ten-day waiting period for second and subsequent card replacements implemented
March 29, 1993	Beta testing of the new POS configuration (OTT2000 terminal) developed for use in single-lane stores initiated at two retailer sites
March 1993	Full demonstration funding ended and ODHS assumed 50 percent of the administrative costs for the continuation of the EBT system
March 1993	Mitsuba PCs replaced with NCR PCs at seven retailer sites
April 1993	OTT2000 terminal deployed at three additional retailer sites, removed from one of the original sites, and implemented at the MCDHS office (for use in recipient training)
April 1993	Mitsuba PCs replaced with NCR PCs at several additional retailer sites and the MCDHS FCO