



United States
Department of
Agriculture

Food and
Nutrition
Service

Office of
Analysis and
Evaluation

Guidelines for Preparation and Review of Online EBT System Design Plans

Summary of "Guidelines Preparation and Review of Online EBT System Design Plans"

Background

With the passage of the Mickey Leland Memorial Domestic Hunger Relief Act of 1990, Congress authorized the use of electronic benefit transfer (EBT) systems to issue and redeem benefits in the Food Stamp Program. Federal regulations implementing the EBT provisions of the Act were issued on April 1, 1992.

The regulations require that State agencies submit a detailed system design plan. The system design plan describes the hardware and software components of an EBT system and explains how these components will operate in order to fulfill all required system functions. Once reviewed and approved by Federal authorities, the design plan serves as the blue print for actual development of the system.

A major impetus for preparation of the Guidelines document is that past experience with EBT demonstrations has shown that initial drafts of system design plans are often incomplete, either in terms of topics discussed or detailed information provided. By specifying what information needs to be included in the system design plan, the process of preparing and reviewing the plan should become more efficient and less time consuming.

Content

This Guidelines document identifies the detailed information that should be included in the system design plan. The objectives are:

- to ensure that the planned system will meet all Federal regulations concerning the required functionality of the system;
- to help determine the likelihood that the planned system will be able to meet the performance standards for EBT systems, as listed in Federal regulations;
- to ensure that sufficient information about the details of the design are available to help later review of system testing.

This document is intended to be used by both preparers and reviewers of design plans.

Guidelines for Preparation and Review of Online EBT System Design Plans

April 1993

Author:
Charles R. King
John A. Kirlin

Submitted by:
Abt Associates Inc.
55 Wheeler Street
Cambridge, MA 02138

Submitted to:
U.S. Department of Agriculture
Food and Nutrition Service
Office of Analysis and Evaluation
Alexandria, VA 22302

Project Director: John Kirlin

Project Officer: Kilolo (Sharon) Bingham

These guidelines were prepared under Contract Number 53-3198-8-38 with the Food and Nutrition Service, U.S. Department of Agriculture, under the authority of the Food Stamp Act of 1977, as amended. Points of view or opinions stated in this report do not necessarily represent official position of the Food and Nutrition Service.

TABLE OF CONTENTS

	<u>Page</u>
Chapter 1	INTRODUCTION 1
	1.1 Overview 1
	1.2 Structure of the Guidelines Document 4
Chapter 2	EBT SYSTEM FUNCTIONALITY 7
	2.1 Overview 7
	2.2 Authorizing Household Benefits 8
	2.3 Providing Food Benefits to Households 12
	2.4 Crediting Retailers and Financial Institutions for Redeemed Benefits 14
	2.5 Managing Retailer Participation 15
	2.6 System Settlement and Reconciliation 16
	2.7 Administrative Support 17
	2.8 Summary 18
Chapter 3	SYSTEM PROCESSING COMPONENTS 19
	3.1 Overview 21
	3.2 Processing Diagram 21
	3.3 Client Eligibility Systems 22
	3.4 Merchant Processing 27
	3.5 Client Processing 36
	3.6 Online Transaction Processing 41
	3.7 Back-up Transaction Processing 51
	3.8 Audio Response Unit (ARU) 55
	3.9 Settlement Processing 58
	3.10 Reporting 68
	3.11 Administrative Processing 73
Chapter 4	HARDWARE COMPONENTS 77
	4.1 Overview 77
	4.2 Hardware Diagram 79
	4.3 Terminals 79
	4.4 Telecommunications Networks 81
	4.5 Central Processing System 82
	4.6 Cards and Card-Related Equipment 82

TABLE OF CONTENTS

	<u>Page</u>
Chapter 5	PERFORMANCE CRITERIA 85
5.1	Overview 86
5.2	System Processing Speed 87
5.3	Availability and Reliability 88
5.4	System Ease of Use 90
5.5	System Operations 90
Chapter 6	EBT SYSTEM SECURITY 93
6.1	Overview 93
6.2	EBT Access Card 94
6.3	Personal Identification Number (PIN) 97
6.4	Network Transmission and Message Validation 100
6.5	Access Security 103
Appendix A	CHECKLIST FOR MATERIAL TO BE INCLUDED IN EBT SYSTEM DESIGN PLANS 109
A.1	Introduction 109
A.2	EBT System Functionality 109
A.3	System Processing Components 114
A.4	Hardware Components 122
A.5	Performance Criteria 123
A.6	System Security 125

LIST OF EXHIBITS

	<u>Page</u>
Exhibit 3-1 Ramsey County EBT Processing Overview Diagram	23
Exhibit 3-2 Merchant Setup Screens	29
Exhibit 3-3 Screen Data Elements and Edit Criteria	30
Exhibit 3-4 Merchant History Information Screen	37
Exhibit 3-5 Client History Information Screen	42
Exhibit 3-6 Processing Codes Example	48
Exhibit 3-7 Transaction Processing Flow	50
Exhibit 3-8 Food Stamp Settlement and Reconciliation Flows	63
Exhibit 3-9 Settlement Types and Holdover Example	65
Exhibit 4-1 System Hardware Components	80
Exhibit 4-2 Central Processing System — PDPW Processing Diagram	83

Chapter 1

INTRODUCTION

With the passage of the Mickey Leland Memorial Domestic Hunger Relief Act of 1990,¹ Congress authorized the use of electronic benefit transfer (EBT) systems to issue and redeem benefits in the Food Stamp Program. Federal regulations implementing the EBT provisions of the Act were issued on April 1, 1992.²

State agencies wishing to implement an EBT system must first submit a Planning APD (Advanced Planning Document), which would include a general system design. The planning phase would culminate in the preparation of a Request for Proposals (RFP) and federal approval to acquire EBT services if the State agency anticipated contracting with a commercial firm to design or operate the system.

Following the planning process, the State agency must submit an Implementation APD and other documents, including a detailed System Design Plan. The System Design Plan needs to describe the hardware and software components of an EBT system and explain how these components will operate in order to fulfill all required system functions. Once reviewed and approved by federal authorities, the design plan serves as the blueprint for actual development of the system.

1.1 OVERVIEW

This Guidelines document identifies the detailed information that should be included in the System Design Plan. It has two major goals:

- 1) to help ensure that those individuals preparing the System Design Plan -- whether State agency or vendor personnel -- include all relevant information about the design of the proposed system; and
- 2) to assist program personnel in their review of submitted design plans.

A major impetus for preparation of this Guidelines document is that past experience with EBT demonstrations has shown that initial drafts of System Design Plans are often incomplete, either in terms of topics discussed or detailed information provided. By specifying what information needs to be included in the System Design Plan, the process of preparing and reviewing the plan should become more efficient and less time consuming.

¹ Title XVII, Pub. L. No. 101-624.

² "Food Stamp Program: Standards for Approval and Operation of Food Stamp Electronic Benefit Transfer Systems." Federal Register 57, no. 63, 1 April 1992.

With regard to the first goal of identifying information to be included in the System Design Plan, vendor or State agency personnel preparing the design plan should consider the information specified in this Guidelines document to be the **basic information** required within the design plan. Preparers may need to include additional information in order to make their design plans complete, especially if their proposed system performs functions beyond those specified in the federal regulations. The Guidelines document notes areas of the System Design Plan where additional information may be needed.

In its role of specifying what information should be included in a System Design Plan, it is also important to note that the Guidelines document is not meant to be a prototype or generic design plan. That is, this document is not an example of what a System Design Plan should look like. Rather, the guidelines specify the types of information (e.g., work screen content and design, detailed message flows) that should be included in a design plan, sometimes giving examples. The actual System Design Plan, in contrast, is expected to completely describe what the EBT system does and how it works; for example, the System Design Plan should show copies of all work screens and explain all message flows.

A basic assumption of this Guidelines document is that the system under review is based on **online** EFT (electronic funds transfer) principles. That is, all EBT transactions will be authorized through an immediate check of a centralized file containing clients' balance information. The Guidelines document is not intended for use in preparing design plans for systems using offline authorization principles. These include systems using integrated chip access cards (or "smartcards") that contain clients' benefit information within the cards' internal memory.

In keeping with the notion that the topic under discussion is online EBT systems, the Guidelines document occasionally references voluntary standards for online EFT systems adopted by the American National Standards Institute (ANSI) or the International Standards Organization (ISO). Proposed EBT systems should conform to these ANSI and ISO standards as much as possible, and the System Design Plan should indicate where the standards are **not** being followed. This approach mirrors that of the federal EBT regulations. Although the regulations generally do not require that EBT systems meet any specific ANSI or ISO standards, there is a clear intent that EBT systems should be as compatible as possible with commercial EFT networks. Inasmuch as most commercial EFT networks have adopted the

ANSI and ISO standards covering online, debit card systems, this means that EBT systems also should be as compatible as possible with the standards.³

This Guidelines document also provides a **recommended structure** for preparers to use in organizing the material in their design plan. If preparers believe the required information can be provided more clearly with a different organizational structure, they should do so. Their goal should be to explain what the system will do and how it will do it as clearly and completely as possible. In deciding how to structure the System Design Plan, however, preparers should keep in mind the needs of those reviewing the design plan. A radically different structure than that recommended will likely increase review time as reviewers try to cross reference the review points included in this Guidelines document with material in the design plan.

The review of a System Design Plan has several objectives:

- 1) to ensure that the planned system will meet all federal regulations and RFP specifications concerning the required functionality of the system;
- 2) to help determine the likelihood that the planned system will be able to meet the performance standards for EBT systems, as listed in federal regulations and the RFP; and
- 3) to ensure that sufficient information about the details of the design are available to help later review of system acceptance testing.

The last objective is quite important. If State and federal program officials do not know the details of how the planned EBT system is supposed to operate, it is quite difficult to assess the adequacy of planned testing or to be able to interpret test outcomes.

Although the main focus of the Guidelines document is on the preparation and review of the detailed System Design Plan, the document may prove useful in preparing other documents required by the APD process. For instance, while the general system design submitted with the Planning APD does not need to be nearly as detailed as the System Design Plan, it should cover the same general topics, and preparers may wish to follow the same recommended structure. In addition, the Guidelines document

³ At present, the American Bankers Association is working with ANSI, industry representatives and government officials to develop a new set of technical and performance standards that would apply to EBT systems. Information about the work of this group (called the X9A8 standards committee) or about specific ANSI standards can be obtained by contacting:

American National Standards Institute
1430 Broadway
New York, NY 10018
(212) 642-4900

may help State agencies prepare their RFP for EBT services, both in terms of desired functionality and performance criteria.

Finally, future EBT systems may introduce expanded functionality or new technology (within the context of an online EBT system) as vendors or State agencies incorporate improvements driven by marketplace innovation. Indeed, as time passes and new technology or functions become well established, State agencies and federal program officials may encourage the adoption of new technology and new functions -- if they are cost-effective. If this occurs, preparers of the design plan should document the enhancements as thoroughly as this Guidelines document specifies that existing technology and functionality should be documented.

1.2 STRUCTURE OF THE GUIDELINES DOCUMENT

Five major chapters and an appendix follow this introductory chapter. In order for reviewers to understand how an EBT system operates, they must first know what functions the system is supposed to perform. Thus, Chapter 2 (EBT System Functionality) identifies what information should be provided about a system's planned functionality.

Chapter 3 (System Processing Components) describes the basic processing components of an EBT system, and it identifies the detailed information needed to ensure that reviewers can fully understand how the planned EBT system will operate.

Chapter 4 (Hardware Components) requires identification of the hardware to be used in an EBT system. Under scenarios where several programs operate on one EBT system, the types of hardware used may include several different types and models. Terminals, telecommunications equipment, and central site computer equipment are just some of the hardware components expected to be described in this chapter of the System Design Plan.

Federal EBT regulations specify performance criteria for an EBT system. Chapter 5 (Performance Criteria) identifies these criteria and indicates the information preparers need to supply in their design plans to show how performance requirements will be met within their systems.

Chapter 6 (EBT System Security) covers numerous aspects of security within an EBT system. Cards, access, and PIN encryption are just three of several areas covered by system security. The chapter indicates the information preparers need to provide to describe the security features of their planned EBT systems.

Finally, Appendix A provides a summary of the material that should be included in a System Design Plan. It can be used as a quick reference guide by both preparers and reviewers of the design plan.

Given the dual purpose of the Guidelines document -- to assist both the preparation and review of System Design Plans -- the expected audience for this document will be quite diverse in terms of knowledge about EBT system design and operations. To assist those with a more limited background in EBT systems, each chapter and major section begins with an overview to help readers understand the topic to be discussed and how it fits into system operations. Readers with more extensive backgrounds in EBT systems may wish to skim through these overviews or skip them entirely. Such readers may also profit by reading the appendix first, inasmuch as it gives a more rapid overview of expected requirements for the complete System Design Plan.

Chapter 2

EBT SYSTEM FUNCTIONALITY

An EBT system includes a variety of processing activities. Moving from a paper-based system that processes food stamp coupons or public assistance checks to an EBT system's processing environment may be startling. Familiar activities like mailing coupons disappear; new ones (e.g., electronically posting benefits to accounts) emerge, often bearing little or no resemblance to past practices. Usually, the new activities provide for higher staff productivity, improved record keeping, better controls, and consistent processing of repetitive work.

Traditionally, an EBT design plan provides detail on **how** the system will operate. That is, it describes the system's processing activities. All system operations or activities, however, are designed to meet one or more of the system's functional requirements. Functional requirements specify **what** the system must be able to accomplish, or its "functionality."

2.1 OVERVIEW

Federal regulations for State EBT systems specify a set of functional requirements for the system.¹ The functional requirements address the following general activities:

- authorizing household benefits;
- providing food benefits to households;
- crediting retailers and financial institutions for redeemed benefits;
- managing retailer participation; and
- system settlement and reconciliation.

The regulations provide some detail as to which activities must be performed under each functional requirement.

If State agencies plan to use an outside vendor for system design and operations, they will include the federally mandated functional requirements in their Requests for Proposals (RFPs). They will probably add other functional requirements as well. Additional requirements would be needed, for

¹ Part 274.12, Electronic Benefit Transfer Issuance System Approval Standards, Section (e), Functional Requirements; Section (i), Concentrator Bank Responsibilities; and Section (j), Reconciliation and Management Reporting.

instance, if the EBT system is to include households receiving cash benefits. Thus, the RFP becomes the primary document for specifying an EBT system's functional requirements.

As reviewers examine the System Design Plan, they must check to make sure that the proposed system will meet all the functional requirements mandated by regulation or listed in the State agency's RFP. To facilitate this review process, **preparers should include a separate chapter in their design plan that explains how each functional requirement will be met.** This design plan chapter should be one of the first chapters in the document; it will provide a context for understanding how later descriptions of system operations support one or more of the system's functional requirements.

A proposed EBT system also may include functions that are not specified in regulations or the RFP. For instance, if the system will be integrated with a commercial EFT (electronic funds transfer) system, some of the POS (point-of-sale) terminals deployed for EBT transactions may also be capable of processing commercial transactions. When the system's functionality will exceed that specified in the regulations or the RFP, design plan preparers should describe the enhanced functionality and explain how it interacts with the EBT portion of the system.

The remainder of this Guidelines chapter provides some detailed information on what material preparers should include in their chapter on EBT system functionality. It is organized according to the five functional areas addressed in the EBT regulations.

2.2 AUTHORIZING HOUSEHOLD BENEFITS

Food stamp EBT regulations specify a number of specific activities that must be supported under the general function of authorizing household benefits. These activities include:

- issuing and replacing EBT cards to eligible households;
- permitting eligible households to select their own personal identification numbers (PINs);
- establishing benefit cards and accounts with the central computer database;
- maintaining the master household issuance record file and current authorization information;
- training households and other users in system usage;
- authorizing benefit delivery;
- posting benefits to each household's account for regular and supplemental (or non-regular) issuances;

- providing households with access to information on benefit availability;
- ensuring the privacy of household data and providing benefit and data security;
- inventorying and securing accountable documents; and
- zeroing out benefit accounts (e.g., during coupon conversion) and other account authorization activity.

Preparers should address each of these specific activities. The sections that follow below provide

~~evidence on what types of information are expected in the design plan.~~

Transferring Eligibility Information

EBT systems are not used to determine client eligibility, but they generally use selected eligibility information from the State agency's eligibility processing system to set up clients' EBT accounts. Usually, the State agency will supply information about approved recipients (e.g., name, case number, approved programs). Receiving and processing this information is the subject of this portion of the functionality chapter. The preparer should describe the basic procedures for receiving and processing data records from the State agency's eligibility system. (If client accounts are initially established through receipt of benefit authorization information as opposed to eligibility information, this first section on eligibility processing may be deleted from the design plan.)

The preparer should describe what types of records will be received from the State's eligibility system and how they will be transferred (e.g., by tape file, by electronic transmission, or other). Details on how they will be processed can be left to later chapters of the design plan, but this is the place to generally describe how the records will be handled. For instance, if a recipient receives both food stamp and cash program benefits, will a separate record for each program or a single integrated record be transferred? What processing rules will be used to convert this information onto the client account file?

- how the records will be transferred;
- when transfers will take place;
- how the State agency will track which households are receiving benefits through the EBT system (e.g., when conversion to EBT is staggered over different areas);
- general description of how the eligibility data will be processed to create the client account file; and
- any planned differences between mass conversion of eligibility data and ongoing processing of new eligibility data.

Posting Issuance Data

In an EBT system, program benefits are treated as available to the household when they are posted to client accounts. To post benefits to client accounts, the EBT system operator needs to receive benefit allotment information from the State agency. The preparer needs to describe this process. Relevant descriptive information includes:

- how the State agency will send the information (e.g., tape file, RJE, etc.);
- what types of records will be transmitted;
- what information is to be included on each record type, and whether and how the information varies by program;
- regular issuance dates for each program (e.g., regular food stamp benefits issued in the first ten working days of the month);
- by what time of day the information needs to be received by the system operator;
- by what time of day the allotments will be posted to client accounts;
- procedures for consolidating cash benefits for clients participating in more than one cash assistance program (unless the system allows clients to specify which cash program's benefits are to be accessed during a transaction); and
- a basic description of the structure of the client account file (if not already provided).

Depending on system design, other material may be needed to fully describe the process of receiving and processing benefit information. For instance, if issuance files are used to set up new accounts, information on this process should be included.

EBT Card Construct and Card Issuance

A basic assumption throughout this Guidelines document is that **standard magnetic stripe ("mag stripe") cards will be used for system access**. If another card type is to be used, that fact should be clearly stated and information about the card presented.

The preparer should describe the layout and design of the EBT card, including what information is to be printed or embossed on the card and what information is to be encoded on the card's magnetic stripe. Discretionary fields defined on the mag stripe may contain a variety of data. Some system operators may choose to use these discretionary data fields to support their system processing facilities. If so, that information should be presented here.

It is anticipated that a card sleeve will be provided to protect the card's magnetic stripe. The preparer should describe any information that is to be printed on the card sleeve (e.g., anti-discrimination statements or a customer service number).¹

The System Design Plan should explain whether a single card can be used to access **all** program accounts in an EBT system or whether multiple cards need to be issued to some multi-program recipients. The latter may be necessary if the State agency's eligibility and issuance files for multiple programs are not integrated, or if different card techniques are used for different programs.

Client Training

The System Design Plan is not expected to provide detailed information on plans for training clients on how to use the EBT card. Such information will be provided in separate documents (e.g., a system implementation plan and training manuals). Nevertheless, general information about training plans should be included in the design plan. This general information would include who is responsible for client training (i.e., the vendor or State personnel), whether training will take place before or after benefits are posted to clients' accounts, and any basic differences in initial mass training of existing clients and ongoing training of new clients (e.g., the vendor will perform mass training but the State will provide ongoing training thereafter).

¹ If this information is not provided on the card sleeve, the design plan should indicate where it will appear.

Card Security and PIN Issuance

Separate from the EBT card construct is a requirement for card and PIN security. The preparer of the design plan should indicate how physical control over the card stock will be maintained. This includes security over blank unused cards and capture and destruction of damaged cards. Because some cards will be reported as lost or stolen, the preparer should specify system controls that will prevent the continued use of such cards. If cards are to be assigned expiration dates, the relationship between these dates and card security should be described.

Federal regulations require that clients be permitted to select their own PINs, and that the PIN be at least four characters in length. Furthermore, to maintain security, PINs must be encrypted at the point of entry using a Data Encryption Standard (DES) algorithm. Preparers should describe their planned PIN encryption procedures and how these procedures will be implemented at the time of PIN selection and card issuance. This would include any planned encoding of the encrypted PIN on the EBT card.

In summary, descriptions for card security are expected to include specific plans for physical card security and for PIN encryption.

2.3 PROVIDING FOOD BENEFITS TO HOUSEHOLDS

EBT system requirements under this area of functionality include:

- verifying identity of cardholder;
- verifying PIN, primary account number (PAN), terminal identification number and retailer identification number;
- determining sufficiency of household's account balance;
- authorizing or rejecting purchase and refund requests;
- providing back-up purchase procedures when the system is unavailable;
- providing transaction receipts showing remaining balances;
- ensuring that benefits are available and carried over from month-to-month;
- converting EBT food stamp benefits to coupons when households leave the EBT system service area; and
- responding to issuance problems in a timely manner.

Transactions at POS Terminals and ATMs

Perhaps the easiest way for preparers to assure reviewers that the system adequately addresses the above functions is to provide step-by-step descriptions of transaction procedures at the checkout lane and at ATMs when food stamp or cash benefit clients use the EBT card to make purchases or withdraw benefits. Several descriptions should be provided, as outlined below:

- food stamp purchase at the POS terminal with electronic processing;
- food stamp purchase using back-up procedures;
- purchase or withdrawal at POS terminal using cash benefits; and
- withdrawal at ATM using cash benefits.

For completeness, the discussion should also include other transactions available at POS terminals. These transactions include refunds and voids.

Preparers should describe any restrictions on transaction sets at POS terminals and ATMs. For instance, food stamp redemption will be limited to POS devices located at program-authorized stores, while balance inquiry information (for food stamp accounts) may or may not be available at ATMs.

In the discussions of step-by-step procedures, vendors should be sure that the following items are addressed:

- types of transactions supported at POS terminals and ATMs, by program;
- structure and use of terminal and retailer identification numbers;
- terminal displays for transactions and response codes; and
- information to be displayed on purchase receipts.

This section of the design plan should also describe procedures for ensuring the security of transmitted transaction messages. These procedures may include message format checks, range checks, transaction sequence numbers, and check-sum digits. If full encryption of transmitted data is to be used, encryption procedures should be detailed.

Other Functional Requirements

With respect to carrying food stamp benefits over from month-to-month, the design plan can just indicate that this will be done. If this entails any special processing requirements, however, the preparer

should be sure to indicate these requirements. If the system will use other rules for other programs' benefits, the system's plans to implement these rules should be described.

Preparers should describe both the procedures and processing steps required to convert EBT benefits when households leave the EBT service area. This will include conversion to coupons and conversion to check (for cash benefits). Separate procedures may need to be discussed for situations in which the client is present and those in which the client has already left the service area.

Finally, the design plan should describe how the State agency or system operator will implement the federal requirements regarding balances remaining after conversion and balances left in "stale" accounts (i.e., those accounts that have not been used by the client over a three-month period or longer).

2.4 CREDITING RETAILERS AND FINANCIAL INSTITUTIONS FOR REDEEMED BENEFITS

Federal regulations require that an EBT system provide credits to the financial institution holding a retailer's business account or to third-party processors within two business days after the end of the system's processing day. More rapid crediting is preferred. The System Design Plan needs to describe the system's settlement process for crediting retailers and financial institutions within the specified time frames. The regulations specify the following functions to be supported by an EBT system:

- verifying electronic transactions flowing to or from participating retailers' bank accounts (including pre-notification procedures for the automated clearinghouse, or ACH, network);
- creating and maintaining a file containing the individual records of EBT transactions;
- totalling all credits accumulated by each retailer;
- providing balance information to retailers or third-party processors for individual POS terminals, as required;
- providing each retailer information on total deposits on a daily basis;
- preparing a daily tape or file with information on benefits redeemed for each retailer and in summary;
- transmitting the daily tape or file to a financial institution to initiate the flow of funds to retailers' bank accounts; and
- transferring information on daily redemption activity by each retailer to the FNS Minneapolis Computer Support Center.

Though not specified as part of this general function in the federal regulations, other functions that need to be addressed in the System Design Plan include:

- providing retailers the ability to check EBT sales totals at individual terminals at any time of the day;
- the concentrator bank's use of the Department of Health and Human Service's (HHS) Payment Management System and the SmartLink interface to gain reimbursement for food stamp transactions credited to retailers or third-party processors; and
- the concentrator bank's use of other procedures to obtain reimbursement for cash assistance program transactions credited to retailers, third-party processors, or ATM owners.

As with providing benefits to households, a useful approach for the preparer to follow in describing the above functions is to **walk the reader through the various activities the system will perform in order to credit retailers and financial institutions for EBT transactions processed and to reimburse the concentrator bank.** The discussion might begin with a flow chart showing the various parties involved in the settlement process (e.g., the system vendor, retailers with system-deployed terminals, retailers with terminals deployed by third parties, retailers' financial institutions, third-party processors, ATM processors, the concentrator bank, the automated clearinghouse network (ACH) and the Federal Reserve, the U.S. and State Treasuries, and the Minneapolis Computer Support Center) and the paths along which settlement information and funds are passed.

The preparer's description should include general information about how transactions are settled at each point in the process and the resulting flows of funds. Separate discussions will be needed for the settlement of different programs' transactions (e.g., food stamps and cash benefit programs). Detailed descriptions can be left to later chapters, as specified in Section 3.9, Settlement Processing, of this guidelines document.

2.5 MANAGING RETAILER PARTICIPATION

Functional requirements supporting the management of retailer participation include:

- removing retailers from the system within two business days of FNS notification of disqualification, de-authorization, or voluntary withdrawal from the Food Stamp Program or EBT system;
- adding newly authorized food retail stores to the EBT system within two weeks after FNS notification to the State agency (30 days for retailers deploying their own terminals or using third-party processors);

- ensuring that only currently authorized retailers can access the EBT system;
- monitoring food retailers to ensure that equipment deployment complies with federal regulations;
- ensuring that EBT equipment and supplies are maintained in working order and that defective equipment is repaired or replaced within 24 hours after notification by the retailer;
- ensuring that retail store employees are trained in system operations; and
- providing a mechanism for compliance investigations.

As can be seen from this list, these functional requirements are largely procedural requirements rather than processing requirements. The System Design Plan should describe the operating procedures that will be implemented to ensure that each requirement will be supported by the EBT system.

Several functions require the timely conveyance of and response to information supplied by FNS to the State agency. The design plan needs to describe how procedures for obtaining the required information and acting upon it will be implemented within specified time frames.

For the support of compliance investigations, preparers should describe the mechanism(s) that will be used to permit authorized investigators to have access to the system. This will likely include issuance of cards to investigators, posting of benefits to these cards' EBT accounts, and providing system data to support investigation activity.

2.6 SYSTEM SETTLEMENT AND RECONCILIATION

System settlement procedures will be largely described under the function of crediting retailers and financial institutions for benefits redeemed. The design plan should also describe the reconciliation and management reports and procedures that support system settlement and other system activities.

Under system reconciliation, the preparer should describe:

- how benefits posted to household accounts will be reconciled against allotment information received from the State agency;
- how individual account balances will be reconciled against account activity on a daily basis;
- how retailer transaction information will be reconciled to retailers' daily credits;
- how retailers' total daily credits will be reconciled to recipients' total daily debits;

- how retailers' daily credit information will be verified against daily deposit information; and
- how total funds entered into, exiting from, and remaining in the system each day will be reconciled.

In a multi-program EBT system, settlement and reconciliation need to be performed for each program, and the design plan needs to describe how this will be done.

2.7 ADMINISTRATIVE SUPPORT

Administrative workstations located in the system's operating center, local offices, and (perhaps) the State agency provide system and program personnel the means to access system databases to obtain or edit information about participating households and retailers. While the EBT regulations do not identify administrative support as a separate functional requirement of an EBT system, a description of EBT system functionality would be incomplete without reference to the availability of such workstations and how they will be used. Even if it entails some duplication of material provided in this chapter of the System Design Plan, preparers should include a separate discussion of administrative support using workstations.

Access to EBT system data bases through administrative workstations will be provided by a series of workstation "screens," each of which will support a specific functional task. For example, one or more screens might be used to enter information about newly authorized retailers and deployed terminals onto the system's terminal and retailer control files. Another screen might be used to enter information about replacement EBT cards. Still other screens might be used to call up information from the system's history or transaction log file to display a history of transactions applied against a household's or retailer's EBT account.

The design plan should provide a comprehensive listing of available workstation screens and specify which personnel (e.g., vendor, local office, State agency, or appropriate combinations) will have access to each screen. Each screen's purpose and security controls should be described. Although later chapters of the design plan should provide detailed information on the limitations of screen usage (e.g. who will be authorized to access each screen, which data elements can be edited and which are protected from change), the preparer should provide some preliminary information on screen limitations at this point. For instance, how many day's worth of transactions can be reviewed from an administration workstation screen?

2.8 SUMMARY

Preparers and reviewers should bear in mind that the purpose of this chapter of the System Design Plan is to explain what the EBT system will do once implemented, and to make sure that all required system functions are supported. Although the chapter will not explain details of how each function operates, more information is needed than simple statements that the system will support this or that functional requirement. Some general explanation of how the system will operate will be needed for reviewers to understand what the system will do.

This chapter of the guidelines document has made numerous references to specific functions required by EBT food stamp regulations. Preparers and reviewers should remember, however, that the primary document for specifying a system's functional requirements is the State agency's RFP and not the EBT food stamp regulations. While several sections of the guidelines chapter have expanded the functions to include activities supporting the issuance and redemption of cash program benefits, the RFP may include many more specific functions for such programs. The preparer of the design plan should be sure to address these functional requirements as well as functional requirements for the Food Stamp Program.

Chapter 3

SYSTEM PROCESSING COMPONENTS

An EBT system comprises many different processing components. Examples include the processing of allotment information, online transactions, back-up transactions, functions initiated at administrative terminals, settlement and reporting. The System Design Plan should identify all processing components, relate each component to the EBT system functions described in Chapter 2, describe any interrelationships among processing components, and document the detailed operations of each component. Given this agenda, the design plan may need to devote multiple chapters to describing system processing components. Preparers need to provide detailed information about each component in a clear, logical, and easy-to-follow fashion.

This chapter provides preparers with detailed guidance on the information expected in their design plans and provides State and federal reviewers with a framework for assessing the thoroughness of submitted plans. System data and logic for an EBT system are described in detail. By analogy, the processing components are the EBT system's body. Talking, walking, seeing, hearing, and feeling all may be metaphorically identified in the EBT system. This section describes, in detail, the EBT body parts.

System design plans center on describing how processing components carry out program functions. Manual activities, such as coupon issuance and food purchases, are replaced by system processing activities. System processing should, at a minimum, perform these manual activities electronically. Usually, electronic processing expands and enhances existing manual processing, increasing productivity, reducing errors, improving controls, and automating reporting requirements.

3.1 OVERVIEW

This Guidelines chapter identifies and describes the documentation requirements for each processing component within an EBT system. To assist reviewers, each section of this guidelines chapter begins with a brief discussion of a particular EBT processing component. Each section then provides a description of the information required from preparers in their System Design Plan. A summary of key review points concludes each section.

It is recommended that preparers begin each section or chapter of the design plan with an overview description of that section's processing component. Descriptions should be tailored, of course,

to cover the processing functionality specific to their system. Preparers should then provide the detailed information outlined in the sections of this guidelines chapter.

Use of flow charts and diagrams throughout the System Design Plan is highly recommended. Several examples are included in this guidelines chapter. The System Design Plan should not provide detail at the level of software programming code. While preparers may want to describe basic software modules (i.e., what they do and how they interact with other modules), reviewers will not be prepared to interpret actual software programming.

For ease of review, preparers are encouraged to structure their design plan and content to parallel this guidelines document. Nevertheless, regardless of the structure used in a given plan, reviewers should expect to find component-specific information along the lines provided here.

The processing components described within this guidelines chapter often include elements which overlap with other processing components. For example, settlement processing from the merchant's perspective is discussed under Merchant Processing, while a complete discussion of settlement processing represents a separate processing component. Where overlap occurs, preparers must decide whether it is more appropriate to duplicate information provided elsewhere in the plan or merely to provide a cross-reference. The guiding principle should be ease of document review, not document length.

This chapter contains ten more sections. Section 3.2, the Processing Diagram, graphically summarizes the processing relationships of the remaining nine sections. The ten processing component sections are:

- Processing Diagram;
- Client Eligibility Systems;
- Merchant Processing;
- Client Processing;
- Online Transaction Processing;
- Back-up Transaction Processing;
- ARU Processing;
- Settlement Processing;

represented by a box in this illustration. Under settlement processing, individual processing elements, such as balancing, would be portrayed as decompositions of the large diagram.

Processing Diagrams

Preparers are expected to provide one or more representative processing diagrams at this point in their design plan, together with an explanation of the diagram(s). Diagrams will vary from simple to complex. Obviously, the more complex the diagram, the more explanation will be required.

Exhibit 3-1 presents the processing diagram from the Ramsey County EBT system design plan.¹ TransFirst included this diagram in the executive overview of their document. In subsequent system design chapters, parts of the diagram were used for reference and expanded to explain processing design for particular components of the system.

This sample diagram includes both application software and hardware components. Some processing activities, such as settlement, are not included here. Other preparers may choose to provide a picture of all EBT activities in their system design processing diagram, including more detail on input device components (e.g., use of in-store controllers in multi-lane stores).

Preparers should provide appropriate detail to support their processing diagram. Where less detail is made available in the diagram, reviewers should ensure that pertinent information is referenced or provided in other parts of the system design.

3.3 CLIENT ELIGIBILITY SYSTEMS

Overview

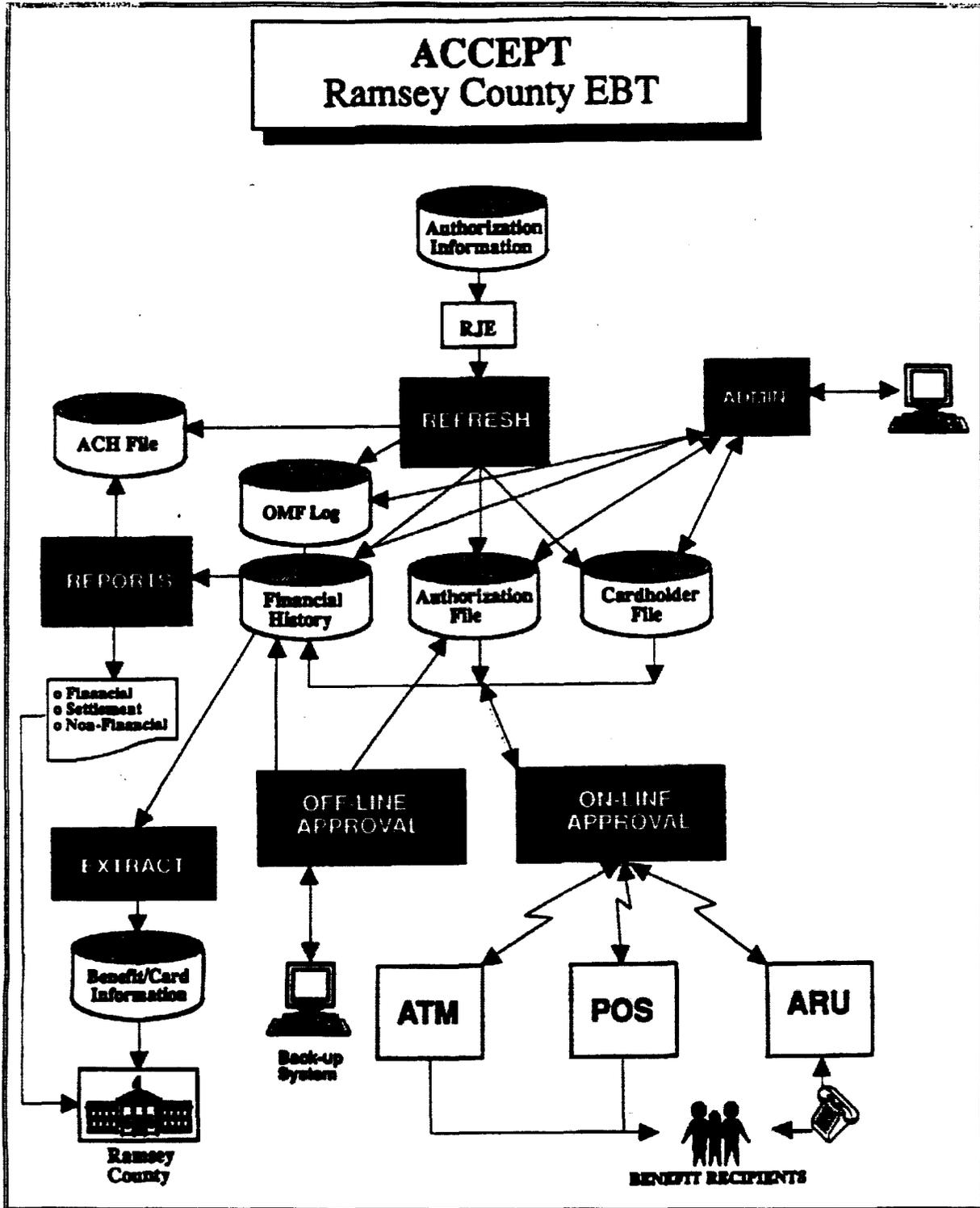
By providing client setup and benefit authorization information, State eligibility systems form a front-end component for EBT systems. Eligibility systems run the gamut from simple accounting systems to complex decision-making systems. Regardless of complexity level, eligibility information and decisions must be translated for EBT processing.

Existing eligibility systems must be modified to transfer eligibility and authorization information required to support EBT processing. Interfaces with EBT systems range from creation of a data tape to electronic transmission of authorization information, with accompanying header and trailer records and file receipt confirmation. EBT projects will require the creation of such an interface capability. System capabilities and the sophistication of the interface will dictate the type of information transmitted and the

¹ "ACCEPT System: Ramsey County Design Document," Dallas, Texas: ACS/TransFirst, June 1989.

Exhibit 3-1

RAMSEY COUNTY EBT
PROCESSING OVERVIEW DIAGRAM



Used with permission

level of information required in the system design. At a minimum, eligibility records for client setup and status and for benefit authorizations will be included in the EBT interface. Some systems will be capable of processing both eligibility status and authorization records in one transmission. Other systems may be able to accommodate only one record type per transmission.

EBT systems are unlikely to be able to accept data directly from a State's eligibility system, necessitating the reformatting of eligibility system data for subsequent EBT system update. Within each client's eligibility record, data elements such as name and address are reformatted for transfer between systems. Processing codes, such as those indicating benefit programs, will be used during the updating of EBT system databases.

Eligibility system capabilities vary widely by State agency. Developing and installing eligibility systems is not the topic of an EBT system design plan, which is expected to discuss only those changes to State systems needed to accommodate EBT recognition and transfer of data.

A thorough discussion of eligibility system support for EBT and transfer of data through interface components should be included in the system design. The following four topics should be covered:

- types of systems;
- interface processing;
- message formats and processing codes; and
- client file conversion.

Each major topic is described in detail in the remainder of this section.

Reviewers should expect preparers to provide appropriate background information on the characteristics of the State's eligibility system. However, the System Design Plan should focus most attention on the:

- changes required for EBT recognition (e.g., addition of an EBT "flag" variable to the State's eligibility file and how that flag gets updated);
- data elements required by the EBT system;
- message formats required by the EBT system;
- processing codes for EBT system update;
- transmission media, such as dial-up lines, dedicated trunk lines or tape file; and
- file conversion process.

Types of Systems

Eligibility systems vary in processing complexity from single-purpose to full integration. Single-purpose systems are defined as supporting only one benefit program, full integration systems as including multiple benefit programs with integrated processing. Rules associated with multiple, integrated programs will vary in their complexity based on system processing capabilities. For example, some full integration systems are capable of applying all appropriate policy information and determining eligibility status and benefit amounts.

Eligibility system capabilities will directly affect EBT processing, especially EBT interface processing. If, for example, the State's eligibility system is integrated across all benefit programs served by the EBT system, then a single eligibility record per client will probably be sufficient to set up that client's account on the EBT system. Otherwise, multiple records may be needed (i.e., one for each program). The geographic coverage of the eligibility system also is important. In a State with county-based program administration, the EBT system may need to obtain eligibility and benefit information from multiple, county-based eligibility systems.

Preparers should describe the existing eligibility system capabilities in enough detail that reviewers can understand any special problems or interface processing issues that the EBT system must accommodate.

Interface Processing

The need to flag EBT client records will require changes in the eligibility system. Such changes are to be noted in the system design. For example, adding a "yes/no" flag to the client records would cause the eligibility system to restrain the issuance of food stamp coupons and pass allotment information to the EBT system. For cash assistance programs, a "yes/no" flag would restrain the printing of the assistance check.

Interface processing defines the transfer of eligibility and allotment information to the EBT system. Preparers are expected to provide detail on interface processing for at least the following topics:

- data elements to be captured from the eligibility system (e.g., name of recipient, names of other case members, eligibility status for individual programs; and allotment amount for individual programs);
- processing rules (e.g., client accounts cannot be established with allotment records); and

- timing requirements (e.g., time of day eligibility or allotment information must be received).

Reviewers should ensure these areas have received appropriate consideration within the system design.

Message Formats and Processing Codes

The structure and format of interface records or messages should be defined within this section of the design plan. Preparers are expected to supply the following information:

- the use of header and trailer records in all transmissions;
- message formats for header, trailer, financial transactions, and others as required for tape processing;
- message formats for electronic message processing;
- mapping of data elements between eligibility system and interface programs;
- special processing rules or algorithms;
- record types (e.g., add, update, or delete); and
- processing codes (e.g., monthly, supplemental).

Thorough explanations are expected throughout this section. Understanding interface message formats and processing codes is crucial to understanding the process of converting clients from a paper-based to an EBT-based issuance system.

Client File Conversion

Once an EBT system is operating, newly authorized recipients will be added to the system's database through the interface processing component described earlier. Prior to system start-up and during any staggered rollout of the system, however, a mass conversion of client information must be performed. That is, information on a large number of recipients must be transferred from the State's eligibility system to the EBT system.

If system processing for mass conversion is identical to the processing of newly authorized recipients, preparers can just note this in their design plans. If mass conversion differs from the processing of newly authorized clients, however, the System Design Plan needs to document these differences, providing as much detailed information about mass conversion processing as for the processing of new clients.

3.4 MERCHANT PROCESSING

Overview

Program-authorized merchants will find their operations significantly changed by the addition of EBT. Customers' purchase of goods, reconciliation of register activity, depositing of funds, and dispute processing will require operational changes in checkout lanes and backroom operations.

Before EBT system use begins, merchant recognition information is gathered and added to the system's database. Merchant information such as store name, address, and contact name is verified against existing manual or automated records. Electronic processing may start when the merchant has been added to the EBT system through the recognition process. Because there are large numbers of program-authorized merchants, the initial conversion of these merchants is likely to be performed using an automated process. That is, the account setup processes for initial conversion may differ from planned account setup procedures after conversion, when relatively few merchants will need to be added to the system at any one time. Preparers should describe both sets of planned procedures.

Data entry screens are used to update related databases with pertinent merchant information, such as terminal type, number of terminals, address, contact person, etc. Once established, a merchant's POS terminal permits transaction processing, settlement, and dispute resolution. Transaction processing for a merchant continues until the merchant decides to leave the system or loses program authorization.

Maintaining data integrity is a basic design tenet. Appropriate edit criteria need to be established in the system to ensure databases are not corrupted by new data. For example, edit criteria would prevent the system from receiving alpha information for a numeric data field (e.g., letters in a data field that is supposed to indicate allotment amount). Stringent field definitions and edit criteria are required and must be maintained throughout the system. The design plan must provide sufficient information about edit criteria to demonstrate data integrity.

Seven major activities constitute merchant processing in an EBT system. Each activity should be thoroughly documented in the design plan. These are:

- system recognition;
- service termination;
- terminal processing;
- settlement processing;
- funds transfer;

- dispute processing; and
- history information.

Each major area is described in detail in the remainder of this section.

System design plans are expected to provide detailed descriptions of these activities and associated data. The merchant processing section of the design plan should address these key review points:

- descriptions of features and functions;
- mapping of functions to data elements;
- definition of data elements; and
- edit criteria for data elements.

System Recognition

Before an EBT system can process an online transaction, it must verify that the transaction has been initiated from a store that is authorized to accept the EBT card for purchases or benefit withdrawals. The system performs this verification, or "system recognition," by comparing store and terminal information contained in the transaction request message with information stored in the system's merchant and terminal control files. The merchant and terminal information, therefore, must be added to the control files before EBT transactions from that store can be processed.

Merchant and terminal information is added to a system's control files through use of data entry screens. The System Design Plan should outline the steps required to establish merchants and terminals on the system's databases. Screen usage, data elements, edit criteria, and function keys are areas to be described.

Exhibits 3-2 and 3-3 show examples of data entry screens for merchant setup and the associated data elements and edit criterion for the setup screens, respectively.¹ Preparers should include similar exhibits in their design plans, either in the merchant processing section or in an appendix. The design plan should also describe how such screens are to be used; their relationship to other screens, if any; and who will have access to the screens for data entry or update.

¹ These exhibits originally appeared in a document prepared by the authors for use during the acceptance test of the State-operated EBT System in Reading, Pennsylvania. See Charles R. King and John A. Kirlin, "Acceptance Test Procedures for the Phase C Electronic Benefit Transfer System," Cambridge, Massachusetts: Abt Associates Inc., April 1987, pages E-29 and E-31.

Exhibit 3-2

MERCHANT SETUP SCREENS

MCF1 LAST MAINT DATE 01/08/89
TIME 14:33

M T E C H E B T S Y S T E M
**** MERCHANT CONTROL FILE ****

COUNTY CODE _____ CASE NO _____ GROCER TYPE _____ STATE CODE _____

NAME _____ DISTRICT _____
 ADDR _____ CITY _____ ST _____
 ZIP _____ PHONE _____

CONTACT NAME _____ PHONE _____

ACCT STATUS _____ ACCT TYPE _____ PIN OFFSET _____
 STATUS CHANGE DATE 00/0/00 CREATE DATE 00/00/00 REISSUE DATE 00/00/00

CHAIN NO _____ REGION NO _____ LANGUAGE _____ DATE CAPT _____ LAST TRANS 00/00/00

CLEAR: INST NO _____ ACCT NO _____ ACCT LGTH _____

SETTLE: SWITCH _____ TIMES _____ (IN MHHHSS FORMAT)

F1 = DISPLAY F5 = CHANGE F9 = PAGE FORWARD SF1 = MAIN MENU
 F3 = ADD SF7 = DELETE F11 = PAGE BACK SF12 = CONTROL FILE MENU

MCF2 LAST MAINT DATE 01/08/89
TIME 14:33

M T E C H E B T S Y S T E M
**** MERCHANT CONTROL RECORD ****

CASE _____ MERCH BIC _____ NAME _____

ACH FLAG _____ UNAUTH VIO _____ UNAUTH STT _____ TROUBLE LOG IND _____

BUSINESS DATE 00/00/00 NEG BALANCE ACCUM .00

CLERK ID RANGE: LOW _____ HIGH _____
 TERM ID RANGE: LOW _____ HIGH _____

TEMP DEBITS OUTSTANDING
 NBR _____
 AMT _____ .00

F1 = DISPLAY F5 = CHANGE F9 = PAGE FORWARD SF1 = MAIN MENU
 F3 = ADD SF7 = DELETE F11 = PAGE BACK SF12 = CONTROL FILE MENU

Exhibit 3-3

SCREEN DATA ELEMENTS AND EDIT CRITERIA

CEBTS Acceptance Test (CAT)
CEBTS Workstation Screen Tables

Table E - 12
Merchant Control File (MCF) Screen
Page 1 of 2

This screen handles the file maintenance for the merchant control file (MCF). Using this screen all merchant information required to support the merchant base in the field is included. This is a two-page CRT function with the field edit checks performed by the screen program.

Any changes made to this file are noted in a record logged to the maintenance log file. The record will include the user case number, function type (add, change, or delete), file name, date and time.

Data Element	Fld Size	Edit Criteria	Edit Check	Comments
COUNTY CODE	9(03)	Numeric, Not=0	A, *, Spaces	
CASE NBR	9(07)	Numeric, Not=0	A, *, Spaces	
GROCER TYPE	9(02)	0 < x < 19	A, *, 20, 99	
NAME	X(26)	Not = Spaces	Spaces	
DISTRICT	X(02)	No Edits	A, 1, *, Spaces	
ADDRESS	X(26)	Not = Spaces	Spaces	
CITY	X(14)	Not = Spaces	Spaces	
STATE	X(02)	Not = Spaces	Spaces	
CONTACT NAME	X(30)	Not = Spaces	Spaces	
PHONE	9(10)	Numeric, Not=0	A, *, Spaces	
ACCT STATUS	X(01)	A, H, L, M	Z, 1, *, Spaces	
ACCT TYPE	X(01)	1, 2, 3	Z, 9, *, Spaces	
CHAIN NO	X(02)	Not = Spaces	Spaces	
REGION NO	X(02)	Not = Spaces	Spaces	
LANGUAGE	X(01)	E, S	99, A, Spaces	
DATA CAPT	X(01)	Y, N	99, A, Spaces	
INST NO	9(09)	Numeric, Not=0		
ACCT NO	9(07)	Numeric, Not=0		
ACCT LGTH	9(02)	Numeric, Not=0		
SWITCH	9(01)	A, H, M	99, A, Spaces	
TIMES <4 Times>	9(06)	Not = 0, 1 if H	99, A, Spaces	Format HH, MM, SS
CLERK ID RANGE				
LOW	X(02)	Not = Spaces	99, A, Spaces	
HIGH	X(02)	Not = Spaces	99, A, Spaces	
TERM ID RANGE				
LOW	X(02)	Not = Spaces	99, A, Spaces	
HIGH	X(02)	Not = Spaces	99, A, Spaces	

Screen data elements' parameters, such as size and storage type, must be described. Size (e.g., 10 bytes) and type of storage (e.g., signed numeric, binary) define each data element's space characteristics. The use of screen function keys, displayed at the bottom of the screens in Exhibit 3-2, also should be described.

Edit criteria cover two types of data fields: variable and fixed. Variable data fields, such as name and address, are subject to general editing criteria (spaces, 0-9, A-Z). On the other hand, fixed field contents, such as account status or settlement times, are system processing parameters.

If the merchant is to receive credits for EBT transactions through an automated clearing house (ACH) process, an ACH pre-notification transaction to the merchant's bank will be required.¹ The System Design Plan should explain the setup and initialization of this process. For example, a brief description of pre-note processing activities could address the testing of end-to-end settlement procedures, which is typically conducted before actual transaction processing starts.

EBT system operators may support non-EBT processing functionality for some merchants. For example, terminals capable of processing commercial debit, credit, and EBT transactions may be available to merchants from the system operator or third parties. In some areas, merchants' internal practices may demand additional information for some purpose such as accounting. Aggregating terminal totals by store is an example of such an internal practice. Inclusion of non-EBT processing functionality descriptions is required whenever they overlap with EBT processing activities.

Service Termination

Merchant participation in an EBT system may change over time. A system must have the capability to place a merchant in a hold or stop processing status. The design plan should detail service termination steps, *including processing for voluntary and involuntary program termination*. Also, where multiple benefit programs are available, the capability to end participation for selected programs (where supported) should be described.

The design plan should describe data entry screens and define data elements supporting service termination procedures.

¹ An ACH pre-notification transaction is a test transaction (involving no actual transfer of funds) used to ensure that the merchant's bank account number is valid and active. The pre-notification transaction is usually sent at least 10 days before actual funds transfers through the ACH are planned.

Terminal Processing

Terminals from a variety of manufacturers can support EBT system requirements. The design plan must identify the functions and data required for supporting those terminal processing features selected for the system.

Many factors, some common to all projects and some project-specific, are included in the terminal selection process. Design plan reviewers will become familiar with those features common to all projects. Project-specific features should be highlighted by the preparer in this section to ensure reviewers understand their significance.

As noted in Chapter 4, Hardware Components, the design plan needs to provide a detailed description of the terminal(s) to be used in an EBT system. A brief description of the terminal(s) should be included in the merchant processing section to facilitate design plan review.

In describing terminal processing, the preparer needs to cover the following elements:

Terminal Functions Typically, terminal functions include financial (e.g., purchase and refund) and administrative (e.g., balance inquiry and settlement) transactions. Non-EBT functions may be available as well (e.g., check authorization).

Example: Sales activity is executed on the terminal using the purchase, inquiry, refund, and void transactions. PIN encryption occurs within the PIN-pad.

Function Keys Definition and usage of each terminal's function keys should be described here. Multi-function terminals might include EBT, debit card, and credit card transaction keys as typical function keys. Each key would be noted with a brief usage description.

Example: EBT KEY: Upper right corner of the POS terminal. Used when customer specifies electronic food stamp usage.

Transaction Processing Transaction processing includes the steps required for processing each terminal transaction. Sales and administrative activity account for most merchant terminal processing.

Example: A sample set of steps for processing a purchase transaction is noted as:

- 1) Customer swipes card through mag stripe reader.
- 2) Customer enters PIN on PIN-pad.
- 3) Clerk presses EBT function key.

n) Transaction is approved.

Display Messages Display messages for manual entry and system responses to transactions are included here. Examples include the logo and logon screens, "Please swipe magnetic card," and "Transaction Denied." Appropriate display messages are expected for each system response.

Example: System Response Code 034: Request denied - Insufficient Funds.

Display Message: Transaction Denied - Please Contact Customer Service at 1-800-555-1212.

Data Elements Data elements required for transaction processing at the terminal are specified here. Typically, manual entry requirements would be the focus of this section.

Example: Card Number, from face of card, to be entered through the terminal's keyboard.

Settlement Processing

Merchant settlement at the terminal will be manual and electronic. Manual settlement includes register-to-terminal reconciliation by clerical staff. For example, a clerk may press a special terminal function key at the end of his or her shift to display total EBT sales since the beginning of the shift. Electronic settlement reconciles the terminal to the system. Totals settlement to detail transaction settlement are possibilities. Additional settlement levels, such as by groups of terminals and by store, could be available depending upon the complexity of the system and connected terminals.

The System Design Plan should address the procedures for settling both electronic and back-up transactions. Settlement between the terminal and the system, followed by reconciliation of out-of-balance conditions, should be described in detail. The detail should include what data from which databases are being compared and the processing involved (e.g., transaction log records for a specific terminal are totaled and compared to the terminal's record of transactions to be settled, or individual transaction records are compared). This section should also describe any settlement options made available to the merchant. For instance, is the terminal's "cutover" time specified by the system or the merchant? If the merchant can decide the time for cutover, is this time selected during account setup or can the merchant select a different cutover time each day by initiating an administrative transaction from the terminal?

Funds Transfer

After settlement between the terminal and the system, funds must be transferred from the system's concentrator bank into merchants' bank accounts. Different funds transfer options exist. If the system operator is a bank that holds merchants' business accounts, funds will be internally transferred after system cutoff -- the end of the system's processing day. If the system operator is not a bank, information on settled transactions will be sent to the concentrator bank and then on to the ACH network for funds transfer. For merchants using third-party processors, the funds may be transferred to the processor, who would then credit the merchants' accounts.

Selection of the funds transfer options in the system is done during merchant setup and initialization. Appropriately detailed descriptions of funds transfer activity, associated data elements, and cutoff times for ACH and for the system should all be provided. An example of funds transfer processing from a pilot project design plan has been included in Section 3.8, Settlement Processing (see Exhibit 3-7 on page 50).

Preparers should be sure to describe the relationship among system settlement times, funds transfer activities, and when funds are actually made available to merchants' accounts. For instance, "All transactions conducted before 5:00 p.m. local time are included in settlement (unless the merchant chooses an earlier cutover time for its processing day); ACH processing occurs before 9:00 p.m. EST; and funds are available in merchants' business accounts by 7:00 a.m. local time the next morning."

Dispute Processing

Automated merchant dispute processing relates directly to settlement-related conditions. Daily balancing totals at the merchant may not match those of the system. Or, funds transferred to the merchant's business account may not match the balanced amount.

The design plan should provide a functional description of automated dispute processing. Methods of initiation, data elements, and data entry screens, if any, should be specified in detail.

Not all systems will have an automated dispute processing capability. If not, manual procedures for handling disputes should be described in the design plan.

History Processing

Either in conjunction with dispute processing or for other reasons, an EBT system is likely to provide a method for accessing historical records of EBT transactions at a particular POS terminal or for

a particular store. For the current EBT demonstrations, this access capability has been provided through the use of administrative workstation screens. Because history information is not subject to change, only an inquiry capability is needed.

Preparers should describe the availability of merchant history information within their EBT system. The description should include:

- a description of functional capabilities;
- diagrams of history information workscreens;
- descriptions and definitions of data elements;
- descriptions and usage of function keys;
- structure of the history file; and
- data retention period for online access (e.g., 30, 60, 90 days).

The preparer's description should indicate whether the **current** day's transactions are available for inquiry. This will likely depend upon whether the workscreen can access only a history file on the system (which is typically updated at the end of each processing day) or the current day's transaction log file as well.

Because merchants may occasionally request information about whether a just-completed transaction was actually fully processed by the system, access to current day history information is

desirable. Whether it is actually provided may depend on whether or not this has been included in the RFP's functional specifications.

Workstation screens are also discussed in Section 3.11, Administrative Processing. Furthermore, a similar capability will be provided for client history information. Preparers may elect to provide details under the Merchant Processing and Client Processing sections of their design plans, with cross-references provided in their section on Administrative Processing.

Merchant history information may also be available using an audio response unit (ARU) capability. See Section 3.8, Audio Response Unit Processing, for a description of ARU use in providing history information. Should ARU access to history information be available, preparers should ensure

An example of a merchant history workstation screen is supplied in Exhibit 3-4.¹ The screen is used by the Pennsylvania Department of Public Welfare to answer questions merchants may have about their transaction activity. The screen may also be used for research purposes.

3.5 CLIENT PROCESSING

Overview

Transferring relevant client information from program files to the EBT system encompasses initialization and setup. Conversion of participating client information was discussed in the section on the Client Eligibility System (3.3). After client information is transferred or converted from the client file, additional processing information, such as card number, will be added. The setup process is complete after participating clients have selected their PINs, been issued cards, and been trained in system use.

Workstation screens supporting client files are the windows that access data maintained on an EBT system. New client initialization and setup, card and PIN issuance, and historical data access are included in workstation screens. These screens will be used extensively by system operators and client support staff with many varied needs. Descriptions of these screens and their specific use should be included in the System Design Plan.

In the absence of periodic account statements, maintaining online access to client history information is key to addressing client servicing issues. Clients will periodically contact the service center with questions regarding their account balances and past transactions. Historical information should be accessible through a number of different keys (e.g., client's case number, EBT card number). Preparers should indicate access capabilities and their uses within the System Design Plan.

Four major activities constitute client processing in an EBT system. Each activity should be thoroughly documented in the system design. The four activities are addressed in detail in the following subsections:

- initialization and setup of clients' EBT accounts;
- card and PIN issuance;
- workstation screens; and
- history information.

¹ Charles R. King and John A. Kirlin, *op cit.*, page E-10.

Exhibit 3-4

MERCHANT HISTORY INFORMATION SCREEN

MHF

CURRENT DATE mm/dd/yy
TIME hh:mm

M T E C H E B T S Y S T E M

MERCHANT HISTORY RECORDS

ENTER MERCHANT CASE NUM : _____ NAME-
ENTER START DATE (M/D/Y): __ / __ / __ ADDR-
ENTER START TIME (HH:MM): __ : __

CLIENT				CL	FC	RS	TRAN	TRAN	BUS	REFERENCE	
CASE #	AMOUNT	STAT	SEQ#	AUTH	ID	CD	CD	DATE	TIME	DATE	NUMBER

F1 = DISPLAY F3 = CONTINUE SF1 = MAIN MENU
SF12 = EBT FILE MENU SF16 = EXIT

Used with permission

Initialization and Setup

Under Initialization and Setup, preparers will be describing the process of setting up clients' EBT accounts using data from the eligibility system. Descriptions of the client database's structure and data elements should be key items of the presentation. Mapping of eligibility system to EBT system databases should describe the flow of data elements between the two systems. Edit criteria, defined for each data element, should be provided to ensure integrity of data applied to EBT system files.

Establishing clients on an EBT system often requires reformatting of records maintained on county or State eligibility systems to allow data transfer to EBT system files. Loading the client file is a process similar to that performed in the previous section, 3.4, Merchant Processing.

Data conversion usually follows two courses: initial conversion and normal processing. Initial conversion captures, reformats, and adds information about existing clients to the EBT system. This processing should be discussed by the preparer in the Client Eligibility System section (3.3). Normal conversion processing is the ongoing link between the eligibility and EBT systems. On the basis of a pre-established schedule, new clients are added, changed, or deleted on existing EBT client files. In addition, monthly, supplemental, and emergency allotments are transferred to the EBT system. Client information and allotments are reformatted and sent to EBT systems via magnetic tape or over telephone lines.

Information transfer requirements should be specified in the System Design Plan. Client file content and formats used by the EBT system for transaction processing should be provided. Edit criteria need to be defined for each data element. Table shells of processing reports that indicate good transactions, rejects, errors, and processing totals (such as transaction processing counts and amounts) should be provided, together with variable definitions. EBT workstation screen displays and data element edits supporting manual inquiry and update to the client files should be described in detail.

Edit criteria for each field are usually specified as either variable or fixed. Changes to variable data elements, such as name, address, and telephone number, are based on input subject to general editing rules (e.g., spaces, 0-9, A-Z). Fixed field contents, such as program type, allotment amounts, and EBT card number are system processing parameters. Edit criteria for such fields should be specified in the system design.

In summary, this section of the design plan should address the following points:

- structure of the client database;
- mapping of data elements between the client eligibility system and the EBT system database;
- client file data elements;
- edit criteria for each data element; and
- conversion of eligibility information.

Reviewers should ensure sufficient information is provided to clearly and concisely explain the details necessary to understand initialization and setup activities for the EBT system client database.

Card Issuance and PIN Selection

In an online EBT system, adding a client to the EBT system involves client training, card issuance, and PIN (personal identification number) selection. Cards and PINs are used by the EBT system to recognize and authorize clients' access to their benefit allotments.

Initially, PINs are selected and cards issued before the start of system processing, following completion of the initialization and setup of client records. During initial training, the card and PIN of each client on file is related to that client's file record, probably through a workstation screen. Cards and PINs are regularly issued to new or reactivated clients.

The System Design Plan should specify procedures to be followed and processing activities associated with card issuance and PIN selection, both during initial conversion and during ongoing operations. The design plan should include the following information:

- description of card issuance procedures;
- description of PIN selection activities;
- special data entry controls (e.g., masked entry of PIN);
- updating database with card number and PIN;
- screen display of card and PIN data elements;
- edit criteria for data elements; and
- security controls and associated processing.

System integrity relies on the card and PIN. Thorough explanations are expected throughout this section. Understanding the card issuance and PIN selection process is crucial to understanding the method for

maintaining system integrity.

Additional information about card issuance and PIN selection is provided in Chapter 6, Security, of this Guidelines document.

Workstation Screens

Typically, workstation screens provide the capability to update or review key client data and balance information. Lost, stolen, or hold status on client cards are frequently used features of client workstation screens. Other less common features, such as changing authorized representative, may also be available. An example of a client workstation screen (for history information) is provided in Exhibit 3-5 in the next section. The design plan is expected to provide detail on client workstation screen content and use.

Provision for security over sensitive workstation screen access should be discussed. Adding or increasing benefit balances, if access is available on the system, will entail system and clerical security procedures. For instance, emergency increases in benefit balances may require supervisor approval in the EBT and manual systems. See the description of security processing for administrative screens under Section 6.5, Access Security.

Preparers' descriptions of workstation screens should include at least the following:

- definition of functional capabilities (e.g., updates and status changes);
- workstation screen display diagrams with associated function keys;
- descriptions of data elements;
- definitions of edit criteria;
- sources of data on workstation screens; and
- access security for workstation screen capabilities.

Typically, workstation screen capabilities should include add, change, update, and delete processing functions. Section 3.11, Administrative Processing, includes further review information on workstation screens.

History Information

As with merchant history information processing, preparers should describe system capabilities for providing information about clients' past EBT transactions (and allotments). The level of detail

should parallel that provided for merchant history processing. If client history information (as opposed to balance information) can be accessed through an ARU, these procedures and processing steps should be described.

Exhibit 3-5 provides an example of the client history workstation screen used by the Pennsylvania Department of Public Welfare.¹

3.6 ONLINE TRANSACTION PROCESSING

Overview

Traditionally, customers at grocery stores complete their purchases using cash, check, or food stamp coupons. These forms of payment are well established and time tested. Recently, funds for purchasing groceries or other goods and services have also come from ATM cards in the form of cash withdrawals. Customers using ATM cash withdrawals rely on their ATM cards (also known as debit cards) to transfer funds from their account (usually checking, but including savings and credit card accounts) to the merchant's account.

Online transaction processing systems provide a means of accessing customer accounts for cash or payment of purchases. Account access may use either debit cards or credit cards. In addition, some systems provide the ability to monitor or guarantee check cashing activities. Using a "debit card" approach, benefit programs can transfer funds to grocers for purchases or provide cash at ATMs or POS devices.

Interaction between the terminal and system is the heart of the online processing system. From the terminal and system point of view, online transaction processing includes a complex set of rules covering normal and abnormal conditions. This section of the system design should describe the rules governing each online session or transaction.

Benefit program cards, treated in a manner similar to "debit cards," allow clients to purchase goods, return goods, or receive cash.² Client activity is defined to the terminal as a transaction. Usually, transactions available to benefit program clients within an online system include the following:

- balance inquiry;
- purchase (cash benefits or food stamps);

¹ Op cit., page E-10.

² Clients receiving food stamps only cannot receive cash.

Exhibit 3-5

CLIENT HISTORY INFORMATION SCREEN

```
CHF                                     CURRENT DATE mm/dd/yy
                                         TIME hh:mm

      M T E C H   E B T   S Y S T E M

      CLIENT HISTORY RECORDS

ENTER CLIENT CASE NUM : _____ NAME-
ENTER START DATE (M/D/Y): ___ / ___ / ___ ADDR-
ENTER START TIME (HH:MM): ___ : ___

MERCHANT                                CL FC RS TRAN  TRAN  BUS  REFERENCE
CASE #  AMOUNT STAT SEQ# AUTH ID  CD  CD  DATE   TIME  DATE  NUMBER

F1 = DISPLAY          F3 = CONTINUE          SF1 = MAIN MENU
                      SF12 = EBT FILE MENU       SF16 = EXIT
```

Used with permission

- cash withdrawal (ATM and POS);
- cashback (purchase amount plus cash)
- refunds; and
- voids.

An EBT system may support all or a subset of these transactions. In addition, the system may provide support for transactions not listed (e.g., check verification or other commercial transactions). All supported transactions should be described.

Other transactions, processed in the system but not initiated by clients, include settlement, merchant inquiry, and system administrative transactions. System-generated transactions, such as reversals, support benefit program processing, but they occur without initiation by merchants or clients.

From a client's or merchant's view, a transaction is either approved or denied. Reasons for approval or denial are included in a system's processing codes. Some systems group all approvals under one code, while others may have several approval codes. For instance, separate codes may be used for approved balance inquiries, purchases, voids, and refunds. For a denied transaction, a variety of denial reasons, such as insufficient funds or system index key corrupted, will be given. Denial codes for program-related actions are straightforward. System-related denial codes, such as "SDF record not on file," can be confusing.

Preparers of the design plan should list all approval and denial codes used in the system. System-related denial codes should include sufficient explanation for why each condition occurs and the notification procedure involved. Also, system-related denial codes should be carefully mapped to terminal display messages. Reviewers should pay close attention to the system design's treatment of these system-related denial codes.

ATM and POS systems often include messages supporting system-specific interactions. Some of these messages are unrelated to EBT processing, but they should still be noted in the system design because unrelated codes may mysteriously appear during EBT processing. Preparers should identify these codes as unrelated, documented in the system design for information purposes only.

Online processing encompasses the system component interactions required to support benefit program processing. System components expected to be functionally described within this section of the design plan include:

- terminals (ATM, POS, and ARU);
- telecommunications network (dial, leased line networks, and support networks);
- intermediate routing points (e.g., switches); and
- the authorization processor.

Hardware descriptions of appropriate components should be provided under Chapter 4, Hardware Components.

Usually, transactions within a processing system comprise a series of messages. A simple purchase transaction includes a request (for authorization) and a response (authorized). Messages include identifying codes, such as request or response, for a particular transaction. Preparers should include detailed descriptions of their transaction processing flows. All possible message combinations for the transaction set should be described and illustrated.

In their design plans, preparers should provide information on the following topics:

- transaction set;
- processing codes (approval and denial reasons);
- online processing interactions; and
- processing rules and flows.

Online processing is technically complex. Because online processing represents the system's heart, this section of the design plan requires extensive review. Each major topic area is described in detail below.

Transaction Set

Transaction set refers to all transaction types supported by system processing. The design plan should list and describe all supported transaction types (e.g., balance inquiries, purchases, refunds, cash withdrawals). Non-EBT transactions (e.g., those initiated by credit cards, travel and entertainment cards, and commercial debit and ATM cards) supported by the system should be described as well to set the proper context for EBT processing.

EBT transactions are usually selected at the ATM or POS terminal by the client or the clerk. Benefit programs are limited by policy to specific terminal access. For instance, food stamp benefits are restricted to POS devices in program-authorized stores, while AFDC benefits are available at ATMs and

all or a subset of POS devices. Program-specific restrictions, incorporated in system processing, should be described in this section of the design plan.

Both terminal-initiated and system-initiated transactions need to be described. Any special transaction types supported by the system should be described in detail. An example is a transaction against a cash program account that involves both a purchase and a cashback component. If the system treats this as a single transaction for a single amount, then its processing is the same as for a cash withdrawal. Some retailers in commercial EFT systems, however, request separate totals for the two components. If the EBT system supports this type of cashback processing, specific detail should be provided in processing rules.

The preparer should detail which transactions are supported by which types of devices, as shown in the following example:

	ATM	POS	ARU
Inquiry	****	****	****
Purchase		****	
Cash Withdrawal	****	****	
Cashback		****	
Refunds		****	
VOIDS		****	

For clarity, preparers may need to break out the inquiry transaction by program type (e.g., is food stamp balance information available at ATMs?).

System-related transactions include settlement and system-generated transactions (e.g., reversals). ATM settlement is usually system-initiated through a transaction at time of cutover or cutoff. POS settlement is initiated by either the system, terminal batch cutoff, or the store owner/manager. Rules surrounding POS terminal cutover should be described.

System transactions also include administrative transactions, such as logon/logoff, transfers of encryption keys, and transaction reversals. System capabilities for supporting these transactions are expected to vary by system. Specific processing capabilities for system transactions should be appropriately described.

Transaction set information should include a description of the transaction type, the transaction code, and the associated message format identifying key data elements. Preparers should provide detail on the supported transaction set for the following topics:

- transactions supported, including EFT;
- rules for transaction initiation;
- benefit program policy processing restrictions; and
- system processing capabilities.

Preparers may provide additional information in this area. Reviewers should ensure sufficient information is provided to clearly and concisely explain the details necessary to understand the transaction set to be used.

Processing Codes

Processing codes are used by EBT systems to report the results of transaction processing activity within the system. Transaction activity is either approved or denied based on the interaction of the transaction request and current account status.

Most transactions are approved as requested. System processing from participating terminals usually results in successful completion. Approval processing codes include typical messages of "Approved - Purchase," "Approved - Cash Withdrawal," "Approved - Refund," "Approved - Void," and "Approved - Inquiry." Some systems lump these processing codes into one approval code. The number of approval categories is a matter of design and choice by system designers.

The higher number of denial processing codes reflects the complexity of system processing. Wherever a processing condition causes system processing to stop or say "no," a denial processing code exists. Some processing codes, such as "no account on file" or "PIN invalid," indicate the client cannot be found and system processing can proceed no further. Other processing codes, such as "insufficient funds," indicate the client is valid, but the transaction cannot be completed as requested.

Preparers need to specify all processing codes in this section of the design plan. The conditions under which a code occurs are to be specified when the condition is not apparent from the code. Reviewers should ensure program-specific codes are included and documented at the required level. System-specific codes should be reviewed to ensure they are meaningful and documented at the required level.

Third-party processors deploying terminals for EBT use may use a different set of processing codes than the system uses. In this situation the system interface with the third-party processor will need a set of rules mapping system codes to third-party processor codes. To the extent to which participating

third-party processors are known at the time the System Design Plan is prepared, their processing codes and mapping rules should be described.

Exhibit 3-6 is an example of processing codes. This information was compiled by TransFirst in support of third-party testing for the Ramsey County EBT system. The cross-referenced list of codes provides information to processors on internal codes (ACCEPT CODE) and external codes (BASE-24 CODE). The external codes are sent to the third party and the third party displays the messages attached to the internal codes.

In the example shown, explanations should be provided for the conditions under which each code may occur. For example, Code 731 - Lost/Stolen Card-Retain is explained later in the document as occurring when card status on the client file is set to either "L" or "S." Preparers should provide similar explanations as required.

In summary, preparers are expected to provide detail for at least the following areas:

- identify all internal and, where possible, external processing codes;
- describe processing code creation conditions;
- translate codes to terminal displays (ATM and POS devices);
- translate codes to voice messages (ARU devices);
- describe conditions under which each processing code occurs; and
- describe special conditions causing processing codes to be generated.

Online Processing Interactions

In online systems, when the number of processing components increases, processing complexity increases. Understanding the connections among system components is fundamental to understanding the effect of degraded processing upon online transactions. Interactions adversely affecting processing have occurred during the testing of each demonstration site. At one site, the transaction files within one switch reached their capacity and caused system lockup. At another, insufficient telecommunications capacity degraded response time.

Breakdowns in components or their connectivity may cause increases in transaction response time or in required back-up transaction processing activity. To help reviewers understand the complete flow of transaction processing, the System Design Plan should describe the interaction of all processing components. These components include transaction input devices or terminals (e.g., ATMs, POS

Exhibit 3-6

PROCESSING CODES EXAMPLE

RESPONSE CODES (BASE-24 CODE SEQUENCE)	
ACCEPT CODE	BASE-24 CODE
700	Approved
701	Approved Refund
705	Approved Balance Inquiry
707	Approved Cancel or Void
710	Approved Admin
733	Expired Card
721	PIN Tries Exceeded
775	Invalid Transaction Code
736	Distribution Method Invalid
738	Origination Invalid
731	Lost/Stolen Card - Ret
732	Benefits on Hold
750	Card Record Not Found
751	Auth Record Not Found
752	Auth Error on Update
774	Invalid Message Type
734	Bad Track II
778	FS Refund w/o Prior WD
753	History Error on Update
773	Agency Record Not Found
742	History Record Not Found
735	Pan Length Invalid
740	No Funds Available
744	Amount Less than Minimum
737	Unable to get Master Key
754	Card Error on Update
780	Card Record Locked
755	History Record Not Found
756	Overdraft Error on Update
782	Overdraft Error on Read
777	Agency Error on Update
771	Read Error on Finder
772	Write Error on Record
779	Invalid Benefit Indicator
770	SDF Record Not Found
781	Store on Hold
743	Invalid Void, Not Last Tran
722	Invalid PIN
741	Insufficient Funds
720	PIN Tries Exceeded - Capture
730	Lost/Stolen Card - Capture
000	Approved
007	Approved Admin
051	Expired Card
052	PIN Tries Exceeded
055	Invalid Transaction
056	No Support
056	No Support
057	Lost/Stolen Card Status
059	Restricted Status
060	Account Not on CAF
061	PBF Record Not Found
062	PBF Update Error
063	Invalid Authorization Type
064	Bad Track II
065	Adjustment is Not Allowed
068	PLTF Error
070	No IDF
074	Unable to Authorize
075	Invalid Pan Length
076	Insufficient Funds
092	Cash Adv Less than Spec Min
100	Unable to process Transaction
104	CAF File Problem
104	CAF File Problem
108	CAPP Not Found
120	UAF File Problem
120	UAF File Problem
121	Admin File Problem
125	** Finder Read Error
126	** Finder Write Error
127	** Invalid Benefit Indicator
150	Merchant Not on File
151	** Merchant Restricted
152	** Invalid Void
201	Incorrect PIN
204	Enter Lesser Amount
900	PIN Tries Exceeded - Capture
903	CAF Status - 3

** New Response Code to EBT Interface

Used with permission

terminals, ARUs); telecommunication networks (e.g., dial or public access); intermediate routing points (e.g., a third-party switch); and the authorization processor (e.g., the EBT system's host computer). Descriptions of system components are discussed in Chapter 4, Hardware Components.

Processing Rules and Message Flows

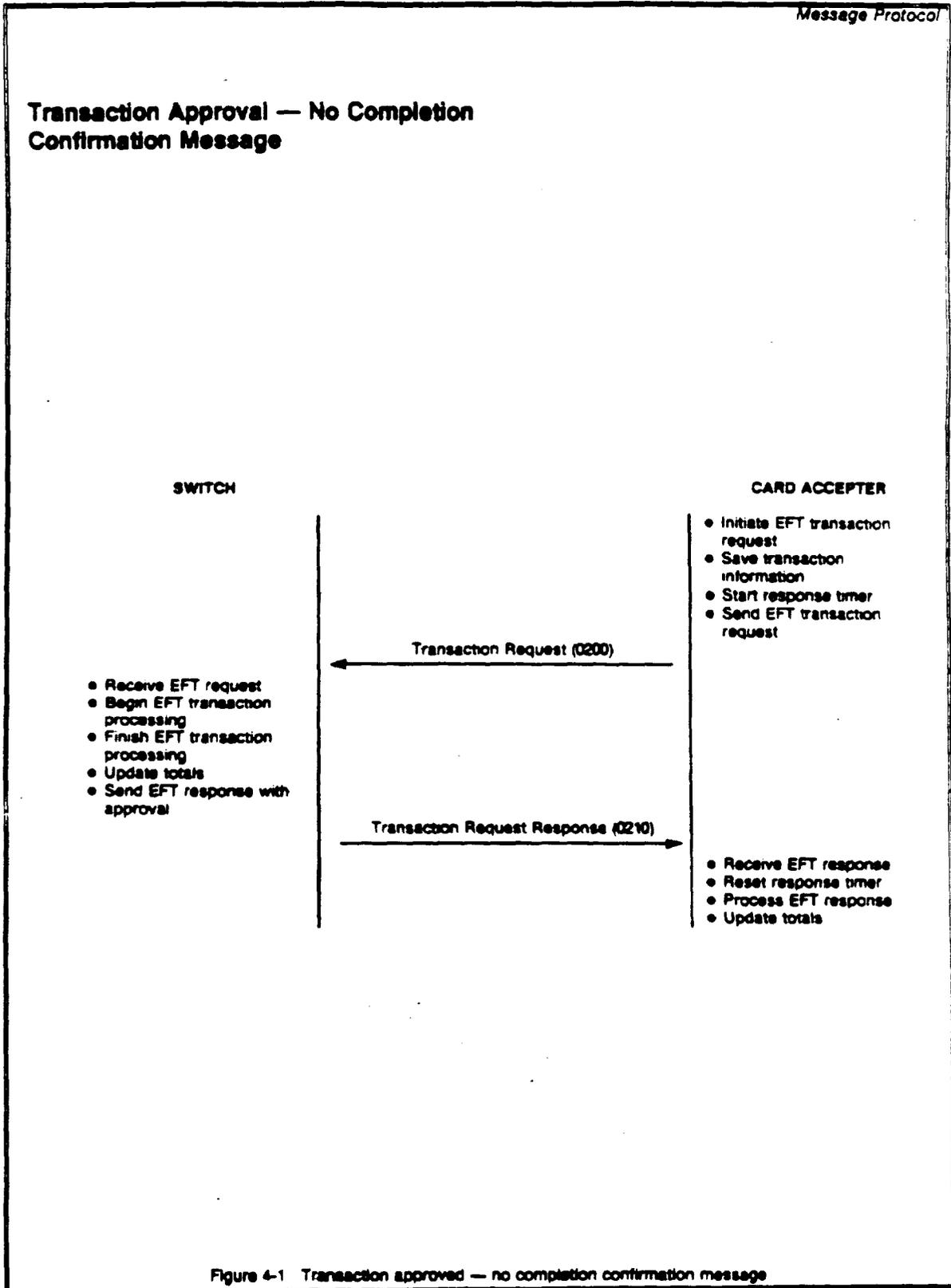
Each EBT system has a set of rules associated with transaction processing. Most transactions are composed of a series of related messages characterized as requests and responses. For example, a reversal is a request/response pair created by the system when the response from a request/response pair (e.g., to process a purchase transaction) is not delivered in a timely fashion.

Flow diagrams are to be provided that illustrate recovery from system processing disruptions. Reviewers should ensure that processing flows for each transaction have been provided. For each transaction, recovery from disruptions at each processing component is to be described in detail. Typically, a reversal message will be used for recovery from a disruption.

Processing rules associated with disruptions are to be specified, where appropriate. For example, where a transaction response reaches the terminal after timeout, processing rules are to be specified. In this case the system designer may choose to hold the transaction in the terminal and send it at the beginning of the next transaction. Or, the designer may choose to initiate the reversal immediately upon receipt of the late response.

Exhibit 3-7

TRANSACTION PROCESSING FLOW



Preparers are expected to specify the processing rules and message flows for online processing, including the following areas:

- message flow through processing components;
- processing rules for processing disruptions;
- rules associated with reversal processing; and
- related processing codes.

3.7 BACK-UP TRANSACTION PROCESSING

Overview

Immediate electronic processing of all purchase transactions at POS terminals is not always possible. Factors preventing electronic processing include:

- damage to EBT card's magnetic stripe;
- terminal malfunction;
- loss of telecommunications network; and
- failure of central computer.

When transactions in a commercial EFT network cannot be electronically processed, the cardholder must usually resort to another form of payment (e.g., cash or check). Because food stamp recipients may not have other forms of payment available, EBT regulations require that the system operator offer alternative back-up methods to authorize EBT purchases when electronic processing is not available. These methods also can be used for merchants who do not have immediate access to POS devices (e.g., food delivery services).

Back-up transactions are sometimes referred to as "manual" or "offline" transactions. Due to ambiguities in these other two terms, this Guidelines document uses the "back-up" terminology. Although back-up transactions may require some manual entry of data or preparation of paper documents, this is not always the case. Furthermore, the term "offline" is also used to identify EBT systems that use a different transaction authorization process than online systems for all transactions. In the Dayton, Ohio, offline EBT demonstration, for instance, program benefit information is carried in the memory chip of a "smart" card, and communication between the card and the POS terminal is used to authorize a transaction.

Within an online EBT system, back-up transactions are completed using reduced authorization criteria. Because these transactions lack positive verification of the cardholder and/or the account balance, the transaction carries increased risk of an overdraft occurring. Liability for such overdrafts will be borne by the State agency, although such liability may be passed on to the system operator or the merchant within negotiated contracts.

Back-up transaction capabilities are needed only at POS terminals, because federal regulations requiring back-up capability pertain only to food stamp transactions. For some systems, back-up transactions may be electronically held by a terminal and released for processing when availability is restored. This is sometimes called "store and forward." Alternatively, back-up transactions may be submitted using a manual, paper-based process. Any number of options could be available, depending on system capabilities. Specific implementations of processing options should be described in the design plan, and could overlap with explanations provided in other sections, such as those on terminals or online processing. Appropriate levels of overlapping information can clarify functionality issues.

When an overdraft occurs as a result of a back-up transaction, federal regulations permit the re-presentation of the transaction during subsequent months, at the State agency's option. Re-presentation is permitted only if a failure of the system's computer or telecommunication lines created the situation requiring a back-up transaction. With re-presentation, up to \$50 of the client's next monthly allotment may be deducted to pay down the overdraft amount. During subsequent months, the maximum deduction from the monthly allotment is the greater of \$10 or 10 percent of the allotment amount. Clients may be asked to voluntarily repay the overdraft at a faster rate.

The online transaction set is usually the basis for the back-up transaction. System processing capabilities will dictate transaction set availability. Usually, only purchases and refunds would be available for back-up transactions; voids and reversals are unlikely to be available.

Back-up processing descriptions are expected in the design plan for the following three functional areas:

- transaction set;
- processing rules; and
- processing flows.

In addition, the design plan should describe how re-presented transactions will be processed. Each major area is described in detail in the remainder of this section.

Reviewers should expect preparers to provide appropriate background information on the back-up processing system. The system design should focus attention on processing in the following areas:

- transaction set and associated processing codes, particularly similarities and differences associated with online processing;
- message flows to complete transaction processing activities. Attention should be given to submission and re-presentation rules for back-up transactions; and
- descriptions of processing rules pertinent to back-up and re-presentation processing.

Back-up Transaction Set

The transaction set supported by back-up processing should be defined here. Preparers should describe back-up processing activities for all card types to provide the context for EBT processing. For instance, back-up credit card processing (if provided by the system) should be described in sufficient detail to place EBT back-up processing in perspective to system processing capabilities. A similar requirement was described for online processing.

Back-up transactions may be processed in any one of several different ways. Some systems may be capable of storing transactions in terminal memory. Stored transactions would be forwarded to the system upon system restoration. Other systems may provide paper document entry, while still others may provide authorization by way of an audio response unit (ARU) with paper document followup. Thus, back-up transaction processing may be entirely electronic (e.g., the store and forward approach), part electronic and part manual (e.g., ARU authorization with paper document followup), or entirely manual.

The System Design Plan needs to provide a detailed description of how back-up transactions will be handled. Preparers of the design plan are expected to provide detail for the following topics:

- transactions supported;
- rules for transaction initiation;
- benefit program policy processing restrictions; and
- system processing capabilities.

Back-up Transaction Processing Rules

Regardless of approach, capture and submission of back-up transactions require satisfactory controls. Back-up processing rules must be thoroughly examined for the use of appropriate controls, as inadequate controls could lead to fraudulent system access.

Preparers are expected to provide information on the following topics:

- timing requirements for submission;
- manual forms with usage instructions;
- required levels of authorization;
- electronic authorization requirements;
- system processing and checkpoints;
- disposition processing; and
- resubmission of rejected transactions.

Preparers should focus on manual and automated controls used in each area.

Back-up Transaction Processing Flows

Back-up processing flows are to be documented in a manner similar to online processing flows.

Back-up transaction processing fits in the system design only as a way to overcome occasional outages. If controls are weak or are not properly implemented, back-up processing is likely to be abused. Clear rules and processing flows are expected to govern the processing of back-up transactions.

Preparers should provide at least the following processing information:

- step-by-step flows through the manual process;
- electronic interactions; and
- any system authorizations required.

Specifically, these flows should provide sufficient detail on the points where liability issues occur.

Re-presentation Processing

If the State agency opts for a re-presentation capability, the design plan needs to thoroughly document how re-presentation will be accomplished. The description should include:

- how the client's account will be debited in subsequent months;
- how the merchant's account will be credited;
- how re-presentation activity will be reported on system reports.

All processing rules, codes and controls for re-presentation activity should be described. Re-presentation processing can be complex, given that it may occur over several months and must conform to federal regulations. Due to this complexity, an extended discussion of re-presentation processing may be needed in the System Design Plan.

3.8 AUDIO RESPONSE UNIT (ARU)

Overview

Audio Response Unit (ARU), also called Voice Response Unit (VRU), technology has expanded rapidly. Recently, inexpensive personal computers (PCs) and telecommunications components designed for ARU processing have been used to replace expensive stand-alone system components. Standard IBM or IBM-compatible PCs have been pressed into service off the shelf. Telephone interface components, created using PC modem technology have become less expensive while increasing in functionality and capability. Expanding the functions of artificial intelligence capabilities should further expand the technology frontiers of ARUs.

Audio response units have traditionally been used within EBT systems to provide balance inquiry and history information to program recipients and participating merchants. As new systems are designed and implemented, the ARU will continue to perform this role. Expansion of ARU usage and functionality should be expected in future projects. Employing ARU functions to provide authorization for small merchants could potentially reduce the scale of terminal installation activities. One pilot site uses ARU technology to authorize back-up transactions, reducing merchant liability and lessening the prospect of re-presentations.

Usually, the ARU's transaction set is limited. Balance inquiry from ARUs, frequently the only transaction available, uses the same application functionality as balance inquiry from POS terminals or ATMs. Occasionally, history inquiry transactions are provided for both recipients and merchants. Program recipients may use the history inquiry feature as a substitute for an account statement; merchants may use it to support terminal or store balancing activities.

As noted earlier, back-up processing may take advantage of ARU technical capabilities by providing authorizations during outages. Authorization of transactions would be limited in scope,

augmenting back-up processing and providing merchants with the opportunity to guarantee funds. Explanations of specific processing performed using an ARU could overlap descriptions provided in the previous section, Back-up Transaction Processing. Internal system processing functions, coupled with ARU interactions, are expected to describe the full complement of ARU processing capabilities. Processing rules for available transactions should be provided.

ARU processing flows are usually very simple. Technically, an ARU could perform the full complement of POS terminal functionality, but controls over access and caller recognition are currently poor, so ARUs are functionally limited to providing balance and history information and authorizations with paper followup. Processing flows are expected to be modified versions of the POS balance inquiry. Authorization flows are likely to be similar to back-up processing flows.

For EBT processing, ARU processing support should be included in the System Design Plan. ARU processing considerations are expected in the following three areas:

- transaction set;
- processing rules; and
- processing flows.

Detailed review considerations for each area are described in the remainder of this section.

Reviewers should expect preparers to provide appropriate background information on ARU processing to ensure proper processing perspective. The system design should focus attention on processing in the following areas:

- transaction set and associated codes, particularly similarities with back-up processing;
- explanations of ARU processing rules; and
- message flows and associated processing flows required to complete transaction activities.

ARU Transaction Set

ARU usage may be new for system processing; EBT may be its first application on the operator's processing system. Some systems, however, may use existing ARU functionality to perform EBT processing. Preparers should describe ARU usage for all card types to provide the setting for EBT processing. For instance, some systems might use ARUs to support processing for other cards, such as credit cards or ATM cards. Where existing ARU functionality will be augmented to include EBT processing, new processing should be explained in light of existing processing.

Preparers are expected to provide detail in the system design supporting ARU functionality in the following areas:

- transactions supported;
- voice messages used to support each transaction type;
- rules for transaction initiation;
- benefit program policy processing restrictions; and
- system processing capabilities.

Other topics may be added, as required, to provide completeness within this section.

ARU Processing Rules

A design plan's description of the ARU transaction set will provide some information on ARU processing rules. A more detailed discussion that describes access controls and other topics, however, is needed. For each type of ARU transaction supported by the system (e.g., balance inquiry, history inquiry, authorization for a back-up transaction), the following information should be provided:

- system processing and controls;
- connectivity and recognition of caller;
- authorization requirements, where necessary;
- audit trails of system access; and
- voice messages used when errors occur.

Preparers should relate system processing and transaction type to voice messages presented when errors occur. For instance, when the ARU user presses the wrong key, the message asking the user to try another key should be documented. Clarity in verbal processing of user errors is a key review point for ARUs. Poor verbal messages could confuse users. If available, preparers should also describe ARU processing for non-English speaking clients, including how the system identifies such clients.

ARU Processing Flows

ARU processing flows are to be documented in a manner similar to those for online and back-up processing. ARU flows will be a mixture of manual (dialing the phone) and electronic (connection and

system processing) steps. Structurally, the plan's approach should be based on the structure of the previous two sections.

Preparers should provide, at least, the following processing information:

- step-by-step flows;
- manual and verbal interactions; and
- any system authorizations required.

Specifically, these flows should provide sufficient detail on points where confusion may occur. Also, if ARU support is provided for back-up transaction processing, appropriate references to back-up flows should be made where liability issues are at stake.

3.9 SETTLEMENT PROCESSING

Overview

On the surface, settlement processing appears to be straightforward. At a POS terminal or an ATM, the card is swiped or inserted, required actions are performed, and the transaction is completed with the receipt of goods and services or cash. The card user's account is debited and the merchant's account is credited.

Actually, the settlement process, behind the scene, is not so simple. What the cardholder and the merchant see is only the end of a complex transfer. In most cases the transaction may pass through a number of points, all of which settle the transaction as it is transferred. Settlement processing might be called "real time accounting," as each transaction is debited and credited through each transfer point.

In an ATM network owned and operated by a financial institution whose cardholders are its only users, settlement is simple. Sharing ATMs with cardholders from other financial institutions complicates an otherwise simple settlement process. In a shared ATM and POS network accessed by cardholders from several entities, the settlement process becomes highly complex. Regardless of the number of participants, each related participant-pair settles each transaction processed between them.

Settlement is a two-step process similar to double entry accounting. Reconciling and reimbursing the net amount of transaction activity for the business day defines the settlement process. Reconciliation starts settlement activities. Two participants reconcile against each other by balancing their separate records of transaction counts and amounts. A debit and credit is applied by each participant for the net settlement amount. Out-of-balance conditions are identified and researched at a later time.

Reimbursement or funding of balancing activities completes the settlement process and occurs when funds are transferred between accounts. In most cases reimbursement follows one or more days after balancing activities finish.

Transaction activity is defined as the number of transactions processed by a given entity, such as an ATM or POS terminal, during a pre-specified period. The pre-specified period is referred to as a business day. During the business week a business day is roughly 24 hours in length; the exact length depends upon the time cutoff is issued. Business conditions vary on a daily basis, causing issuance of business day cutoff to vary. Nonetheless, all transactions processed between two cutoffs represent the processing activity for the business day.

Depending on settlement parameters, a weekend or holiday business day varies from 24 to 72 hours (Friday to Monday). Some processors issue cutoff every calendar day of the year, while others issue cutoff only on business days. For the latter, weekends and holidays represent rather long business days.

The system's cutoff time may not be the same as merchant cutoff times. Processing of transaction activity in terms of varying cutoff times has implications for the transfer of funds, maintenance of history information, and in performance and capacity areas. Descriptions of cutoff times and post-cutoff processing are expected to focus on its implications for participants, especially the time before merchants have access to funds.

Net settlement is the difference between the sum of debits and credits for two or more processing participants. On the day transactions have been processed, balancing activities occur between the participants. Summary totals are compared for each participant. Frequently, there are no differences in the balancing activity and processing proceeds. Acquiring participants (i.e., merchants and ATM owners) will usually receive funds from the transfer- or card-issuing participant (e.g., a third-party processor or the system operator) at a later time.

Out-of-balance conditions require research of individual debit and credit transactions. Processing continues between the participants. Funds for the out-of-balance day are transferred based on pre-established rules. Upon completing the reconciliation process, corrections are made to previously transferred funds, as required. System administrative capabilities are often used for completing the reconciliation process. Preparers are expected to explain their reconciliation capabilities in the system design.

Increasing the number of network participants increases the number of settlement endpoints. Merchants, cardholders, financial institutions, third-party processors, and switches are just a few of many

"players" in the EFT/EBT processing. Combinations of these processors increase the number of settlement endpoints, and hence settlement complexity.

Complexity of settlement processing is expected to increase dramatically as EBT processing uses, or "piggybacks" on, existing EFT capabilities to deliver benefits. Existing balancing procedures are expanded to accommodate another layer of settlement processing. System operators adding EBT to existing EFT services will be expanding their settlement capabilities.

Each benefit distribution channel will be regulated by a specific settlement type. Settlement types relate delivery vehicles (e.g. POS terminal, ATM) with a flow of funds. Most benefit programs' flow of funds is similar across delivery vehicles. For example, an AFDC withdrawal at a POS terminal or at an ATM represents two settlement types with related flows of funds. Likewise, food stamps at a POS terminal is a similar, but separate, settlement type with a different flow of funds. Each settlement type available from a system is expected to be defined and associated with its flow of funds. Preparers may wish to present this information in matrix form with accompanying text. In all cases the preparers should describe the flow of funds using an accounting perspective.

Business day cutover varies by delivery vehicle and will affect the deposit of funds. A merchant may be given the capability to independently change its business day, which directly affects that merchant's deposit totals. Under this scenario, a merchant's deposit will be different from that of the switch. The authorization processor settling the merchant's POS terminal may have a different business day, affecting the processor and merchant's business day deposit. Business day cutover, affecting flow of funds activities, should be described in detail.

Reconciliation and reimbursement processing, as noted earlier, define settlement activities. Reconciliation processing begins with balancing between system participants. Balancing between endpoints, such as POS terminal-to-switch and switch-to-authorization processor, should be described in detail. Out-of-balance conditions and related manual activities should be described to ensure that flow of funds integrity is maintained. Reimbursement will be defined in terms of a settlement type's flow of funds processing.

Reporting for settlement activities is expected to be extensive. System operators will provide a variety of reports based upon various views of balancing and flows of funds activities. Balancing reports could be expected by terminal, by store, by switch, by third-party processor, or by client. Most reports will be used by the system operator as system activities are monitored. Others may need to be sent to third-party processors or merchants' corporate headquarters. Summary reports will need to be sent to the State and federal agencies.

For EBT processing, settlement processing represents a significant and complex component of the system design. Characteristics unique to their processing environment will influence the manner in which settlement processing is performed. Settlement processing considerations are expected within the system design for the following areas:

- settlement types and flow of funds;
- participant cutover and impacts on flow of funds;
- balancing, reconciliation, and funds transfer; and
- reporting.

Each major area is described in detail in the remainder of this section.

The reviewer should expect the design plan to provide appropriate descriptions of processing functions and of reporting data elements. In the review of each subsection, reviewers should ensure that relevant points have been addressed. Key review points are as follows:

- description of settlement types;
- description and diagrams of flow of funds;
- explanations of flow of funds relative to the system's overall processing activities;
- narratives and diagrams of participant cutover processing activities;

- explanations of balancing at each set of endpoints;
- descriptions of reconciliation in out-of-balance conditions;
- explanations of system administrative capabilities dedicated to reconciling out-of-balance condition;
- descriptions of transaction activity funding flows; and
- details on reports, including each report field and its source or derivation.

Settlement Types and Flow of Funds

Settlement types specifies the method of balancing individual program benefits at participating terminal types in the EBT system. POS terminals may be used for redemption of benefits in several programs. ATMs may be used for redemption of cash program benefits. A settlement type is expected for each program benefit redeemable at a participant's terminal.

For each settlement type, the flow of funds is expected to vary slightly by program. Regardless of differences, flow of funds is expected to be defined for each settlement type. Each participant's accounting of each transaction type should be specified. Funding activities (e.g., letter of credit or transfers to the regional Federal Reserve Bank) are to be included in the flow.

Preparers are expected to provide detailed information in this section on the settlement types supported by their systems. Flow of funds for each settlement type is to be specified in detail. Redundancies are expected within this section, as some settlement types could overlap.

Reviewers should expect preparers to supply appropriate, straightforward, and easily understood information in the following areas:

- terminal types;
- program benefits supported;
- accounting level information on transfer of transactions between participants; and
- funding activities supporting each settlement type.

Exhibit 3-8 shows the flow of reconciliation and settlement activities for an EBT system's food stamp transactions. Preparers should provide similar exhibits for each settlement type. The exhibits should provide detail on the actual participants in the settlement process (e.g., which FNS regional office is involved, name of concentrator bank).

Participant Cutover and Impact on Flow of Funds

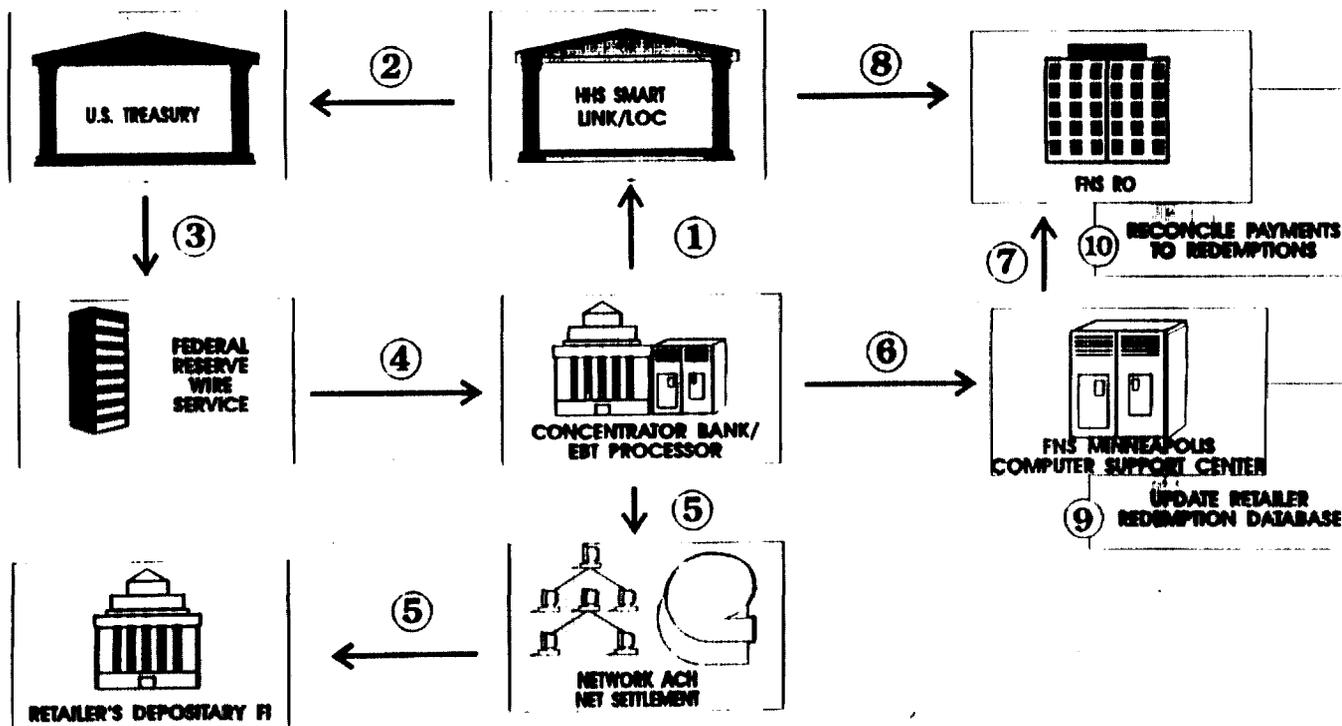
Terminals and transfer points within the EBT system are expected to have unique cutover times. Cutover of business day processing is the technique of ending processing activity for a pre-defined time period. In some environments, the cutover process is known as cutoff.

Cutover times will affect flow of funds processing. Cutover times could add an additional day to the transfer of funds to the merchant should those times be later than ACH processing times. In some cases, cutover times could be early in the day, causing the bulk of the merchant's processing activity to be settled the following business day. Such delays may have little impact on system processing, but have major significance to merchants or terminal owners.

Overlaps of cutover times are expected to create a category of transaction called "holdovers," or "suspended transactions." In multi-cutover environments, holdovers are very common. Holdovers are those transactions that occur after one point's cutover and before another point's cutover. For example,

Exhibit 3-8

FOOD STAMP SETTLEMENT AND RECONCILIATION FLOWS



- | | | | |
|--------------------------------|---|--|------------------------------|
| 1 REQUEST REIMBURSEMENT | 4 TRANSMIT FEDWIRE PAYMENT | 7 TRANSMIT SUMMARY DATA | 10 RECONCILE PAYMENTS |
| 2 TRANSMIT SF 1166 | 5 CREDIT RETAILER BANK | 8 TRANSMIT CONFIRMATION OF PAYEMENT | |
| 3 AUTHORIZE PAYMENT | 6 TRANSMIT RETAILER TRANSACTION DATA | 9 UPDATE DATABASE | |

an ATM cutover at 11 a.m. and an ATM switch cutover at 2 p.m. means the ATM's transactions from 11 a.m to 2 p.m. are held over by the ATM switch for inclusion in the ATM's total for the next business day. In other words, the ATM and ATM switch business days overlap for 3 hours daily.

Cutover times for all transfer points should be reviewed relative to each other. A review of all processing cutovers compared with the flow of funds will provide the information necessary to determine which areas in the EBT system are affected. Cutovers and impacts on the flow of funds should be noted in the system design for:

- merchants;
- terminal types,
- transfer points, and
- fund transfers.

Redundancies are expected within this section as cutover for some participants could overlap.

Reviewers should expect preparers to supply information on cutover and flow of funds in the following areas:

- transfer points;
- timing between transfer points;
- accounting level information on transaction activity holdovers resulting from cutover time conflicts; and
- funding activity impacts from each cutover time.

Exhibit 3-9, taken from the TransFirst Ramsey County EBT Settlement Guide (page 2.21), illustrates cutover times and holdover activity. Holdover activity is identified as "Suspense." Preparers should provide this type of information in their explanations.

Balancing, Reconciliation and Funds Transfer

Balancing between components occurs where two points send transactions to each other and provide a daily accounting. Daily balancing occurs shortly after cutover or cutoff has occurred. Usually the merchant or ATM owner processes enough activity to be a net receiver of funds, although there may be rare situations where the opposite is true (e.g., when more refunds than purchase transactions are processed). Balancing should consider both eventualities.

Exhibit 3-9

SETTLEMENT TYPES AND HOLDOVER EXAMPLE

HOW THE BUSINESS DAY IS SETTLED



Any time during the day.
Example: 3:00 PM CT
Business Day is 3:00 PM to 3:00 PM
Suspense: 1 Hour = 3:00 to 4:00 PM CT



STORE BUSINESS DAY SETTLEMENT



ALWAYS 4:00 PM CT
Example: 4:00 PM CT
Business Day is 4:00 PM to 4:00 PM
Suspense: None



POS BUSINESS DAY SETTLEMENT



When Network Uses New Dating
Example: 6:03 PM CT
Business Day is 6:03 PM to 6:03 PM CT
Suspense: 5 Hours and 12 Minutes
Time between ATM and TransFirst Cutover.



ATM NETWORK BUSINESS DAY SETTLEMENT



After ATM Network Settlements
Usually between 10 and 11:30 PM CT
Example: 11:15 PM CT
Business Day is 11:15 PM to 11:15 PM CT
Suspense: None



TRANSFIRST BUSINESS DAY SETTLEMENT

EXHIBIT 2.5

Summary of activity is the first point of balancing. Rules associated with calculating the balance are expected to be provided by the system operator. For instance, all transactions, by type, are summarized and then totaled. Balancing or settlement transactions are to be specified along with the rules for calculation.

Different conditions can lead to out-of-balance situations needing reconciliation. For instance, system processing of a re-presentation may cause system and merchant totals to be out of balance. Processing errors will also cover out-of-balance conditions. The design plan should specify -- to the extent possible -- conditions that might lead to out-of-balance situations.

Rules for transfer of funds when out-of-balance situations occur are to be specified. For example, one transfer point's totals may be used for determining the day's transfer of funds. The reconciliation process will resolve any differences using administrative procedures.

Balancing, reconciliation and funds transfer processing activities should be noted in the system design for:

- merchants;
- transfer points or switches; and
- funding organizations.

Preparers may identify other settlement entities depending upon system configuration. For instance, some systems may support third-party processors as settlement entities.

Reviewers should expect preparers to supply information in the following areas:

- balancing rules;
- conditions leading to out-of-balance situations;
- reconciliation rules (i.e., how out-of-balance situations are resolved); and
- funding organization transfer activities and rules.

Settlement Reporting

Settlement reporting usually consists of a standard set of reports covering transactions processed during a business day. Perhaps the least reviewed but most needed report is the daily activity report, a record of all transaction activity processed on the system. When an out-of-balance condition occurs, this report is used extensively for reconciliation purposes.

Different reports often display the same information in different ways to meet management information requirements. For example, the daily activity report may be reformatted into the terminal activity report, a sorting of daily activity by terminal origination.

Preparers should provide examples of the system's settlement reports. Reports should be provided in at least the following categories:

- daily activity;
- terminal activity;
- benefit program activity;
- cutover activity;
- holdover activity;
- balancing;
- administrative processing activity;
- funding activity; and
- funds transferred activity.

Other reports may be provided by the system. These reports should be reviewed in light of the settlement types and system processing provided.

Reviewers should expect preparers to provide the following detailed information on their settlement reports:

- description of purpose and function of each report (including how reports are to be used in system reconciliation process);
- definition of each report element, its source or derivation;
- explanation of the relationship between reports; and
- description of report production timing.

Settlement reporting is particularly critical to validating processing activity on the system. Reviewers should ensure that these areas have received appropriate consideration within the system design.

3.10 REPORTING

Overview

Reporting provides detail on every aspect of EBT system processing activities, including -- as described above -- system settlement. System processing activities and administrative information are the main topics of reporting.

Existing EFT systems -- processing ATM, POS, and other transactions -- have established reporting capabilities. EBT processing activities are apt to be fitted into existing EFT systems reports, and EBT information must be extracted from those reports unless special reporting capabilities are added to the EFT system. Users may have to learn their way around the EFT reports before they can segregate EBT information for analysis purposes.

Standalone EBT systems are likely to provide reports specifically tailored to EBT processing requirements. Where separate processing reports are available, descriptions and usage of reports may be clearer than for those provided in a combined system.

The remainder of this section divides reporting functions along user lines. Each group's likely requirements are summarized separately. However, each group's requirements are prone to overlap. Preparers may structure reporting differently in the System Design Plan than is described here. Each set of requirements, regardless of presentation, should be addressed in this section of the system design.

Five major reporting areas are expected to be covered in the reporting section of the system design. More reporting areas may be covered by preparers, particularly where existing systems are being expanded to accommodate EBT processing. The reporting areas to be addressed are:

- FNS requirements;
- MIS requirements;
- financial requirements (i.e., those required for system settlement);
- processing requirements; and
- administrative requirements.

Each set of reporting requirements will be reviewed in detail in the remainder of this section.

Reviewers should expect preparers to describe reports, their function, and data elements required. In reviewing each subsection, reviewers should ensure that relevant points have been addressed. Key review points for this section are:

- explanation of each report's use and purpose;
- description of each report's functions;
- identification of report data elements; and
- summarization of calculations and algorithms.

FNS Requirements

FNS' requirements for system reports include performance-related reports, reports supporting compliance investigations, and reports on program costs and billing.

For performance-related reports, the system needs to provide information on: how it is operating relative to its performance standards; the incidence, type and cause of system problems; and utilization patterns (e.g., transaction activity such as purchases, refunds, withdrawals and balance inquiries, by type of input device). Performance areas to be monitored and reported on include:

- response times at the checkout counter;
- processing time and timeliness of batch jobs;
- system accessibility and reliability; and
- maintenance of accurate benefit accounts.

Key measures for these four areas should be addressed in the system design.

For compliance investigations, the system needs to be able to provide, on a requested basis, reports detailing transaction data by individual merchants or households.

Program costs and billing reporting requirements revolve around periodic operations costs and the system operator's billing for processing activity. Reports will be required providing details on system processing characteristics such as the number of financial transactions processed, average amount per transaction, and segregation of denials by type. Billing information will likely be reported based on the number of accounts, the number of transactions processed, transaction response time and other information. Separate information for online and back-up transactions processed need to be included in these reports.

FNS' required information may be captured either manually, from system reports used for other purposes, or electronically, from specially tailored system reports. Reports required to manually secure

required information should be identified, along with associated procedures, in appropriate sections of the system design.

System-specific reports should be addressed in this section. Preparers are expected to supply report shells, together with the following information:

- report name and functions;
- data elements used on each report;
- algorithms and calculations on each report;
- frequency of report generation; and
- report format (e.g., hard copy, microfilm, file transfer, etc.).

Thorough explanations should be provided. These reports are expected to be used by local, State, regional FNS, and federal FNS groups for monitoring EBT activities. Clarity and ease of use should be highlighted here.

MIS Requirements

Management information system (MIS) requirements direct attention to various processing characteristics of the system. Usually, processing characteristics provide system management with details that highlight **changes** in system processing. With this type of information, system operators can monitor trends. Early detection of changes in these trends can become the basis for identifying larger trends or fraudulent activity.

Information expected in MIS reports includes:

- the number of transactions being denied, reasons for denials, and when (i.e., day of month, time of day) such transactions are occurring;
- for all transaction activity, when the transactions are occurring and peak daily and hourly volumes;
- internal processing characteristics (e.g., length of transaction queues waiting processing, system usage relative to system processing capacity);
- transaction volumes on telecommunications network(s) relative to capacity;
- client usage attributes (e.g., average number of transactions per client per month); and

- location usage attributes (e.g., ATM versus POS terminal transactions, identification of specific ATMs or merchants generating large volumes of transactions).

System-specific reports should be addressed in this section. Preparers are expected to supply report shells, together with the following information:

- report name and functions;
- data elements used on each report;
- algorithms and calculations on each report;
- frequency of report generation; and
- report format (e.g., hard copy, microfilm, file transfer, etc.).

Thorough explanations are expected. Managing EBT processing and spotting trends will be an important method for meeting changing client needs and for identifying questionable usage patterns.

Financial Requirements

Financial requirements cover activities surrounding system reconciliation and flow of funds. These requirements were discussed in the previous section, Settlement Processing, and are not repeated here. Preparers may choose where in their System Design Plan this information best fits, but they should provide cross-references to the supplied information where needed to assist document review.

Processing Requirements

Of the five areas of reporting requirements, system processing has the greatest scope. POS, ATM, and other terminal transaction activity is dealt with in this section. Reports are expected to cover the following categories:

- POS activity;
- ATM activity;
- all activity (daily, weekly, monthly);
- benefit update (refresh activity);
- merchant activity;
- client activity;

- back-up transaction activity; and
- utilization activity.

All EBT processing activity is recapitulated through these reports. These reports represent the heart of reporting in the EBT systems. Every transaction processed, during a business period, is shown on the reports. The "all activity" report includes all transaction processing activity in the system. All other reports are a reformat or a subset of the "all activity" report.

Processing-specific reports are addressed in this section. Preparers are expected to supply report shells and the following information:

- explanation of report name and functions;
- description of data elements used on each report;
- calculations used on each report;
- frequency of report generation; and
- report format (e.g., hard copy, microfilm, file transfer, etc.).

Thorough explanations are expected within the section. Transaction processing activity is represented by these reports and as such, the reports are repeatedly used for audit trails and to correct errors in processing activity.

Administrative Requirements

Administrative reporting provides a view of behind-the-scenes system processing. These reports contain details surrounding system support capabilities, such as system access denial activity or card statistics. System operators will supply administrative reports based on the capabilities of their system.

Basic administrative subjects covered by reports will include:

- access security (e.g., failed attempts to log onto the system or to initiate restricted workstation functions, by location and – where possible – by user);
- database access and updates, by location and user; and
- administrative activity, by function (e.g., new accounts established; number of cards issued, by reason; number of PINS changed; number of requests for transaction histories).

These reports need to be monitored by system operators and State agency personnel to identify and verify proper usage of administrative terminal functions.

Reviewers should expect preparers to provide report shells and the following detailed information on their administrative reports:

- explanation of report name and functions;
- description of data elements used on each report;
- calculations used on each report;
- frequency of report generation; and
- report format (e.g., hard copy, microfilm, file transfer, etc.).

3.11 ADMINISTRATIVE PROCESSING

Overview

Administrative processing capabilities provide access to several or all system databases. Client and merchant account maintenance and emergency changes to benefit amounts are two typical administrative processing activities supported by EBT systems. Control files, such as access security and control over administrative support functions, are also included here. Immediate access to system files improves staff productivity and allows immediate correction of errors in system information or processing. Where possible, all system information should be accessible via administrative processing screens, with appropriate controls over who has access. Overly stringent access controls, however, can be counterproductive. Limited access to file information can result in simple questions requiring significant research before an answer can be obtained.

Administrative processing also encompasses system support capabilities required for smooth operation of the system. For instance, system setup information, security and access control, and system performance statistics may be available in the administrative subsystem.

Usually, administrative processing sections focus on online screen access. However, detailed reports are also available for use in managing the administrative processing. Reports supporting administrative processing were described in Section 3.10, Reporting. Preparers may choose to review administrative reports in both sections, dividing the discussion so as to provide a complete view of reporting and administrative processing while avoiding unnecessary repetition.

Administrative processing is usually available through workstation screens, which are used by support staff in addressing questions from many sources. Creating useful clerical procedures requires in-depth definitions and descriptions of the workstation screen subsystem. Preparers need to identify all screens and their associated functions. Available screens will vary by system, and workstation screen subsystems will vary from very simple to very sophisticated. Clarity and completeness in descriptions and definitions are important in this section.

Administrative Processing Areas

Administrative processing includes, at a minimum, access to the following information:

- participant files, such as merchant and client files;
- control files, such as access security;
- history files, such as client and merchant transaction history;
- processing files, such as daily transaction information; and
- settlement files, such as merchant settlement totals.

This list is by no means complete. Additional areas might include allotment files, status of back-up transaction reconciliation, and system performance. Preparers need to provide descriptions of these capabilities in this section of their system design.

Workstation Screens

Preparers should provide the following information on workstation screens:

- workstation screen subsystem overview;
- screen to screen flow in the subsystem;
- description of each workstation screen including:
 - an illustration of each workstation screen;
 - a detailed accounting of each screen's features and functions;
 - identification of each function key and its usage;
 - a description of screen data elements and their source;
 - relation of edit criteria to each data element; and
 - mapping of data elements to features and functions.

Vendor-supplied screens from pilot projects have been provided earlier as examples. See Exhibits 3-4 and 3-5 on pages 37 and 42 for examples of merchant and client history information screens, respectively.

Chapter 4

HARDWARE COMPONENTS

EBT systems require a variety of different hardware components to support processing activities. Preparers of the System Design Plan should identify all necessary hardware components within the system and describe the relationships of these components to each other, based on their processing functions and use within the system.

Hardware components used within EBT systems commonly include:

- POS terminals, with PIN-pads and printers;
- in-store controllers;
- ATMs;
- ARU devices;
- administrative terminals;
- telecommunications equipment;
- networks; and
- computer equipment.

This chapter provides preparers with guidelines for presenting information in the design plan about the system's hardware components. These guidelines are also the basis by which State and federal reviewers can assess the thoroughness and adequacy with which these topics are discussed.

The design plan should not include detailed specifications of individual hardware components (e.g., manufacturers' engineering specifications or industry reviews of hardware functionality and application). It is too easy for preparers to substitute such documentation for a thorough discussion of how the hardware will meet the specific needs of an EBT system application.

4.1 OVERVIEW

In a "piggyback" configuration, where the EBT system uses existing hardware for processing or is integrated with commercial EFT networks, an understanding of the overall processing configuration will be fundamental to understanding the EBT system. A description of all processing components should be used as the basis for introducing EBT-specific components.

Six sections have been specified in this chapter. The first is the overview; the second is the hardware diagram which pictorially identifies the relationship between components. The remainder of

the chapter focuses on the following four areas:

- 1) terminals:
 - ATMs,
 - POS devices,
 - Administrative terminals,
 - ARUs;
- 2) telecommunications networks:
 - lines,
 - protocols,
 - line speeds;
- 3) central site, or host, processing components;
- 4) cards and card-related equipment.

Preparers should include in this chapter a description of the hardware used for EBT purposes.

Each hardware component should have its:

- equipment identified;
- install-base size described;
- usage noted;
- functionality recognized;
- processing flows described;
- restrictions examined; and
- network processing requirements recounted.

Where a particular aspect of processing components has been noted elsewhere in the system design, preparers should either replicate or cross-reference the information. Reviewers should expect the descriptions of the system's hardware components to include the categories listed above.

4.2 HARDWARE DIAGRAM

Preparers should begin by including a diagram showing the system's hardware components and their relationship to each other. Exhibit 4-1 illustrates a typical hardware components diagram. Preparers' diagrams are expected to provide more detail, including such information as locations or service providers.

The hardware component diagrams presented in this section of the design plan should start at a general level to provide the relationship context of all components. The example provided here illustrates the most general level reasonably expected. Subsequent sections of the design plan's chapter, focusing on descriptions of individual components, will likely include diagrams providing further detail.

All major components described in this chapter should be included in the hardware diagram. The diagram should show terminals, telecommunications networks, computer processing components, and batch transmissions. At this level each should be briefly described to provide the structure for the detailed descriptions to be presented in subsequent sections.

4.3 TERMINALS

ATMs (automated teller machines), POS (point-of-sale) devices, balance-only terminals, administrative terminals, and ARUs (audio response units) are the terminals found in the typical EBT system. The number and types of terminals to be used should be described. For any ATM or commercial POS networks that will be integrated with the EBT system, the design plan should provide the name(s) of the network(s) and a general description of the area served by the network(s).

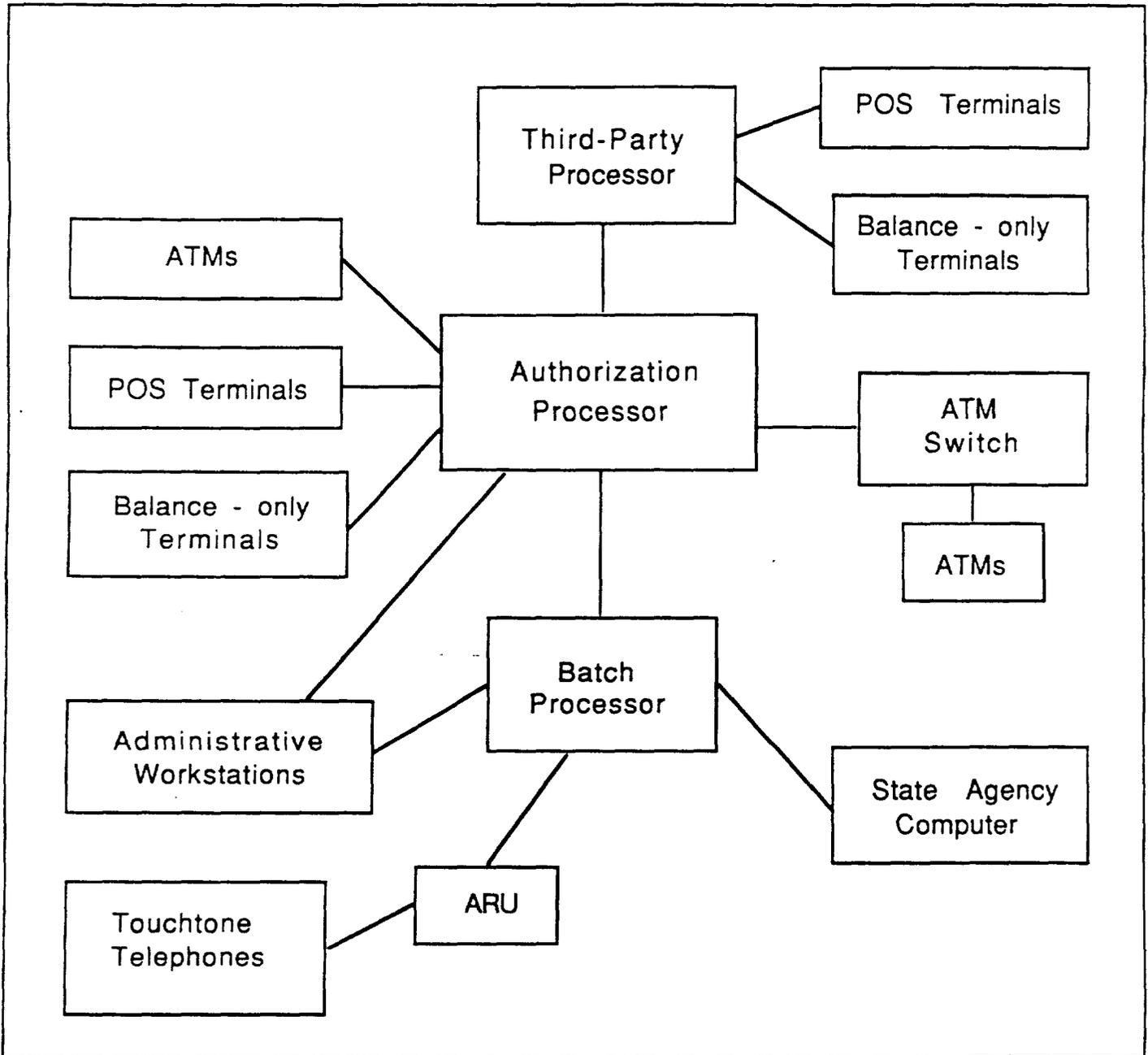
Terminal ownership and associated processing considerations should be addressed within this section. Due to the expected size of future EBT systems, system operators will be unlikely to own all the terminals used to support EBT activity. Terminal ownership is important because it affects who bears terminal installation costs, the presence of transaction fees, and terminal functionality (e.g., which transaction types can be initiated at which terminals).

Reviewers should expect the design plan to provide the following information on terminals:

- equipment type and model;
- type and model of in-store controllers;
- benefit program usage and limitations;
- functionality supported, by terminal type;

Exhibit 4-1

SYSTEM HARDWARE COMPONENTS



- pertinent processing flows;
- equipment restrictions;
- network processing support to be provided; and
- ownership.

Reviewers should find most of these discussions self-explanatory. Preparers may choose to refer to processing flows described in another section of the design plan. Equipment restrictions may include information such as no handicap support. Network processing support may be referenced elsewhere and should be so noted. Such support includes access to a customer hotline or help desk to assist retailers with terminal problems and the provision of terminal repair and maintenance services.

4.4 TELECOMMUNICATIONS NETWORKS

Telephone lines or telecommunications networks are required to support online EBT systems. Varying levels of sophistication are required in transmitting information across telephone lines. Telecommunications networks are likely to be a combination of private and public networks. (For example, in several pilots Compuserve, a national public telecommunications network, is used for delivery of transactions across the country to the host computer.) Use of public networks is to be specified here, as well as the structure of private network processing.

Reviewers should expect preparers to provide the following information on telecommunications network usage:

- which public and private networks are being used;
- which third-party processors are using which networks;
- telecommunications equipment being used (e.g., modems);
- telecommunications protocol(s) being used; and
- speed across the lines (i.e., baud rate).

This area of the design plan is not expected to be self-explanatory. Preparers should provide sufficient information about the structure of telecommunications networks to allow reviewers to understand the system's use of these networks. Preparers may wish to provide the more technical material in an appendix.

4.5 CENTRAL PROCESSING SYSTEM

At the heart of the EBT system is the central processing system. Central processing systems are composed of a variety of hardware components such as computers, disks, tapes, and connections to telecommunications networks and to administrative terminals. Each of these components should be described in some detail.

A sample central processing system diagram has been included as Exhibit 4-2 to provide reviewers with a reference point. This diagram was prepared during a review of the Pennsylvania Department of Public Welfare's Phase C EBT system, and it is a reasonable illustration of the system components and files available on the central processing system.¹ (Preparers' diagrams are expected to include more detail than is provided here.) Note that this diagram focuses on both the hardware and application software components. Preparers may choose to present hardware and application software relationships using separate diagrams.

Reviewers should expect the design plan to provide the following information on its central processing components:

- equipment type and model;
- number of each type and usage;
- location of equipment;
- relationships between processing components; and
- special equipment to be used.

The information listed will provide reviewers with a sufficient understanding of this section; they should not expect this section to provide significant detail. However, preparers should ensure that appropriate structural descriptions have been included so that reviewers can understand each component and its relationship to other components.

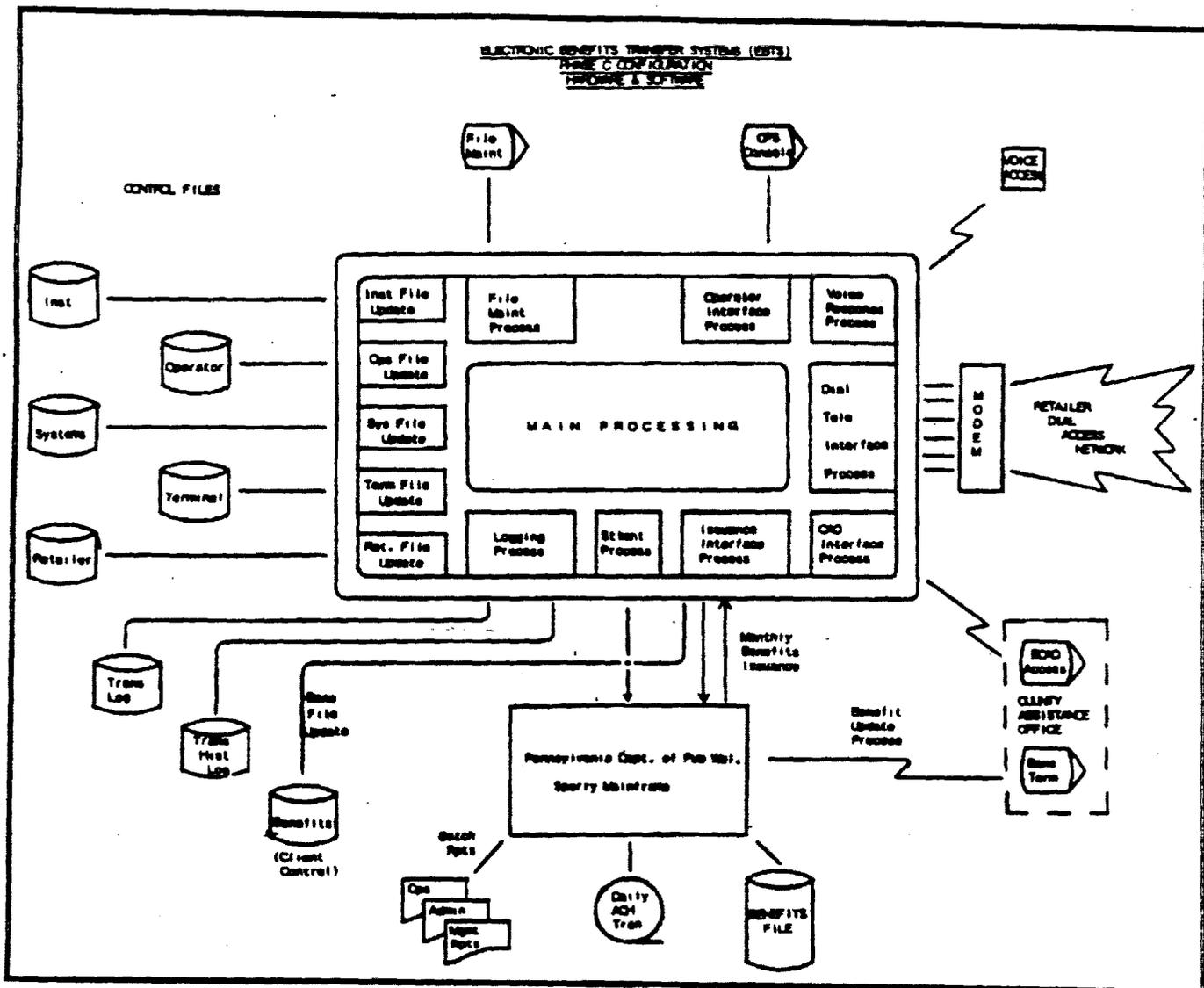
4.6 CARDS AND CARD-RELATED EQUIPMENT

The System Design Plan should describe the type of access card to be used and any equipment to be deployed to emboss or encode the cards. (Equipment used by manufacturers to fabricate, encode

¹ Charles R. King, Electronic Benefit Transfer System (EBTS) Phase C — Acceptance Test Plan, Cambridge, Massachusetts: Abt Associates Inc., December 9, 1986, page 8b.

Exhibit 4-2

CENTRAL PROCESSING SYSTEM
PDPW PROCESSING DIAGRAM



Used with permission

encoding and embossing will be performed by the State agency or by vendor personnel. For card encoding or embossing equipment, the design plan should describe:

- equipment type and model;
- number of each type and usage;
- location of equipment (e.g., local welfare offices or training and card issuance sites); and
- controls over access to card stock and card-related equipment.

If card-related equipment needs will differ during initial conversion of clients to EBT and subsequent issuance of cards to new clients or clients whose cards are lost, stolen or damaged, these differing needs and deployment actions need to be described.

Chapter 5

PERFORMANCE CRITERIA

Federal regulations for State EBT systems include standards for system operating performance.¹

These performance standards cover:

- (1) system processing speeds;
- (2) system availability and reliability; and
- (3) system ease of use.

The regulations also state that State agencies may require a performance bond or utilize other contractual clauses if deemed necessary to enforce system compliance with these standards.

System performance is perhaps the single most interesting aspect of EBT systems. Changes to system performance occur constantly. Some factors are under control of operators, some are not. All performance, good or bad, is ultimately the system operator's responsibility.

Anticipating system performance levels sometimes seems like "rocket science." While it is complex, knowledge of the various processing components, mixed with reasonable estimates of processing time through each component, will yield predicted response time. The intricacies of processing components and their discrete processing times, however, are not common knowledge. Gathering and compiling this information can be a long and tedious analytic process.

As the least understood system factor, system performance receives the most attention when it is poor. System processing functions, once certified as working correctly, work as expected unless changed. System performance, on the other hand, changes as processing characteristics within the system change. So performance may be more than acceptable one day, and unacceptable the next.

This chapter provides preparers of the System Design Plan with guidance on system performance information to be included in the design plan. For State and federal reviewers, it provides a framework for assessing the thoroughness of submitted plans.

¹ Part 274.12, Electronic Benefit Transfer Issuance System Approval Standards; Section (h), Performance and Technical Standards.

5.1 OVERVIEW

The most important components of system performance can be categorized under the headings of processing speed, availability and reliability, and system ease of use. Processing speed covers two online processing areas: system response time and transaction throughput. System availability and reliability refer to the system's ability to be accessible and to accurately process online transactions when needed. Ease of use refers to steps taken during system design to maximize the ability of households, retailers, and State agency personnel to correctly and easily use the system.

Many aspects of system performance can be objectively measured during acceptance testing. Because acceptance testing takes place over a relatively short time interval with a limited set of transactions, however, test measures of system availability and reliability may be misleading. Furthermore, system processing speed can be adversely affected by any number of problems encountered during system operations. Thus, the System Design Plan needs to address how system performance will be measured and monitored throughout the system's period of operations. This discussion should include the objective criteria that will be used for monitoring all aspects of system performance.

System operators should know enough about their system's processing characteristics to provide initial system performance information. Preparers should identify in the system design at least the following performance-related information:

- calculated system response time during average and peak processing periods;
- expected system throughput at projected peak volumes;
- system end-to-end availability;
- offline cutoffs and commitment times;
- steps taken to maximize system ease of use;
- measurement criteria for performance factors;
- performance monitoring capabilities and reporting; and
- observed system performance under production conditions, if available.

Four sections comprise the remainder of this chapter. They identify factors for reviewers to address in the examination of performance in the system design. These sections are:

- processing speed;
- availability and reliability;
- system ease of use; and
- system operations.

Preparers may choose to add sections to this chapter of their design plan to highlight the performance monitoring features of the EBT system. They are encouraged to do so.

5.2 SYSTEM PROCESSING SPEED

Processing speed performance parameters revolve around the system's quickness and the volume of transactions that it will process. In other words, processing speed issues include response time and throughput.

Response time is measured at the system's entry devices. Subjectively, terms like "why is it taking so long" or "boy, the system sure is slow" often summarize poor system response time. Objectively, the measurements of system response time are captured at the entry device and reported on a periodic basis.

Pure response time is defined as the interval between pressing "enter" or "send" and the receipt of the response at the input device. The system's response time is measured at input devices such as ATMs, POS devices, administrative terminals, and ARUs. Each input device may have different response time standards. The federal EBT regulations specify response time standards at POS devices. For devices using leased lines for communication with the central computer, the standard is that 98 percent of all EBT transactions shall be processed within 10 seconds or less and that all EBT transactions shall be processed within 15 seconds. For POS devices using dial-up lines, 95 percent of all transactions shall be processed within 15 seconds or less, and all transactions shall be processed within 20 seconds. These same standards apply whether the POS device communicates directly with the EBT system's computer or through a third-party processor.

The federal regulations do not address response times at other input devices (e.g., ATMs, ARUs or administrative terminals). The design plan should specify the response times that the system will support for such devices, with cross-references to any performance standards specified in the RFP or other documents.

Throughput is the accumulation of processing activity measured over a period of time, such as an hour. Depending upon orientation, throughput may be defined in terms of the average hour (monthly

volume divided by the month's hours of operation) or the peak hour (highest hourly volume for the month). Expected peak hour volumes define the processing rate that the system must be able to sustain over a significant period of time. Systems that cannot accommodate peak hour volumes are too small, and their processing capacity must be enlarged.

Reviewers should expect preparers to provide sufficient background information in the design plan to address processing speed performance issues. Materials that should be included are:

- an estimate of peak hour volume;
- the system's throughput capacity at the peak hour, and how that capacity was determined;
- estimated average and maximum response times at each type of input device, broken down by whether leased or dial-up lines are being used;
- planned methods for measuring and providing reports on system response times and throughput; and
- planned approaches for reducing response times or increasing throughput if system performance falls short of required standards.

With regard to estimated peak hour volumes, the design plan should explain how the peak volume was estimated. Peak volume will be affected by the number of households, by program, using the system; the degree to which dates for posting benefit allotments are concentrated or staggered; and the temporal patterns of benefit use once benefits are posted. The current EBT demonstrations are the best source of information on how benefit usage varies by device type (e.g., POS terminals or ATMs), time of day, and the number of days after benefit issuance.

5.3 AVAILABILITY AND RELIABILITY

System availability and reliability refer to a system's ability to process transactions electronically whenever they are initiated and to the accuracy with which these transactions are processed. Availability is a key component of system performance; when the system is not available purchase transactions must be handled with back-up procedures, and some transactions cannot be completed at all.

The Food Stamp Program's standards for system availability are that the EBT system's central computer must be available for electronic processing 99.9 percent of scheduled uptime, 24 hours per day, 7 days per week. The total system, including the central EBT computer and any network or intermediate processing facilities, must be available 98 percent of scheduled uptime, 24 hours per day, 7 days per

week. Periods of scheduled downtime for routine maintenance are not included in these standard measures; such downtime should be scheduled during non-peak hours.

Conceptually, system availability also refers to an input device being available for EBT transactions and the telecommunications network having enough capacity to handle the required communication flows. Although the standards for system performance do not explicitly address these last two aspects of system availability, the System Design Plan should provide information about the expected availability of input devices and the capacity of the telecommunications network. For the input devices, this information may be a discussion of users' experiences with similar installed equipment (e.g., how often POS devices need to be repaired). For the telecommunications network, the preparer should provide background calculations that estimate the relative frequency (during peak hours) of a transaction being unable to be communicated to the central computer because an open communications line is not available. It is recommended that no more than five percent of attempted calls during a peak hour encounter a busy signal.

In terms of processing accuracy, the federal regulations state that no more than two of every 10,000 EBT transactions shall be processed incorrectly, and that EBT transactions include electronic transactions at POS devices, manual transactions entered into the system, credits to household accounts, and funds transfers to retailer accounts. In other words, the system must accurately process at least 99.98 percent of all transactions.

The design plan should specify how system availability and reliability will be measured and monitored. Possible measurement approaches for system availability include using system trouble logs (reporting periods of downtime on the central computer), local staff reports of problems with administrative terminals, reports of telecommunications failures, and retailer requests for terminal servicing. The system operator can also ask the telecommunications network to monitor the number of times dial-up POS terminals encounter a busy signal when attempting to communicate with the system. This should be done during peak hours whenever peak loads increase. The design plan should also describe how processing errors will be identified (e.g., during system balancing and reconciliation and through customer complaints about remaining balances or deposit amounts), reported to the State agency, and corrected.

5.4 SYSTEM EASE OF USE

System ease of use refers to the following design objectives:

- minimize the number of separate steps required to complete a transaction;
- minimize the number of codes or commands needed to make use of the system;
- provide clear and comprehensive account balance information with a minimum number of steps;
- provide prompts to the users of POS terminals and balance-only terminals;
- provide manual procedures for completing transactions when the system is not available for electronic processing;
- provide retailers timely information on daily credits to their bank; and
- provide retailers deposit information in a format readily comparable to information maintained in the store.

In addition, the system operator or the State agency must provide appropriate training and instruction to all users and inform retailers and recipients of appropriate procedures for resolving problems.

Many of these parameters are necessarily subjective, and it is difficult for a reviewer to determine whether the steps taken to make a system easy to use are sufficient. The design plan should therefore include a separate section explaining efforts taken to achieve ease of use. Reviewers should also compare proposed user operations with operating procedures in the EBT demonstration sites. Finally, to help ensure that the system will be easy to use for retailers, the design plan should document the steps taken to consult with retailers or their trade organizations to gain their input into the design process.

5.5 SYSTEM OPERATIONS

Many factors can affect system performance after an EBT system is implemented. The most obvious factor is growth in volume, which can lead to slower response times. Failure of hardware components or telecommunications lines can also disrupt services.

Growth in volume can be direct or indirect. Direct volume growth will occur as the EBT system expands to new areas, as new programs (and their recipients) are added to the system, as caseloads expand, or even as existing households begin to use the system more frequently. Indirect growth occurs when volumes increase on a system connected to the EBT system. For instance, growth in non-EBT telecommunications traffic may reduce the availability of open lines for EBT use, or growth in commercial POS or ATM usage may affect response times for EBT households using the same

commercial networks. All these factors and more can contribute to performance changes within the EBT system.

The best way to ensure continuing good performance from an EBT system is for the system operator to continuously monitor system performance. Continuous monitoring allows rapid identification and resolution of problems affecting performance. It also allows identification of trends (e.g., gradual volume increases) in sufficient time to make capacity adjustments to address anticipated needs.

Reviewers should expect system designers to build into their systems the capabilities to monitor their system's operational characteristics. The design plan should provide information in at least the following areas:

- what aspects of system performance will be monitored and how frequently;
- how performance characteristics will be measured;
- how performance measurements will be reported to State and federal agencies, and the frequency of reporting;
- how use of existing capacity (in terms of throughput, central processing unit time, disk space) will be measured, monitored and reported; and
- potential impacts on system components from changes in volume characteristics.

Reviewers should ensure that preparers of the design plan have identified procedures that allow early identification of system performance degradation. System operators should take the lead in establishing and monitoring a cooperative effort to ensure that performance is maintained at the highest levels.

Chapter 6

EBT SYSTEM SECURITY

EBT systems offer an opportunity to improve the security of benefit issuance and redemption procedures, compared to the paper-based systems they replace. Without adequate safeguards, however, EBT systems also introduce potential exposure to error, fraud and abuse. In this section of the System Design Plan, preparers need to describe the specific design features and procedural steps the system will adopt to maintain all aspects of system security.

6.1 OVERVIEW

Federal EBT regulations specify six general areas pertaining to system security. Two of these areas (the State agency's Security Program for Automated Data Processing Systems and the EBT system's contingency plan) do not need to be addressed in the System Design Plan. The other four areas include:

- 1) storage and procedural controls;
- 2) communications access;
- 3) message validation; and
- 4) administrative and operational procedures.

Preparers should be sure that the four security issues presented above are addressed in their design plans. For completeness, however, other security issues should be addressed as well. This section provides a recommended structure for discussions of EBT system security.

Security embraces every component and aspect of system processing and operations. Control

- network security;
- access security; and
- administrative screens.

Security concerns in commercial point-of-sale systems have led to the establishment of many industry standards affecting security. Wherever possible, preparers should structure their system design descriptions around industry standards, explaining any additional safeguards that have been included. Where the proposed system design does not follow industry standards, the preparer should note the area of discrepancy and explain why the industry standard has not been followed.

Reviewers of the System Design Plan should take special note of:

- standards being followed for a specified security component;
- descriptions of additional, vendor- or State-developed security procedures;
- overview of system software security features; and
- the preparer's inclusion of appropriate security features for all areas of system processing.

6.2 EBT ACCESS CARD

Overview

EBT demonstration systems have, historically, used magnetic (mag) stripe access cards. Pilots in Pennsylvania, Minnesota, Maryland, and New Mexico all use a variation of the mag stripe card. The offline EBT demonstration in Ohio is the only exception; it is using a "smart" card for distribution of benefits.

Card issuance to recipients occurs in two phases: mass or bulk issuance to all recipients when the program converts from a paper system to EBT; and ongoing, periodic reissuance and issuance to new recipients.

Specific industry standards govern every aspect of mag stripe cards. Such standards oversee the materials, size, encoding of the magnetic stripe, embossing, and signature panel. Standards are defined in great detail. Periodically, standards are reviewed and updated. All online EBT systems are expected to adhere to these standards. With over 500 million cards in circulation, processing equipment designed around the mag stripe card and standards controlling their creation will pose the fewest problems in

system design and operation. In addition, following these standards ensures that project expansion is not hampered by the use of a non-standard card.

Card management -- the tracking and control of cards within the EBT system -- is an ongoing process. New recipients' cards are added to the system's databases during the initialization process. Existing cards that are lost, stolen or damaged are deactivated and replaced. Expired cards also are deactivated and replaced with new cards.

Vendors should describe EBT card security under the following areas:

- card issuance;
- standards; and
- card management.

Each card-related area is described in detail in the remainder of this section.

Card Issuance

Cards are created for either mass issuance (when the program switches to EBT) or routine, ongoing issuance. Special materials and hardware are required to issue cards. Materials and hardware costs for card issuance are quite high and lend themselves to economies of scale. Usually system operators, unless quite large or specializing in card processing, will contract with a third party for creating cards.

Even when card creation will be completed by a third party, system operators and State agencies will select card materials, design the logo, specify embossing and delineate mag stripe content. Card materials are selected based on requirements for life span (e.g., 2 years), frequency of usage (e.g., 200 times over life of card), and places of usage (e.g., ATMs). State agencies design the logo, the "picture" on the card's face. Embossing requirements specify the size of letters or numbers and any overlays, such as black or gold. Finally, mag stripe content will be controlled by industry standards, except for special fields such as the PIN offset.

Within the System Design Plan, the section on card issuance should address the following topics:

- selection criteria for card materials;
- embossing parameters used; and
- content of the magnetic stripe.

Preparers should also specify the company that will create the cards, the methods to control unused card stock, and other pertinent information surrounding card issuance. This information should be included even if the system operator is not responsible for card issuance (e.g., when local offices will issue new cards after initial conversion).

Standards

Industry standards are widespread for the magnetic stripe card. Typical standards governing the physical card characteristics include:

- material (ISO 7810);
- size, card dimensions (ISO 7813-1985);
- magnetic stripe (ISO 7811/2-1985);
- encoding of tracks 1 & 2 (ISO 7811/4-1985); and
- embossing (ISO 7811/3-1985).

Other standards, not listed here, may be used and should be specified within the appropriate section of the design plan.

Within the design plan, industry standards should be identified where they are used. Inclusion of the standards documents themselves is unnecessary and would detract from the design contents.

Card Management

Control over cards is a function of the EBT system. Associating card number with recipient records is the first requirement of card management. The system must be capable of updating the recipient's record using the card number on the plastic card. This number will usually be the recipient's primary account number (PAN) as well.

Routine status changes must be accommodated within the system. Cards deteriorate through use and abuse, and are occasionally lost or stolen. Reissuance of cards and control over invalidated cards demands a system processing capability that will identify and disallow card usage.

Within the System Design Plan, card management functions should address the following:

- control over blank card stock;
- capability of associating card and recipient;

- status changes for damaged cards;
- issuance of new cards;
- deactivation of lost or stolen cards; and
- transfer of benefits and status to new cards.

Other areas may be included in this section. Reviewers should ensure that at least this minimal information is provided by preparers.

6.3 PERSONAL IDENTIFICATION NUMBER (PIN)

Overview

The recipient's secret personal identification number (or PIN) has been called the "electronic signature" for financial transactions. By relating the PIN to a recipient's card, the EBT system "recognizes" the user of the card as the recipient. PIN authentication is therefore one of several criteria for transaction approval.

At time of card issuance, clients are allowed to personally select their own secret PIN. Others will know the client's PIN only if it is revealed by the client.

Security over the PIN is of prime importance. The PIN is very powerful in its function. Bypassing the signature check in favor of the PIN provides access capability to anyone who knows the PIN. Confidence in the system's integrity rests on its ability to protect the secrecy of the PIN. Therefore, great lengths are taken to ensure protection of the PIN.

PIN secrecy is protected by an encryption process, which masks the true PIN value during system processing. PINs entered by a recipient are immediately combined with other, secret values called "keys", using an encryption algorithm. A Data Encryption Standard (DES) algorithm is used for this purpose.

By industry standard, PINs must be between 4 and 12 characters in length, but are usually 4 to 6 characters long. Card issuers are responsible for selecting PIN length within the pre-specified range. Alphabetic or numeric characters may be used for PIN creation. Recipients may better remember alphabetic characters, but alphabetic characters used in PINs are recognized as their numeric equivalents by processing systems.

PIN processing activities should be included in the system design. Considerations of the following PIN-related areas are expected:

- PIN selection and storage within the processing system;
- encryption key management; and
- data encryption standards.

Each PIN-related area is described in detail in the remainder of this section.

Reviewers should expect preparers to provide appropriate background information on the issuance and management of PINs within the system. The system design should focus attention on PIN processing in the following areas:

- criteria for PIN selection;
- PIN encryption;
- storage of PIN information;
- PIN usage; and
- standards governing PIN processing.

PIN Selection and Storage

Protecting the PIN's value within the system is essential to maintaining the integrity of the "electronic signature." User confidence in the system usage is tied to the system's ability to maintain PIN secrecy. Failure to protect the PIN's value opens the entire system to potential abuse.

For each card issued to a recipient, a corresponding PIN is personally selected. Connecting the PIN to the card within the EBT system is essential to system operation. The PIN is never stored "as is" in the processing system databases; it must be scrambled or encrypted. Usually, the PIN is combined with an encryption key using a pre-determined algorithm or set of combination rules. Encryption algorithms are standardized to allow bi-directional processing, i.e., both PIN encryption and decryption work in reverse.

Encryption methods typically used within processing systems employ the Data Encryption Algorithm (DEA) as specified in the Data Encryption Standard (DES). Specifications for DEA processing and use of DES are incorporated in the X9.8 Data Encryption Standard maintained by American National Standards Institute (ANSI).

Within the design plan, PIN selection and storage should address the following areas:

- criteria for PIN selection;
- association of the PIN with the recipient's system record;
- PIN encryption technique;
- storage of the PIN on the system;
- hardware or software encryption technique;
- maintenance of encryption keys; and
- capability for changing PIN.

PIN issuance, encryption, and storage is not a simple task. Several very complex processes must be performed to achieve the desired result. Reviewers should ensure these areas have received proper consideration within the system design. Descriptions should be straightforward and easily understood.

Encryption Key Management

PINs maintained on the processing system's client database require special handling. Encryption key management encompasses the maintenance of PIN integrity throughout the processing system. PINs, upon entry into the system, are not to be in their clear form at any point. Terminal entry, the first point of system access, requires immediate encryption of the PIN within the PIN pad.

Once encrypted at the PIN pad, a PIN may be decrypted and re-encrypted through several points. This is the ideal -- re-encryption at every transfer point -- but such re-encryption requires significant technical capabilities. Not all systems processing EBT activity will have the capability to re-encrypt through transfer points.

EBT systems not capable of transfer point re-encryption will send the encrypted PIN, unchanged, through the network to the processing system. In this case, the encrypted PIN arrives at the processing system in the same state it was in upon entry. The processing system must have a copy of the encrypting key for use in comparing the transaction's encrypted PIN to the system's encrypted PIN.

With or without transfer point re-encryption, the algorithms or "keys" used to encrypt and decrypt PINs may occasionally be changed to provide additional security. This process, which is part of encryption key management, requires the system operator to download a new algorithm to POS terminals, ATMs, and transfer points with each encryption key change.

Preparers are expected to describe in detail the PIN encryption, encryption key management, and any re-encryption processes within their EBT system. Within the System Design Plan, the section on

PINs should address the following areas as applied to encryption key management at the terminals and network transfer points:

- criteria for creating and maintaining encryption keys;
- process for encryption key distribution in the network;
- encryption technique at terminals and transfer points;
- encryption key storage in terminals and at transfer points;
- hardware or software encryption technique; and
- capability for changing encryption keys.

Data Encryption Standards

Currently, reversible DEA (Data Encryption Algorithm) is the predominant encryption technique used for protection of PINs in financial transactions. Most EBT pilots use this technique, and future EBT systems are expected to use it as well.

The DEA is a nonlinear, iterative, block product cipher. This block cipher maps 64 bits into 64 bits based on a 56-bit key. The DEA input block and output block (I/O blocks) are 64-bit vectors numbered from left to right: (1,2, ... 64). Additional information on the details of encryption are available from the ANSI X9.8: Data Encryption Standard.

Preparers should supply sufficient information describing system encryption activities. Most systems will probably use DES for their PIN encryption and processing. Reviewers should not expect to know the entire scope of DES, but a review of the X9.8 document would be helpful in understanding preparers' explanations of encryption processing and key management.

6.4 NETWORK TRANSMISSION AND MESSAGE VALIDATION

Overview

Transmission of information across telecommunications networks provides an opportunity for data corruption (data received are not identical to data sent) or the introduction of fraudulent or tampered data. The System Design Plan needs to describe the full range of controls that will be used to ensure telecommunications security. Three basic areas of communications should be covered:

- eligibility systems to EBT systems;

- online processing across public and private networks; and
- back-up transaction processing.

Preparers may choose to add more areas for consideration. They should be very specific as to which areas are covered by network transmission security.

Within the System Design Plan, network transmission security should address at least the following areas:

- criteria for network transmission security;
- encryption techniques, if used;
- hardware and software security methodologies; and
- standards governing processing, specified by the system operator.

Preparers should give these areas appropriate consideration within the System Design Plan. Expansion of these areas should be clearly addressed, as required.

Eligibility Systems to EBT Systems

Benefit information is often transferred from a State's eligibility and issuance records to EBT systems using telecommunications networks. Frequently, files are bulk transferred from the eligibility system. Under existing pilots, file size has covered 10,000 to 20,000 cases. Transmissions for the pilot sites will be dwarfed by the size of file transmissions for full state rollouts.

While file sizes are expected to increase under large-scale rollouts, transmission options between transfer points are also expected to increase. For instance, individual recipient records may be updated online as soon as the new information is entered, rather than waiting for file transmission.

Currently, controls over file transmissions revolve around the use of "hash" and amount totals. Hash totals are a calculated summary of selected fields based on an algorithm known to both transfer points. Amount totals summarize the number and amount of each transaction type within the file. These controls reduce the probability of processing incorrectly created files or data corrupted during transmission. But these controls are at best crude, having limited capability to identify introduction of intentional errors. Preparers should describe all controls to be used in assuring accurate file transmission and, where possible, any controls used to identify intentional tampering with the file. Controls to ensure that previous days' issuance files are not inadvertently reprocessed also should be described.

One possible security enhancement to the transmission between the eligibility and EBT systems is data encryption. All data or selected fields within the file may be encrypted using algorithms and keys known only to the transferees. Preparers should describe the details of this encryption if it is to be used.

Reviewers should be prepared to address transmission security between eligibility and EBT systems in the following areas:

- controls used to verify transmission accuracy;
- hardware or software supporting controls; and
- industry standards employed to support controls.

This list is by no means complete. System designers will likely be creative in addressing these areas and in improving controls over the transfer of information between systems.

Online Processing Across Networks

Online processing is likely to be performed using public and private telecommunications networks. Public networks, such as CompuServe, the local telephone company, and AT&T, are in use in the pilot sites. Other public networks, not mentioned here, could reasonably be expected to be used to support EBT systems.

Access to public networks is open to anyone with the appropriate technology and a local phone number. Consequently, use of a public access network conceivably allows access to the user's data or activities. While such a possibility is remote, acquisition and misuse of information is a possibility that must be considered.

Private networks offer considerably more control over access to the network. Private networks also afford the owner extensive monitoring capabilities. However, private networks are rarely totally private. Most networks require use of public, albeit dedicated, facilities. Only the largest of institutions have the capabilities to create and maintain private, exclusive-use networks.

EBT systems will mostly use a mixture of public and private networks. Appropriate controls must be added to online processing to increase the likelihood of completing transaction processing without interruption. Typically, simple controls include PIN encryption, a system-generated sequential counter with each transaction (to avoid reprocessing a previously transmitted transaction), and message validation codes. Validation codes are used to ensure that no data were corrupted or changed during transmission.

One possible security enhancement to online processing across networks is transaction encryption. All transaction data or selected fields within the transaction may be encrypted using algorithms and keys known only to the transferees. Preparers may add this type of processing capability to their systems.

System Design Plans should explain online processing transmission security features in the following areas:

- controls used to verify transmission accuracy;
- hardware or software used for control purposes; and
- industry standards employed to support controls.

Preparers should also describe the situations under which transaction reversals will occur and system controls for ensuring that reversals are processed correctly. Transaction reversals occur when the original transaction cannot be fully processed, and any initial processing must be reversed.

Back-up Transaction Processing

Processing of back-up transactions (i.e., those requiring manual authorization in an otherwise on-line system) bypasses many security features built into an EBT system. For instance, there is no automatic check that the transaction is being initiated at an authorized POS terminal. The System Design Plan, therefore, needs to describe the security controls that will be used to ensure that back-up transactions are legitimate and that they are processed accurately. Such controls may include a special retailer code to be given verbally by the retailer prior to presenting a back-up transaction. Other procedures are needed to control the entry of back-up transaction data into the system and the subsequent reconciliation of the data. For instance, what procedures will be used to identify and correct errors in data entry? Preparers should provide details on:

- controls over access only by authorized retailers;
- controls over data entry;
- procedures for reconciling back-up transactions and for investigating disputes.

6.5 ACCESS SECURITY

Overview

System databases and the information they contain need to be protected from unauthorized access. Client names and addresses, benefit amounts, terminal locations, and merchant participants are only a few

of the information items maintained on the system. Only authorized and appropriate users should be able to add to or update this information, which necessitates access security features capable of limiting and managing system data resources.

Application functions, such as add, change, and delete capabilities, provide the mechanism for data manipulation. System software, such as database managers or operating systems, also provide data manipulation capabilities. Controlling access to data and their manipulation are critical to maintaining data security.

Workstation or administrative screens represent powerful windows accessing and changing data on the EBT system and are the most visible component governing system access. Clearly, control of screen functions is crucial to maintaining system integrity.

Access security features are often elaborate in their design and scope. System designers often build these capabilities to meet stringent requirements of the financial services industry. Reviewers should be prepared to review access security in the following areas:

- EBT processing terminals;
- EBT processing systems; and
- EBT administrative screens.

Basic access security processing areas must be included in the system design. Preparers may choose to add more areas for consideration. They should be very specific regarding the areas covered by access security.

Within the System Design Plan, access security should address at least the following areas:

- criteria for user access;
- system security structure;
- hardware and software supporting the methodology; and
- standards governing the processing.

EBT Processing Terminals

Within the EBT system, POS terminals, ATMs and ARUs will be accessed most frequently in support of recipient benefit distribution. System recognition of these terminals and of the participants

using them is in itself a means of security. However, recognition alone represents only one aspect of access security.

The System Design Plan should provide complete descriptions of terminal access security. For instance, a POS dial terminal may be required to use only a pre-specified number, encrypt designated fields within the transaction, and verify the clerk using the terminal. ATMs, most likely not under the control of the system operator, may require additional access security information.

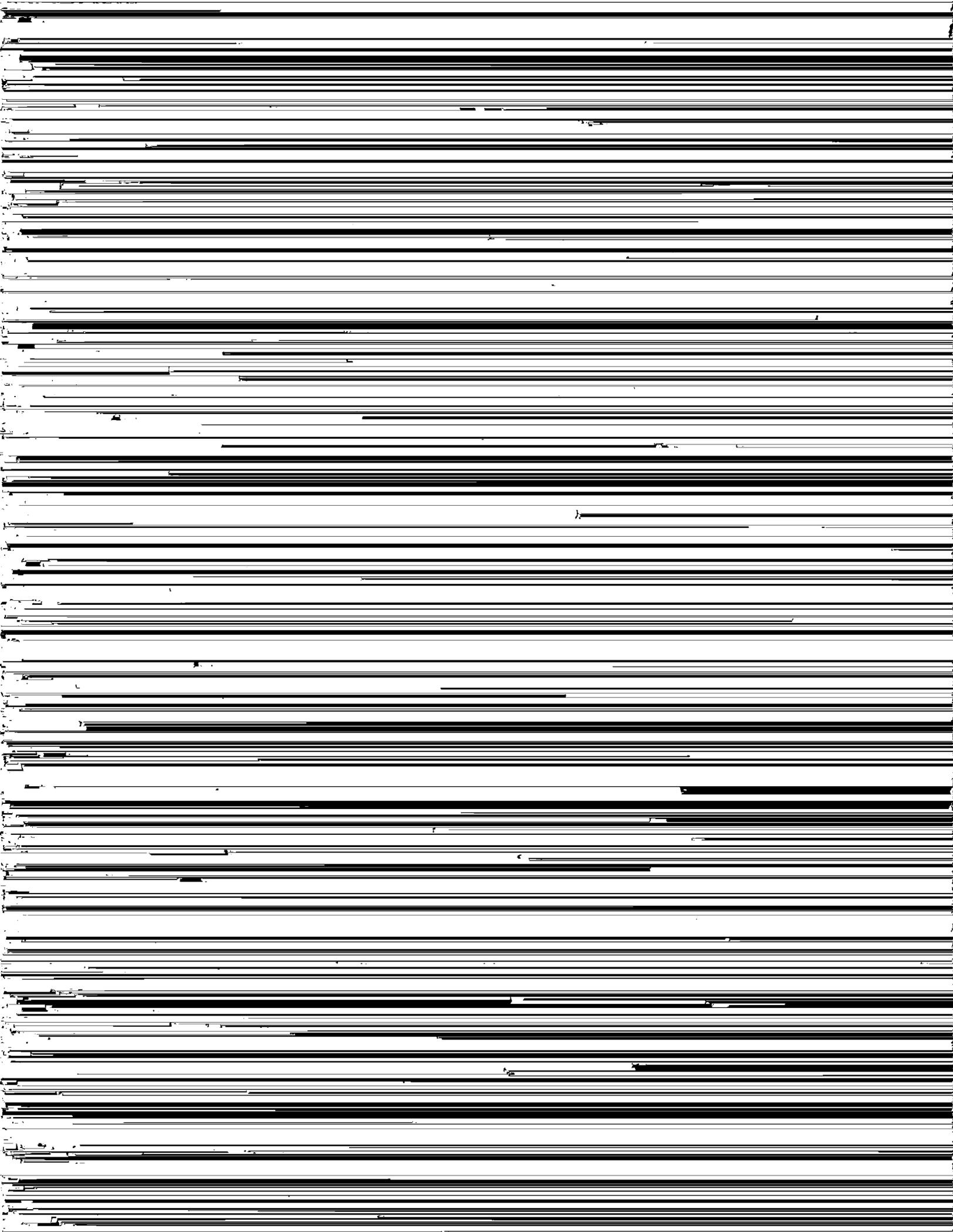
Access security over ARUs can be problematic. For example, one would like to ensure that a recipient's balance information is released only to the recipient, and this requires use of some type of access code. PINs should not be used as a code for ARU access, however, because they cannot be encrypted. The EBT demonstrations have used the recipient's case number as an access code, which is probably sufficient. Because other persons may know a recipient's case number, however, State agencies may wish to provide greater access security for ARU use. One option would be for recipients to select at training a special code for ARU access. The tradeoff here is between providing greater security for confidential information and burdening recipients with remembering **two** access codes, the ARU code and their PIN. The System Design Plan should indicate what extra procedures, if any, will be used to control ARU access.

Reviewers should be prepared to address access security by processing terminals in the following areas:

- controls within the terminal for recognizing users (e.g., sign-on procedures);
- software and files used for control purposes (e.g., a file of participating merchants and terminals, a file of ARU access codes); and
- industry standards employed to support controls.

The options available industry-wide are great. System designers will likely be creative in addressing these areas and in improving controls over terminal access security.

One final area of access control deserves special attention in an EBT environment. In a system that includes terminals used by commercial customers, some POS devices may not be authorized for use by EBT participants. For instance, food stamp recipients will be authorized to use only those terminals installed in program-authorized stores. In addition, cash benefit recipients may be restricted from accessing program benefits in certain stores (e.g., liquor stores) for policy reasons. When the EBT system is connected to a commercial network with POS terminals in non-authorized EBT locations, the



software controls, are designed to provide users with control capabilities that allow the access security features to be tailored by the user. As a result, access security over administrative screens should be robust, with preparers dedicating significant portions of the System Design Plan describing features and usage capabilities.

System security features designed to allow users to limit and distribute the use of functions should adequately address the need to establish clerical controls, such as segregation of duties and need-to-know access to information. In addition, access controls must be constructed to meet legislative requirements, such as those covering privacy legislation.

Reviewers should expect a complete description of administrative screen access security. Features and functions are likely to be extensive and detailed. Workstation access security features and function descriptions should provide information in the following areas:

- control over access to the administrative screens;
- control over use of sensitive features, e.g., emergency issuance;
- audit software used to identify access attempts;
- access and function limitation software;
- system software used for access control purposes;
- application software developed specifically to augment system software access controls; and
- industry standards employed to support controls.

Preparers should also describe the structure of system software and application software controls used within the system. Again, clarity of descriptions is essential to the reviewer's understanding of access security.

Appendix A

CHECKLIST FOR MATERIAL TO BE INCLUDED IN EBT SYSTEM DESIGN PLANS

A.1 INTRODUCTION

Numerous references have been made throughout this Guidelines document to material or information that an EBT system vendor or State agency should include in their EBT System Design Plan. This appendix provides a checklist of the references included in the main document. Reviewers can use the checklist as a quick reference aid when reading sections of a State's design plan.

The checklist is organized along the topics included in the main Guidelines document, although overviews and explanatory material have been deleted. For ease of reference between the checklist and the document, each section of the checklist indicates the corresponding section in the document where a full discussion of the topic may be found.

A.2 EBT SYSTEM FUNCTIONALITY

This section of the preparer's design plan needs to provide detail on what functions the proposed EBT system will accomplish in regard to issuing and redeeming program benefits. The system's required functionality will be specified in the State agency's Request for Proposals (RFP) and in federal regulations.

Authorizing Household Benefits (2.2)

Setting up Client Accounts on the EBT System

Information on clients to be added to the EBT system's database will be transferred from the State agency to the EBT system operator. This section of the design plan should specify:

- what types of eligibility records will be transferred to the EBT system;
- how the records will be transferred;
- when transfers will take place;
- how the State agency will track which households are receiving benefits through the EBT system (e.g., when conversion to EBT is staggered over different areas);
and

- general description of how the eligibility data will be processed to create the client account file.

If different procedures are to be used for initial mass conversion of clients to the EBT system and subsequent ongoing transfer of information for new clients, these differences need to be explained.

Posting Issuance Data

The State agency will transfer clients' benefit allotment information to the system operator so that issuance data can be posted (added) to client account balances. The design plan should specify:

- how the State agency will send the information (e.g., tape file, RJE);
- what types of records will be transmitted;
- what information is to be included on each record type, and whether and how the information varies by program;
- regular issuance dates for each program;
- by what time of day the information needs to be received by the system operator;
- by what time of day the allotments will be posted to client accounts;
- procedures (if any) for consolidating cash benefits for clients participating in more than one cash assistance program; and
- a basic description of the structure of the client account file (if not already provided).

EBT Cards and Card Issuance

The design plan should specify:

- the type of card to be used to access EBT benefits (e.g., standard magnetic stripe, other);
- the layout and design of the EBT card, including what information is to be printed or embossed on the card;
- what information is to be encoded on the card's magnetic stripe;
- information to be printed on the card sleeve (e.g., anti-discrimination statements, customer service number); and
- whether a single card can be used to access **all** program accounts.

Client Training

The design plan should provide general information about:

- client training plans, including who is responsible for client training (e.g., vendor or State personnel);
- whether training will take place before or after initial benefits are posted to clients' accounts; and
- any basic differences in initial mass training of existing clients and ongoing training of new clients.

Detailed information on client training plans is expected to be provided in other documents (e.g., a system implementation plan and training manuals).

Card Security and PIN Issuance

The design plan should specify:

- procedures for control over blank card stock;
- how the client's PIN will be encrypted;
- procedures for issuing new cards and replacement cards, including PIN selection by clients.

Providing Food Benefits to Households (2.3)

Functional requirements to be described include:

- how the identity of the cardholder will be verified (e.g., use of PIN and comparison of PIN and card PAN);
- how identity of access device will be verified (e.g., creation and use of merchant and terminal control files);
- food stamp transactions supported at POS devices (e.g., purchase, refund, void and balance inquiry) and basic description of how they are processed;
- cash assistance transactions supported at POS devices and ATMs (e.g., purchase, withdrawal, void, balance inquiry) and basic description of how they are processed;
- terminal displays for transaction and response codes;
- procedures for back-up transactions when either the system, communications network or terminal is down;

- ways for clients to access balance information; information to be printed on receipts;
- rules and procedures for converting EBT benefits to coupons or checks when households leave the EBT service area; and
- procedures for handling stale accounts, by program.

Crediting Retailers and Financial Institutions for Redeemed Benefits (2.4)

The design plan needs to specify how the following functions will be performed:

- verifying electronic transactions flowing to or from participating retailers' bank accounts (e.g., ACH pre-notification);
- creating and maintaining a file containing the individual records of EBT transactions;
- totalling all credits and debits (i.e., refunds) accumulated by each retailer each day;
- providing balance information to retailers or third-party processors for individual POS terminals, as required;
- providing each retailer information on total deposits on a daily basis;
- preparing a daily tape or file with information on benefits redeemed for each retailer, and in summary;
- transmitting the daily tape or file to a financial institution (the concentrator bank) to initiate the flow of funds to retailers' bank accounts;
- transferring information on daily redemption activity by each retailer to the FNS Minneapolis Computer Support Center;
- providing retailers the ability to check EBT sales totals at individual terminals at any time of the day;
- the concentrator bank's use of the Department of Health and Human Service's (HHS) Payment Management System and the SmartLink interface to gain reimbursement for food stamp transactions credited to retailers or third-party processors; and
- the concentrator bank's use of other procedures to obtain reimbursement for cash assistance program transactions credited to retailers, third-party processors, or ATM owners.

Managing Retailer Participation (2.5)

The design plan should explain how the following functional requirements will be supported:

- removing retailers from the system within two days of FNS notification of disqualifications, de-authorizations, or voluntary withdrawal from the Food Stamp Program or EBT system;
- adding newly authorized retail food stores to the EBT system within two weeks after FNS notification to the State agency (30 days for retailers deploying their own terminals or using third-party processors);
- ensuring that only currently authorized retailers can access the EBT system;
- monitoring food retailers to ensure that terminal deployment complies with federal regulations;
- ensuring that EBT equipment and supplies are maintained in working order and that defective equipment is repaired or replaced within 24 hours after notification by the retailer;
- ensuring that retail store employers are trained on system operations; and
- providing a mechanism for compliance investigations.

System Settlement and Reconciliation (2.6)

The design plan should describe the following functions for each program served by the EBT system:

- how benefits posted to household accounts will be reconciled against allotment information received from the State agency;
- how individual account balances will be reconciled against account activity on a daily basis;
- how retailer transaction information will be reconciled to retailer's daily credits;
- how retailers' total daily credits will be reconciled to recipients' total daily debits;
- how retailers' daily credit information will be verified against daily deposit information; and
- how total funds entering into, exiting from, and remaining in the system each day will be reconciled.

Administrative Support (2.7)

The design plan should describe:

- what system functions are supported by use of administrative terminals and workscreens;

- what types of vendor, State and local office personnel will have access to individual screen functions; and
- basic procedures for how each screen operates (e.g., add, update, delete information of what type? which databases are accessed through use of each screen?).

A.3 SYSTEM PROCESSING COMPONENTS

The System Design Plan should identify all processing components within the EBT system, relate each component to functions performed, describe any interrelationships among processing components, and document the detailed operations of each component.

Processing Diagram (3.2)

To give an overview of how the EBT system will work, the design plan should provide one or more processing diagrams that include all system hardware and software components.

Client Eligibility Systems (3.3)

The design plan needs to explain how client eligibility and allotment information will be transferred from the State agency to the system to set up clients' EBT accounts and to post allotments to these accounts. Specific information that should be included is:

- required changes to State agency files to support EBT processing (e.g., addition of an EBT "flag" variable to the State's eligibility file and how that flag gets updated);
- sources of information to be used to set up client accounts (e.g., eligibility records, benefit allotment records, separate records by program or integrated records?);
- data elements on State files to be captured and transmitted to EBT system;
- types of records to be transmitted (e.g., add, update, delete);
- method of transferring data (e.g., tape file, electronic transmission);
- timing requirements (e.g., time of day eligibility information or allotment information must be received by the system);
- specifications for files transferring data (e.g., header records, data records, trailer records);
- message formats for header, data and trailer records; and
- processing codes and processing rules.

Merchant Processing (3.4)

The design plan should provide the following information for the major topics listed below:

System Recognition and Service Termination

- use and structure of merchant and terminal control files;
- procedures for ensuring that only FSP-authorized merchants can submit food stamp purchase requests;
- steps required to add (or delete) a merchant and deployed terminals to the system's control files;
- detailed information on screen design, use of function keys, data elements involved, and data edit criteria; and
- ACH pre-notification procedures.

Terminal Processing

- EBT functions supported by POS terminals (e.g., financial transactions like purchase, refund, cash withdrawal, and void; administrative transactions like terminal settlement, sales totals, logon/logoff, and password changes);
- EBT functions supported by ATMs;
- definition and usage of all terminal function keys;
- merchant, customer and system actions required to complete each type of supported transaction;
- display messages; and
- data elements required for transaction processing (e.g., manually entered data for back-up purchase transactions).

Settlement Processing

- options for merchant cutover times;
- procedures for terminal/system settlement of electronically processed transactions;
- procedures for settlement of back-up transactions; and
- procedures for reconciling out-of-balance conditions.

Funds Transfer

- description of the relationship among settlement times, funds transfer activities, and when funds are made available to merchants.

Dispute Processing

- description of procedures to be taken when disputes arise over terminal or merchant reconciliation, including methods of initiation, data entry screens, and data elements.

History Information

- description of functional capability, including data retention period and structure of the transaction history file;
- description of procedures to be followed to access merchant history information;
- description of workscreens, data elements, and use of function keys; and
- use of ARUs for accessing merchant history information (if supported).

Client Processing (3.5)

For the major topics listed below, the design plan should provide the following information:

Initialization and Setup

- description of the structure of the client database and identification and definition of all data elements;
- mapping of data elements between the client eligibility system and the EBT system database;
- edit criteria for each data element; and
- procedures for converting eligibility information.

Card Issuance and PIN Selection

- description of card issuance and PIN selection procedures;
- special data entry controls to be used (e.g., masked entry of PIN);
- procedures by which the database is updated with card and PIN information;
- screen display of card and PIN data elements, and edit criteria for data elements; and

- security controls and associated processing.

Workstation Screens

- definition of functional capabilities (e.g., updates and status changes);
- description of workstation screens and associated function keys;
- description of data elements and edit criteria;
- sources of data for workstation screens; and
- access security for workstation screens.

History Information

- description of functional capability, including data retention period and structure of the transaction history file;
- description of procedures to be followed to access client history information;
- description of workscreens, data elements, and use of function keys; and
- use of ARUs for accessing client history information (if supported).

Online Transaction Processing (3.6)

The design plan should provide the following information for the major topics indicated:

Transaction Set

- types of EBT transactions (both financial and administrative) supported, by program and input device (e.g., POS terminal, ATM, ARU);
- types of non-EBT transactions supported by the system operator's processing system;
- rules for transaction initiation;
- benefit program policy processing restrictions; and
- system processing capabilities.

Processing Codes

- description of all EBT system processing codes and the conditions under which they occur;
- description of third-party processing codes and the mapping between EBT system and third-party processing codes;
- mapping of processing codes to terminal displays; and
- mapping of processing codes to ARU voice messages.

Online Processing Interactions

- description of the processing connections and interactions between input devices or terminals, telecommunications networks, intermediate routing points, and the authorization processor.

Processing Rules and Message Flows

- for each transaction type, processing rules and message flows through processing components, with accompanying flow diagrams;
- processing rules for processing disruptions;
- rules associated with reversal processing; and
- related processing codes.

Back-up Transaction Processing (3.7)

The system must support back-up processing of food stamp transactions when full electronic authorization and processing is not available. The design plan should provide the following information for the topics indicated:

Back-up Transaction Set

- transactions supported with back-up processing (e.g., food stamp purchases and refunds);
- rules for transaction initiation;
- benefit program policy processing restrictions; and
- system processing capabilities.

Back-up Transaction Processing Rules

- when back-up processing is allowed (e.g., when system is down or for vendors without POS terminals);
- timing requirements for submission of manual forms;
- required manual forms with usage instructions;
- required levels of authorization (e.g., customer service authorization number);
- electronic authorization requirements;
- system processing flows and checkpoints;
- disposition processing; and
- resubmission of rejected transactions.

Back-up Transaction Processing Flows

- step-by-step description of back-up transaction processing;
- steps with electronic interaction; and
- any system authorizations required.

Re-presentation Processing

- procedures used to debit client's account in subsequent months;
- description of how the merchant's account will be credited; and
- how re-presentation activity will be reported on system reports.

Audio Response Unit (3.8)

If audio response unit (ARU) technology is used in the proposed EBT system, the design plan should specify:

- transactions supported by the ARU (e.g., balance inquiry, merchant deposit inquiry, authorization for back-up transactions), by program;
- rules for transaction initiation, and processing restrictions;
- procedures to be followed for each transaction type (e.g., prompts to follow, data to be entered on telephone keypad);

- voice messages used in prompts;
- capability for non-English prompts;
- step-by-step processing flows for ARU transactions;
- processing codes associated with ARU processing;
- any system authorizations required;
- audit trails of system access; and
- prompts used when errors occur.

Settlement Processing (3.9)

For the following topics, the design plan should provide information on:

Settlement Types and Flow of Funds

- settlement types supported by the system (e.g., food stamps at POS terminals, cash benefits at POS terminals, cash benefits at ATMs);
- diagram of flow of funds for each settlement type; and
- identity of all participants involved in each settlement type, including concentrator bank, third-party processors, and institution(s) providing funds.

Participant Cutover and Impact on Flow of Funds

- points where funds transfers occur;
- timing of funds transfers;
- relationship between cutover times and funds availability; and
- system processing of holdover transaction activity.

Balancing, Reconciliation and Funds Transfer

- points at which balancing and reconciliation occur;
- rules for calculating balance totals;
- conditions leading to out-of-balance situations;
- rules for resolving out-of-balance conditions; and

- funding organization transfer activities and rules.

Settlement Reporting

- description of purpose and function of each settlement report;
- definition of each report element and its source or derivation;
- explanation of the relationship between and among reports; and
- description of report production timing.

Reporting (3.10)

An EBT system will generate numerous reports to be used for different purposes, including monitoring of system performance and activity levels, settlement activity and reconciliation (discussed earlier), and system security management. The design plan should categorize all reports according to major purpose and, for each report, provide report shells and the following information:

- report name;
- explanation of report's use and purpose;
- description of information (data elements) included in report and source(s) of information;
- explanation of calculations or algorithms used to generate data elements that are not taken directly from system files;
- frequency of report generation (e.g., daily, weekly, monthly);
- time of day for report generation;
- format of report (e.g., hard copy, microfilm, file transfer); and
- distribution of report (e.g., vendor personnel, State agency personnel, federal agency personnel).

Administrative Processing (3.11)

Administrative processing includes the processing involved for workstation screens. While the use and structure of many of these screens will have been explained in earlier portions of the design plan, the design plan should have one section where all workstation screens are explained or at least referenced (if described earlier).

The design plan should provide an overview of the workstation screen subsystem, with a description of screen to screen flow within the subsystem. Finally, the design plan should provide a description of each workstation screen that includes:

- an illustration of the screen;
- a detailed accounting of the screen's features and functions;
- identification of each function key and its usage;
- a description of screen data elements and their source;
- relation of edit criteria to each data element; and
- mapping of data elements to features and functions.

A.4 HARDWARE COMPONENTS

An EBT system's hardware components includes terminals, the telecommunications network, the central processing system, and card management equipment. The design plan should include:

- a diagram showing all hardware components and their relationship to each other.

Required information related to each hardware component is specified below.

Terminals (4.3)

Terminals include ATMs, POS devices, balance-only terminals, administrative terminals (workstations), and ARUs. For each type of terminal, the design plan should specify:

- equipment type and model, including in-store controllers;
- which benefit programs are served;
- the specific functions supported for each program by each terminal (e.g., purchase, refund, void and balance inquiry for food stamps at POS terminals; cash withdrawals and food stamp and cash balance inquiries at ATMs);
- pertinent processing flows;
- equipment restrictions (e.g., no handicap support);
- network support (e.g., customer service, on-site service and maintenance); and
- ownership.

Telecommunications Networks (4.4)

The design plan should include information on:

- which public and private networks are being used;
- which third-party processors are using which networks;
- equipment type and model (e.g., modems);
- communications protocols used (i.e., the software used to manage communications between sending and receiving devices); and
- speed across the lines (i.e., baud rate).

Central Processing System (4.5)

The central processing system includes a variety of hardware components, including computers, disks, tape drives, and connections to telecommunications networks. For each component, the design plan should detail:

- equipment type and model;
- number of each type and usage;
- location of equipment;
- relationships between processing components; and
- special equipment to be used.

Card Management (4.6)

Hardware related to card management may include on-site equipment to encode and/or emboss EBT cards. The design plan should specify:

- equipment type and model; and
- location.

A.5 PERFORMANCE CRITERIA

Federal regulations specify performance criteria for EBT systems, and the State agency's RFP may include other criteria. The design plan should provide information on expected performance and how actual performance will be monitored and reported to State and federal officials.

System Processing Speed (5.2)

The design document should provide:

- an estimate of peak hour volume on the system, and how that estimate was derived (e.g., based on so many clients from each program receiving benefits, expected average number of monthly transactions -- by program -- for each client, distribution of monthly transactions by day based on issuance schedules, and distribution of daily transactions across hours of the day);
- the system's throughput capacity at the peak hour, and how that capacity was determined;
- estimated average and maximum response times at each type of input device, broken down by whether leased or dial-up lines are being used;
- planned methods for measuring and reporting system response times and throughput; and
- planned approaches for reducing response times or increasing throughput if system performance falls short of required standards.

System Availability and Reliability (5.3)

The design plan should provide information on:

- expected uptime at the central processor;
- expected availability of input devices (e.g., POS terminals, administrative terminals);
- expected ability of telecommunications network to handle expected peak hour volumes;
- justification for the above expectations (e.g., prior experience, manufacturers' certifications, calculations of relative frequency a transaction cannot be completed because an open communications line is not available);
- how system availability will be measured and reported; and
- how processing errors will be identified, reported and corrected.

System Ease of Use (5.4)

The system operator should strive to make the system as easy to use by merchants, recipients and local office personnel as possible. Ease of use, however, is a subjective concept. To help ensure that the system is easy to use, the design plan should include a discussion of steps taken to improve ease of use. These steps include:

- documentation that merchants or their trade associations have been consulted to gain their input on system functions affecting merchant processing;

- verification that State agency personnel have reviewed the format and usability of workscreens on administrative terminals; and
- full documentation of user prompts used at POS devices, ATMs, and ARUs.

Finally, familiarity with operating procedures being used in existing EBT sites should help reviewers judge the ease of use of the proposed system and identify areas when improvements might be made.

System Operations (5.5)

If not already covered in the discussion of response times and system availability, the design plan should provide information on:

- what aspects of system performance will be monitored, and how frequently;
- how performance characteristics will be measured;
- how performance measurements will be reported to State and federal agencies, and the frequency of reporting;
- how use of existing capacity (in terms of throughput, central processing unit time, disk space) will be measured, monitored and reported; and
- potential impacts on system components from changes in volume characteristics.

A.6 SYSTEM SECURITY

The design plan needs to explain the controls (both procedural and hardware- or software-based) that will be used to ensure the security of the EBT system. When controls do not follow industry standards (or common practices), the design plan should note the area of discrepancy and explain why the industry standard has not been adopted.

EBT Access Card (6.2)

The design plan should specify:

- card material, size, embossing parameters, and information encoded on the magnetic stripe;
- the degree to which the EBT access card does or does not conform with industry standards (i.e., ISO or ANSI) for magnetic stripe cards;
- the card manufacturer(s);

- expected card life (e.g., 2 years) or usage (e.g., 200 transactions over the life of the card);
- control procedures to be followed to protect blank card stock;
- procedures for issuing cards to recipients (including temporary cards, if used);
- procedures for controlling status of cards (e.g., active, lost, stolen) and for changing status when cards are issued or reported as lost or stolen; and
- use of card expiration dates and/or card generation numbers.

Personal Identification Number (6.3)

Inasmuch as the recipient's PIN -- together with the EBT card -- controls access to the system, security over the PIN is of prime importance. The design plan should specify:

- PIN restrictions (e.g., use of alpha-only or numeric-only characters, number of characters);
- procedures for PIN selection by recipients and for capturing PIN information on the card and the system's data bases;
- how PIN information will be stored on the card and system databases;
- how PIN information is associated with the system's recipient record (e.g., by card number);
- procedures for changing PINs;
- criteria for creating and maintaining encryption keys;
- process for updating encryption keys throughout the network;
- encryption techniques at terminals and transfer points;
- how keys are stored in terminals and at transfer points;
- whether encryption is performed by hardware or software;
- when and how encryption keys are changed; and
- whether DES encryption or other encryption techniques are to be used.

Network Transmission and Message Validation (6.4)

The design plan needs to specify how data transferred over communications lines are protected.

The plan should provide information on:

- procedures used (e.g., header records, trailer records) to ensure that issuance files are accurately transferred from the State agency to the system operator;
- procedures used to prevent the reprocessing of an already transferred issuance file;
- procedures used to protect the transmission of data between POS devices and the system (e.g., use of terminal and merchant control files, PIN encryption, system- or terminal-generated transaction counters, message validation codes, full message encryption); and
- procedures used to ensure the validity and accuracy of back-up transactions, including controls over access only by authorized merchants, controls over data entry, and procedures for reconciling back-up transactions and for investigating disputes.

Access Security

The design plan needs to provide the following information on controls over system access:

- methods used to control access to POS terminals (e.g., logon/logoff procedures using password control);
- methods used to control terminal access to the system (e.g., terminal and merchant control files, use of pre-specified dial numbers, terminal- or system-generated transaction counters);
- physical and software-based methods to control access to the operating system and software;
- methods used to control access to application software;
- methods used to control access to administrative workstations, generally and for specific workstation functions;
- audit software used to identify access attempts over all components; and
- physical and software-based controls over card stock and card encoding equipment.