A Framework
For
Exchanging Image Returns

FRB/Industry Image Returns Task Force
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To: Readers of this Document

From: Steve Whitney and Mel Purcell (Task Force Co-chairs) and Members of the FRB/Industry Image Returns Task Force

We are pleased to distribute the enclosed paper, *A Framework For Exchanging Image Returns*, that documents the results of the FRB/Industry Image Returns Task Force's work over the past couple of years to establish a framework for exchanging return items in the current legal and regulatory environment and for the foreseeable future.

The primary purpose of the document is to provide technical, operational and legal information to educate and guide institutions interested in exchanging image returns. Given the complexity of the subject and the rapid, ongoing changes taking place in technology and the banking industry, the document is intended to provide general guidance based on the information available at this time and the collective knowledge and experience of the Task Force. While the document is not intended to be all-inclusive, the information and suggestions contained within may be appropriate for many image return arrangements.

In a separate but complementary effort, staff at the Federal Reserve Board of Governors are working with the financial industry on a potential legislative initiative to improve the check payments system. The draft concept, currently referred to as the Check Truncation Act, would facilitate truncation by allowing a copy of a check to be used in place of the original item in the collection and return process. The proposed law would allow a bank to truncate some or all checks, and collect or return them electronically by agreement, as they can do today, or by substituting machine-readable printed images of checks ("substitute checks" or image replacement documents) for the original checks. Electronic images of checks and substitute checks would be the legal equivalent of the original check. The proposed legislative initiative offers important benefits for the return environment. If passed, such legislation could be a significant enabler for broad-based industry use of an image return process over the longer term.

One substantial potential benefit of the Check Truncation Act legislation is that it could establish a base line with respect to many of the issues that an image return agreement between participants should address. If such legislation were passed at the federal level, it could have the effect of providing a uniform and consistent national framework for such arrangements. The draft Check Truncation Act also offers banks greater operational flexibility and potential processing efficiencies. Passage of such legislation would provide a significant boost to image return exchanges.

The enclosed document provides a range of information to help interested financial institutions move forward with image return exchanges. While the near-term image return process described in the paper would be facilitated by legislation such as the Check Truncation Act, it also could work in the current legal and regulatory environment. The proposed process can accommodate national expansion as legal and regulatory changes support more widespread use of image returns.

The paper is divided into six key sections, described briefly below:

- Section 1, *Introduction and Background*, discusses the Task Force's rationale for and approach to developing an image return process. It also includes background information about the current check system, the evolving use of technology in check processing, and how this effort relates to and supports other industry efforts aimed at improving the check collection system with electronics.

- Section 2, *Technical and Operational Considerations*, provides detailed information about technical and operational aspects of implementing image exchanges and includes near-term and longer-term image return process flows.

- Section 3, *Legal Considerations*, summarizes the general legal issues involved in agreements to exchange image returns and discusses a number of basic questions related to the practical and legal aspects of potential image return systems.

- Section 4, *Tests of Concept – Lessons Learned*, discusses four different tests of concept and some of the experience gained with operational, technical and customer acceptance aspects of image returns.

- Section 5, *Stakeholder Perspectives: Qualitative Market Research Findings*, summarizes the results of qualitative market research undertaken with key participants and stakeholders in the check return process in 1999 and 2000, that underlie the image return exchange process described in this paper.

- Section 6, *Image Return Cost Benefit Analysis*, presents the results of a recent analysis of the potential costs and benefits of image returns. The analysis is intended to serve as a guideline for indicating how different participants might be affected in an image return process.

If you have any questions or comments about the document, or if you would like to receive additional copies, please call Steve Whitney, Senior Vice President, Federal Reserve Bank of Boston at (617) 973-3105 or Mel Purcell, Senior Vice President at the Federal Reserve Bank of Atlanta, Nashville Branch, at (615) 251-7201.

FRB/Industry Image Returns Task Force
List of Participating Organizations

American Bankers Association (ABA)
Association for Financial Technology (AFT)
Bank of America
Bank One
Bankers Information Technology Secretariat (BITS)
Chase Manhattan Bank/Chase Texas
Citigroup
Comerica Bank
Credit Union National Association (CUNA)
EasCorp
ECCHO
Federal Reserve Bank
Federal Reserve Board
First Interstate Bank
First Union
Fleet Boston
Grundy National Bank
Independent Community Bankers of America (ICBA)
INTRUST Bank
Midwest Independent Bank
National Automated Clearinghouse Association (NACHA)
New York Clearinghouse Association/SVPCo
Southwest Corporate Credit Union
SunTrust Bank
Stillwater National Bank
Wachovia Bank/Silas Technologies

The members of the FRB/Industry Image Returns Task Force wish to acknowledge and express their deep appreciation for the significant contributions made to the project by the late Albert E. Martin III, legal counsel for the Federal Reserve Bank of Atlanta.

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Section 1: Introduction and Background

The FRB/Industry Image Returns Task Force includes representatives from a national cross-section of large and small banks, industry associations, Reserve Banks and Board of Governors staff. Since October 1998 the Task Force has been working to identify and evaluate potential ways to apply image technology to improve the existing check return process. In late 1999, the Task Force established an overall goal to put a process and structure in place that would allow agreeing participants to exchange image returns and would be acceptable to banks and end users.

This paper documents the results of the Task Force's work to establish a framework for exchanging return items in the current legal and regulatory environment. The primary purpose of the document is to provide technical, operational and legal information to guide institutions interested in exchanging image returns. To help put the image return process in context, the document provides high-level background information about the current check collection and return process, and how the application of image technology could improve the return system. The document briefly describes the banking industry's ongoing efforts to migrate toward a more electronic check collection system over the longer term, and discusses how the FRB/Industry Image Returns Task Force's work relates to and supports these efforts. It also provides preliminary information about a legislative initiative currently underway that has the potential to make it easier for the banking industry to use electronic technologies to improve the check collection and return system. As additional background information for potential image return participants, the document describes tests of concept undertaken to learn more about specific aspects of image return, discusses the results of qualitative market research conducted in 1999 and 2000 that underlie the image return exchange process described here, and provides preliminary information about potential costs and benefits for different participants in an image return environment.

The Current Check Collection and Return System

Checks are widely used in the United States by individuals, businesses and governments. They are almost universally accepted and are convenient, familiar and reliable. The check clearing process is well established and works reasonably well, but it is also a paper-based, transportation-reliant process which takes place within tight time frames.

A check writer (or drawer or maker) writes a check to authorize his or her bank to withdraw funds from his or her account to pay a named payee. To obtain payment, the payee who accepts the check typically deposits the item with his or her bank (the bank of first deposit or BOFD), where the amount is credited to the depositor's account. To obtain settlement for the check, the BOFD must send the check to the drawer's bank (the paying bank). About one third of all checks written are "on-us" checks, where both the drawer and the depositor maintain their accounts at the same depository institution and the processing of the checks is internal to their common institution. The remaining two thirds of the checks written are interbank or "transit" checks, where the BOFD and the

paying bank are different institutions and the checks are cleared through the interbank check collection process. The process of presenting a transit check to a paying bank may be performed in a number of ways: the BOFD may present the check directly to the paying bank; it may present the check at a local clearinghouse exchange; or it may use the services of an intermediary, such as a correspondent bank or a Federal Reserve Bank. When the paying bank receives the check, typically it settles with the presenting bank and the amount of the check is deducted from the drawer's account.

In most cases, the funds in the drawer's account are sufficient to cover the amount of the checks presented and the paying bank settles with the presenting bank for the amount of the check on the day of presentment. On occasion, however, the funds are unavailable because of insufficient or uncollected funds, a closed account, or other reasons. The paying bank then has until midnight of its next banking day to return the check. (If the paying bank does not return the check by this midnight deadline, payment of the check is considered final.) The returned or "bounced" checks are sent back to the BOFD directly or through a clearinghouse or through one or more intermediary returning banks. The BOFD settles with the returning bank, deducts the amount of the returned check from the depositor's account and sends (often by mail) the dishonored item back to the depositor. If the check was returned for uncollected or insufficient funds the depositor might decide to redeposit the check for collection through the original BOFD or through another institution: a large percentage of checks returned for insufficient or uncollected funds clear when presented to the paying bank the second time. Appendix 1 provides a detailed diagram of the current paper return process.

Studies by the Board of Governors and others provide some sense of the scope of the return issue. Of the approximately 64 billion checks written in 1996 in the United States, approximately 45 billion were interbank checks[1]. On average, slightly less than one percent of the total checks written are returned to the BOFD unpaid, resulting in approximately 400 million interbank check returns annually. According to the results of a study by the Board of Governors of the Federal Reserve System, in 1995 the average return cycle for interbank check returns was 5.5 calendar days. Slightly less than half of the local return checks (approximately 48 percent) were returned within two business days, which is the maximum permissible hold period for funds availability on local checks. Approximately 83 percent of all nonlocal checks were returned within five

[1]This is the approximate number of interbank checks written in 1996 as cited in the January 1998 report, The Federal Reserve in the Payments Mechanism, by the Committee on the Federal Reserve in the Payments Mechanism. No one knows the actual volume of interbank checks and return items, since the number of checks cleared and returned through clearing houses, correspondent banks and direct presentment and the actual number of on-us checks are unknown. The Federal Reserve is undertaking an extensive payments study in 2001 to determine the total volume of checks written in the United States and to gather information that will help make the payments system more efficient. The total number of checks written each year continues to grow; recent estimates suggest that there are now about 68 billion checks written annually in the U.S.

business days, which is the maximum permissible hold period for funds availability on nonlocal checks. [2]

The results of the Board's survey also indicated that about 60 percent of all banks lost money through check fraud in 1995, with these fraud losses amounting to approximately $600 million. Other industry sources estimate annual check fraud losses for financial institutions in excess of $1 billion[3] and that estimated fraud losses incurred by merchants and corporations are significantly higher, perhaps over $10 billion.[4] While the exact amount of check fraud is unknown, there is wide agreement that the amount and scope of check fraud is significant and increasing dramatically.

Role of FRB/Industry Image Returns Task Force

Although the U.S. check clearing system works reasonably well, it has a number of drawbacks. It is costly due to the repetitive handling, processing and time-critical transportation required to clear items, and slow when compared with electronic payment options. It is prone to errors and delays (from adverse weather and other factors). It also is increasingly subject to fraud. A transit check can be handled by two, three, or even more institutions in the collection stream, with multiple processing steps at each point. Exception items such as returned or bounced checks must be handled manually by the paying bank and the BOFD, and are generally processed in an automated manner by intermediaries (similar to forward collection items).

To help address some of the drawbacks to the current paper-based system, the industry has been involved for many years in various efforts to apply the efficiencies of electronics to the check collection system. Over the last several years a number of industry participants have expressed new or intensified interest in pursuing electronic check collection. Industry organizations and groups such as the Small Value Payments Company (SVPCo), the Electronic Check Clearinghouse Organization (ECCHO), the Image Archive Forum, NACHA's Electronic Check Council and others are sponsoring or collaborating on initiatives to explore different approaches to separate the payment information from the paper check and exchange the check payment information electronically.

The work of the FRB/Industry Image Returns Task Force is consistent with other industry groups' efforts to apply technology to the current paper-based check system to improve efficiency, reduce costs, improve funds availability and reduce risk. The focus of the Image Returns Task Force has been to develop a process that would support migration to an all-electronic returns environment consistent with an end-to-end electronic check collection system. Developing a more electronic returns process is

[2] A local check is one deposited at a depositary bank that is located in the same Federal Reserve check processing region as the paying bank. A nonlocal check is one deposited at a bank in a different Federal Reserve check processing region than the paying bank.
[3] Gillam, Carey, "N.C. Giants Clash with Out-of-State Customers: First Union Draws NJ Protest with Thumbprint Policy, American Banker, August 22, 1997.
[4] Bank Systems + Technology, January 1998.

critical to achieving the industry's longer term goal of moving to a more electronic check clearing system that allows for truncation of the physical check as early in the collection process as practical. The challenge for the Image Returns Task Force has been to design an image returns environment that is acceptable to participants and improves overall efficiency without sacrificing safety, security or risk.

Using Image Technology to Improve the Check Return System

Over the years, technological advances have been applied to many aspects of the banking industry to improve the efficiency, quality and reliability of internal and external systems and provide better service to customers. In the check arena, while the basic mechanics of check processing have remained unchanged for some time, the equipment used to perform the processing has become more technologically advanced. In recent years, hardware and software have advanced to the point where full scale digital imaging of checks is both possible and affordable. Financial institutions have been implementing imaging technology in various internal check functions, such as proof of deposit and customer statement operations, to improve productivity and reduce costs and have begun to apply image technology to other check processing functions. These imaging implementations have gradually been replacing older microfilm technology at most financial institutions.

In the check processing function, image technology allows digital images of the front and back of checks to be captured using special cameras as the checks pass through check-sorting equipment. The digital images can then be stored, or archived, on Direct Access Storage Device (DASD), a computer diskette (CD ROM), or magnetic tape for future retrieval and viewing. Depending on the individual institution's business need, images can be sorted and indexed by account number, check number, pay date, customer name or other criteria. During viewing, ideally, the images could be manipulated as needed to highlight particular information (e.g., flipped, rotated, turned, sections enlarged). These capabilities were not possible with older technologies, such as microfilm.

The Image Returns Task Force has been evaluating potential changes to the check return process whereby the paying institution could return an image of the dishonored check to the BOFD. Digital images could be used either to complement the physical movement of the paper return (in the near term) or as a substitute to eliminate the paper return (over the longer term). An image return process between participating institutions might work as follows:

- the paying bank (check writer's bank) receives a paper check for payment, identifies it as a return item, and captures an image of the check for return to the BOFD;
- paying banks that do not have image capability return the paper check to an intermediary, such as their processor or a Federal Reserve Bank, to create the image and deliver the image return to the BOFD;

- the paying bank, or its intermediary processor, sends the image return to the BOFD or provides access to return item images from an image archive;
- the BOFD sends a paper copy of the image return item (an image replacement document or IRD) to the check depositor or provides the depositor access to the images from the institution's image database;
- the paying bank destroys the original return item after an appropriate period of time. The image then serves as the permanent payment record.
- checks that were collected using an electronic forward collection process would have sufficient information included in electronic form to facilitate the return of dishonored checks to the BOFD and its customer.

The above description is included here only to illustrate how an image-based return process could speed the flow of information to the BOFD and its customer and reduce paper handling. The technical section of this document provides detailed descriptions of a number of image return scenarios that participating institutions might undertake in the near term. The scenarios include different forward collection and return processing models, assume that the paper return item would likely flow back to the BOFD in the near term, and address specific issues such as how re-presentment would work under different processing models in an image returns environment. Image replacement documents are described in more detail later in this section (Section 1) as part of the discussion about a new, potential legislative initiative.

Some of the anticipated benefits from industry-wide use of an image-based return system include back-office cost and labor savings for collecting and paying institutions from a more streamlined returns process; reduced risk, including a potential reduction in fraud losses through faster notification and return of dishonored items to the bank of first deposit, and earlier provision of information regarding bad checks to depositors, such as merchants and corporate customers; and new opportunities to provide value-added services to corporate/retail customers and consumers. More widespread use of image returns also could facilitate the use of electronic check presentment by participating depository institutions.

Some of the potential costs associated with moving to an image return system include hardware and software costs for participating institutions to adapt or obtain image systems and higher near-term costs associated with inefficiencies during the transition period, such as having to run dual return processing systems (paper and electronic).

The transition period for migrating to broad-based use of image returns will pose difficulties for the industry and individual institutions. Justifying moving forward with image returns, and taking on higher near-term costs before there are enough participants to ensure a successful transition by the industry, will be a key challenge for early participants. Institutions considering early involvement in image return exchanges will likely have an easier time justifying participation if they are already using image for other internal functions, or if early participation can be tied to achieving other important benefits for their institution, such as improved services and customer satisfaction or revenues from related value-added services.

Shared Industry Long-Term Vision for Returns

The FRB/Industry Image Returns Task Force developed a shared industry returns vision for the longer term in early 1999 to provide a conceptual foundation for the image returns project. The paragraph below, taken from the vision document, provides a high-level summary of the long-term returns vision:

"The vision is of a nation-wide all-electronic clearing system that accelerates the delivery of electronic return item information to the Bank of First Deposit (BOFD) or its agent. The charter for the Image Returns Task Force, and the challenge for the banking industry, is to design and implement an all-electronic environment that improves the overall efficiency and service without sacrificing safety, security or risk. This will require developing the appropriate legal and operational infrastructure to speed electronic return item information to the collecting and paying banks and for the timely resolution of return item transactions. The electronic information flow would be supported by an image-copy of the check. An image of the paper return item may accompany the transmitted electronic information, or access to the return image may be provided as per instructions within the return item record received." Appendix 2 provides the complete text of the vision statement.

High-level Objectives for the Image Returns System and Success Criteria

Below are a number of high-level objectives for an image returns system. The Task Force established the objectives, and the key success criteria, to guide the development effort.

1. Meets key success criteria - the proposed changes to the return system must be consistent with the key success criteria developed by the Industry Image Returns Operations Work Group. Specifically, proposed changes to the return process must be developed collaboratively; result in overall payment system improvements; ensure the safety, soundness and security of the new system; address end-user issues and rights; be implemented in a way that does not "shock" the industry; meet the needs of depository institutions of all sizes in both the near term and the long term; support a returns re-clearing process; and support or facilitate forward collection of checks in both paper and electronic environments.

2. Supports multiple check processing models and environments - the proposed changes to the return system will allow participation by institutions using paper-based or electronic check collection processes, and will support both truncation and non-truncation environments. The new return system will support participation by individual institutions and by large super-regional or national institutions operating in multiple time zones with cross-regional processing requirements.

3. Uses existing technology for the most part - the new electronic/image returns system will rely on existing software, hardware and telecommunications technology, although this technology may be combined in different ways than before. For example, in an image returns test currently underway, participating institutions have been using image replacement documents (IRDs) in some parts of the return process, in place of the paper return item or an image return. Return IRDs are copies of the back and front of the return check, created from an image of the item, printed on special paper, encoded with the associated MICR line and containing a legend indicating that the IRD replaces the original item. (Appendix 3 includes a sample copy of an IRD.) The new return system will provide the functionality of the current system at a minimum.

4. Accommodates participation without investment in technology - Some institutions, including smaller institutions, may choose to invest in hardware and software systems to participate directly in an electronic returns process, while others may want to participate in the process without making this investment. Intermediaries will be available to provide services for institutions that do not want to invest in the hardware and software required to support electronic returns.

Potential Future Developments Regarding the Returns Environment

Although the banking industry is interested in moving from the current paper-based check collection and return system toward a significantly more electronic process, the opportunities to do so have been limited by a number of factors including: current legal and regulatory requirements regarding presentment and return of the physical item; the need for agreements between institutions to be able to present and return items electronically; concerns about the legality of images as evidence; reluctance to invest in technology if a critical number of institutions do not participate; and concerns about losing customers who want to continue receiving their paper checks and return items.

As discussed in more detail later in this document, staff at the Board of Governors of the Federal Reserve System have a new initiative underway to facilitate the application of new electronic technologies to improve the check collection system. More specifically, Board staff members have been working with representatives from Reserve Banks and the industry on a potential legislative initiative that would facilitate truncation by allowing a copy of a check to be used in place of the original check in the collection and return process. If passed, the legislative initiative would be a significant enabler for broad based industry use of an image return process over the longer term.

The draft concept currently being developed and evaluated is called the Check Truncation Act. It would allow a bank to truncate some or all checks, and collect or return them electronically (by agreement) or by substituting machine-readable copies of images of the checks (i.e., "substitute checks" or image replacement documents) for the original items. The substitute check or IRD would have to accurately represent the information that appeared on the original check. It would have to be machine readable,

full-field MICR encoded, and would include an image of the front and back of the check, plus subsequent endorsements and a legend explaining that it is a substitute check. IRDs used in the return process would need to include additional elements specific to the automated processing of returns (e.g., a "2" in position 44 of the MICR line, a return reason code, the BOFD routing transit number). Electronic images of checks and substitute checks would be the legal equivalent of the original check for forward and return items. The intent of the proposed law is to foster innovation without mandating the receipt of checks in electronic form, significant operational changes, or specific technical solutions.

Board staff are working collaboratively with the industry to refine the concept and draft statutory language. If the concept remains promising after obtaining broad input from interested parties (i.e., banks, corporate and consumer check users, the Treasury) Board staff will request Congressional consideration of the draft statute. As noted in the legal considerations section of this document, under current law, banks that wish to pursue image returns have to establish agreements to govern those arrangements. One significant potential benefit of the Check Truncation Act legislation is that it could establish a base line with respect to many of the issues that an image return agreement between participants should address. If such legislation were passed at the federal level it could have the effect of providing a uniform and consistent national framework for such arrangements.

Overview of the Rest of the Document

The remainder of this document provides a range of information that is intended to help interested institutions move forward with image return exchanges in the current legal and regulatory environment. The near-term image return process described in this document would not require legal or regulatory changes and minimizes the business risk for early participants. The proposed process accommodates individual institution's choice of return media and would be implemented based on agreement between participating institutions. It supports the use of third-party processors and intermediaries by institutions that want to participate without investing in technology, and is structured to accommodate national expansion as legal and regulatory changes facilitate more widespread use of image returns. The remaining sections of the document are described briefly below.

Section 2 provides detailed information about technical and operational aspects of image return exchanges. The section describes the operational and technical criteria that need to be met to implement image returns; documents near-term and longer-term image return process flows; outlines the technical components and processes required for different parties in the image return process; discusses implementation considerations; and describes the use of standards for image returns and the need to establish protocols. Section 2 also includes information related to image quality and usability, potential exception resolution procedures, and security/fraud issues.

Section 3 of the document summarizes the general legal issues involved in agreements to exchange image returns and discusses a number of basic questions that have been raised about the practical and legal aspects of potential image return systems. Issues discussed in the legal section include image usability, warranties, information contained on IRDs, elements that might be addressed in an image return agreement, retention considerations, and the admissibility of images as evidence. The section also includes additional information about the Board's legislative initiative.

Section 4 provides information about lessons learned thus far from tests of concept currently underway, and those completed previously, regarding specific aspects of image returns. The section covers four tests of concept: 1) the Electronic Presentment Image Check (EPIC) Project in Montana; 2) a test involving Eastern Corporate Credit Union (EasCorp), its member credit unions, and the Federal Reserve Bank of Boston; 3) a test, completed previously, between the Federal Reserve Bank of Jacksonville and institutions in the Sixth Federal Reserve District; and 4) a test involving the New York Clearinghouse, Chase Bank and the Federal Reserve Bank of Boston, also completed previously. Some of the issues discussed in the tests of concept section include the use of grayscale versus black and white images, customer acceptance of image replacement documents versus a copy of the image, and the use of automated exception handling processes.

Section 5 summarizes the results of the qualitative market research conducted by the Customer Issues Work Group in 1999 and 2000 with key participants and stakeholders in the check return process. The summary discusses some of the issues, potential benefits, educational opportunities and ideas for increasing acceptance of image returns identified through the market research effort. As noted in the "overall impressions" section at the end of the market research summary, most stakeholders were positive regarding a move to image returns. While all groups raised potential concerns and barriers, the market research results indicate that most stakeholder groups would accept an image return process if the major barriers and concerns are addressed. The results also indicate that most respondents believe that the potential benefits of an industry move to image returns outweigh the potential drawbacks.

The final section of the report, Section 6, presents the results of a recent analysis of costs and benefits associated with image returns. As discussed in the section's overview, the results of the analysis are highly sensitive to the assumptions used and would change under a different set of assumptions. Also, the financial information included in the analysis is based on the experiences of two banks and indicates that the costs and benefits vary substantially according to the size of the institution participating in the return process. The cost and benefit analysis, therefore, is intended to serve as a guideline for indicating how each party might be affected in an image return process; the findings are not sufficiently robust to determine whether image returns would provide positive net benefits overall.

Section 2: Technical and Operational Considerations

Section 2 discusses technical and operational considerations related to implementing an image return process. The ten sub-sections (labeled A through J) cover the following topics:

A. Overview of technical and operational requirements
B. General operational and technical design assumptions
C. Likely near-term image return scenarios (process flows)
D. Detailed near-term and longer-term process flows
E. Required technical components for image returns participants
F. Implementation considerations
G. Standards and protocols
H. Image quality and usability
I. Exception resolution procedures
J. Security and fraud considerations

A number of the earlier sub-sections in this section of the paper (i.e., Sections 2. B, C, E, F) reference specific standards developed by the Accredited Standards Committee (ASC) X9B, such as American National Standard (ANS) X9.37 or ANS X9.90. The specific standards are described in more detail in Section 2.G of this paper. Also, some portions of this section are provided in "bullet" format rather than prose format. Task Force members thought that the use of a bullet format for some of the more technical discussions would be easier for readers to follow.

A. Overview of Technical and Operational Requirements

The FRB/Industry Image Returns Task Force has identified an image return technical infrastructure that works within the legal and regulatory structure in place in 2001 and that utilizes existing hardware and current or proposed ASC X9B standards. The technical design subgroup identified three process flows that involve truncation of the forward and return item at different points in the collection stream. The three process flows are: 1) truncation of the paper return at the BOFD (Chart A), 2) truncation of the paper return at the paying bank (Chart B), and 3) truncation of the forward item at the BOFD (Chart C). All three process flows use basically the same architecture (hardware and software). Given the legal and regulatory environment in place at the time this document was written it is believed that Chart A, where the paper item continues to flow back to the bank of first deposit, is the most likely near-term scenario for implementing an image return system. Chart A is considered a short-term process flow that can provide a comfort level for participants during the transition period because the paper returns follow electronic or image delivery to the BOFD. Over the longer term, to gain the full efficiencies thought to be available through an image-based return process, the Task Force expects the industry to move to the process flow shown in Chart B and/or Chart C, where the paper item would be truncated prior to return to the BOFD.

The proposed changes to the return process are consistent with the high-level objectives set by the Image Return Task Force. The proposed image return process meets the key success criteria, supports multiple check processing models and environments, uses existing technology, and accommodates participation without significant investment in new technology. The proposed process flow supports intermediaries providing services for institutions that do not want to invest in the hardware and software required to support image returns. More specifically, the proposed process can accommodate individual institutions' choice of return media -- Image Replacement Document (IRD), electronic image, or paper -- and can be implemented based on agreement between participating institutions. The proposed process also can accommodate national expansion as legal and regulatory changes support more widespread use of image returns. In addition, the recommended near-term image return process flow minimizes the business risk for participating institutions during early tests of concepts.

The intent of the technology section is to answer questions that an organization might have regarding implementation of image returns. Below are some of the basic questions that are addressed in the following sub-sections:

- General Assumptions: What criteria does my organization need to meet to implement image returns?

- Process Flow(s): What considerations must be addressed in my current work flow to support image returns?

- Required Technical Components for Image Returns Implementation: What technical components must I have in place to participate?

- Implementation Considerations: Where might my current return process require modification to support image returns?

- Standards and Protocols: What formats will be used to exchange data between parties?

B. General Operational and Technical Design Assumptions

Below are the operational and technical design assumptions regarding implementation of the image return process, including assumptions about the use of grayscale versus black and white images. The assumptions indicate some of the criteria that participating institutions will need to meet to implement image returns. The assumptions involving the use of image replacement documents are based on passage of enabling legislation, such as that currently referred to as the Check Truncation Act, over the longer term and agreements between participating institutions in the short term.

Operational Assumptions

- An agreement will be made between the Bank of First Deposit or its intermediary and the Paying Bank or its intermediary regarding what will constitute the transfer of value for a return item.
- An agreement will be made between the BOFD or its intermediary and the Paying Bank or its intermediary regarding the timing of return of the paper items, if appropriate. The paper item will generally be returned to the BOFD within two business days of the electronic image return unless the parties specifically agree to some other timeframe, or laws or regulations are written to allow non-return of paper without specific agreement.
- An agreement will be made regarding the type of connection used to send an Electronic Check Exchange (ECE)[5] return file or a return Image Cash Letter between the BOFD or its intermediary and the Paying Bank or its intermediary.
- If electronic returns are followed by the original paper items, the Paying Bank will send the paper-to-follow returns in a separate, clearly marked return cash letter.
- The BOFD will implement internal procedures to prevent double posting of paper-to-follow returns.
- The BOFD will determine the media used to return items to customers (i.e., electronic image, Image Replacement Document or original paper return).
- In the near term, the Image Replacement Document (IRD) will be used for re-presentment in most cases.
- The IRD will be printed by the BOFD or its intermediary.

[5] ECE, ECL and ECP mean different things to different participants in the check process. The three terms are defined in this document as follows:
ECE (Electronic Check Exchange) definition from X9.37 – The exchange of check information electronically, in lieu of or in addition to the exchange of paper checks. For forward presentment, usually referred to as electronic check presentment (ECP).
ECL (Electronic Cash Letter) – ECL is generally used by the Federal Reserve to define a product where the input cash letter is electronic. As used in this document, it also refers to the creation of the X9.37 formatted file.
ECP (Electronic Check Presentment) – ECP can be used to describe when legal presentment occurs. However, it is more generally used in the banking industry to describe the electronic exchange of payment information. The Federal Reserve defines its ECP products as those where legal presentment occurs with the receipt of the electronic information. The private sector calls their electronic process ECP, but legal presentment does not necessarily occur with the receipt of the electronic check data.

- An IRD is indemnified and warranted by the BOFD or converting bank as a replacement for the original.
- The BOFD will institute internal procedures to handle the possibility of a customer requesting the original paper return after an indemnified IRD was already released. Internal procedures to be considered include:
  - Marking the original return with a "Item Not Negotiable" stamp
  - Implementing Audit Trails
  - Developing Controls

Technical Assumptions

- The Paying Bank or its intermediary has the software to create and send a return Image Cash Letter (X9.37) or an ECE Return File (X9.37).
- The BOFD or its intermediary has the software to accept a return Image Cash Letter (X9.37) or ECE Return File (X9.37).
- The BOFD or its intermediary has, or will implement, the hardware and software to generate an Electronic Image Return for its customers, if they choose to provide this service.
- If an IRD is the desired media for return to the customer, the BOFD or its intermediary has, or will implement, the hardware and software to generate and print the IRD.
- IRDs will be compliant with emerging ASC standard X9.90. This standard will address inclusion of the returning bank routing transit number, sequence number and processing date.
- If both participants have image archives, and the Paying Bank or its intermediary returns a return Image Cash Letter, the BOFD or its intermediary will use the image sent by the Paying Bank or its intermediary to generate the return to ensure complete endorsement information.
- If both participants have image archives, and the Paying Bank or its intermediary returns an ECE return file, the BOFD or its intermediary has the option to use the image from its own archive to create the image return as long as they append the information from the ECE return file to ensure the completeness of the endorsement chain.

Grayscale Assumptions

- When BOFD data is not available, grayscale images may be necessary to support the return process.
- Paying Bank process:
  - If a Paying Bank receives an ECE X9.37 forward cash letter with BOFD information, then a grayscale image is not necessary.
  - If a Paying Bank or its intermediary is trying to interpret the BOFD from the image, a grayscale back may be necessary more then 50 percent of the time (based on experience gained in the Montana EPIC Project).

- BOFD process:
  - If the Paying Bank or its intermediary supplies the original BOFD send data in the returns file then a grayscale image is not needed.
  - If the BOFD uses an image to interpret the depositing customer, a grayscale image may be needed for the back of the check.

C. Matrix of Likely Near-Term Return Scenarios

Below are the most likely return scenarios for the near term. The scenarios represent the possible forward and return flows included in Chart A. As noted earlier, Chart A is considered the most likely image return scenario in the near term because it does not require legal or regulatory changes and it minimizes the business risk for participating institutions during early tests of concept. The matrix below represents all possible combinations of Chart A's three different forward options (paper, ECE, image) and two return options (ECE, image). The purpose of the matrix is to help institutions identify which flow(s) are appropriate for their current environment and which flow(s) they may want to address in the future. The flows included in Chart A are explained briefly below the matrix and discussed in more detail in Section 2.E of this paper, titled Required Technical Components for Image Returns Implementation. Appendix 4 provides a more detailed matrix of potential process flows. The detailed matrix includes the six scenarios shown here, as well as a number of other possible scenarios that are either outside the scope of this project or would require special agreements or enabling legislation. For each scenario, the detailed matrix shows the media that would be used in the forward and return process based on the particular requirements or processing environment of the BOFD, the Paying Bank and the check depositor.

Six Process Flow Combinations in Chart A

	BOFD/Intermediary Forward Process	**Paying Bank/Intermediary Return Process**
1.	Paper	Image
2.	ECE	ECE
3.	ECE	Image
4.	Paper	ECE
5.	Image	ECE
6.	Image	Image

Forward Process – This process refers to the method the BOFD or its intermediary uses to clear the forward presentment item.

- Paper – BOFD sends a paper forward cash letter with no electronics.
- ECE – BOFD sends an Electronic Check Exchange (ECE X9.37) with forward paper to follow.
- Image – BOFD sends an Image Cash Letter (X9.37) with forward paper to follow.

Return Process – This process refers to the method the Paying Bank or its intermediary uses to return the item to the BOFD or its intermediary. It is likely that settlement will occur based on this method. In the near term, the paper return will likely follow the electronic or image return with a two-day lag.

- ECE – Paying Bank or its intermediary sends an ECE (ECE X9.37) return to the BOFD or its intermediary.
- Image – Paying Bank or its intermediary sends a return Image Cash Letter (X9.37) to the BOFD or its intermediary.

D. Detailed Near-Term and Longer-Term Image Return Process Flows

Section 2.D provides more detailed descriptions of the three process flows that the Image Return Task Force's Technology Workgroup identified for implementing an image return system. Each process flow involves truncation of the forward or return check at different points in the collection stream. A financial institution that wishes to participate in the image return process without investing in the necessary hardware and software could contract with an intermediary to perform the applicable functions and provide collection items to the appropriate party in the desired format. Below are descriptions of the three near-term and longer-term image return process flows, followed by the actual flow charts (Charts A, B and C).

Chart A – Original return truncated at the BOFD: This process flow illustrates the forward paper check being sent to the paying bank or its intermediary and the paying bank or its intermediary returning the original item to the BOFD, following delivery of the image or electronic return. An Image Replacement Document (IRD), an image of the item, or the original return item can be used for re-presentment depending on the method of return. As noted earlier, this process flow is considered the most likely scenario in the near term because it does not require legal or regulatory changes and minimizes the business risk for participating institutions during early tests of concept. The proposed process flow accommodates individual institution's choice of return media (IRD, image copy, or paper) and would be implemented based on agreement between participating institutions. The process flow can accommodate national expansion as legal and regulatory changes support more widespread use of image returns.

Chart B - Original return is truncated at the Paying Bank: This process flow illustrates the forward paper check being sent to the paying bank or its intermediary and the paying bank or its intermediary returning an image of the item, and/or an ECE return, and truncating the original return. The technical requirements are the same for Chart A and B. However, in Chart B, the paper check is not returned to the BOFD and the paying bank would have to develop operational procedures for handling any requests received from the BOFD to retrieve an original return item. An Image Replacement Document (IRD), an image of the item, or the original return item can be used for re-presentment depending on the method of return.

Chart C - Forward Item is truncated at the BOFD: This process flow illustrates truncation of the forward item at the BOFD. The BOFD sends an image cash letter or ECE cash letter to the paying bank or its intermediary as presentment, and the paying bank or its intermediary sends a return image cash letter or ECE return file to the BOFD or its intermediary. The BOFD would need a transit item bulk file system to be able to retrieve an original return if requested. An Image Replacement Document (IRD), an image of the item, or the original return item can be used for re-presentment depending on the method of return.

Absent legal or regulatory relief, this process is not considered the most likely scenario in the near-term because it affects the forward presentment of items to the paying bank as well as the return process.

Chart: **A**

Return Paper to Follow

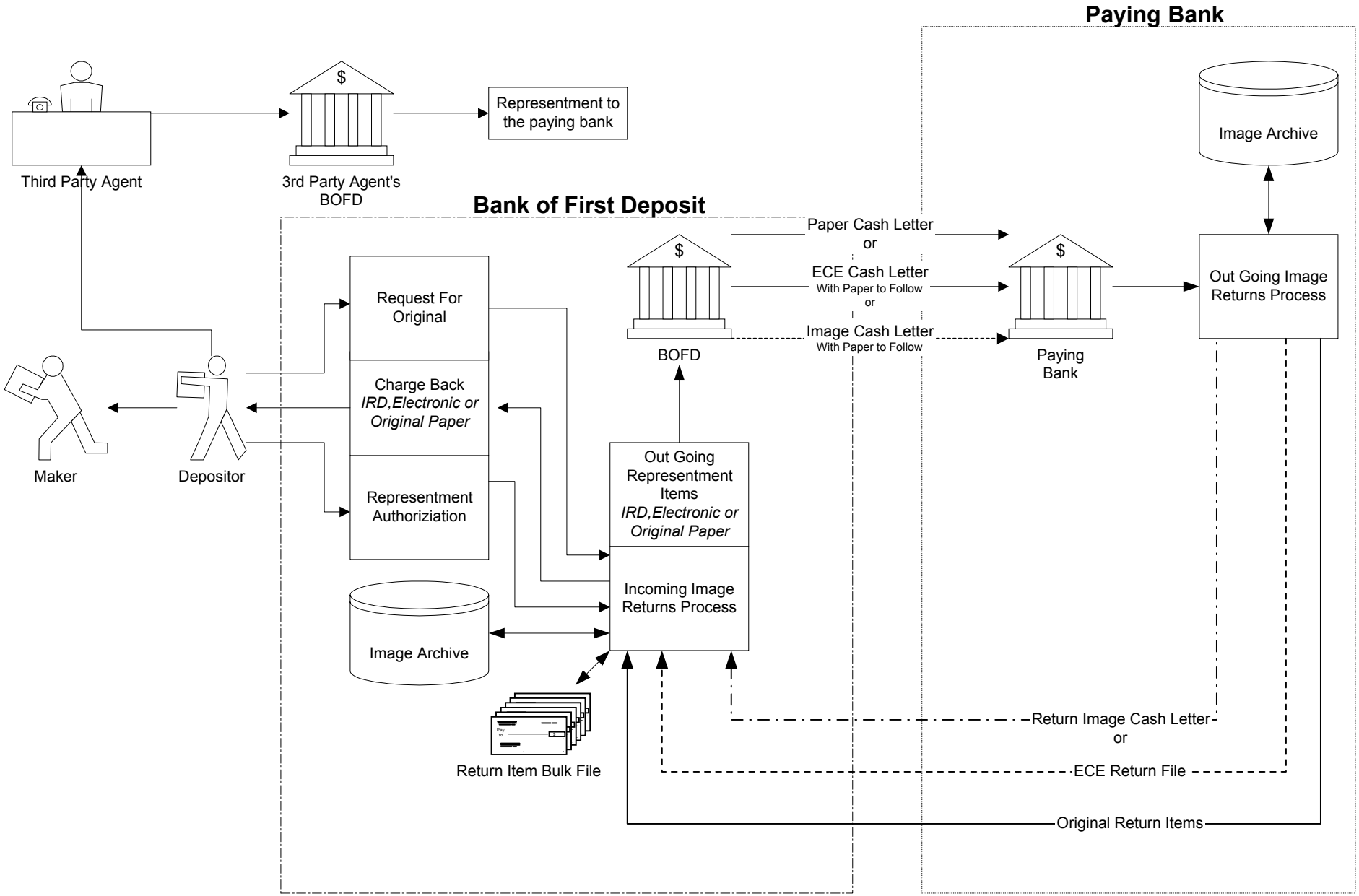


Chart: **B**

Forward Paper is Truncated At Paying Bank

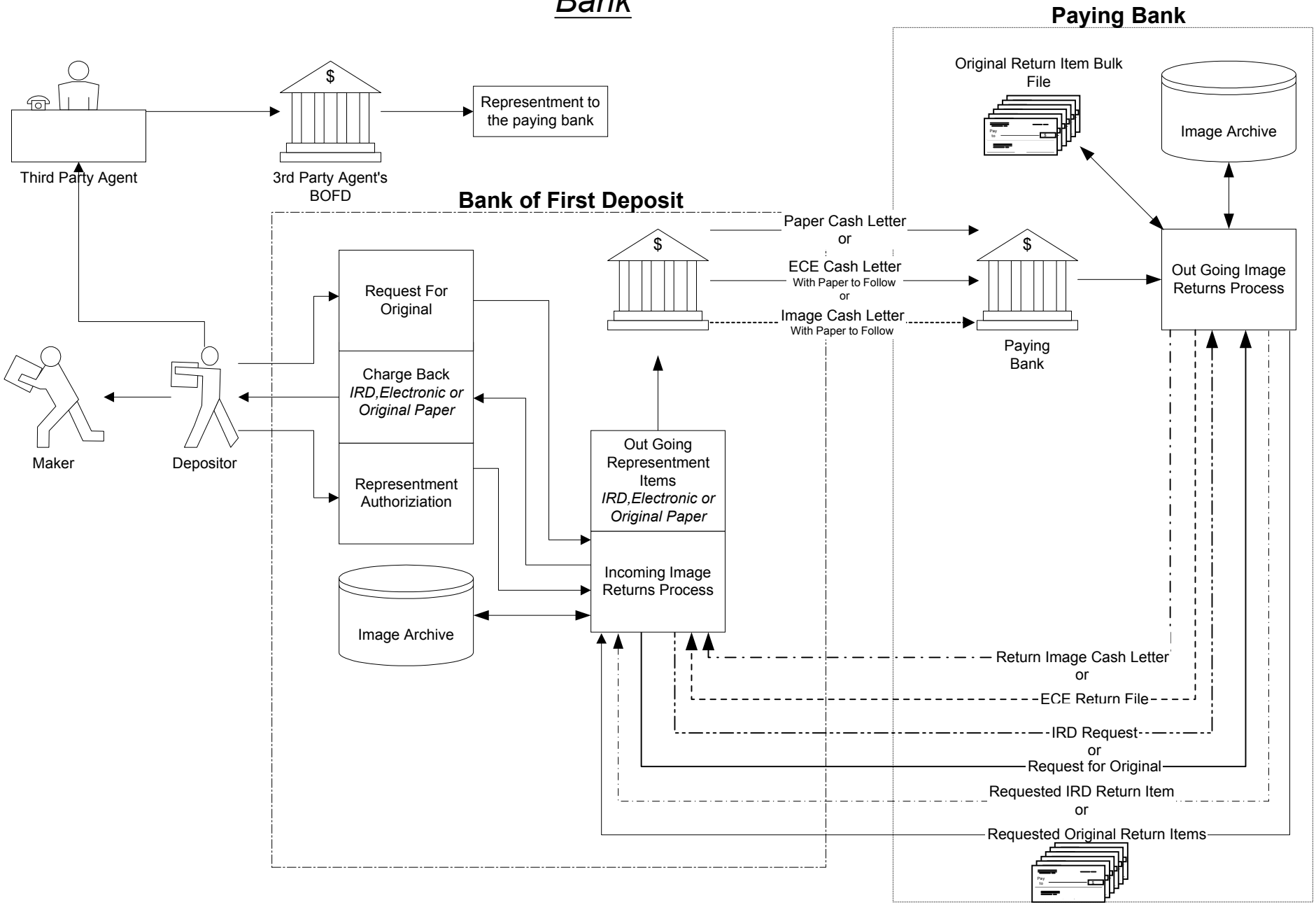
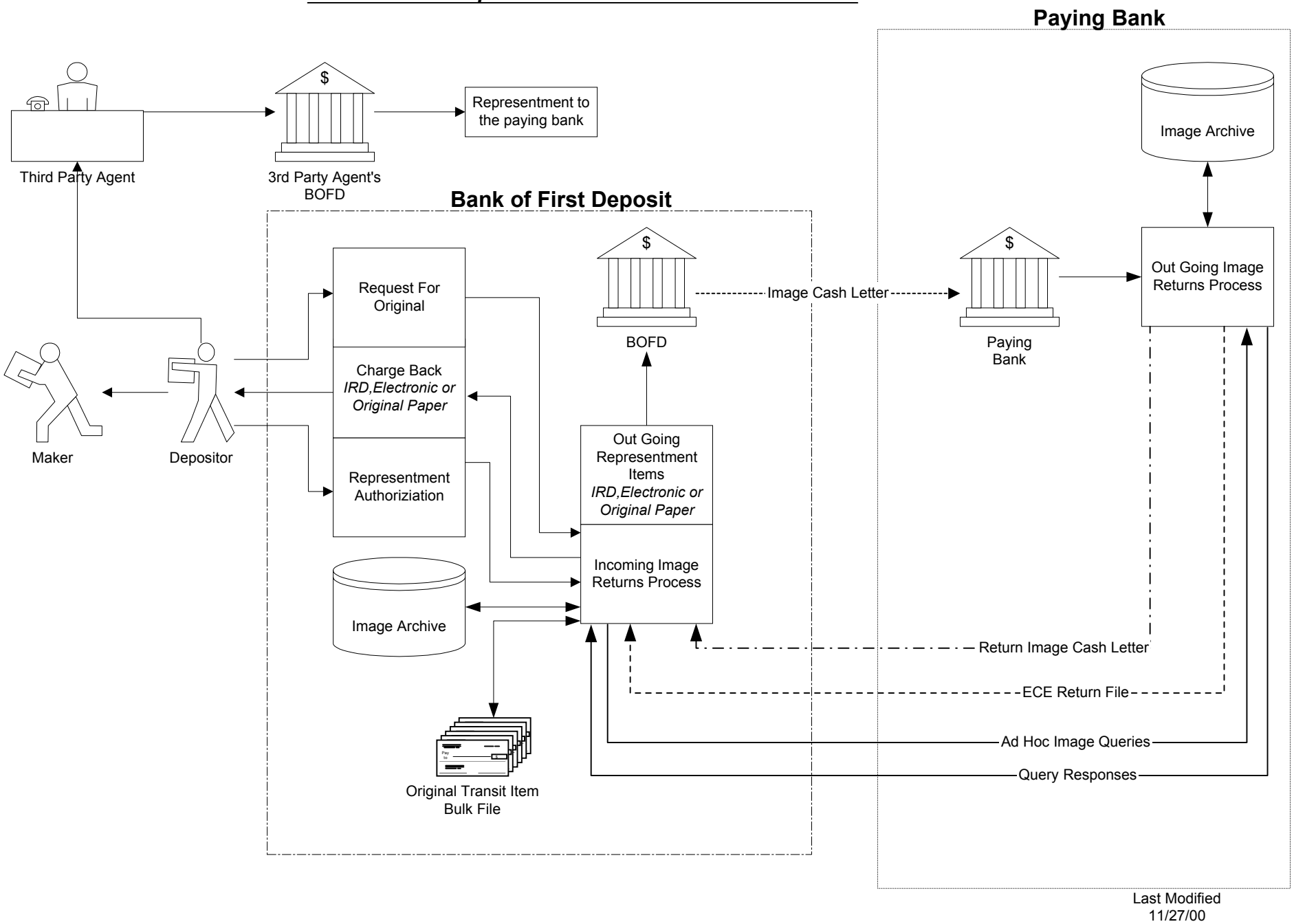


Chart: **C**

Forward Paper is Truncated At BOFD



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E. Required Technical Components for Image Returns Implementation

Section 2.E provides information about the technical components that institutions will need to have in place to participate in the image return process described in this document. The technical components required for the following eight processes are discussed below (in bullet rather than prose format):

1. Bank of First Deposit – Forward Collection Send Process
2. Paying Bank – Forward Collection Receive Process
3. Paying Bank – Exceptions Processing
4. Paying Bank – Returns Processing
5. Paying Bank – Returns Send Process
6. Bank of First Deposit – Returns Receive Process
7. Bank of First Deposit – Returns Process
8. Depositor Process

1. Bank of First Deposit - Forward Collection Send Process

- The Bank of First Deposit (BOFD), or its intermediary, could send the Paying Bank
  - A traditional paper cash letter
  - An Electronic Check Exchange (ECE X9.37) file and/or
  - An Image Cash Letter (X9.37)
- The BOFD, or its intermediary, can use image technology as follows
  - The image capture occurs via a prime or recapture process.
  - The capture process would load an image archive (short-term or long-term).
  - The capture and archive process could be performed by the BOFD or by another party.
- If Image Cash Letters are used, images could be in a black and white format
  - The BOFD data will be in the ECE file sent to the Paying Bank.
  - Use of grayscale will depend on bank agreements.
- The capture and archive process should have appropriate controls and software to ensure satisfactory check image availability and quality.
- Software is needed to produce an Electronic Cash Letter conforming to ANS X9.37 (specifications for electronic check exchange) for the appropriate electronic endpoints.
- If a complete image file and ECE data are being sent, then software would have to be developed to:
  - extract all associated images from the archive
  - construct an image cash letter conforming to ANS X9.37
- The X9.37 standard facilitates the ability to process the data and construct the control records and data records.
- If Electronic Cash Letter data needs to be sent in advance of the complete image data files an ECE X9.37 file would be sent first, followed by an Image Cash Letter (X9.37).

- If only a subset of images is desired, then the two banks would use ANS X9.46 (financial image interchange standard) to request and send specific images associated with the ECE X9.37 file.
  - The X9.46 standard does not include typical cash letter data.
- All MICR data captured must be included in the file.
- The capture and archive process must enable check digits to be included with routing transit numbers.
  - This may impact some capture systems as check digits can be truncated.
- The "on us" field data needs to be "as captured".
  - Some MICR field data might be truncated or reformatted based on capture edits.
- Repair:
  - The "on-us" MICR data may or may not be repaired as long as all characters read during capture are retained and sent to the Paying Bank.
  - Data repair would depend on bank agreements.
- Job scheduling and data transmission facilities would need to be established to enable sending the data as entries are completed.
  - Consideration should be given to sending multiple cash letters throughout the day, rather than using an end-of-day bulk send, to reduce the demands on bandwidth and CPU processes.
    * This decision will depend on volumes, cut-off times and telecommunications bandwidth.
  - The electronic transmission process will need to include controls to prevent the duplication of cash letters and allow a re-send to be initiated if needed.
- If electronic files are sent,
  - The paper items can be out sorted on a non-critical sort process so that a paper cash letter can be printed and associated with the physical checks.
  - The paper cash letter will need to contain special marking noting that it is associated with the electronic cash letter.
  - Under Chart C (Forward Item Truncated at BOFD) this process is not needed:
    * The BOFD would bulk file the physical paper checks for the appropriate time period.

2. Paying Bank- Forward Collection Receive Process

- The Paying Bank, or its intermediary, will need software that can manage the receipt of electronic cash letter data in an ECE X9.37 format.
- If ECE data and image files are received, the paying bank, or its intermediary, will need to receive data in an image cash letter X9.37 format.
- Electronic ECE MICR data will be reconciled to the image data for completeness.
- ECE data would be loaded as an electronic string into the check capture system software.
- Normal MICR edits would be performed and reject strings would be created for repair.
- Depending on how the images are fed to an image-enabled reject system, the image cash letter data would be loaded:

  - To the image capture system,
  - To the image reject system, or
  - Directly into the image archive.
- Rejects would be repaired using the transmitted image loaded into an image-enabled reject system or by accessing the image archive.
- Posting processes would not change.
- If ECE is used without images or when an Image Cash Letter follows an ECE transmission,
  - A recapture match reconciliation and repair process would have to be implemented to balance the paper to the ECE file.
    * The recaptured images would be loaded to an archive.
  - Adjustments would be posted to customer accounts when corrections are made.
  - The need for this would depend on the timing of the files
- If a paper cash letter is received, the Paying Bank, or its intermediary, will have to image capture the paper items and load the images to an archive.
- If image cash letters are used, the physical paper following the electronic cash letters would be held until the daily exceptions/returns processes are complete.
  - A sort process would separate all checks that had image returns so that they can be forwarded to the Bank of First Deposit on a non-critical schedule.
    * As checks-to-follow.
  - The Paying Bank, or its intermediary, will create a paper return cash letter and clearly mark the paper return item cash letter to identify it as containing paper items supporting electronic returns sent previously.
  - All other physical items would go to the normal bulk file for holding or statement return.
- For Chart B (Return Truncated at Paying Bank) the Paying Bank, or its intermediary, would bulk file all of the paper return items.
- For Chart C (Forward Item Truncated at BOFD) no paper processing would be required.

3. Paying Bank - Exceptions Processing

- If the Paying Bank, or its intermediary, receives images or performs an image recapture
  - The existing exceptions processes could be image enabled
  - Transmitted images could be accessed by loading them to an image archive, or
  - Images could be loaded to an enhanced image-enabled exceptions process.
- The physical paper would not be used for review.
- If the BOFD data from ECE files is not available in the exception application
  - Grayscale imaging of the back of the items should be considered to reduce the need to retrieve the paper item from the bulk files to identify the BOFD.

4. Paying Bank - Returns Processing

- The dispositioned exceptions file would be fed to the returns system.
- The existing returns system would be image enabled via image access to the archive,
  - Or a new integrated image return system would be implemented.
- If ECE files are received, the return system could be enhanced
  - To take the BOFD data from the archive as a pre-load for automated processing or
  - The BOFD data could be made available for viewing when an image is displayed.
- The return process would facilitate the determination of the BOFD and any special instructions for items to be returned.
- The system would be modified to include printed images on the printed charge-back notices to their customers.
  - The notice would include the printed images of the front and back of the item along with existing data.
- The system software would also create a print file of all customer charge backs and a print file of all BOFD returns.
  - This print file would be sent to a special IRD printer
    - A duplex printer with MICR ink cartridges.
  - The printer would use special software to allow for the printing of a reproduction of the check conforming to IRD standards:
    - MICR ink; front and back of the item printed on physical check stock.
- Printed IRDs would be matched to the charge-back notices and return cash letters for those endpoints and customers that do not accept electronics.
  - Depending on the volume involved, some software modifications may be desired to automate this collation process.
  - It would be highly desirable for the printer to be able to print the charge back and IRD, and automatically collate them, to eliminate the physical matching process.

5. Paying Bank - Return Send Process

- A Paying Bank, or its intermediary, has the option to send
  - An Electronic Check Exchange (ECE X9.37) return file and/or
  - A return Image Cash Letter (X9.37)
- For endpoints that accept electronics
  - Software is needed to take item data from the return file and build
    - A return electronic cash letter conforming to X9.37 and/or
    - A return image cash letter conforming to X9.37
  - This software will need to pull information such as the BOFD or sending institution sequence number from the check archive or the forward cash letter database.
  - The as received “on us” field data would be included from the incoming ECE data or the captured paper item.
  - The image would be retrieved from the paying bank archive or the image-enabled return system.

  - The software will also provide job scheduling and file send/recovery functionality.
- The system should allow multiple sends to an endpoint.
  - Telecommunications network connectivity will need to be established between the two institutions.
  - This electronic transmission process will need controls so that return cash letters are not duplicated and a re-send can be initiated if needed.
- If the BOFD requires paper (Chart A – Paper to Follow), the paper return item cash letter will flow back to the BOFD according to the agreement between the institutions,
  - Or, if no agreement is in place, according to current legal and regulatory guidelines.
- Paper return cash letters that support a previously sent electronic file will need to be clearly marked as such.
- Physical items that are not returned to the BOFD (Chart B – Return Truncated at Paying Bank) will be held in a bulk file for the appropriate period of time.
  - This could be a separate returns bulk file that would enable quick location of the physical item if it were requested by the BOFD.

6. Bank of First Deposit - Return Receive Process

- The BOFD, or its intermediary, would need software to receive
  - An Electronic Check Exchange (ECE X9.37) return file and/or
  - A return Image Cash Letter (X9.37)
- If only a subset of images are desired, software to transmit and read X9.46 data could be used to request and receive specific images.
- The BOFD, or its intermediary, must implement software to manage receipt of multiple return files and have the ability to request resends.
- As files are received, the MICR data would be validated and correlated to the image data for completeness.
  - This would depend on the timing of the files
  - The data and images would be loaded to an archive and/or an image enabled returns system
- For Chart A only, the BOFD will also receive a supporting paper return item cash letter according to the agreement between the institutions.
- The BOFD, or its intermediary, should not need a grayscale image of the back of the items because it will have the MICR data and payee to validate the item.
- The ECE return file should include the paying bank's processing date and item sequence number.
  - The current X9.37 file structure would only support inclusion of this information in a "reserved" or "user" field area.
- The fields could be used by agreement between the banks until the standards are updated to include this data.

7. Bank of First Deposit - Returns Process

- The MICR returns data would be matched to the check all-items file.
  - This is typically done with a call from the returns system.
  - Items that cannot be matched or that are suspect would be presented to an image-enabled workstation that would present the image and provide for data correction and dispositioning so that all depositors are identified
- The current return system would handle processing of any special instructions and the creation of charge backs.
- The BOFD has the option of providing the depositing customer with
  - An electronic image return file or
  - An Image Replacement Document (IRD) or
  - The original item.
- The return system would be modified to include the front and back of the image in the charge-back print file.
- If IRDs are used for the return, software would also be implemented at the BOFD or its intermediary to take the return file and create a print file of IRD documents.
  - The documents would be printed on a special printer capable of printing MICR ink and the front and back images of the item on check-sized documents.
  - The document and print file would conform to IRD standards.
  - The BOFD would authorize the indemnity of the IRD as a valid item for collection.
  - The charge-back notices and IRD documents would be printed, collated and mailed back to the depositor.
    - It would be highly desirable if the printer could print the charge back and IRD, and automatically collate them, to eliminate the physical matching process.
- If the BOFD chooses to return to the depositing customer an image notice of return and an electronic image return file, software would be needed to create the notice and the image return file.
  - This file could be unique to the BOFD and its customers or
  - It could conform to the X9.37 standard.
- If the depositor requested the physical check, it would be requested
  - From the paying bank's return bulk file (Chart B) or
  - From a special return bulk file at the BOFD (Chart A and C).

8. Depositor Process

- The depositor has the option to pursue payment from the check maker by using the return media provided by the BOFD or by requesting the return of the original item.
- If the depositor received an electronic image notice of return or an image cash letter, they could instruct the BOFD to redeposit the item electronically.
- The depositor can also redeposit the paper item either through the original BOFD, or through another BOFD, using the IRD provided by the BOFD or by requesting and redepositing the original item.

F. Image Return Process Implementation Considerations

This section provides a high-level description of the steps involved in the image return process. It is intended to help institutions determine where their current return process might require modification to support an image return process. The steps are as follows:

1. The Bank of First Deposit will follow its normal forward check collection process with the Paying Bank.
   - In today's environment, a majority of forward cash letters will include a paper cash letter, either alone or following an electronic cash letter.
   - There may be a reduction in the number of paper cash letters if legal or regulatory changes are enacted that support the use of electronics.

2. Upon receiving the forward collection items, the Paying Bank will continue to follow the forward collection process used today.

3. The returns process will continue to follow the process used today to return paper items while adding the ability to
   - produce and return an electronic image return file or
   - produce and return an ECE return file.

   Paper may or may not follow the electronic return file.
   - In today's environment paper will follow the electronic return file unless an agreement is signed between the Paying Bank and BOFD. The paper cash letter will be clearly marked to identify it as a paper cash letter supporting an electronic cash letter.
   - If supporting regulatory change is enacted, the paper item may be truncated at the Paying Bank without the need to sign an agreement.

   ASC X9B has initiated a standards change request to include the routing transit number, sequence number, and processing date of the returning institution in the X9.37 return cash letter. Once this standard is approved, these fields will be included by the paying bank creating the electronic return cash letter.

4. The Bank of First Deposit will receive an electronic return file (image or ECE).
   - In today's environment the electronic file will be followed by a paper return item cash letter that is clearly marked by the returning institution to identify it as paper items supporting previously sent electronic returns.
   - If supporting regulatory change is enacted, the paper returns may have been truncated at the paying bank.

5. The Bank of First Deposit will handle the return item by one of three methods:
   - Creating and returning an IRD (reference Standards and Protocols item X9.90 Specification for Image Replacement Document)

- Sending an electronic return to the customer
- Sending an image notification followed by the paper item.

When the proposed changes to X9.37 are approved, the IRD or electronic return will include the routing transit number, sequence number and processing date of the paying bank.

6. The depositing customer will pursue payment from the check maker or will redeposit the return media (IRD, electronic return, or paper item) either through the original BOFD or through another BOFD.
   - If the media used for redeposit is an IRD, it will be indemnified as a valid item for collection by the BOFD that presented the redeposited item.

7. Once the item is redeposited the process begins again at Step 1 above.

G. Standards and Protocols

The standards and protocols section describes how the identified standards will be used in the image return process. The detailed ASC X9B technical specifications are available for purchase at www.x9.org/books.html, or by calling 800-854-7179 or 303-397-7956.

Standards

X9.37 Specification for Electronic Check Exchange

This standard currently establishes the file sequences, record types, and field formats to be used for the electronic exchange of check MICR line and associated check processing data. The X9.37 file structure can be used for forward check presentment, return item notification (whether forward presentment occurred via electronic exchange or via traditional physical means), and return of truncated items. An enhanced version of X9.37 (development in progress) will support forward presentment and return with electronics only (images and/or paper to follow) and electronics and images. Provisions have been made for Image Replacement Documents (IRDs). The plan is to have the standard out for ballot to ASC X9 Financial Services members by fourth quarter 2001.

Decisions an organization must make when implementing this standard include, but are not limited to, the following: choice of data compression (e.g., Blank compression), encryption (e.g., DES, Clipper), transmission specifications (e.g., protocols, line spreads), and data representation (e.g., ASCII, EBCDIC).

X9.46 Financial Image Interchange

The Financial Image Interchange standard defines a query protocol that may be used to request specific imaged items, or to request groups of imaged items being held in another institution's image storage facility. The ability to request specific items facilitates the truncation of the paper at the earliest possible point in the clearing process. In an image return environment, this standard could be used if the paying bank sends an X9.37 return item cash letter and the BOFD requires an image of the item before it receives the return paper-to-follow cash letter. This standard could also be used in situations where the forward paper item is truncated at the paying bank.

X9.90 Specification for Image Replacement Document

A standard is being proposed for a substitute machine-readable copy of a check that would be used as the industry standard referenced in the proposed legislation, currently referred to as the Check Truncation Act. The proposed standard is modeled after an Image Replacement Document (IRD) specification used in the image return

portion of the EPIC Project in Helena, Montana. The industry has referred to this type of document as an Image Replacement Document.

The document has the characteristics of a check in that it would be printed on commercial size check stock and would incorporate a MICR code line at the bottom of the document. The document will have unique characteristics in that it will include areas that contain indemnification statements based on the use of the document. The IRD will also support the reproduction of the original MICR code line as well as an optional tear-off MICR code line that can be used for returns processing. Potentially, the ASC X9B IRD standard will provide the ability to include a digital certificate of authenticity.

Protocols

In the context of this document, protocols are the rules that govern the exchange of file data between two entities. The protocols do not define the underlying communication transport layer such as TCP/IP or FTP.

To date, no group or organization has established the protocol rule set necessary for the financial industry. The financial industry needs to charter a group of banks, software developers and communications providers to establish a financial industry file exchange protocol. Some of the elements that this group must define are:

- Handshake procedures
- File acknowledgments
- Error handling and restart procedures

H. Image Quality / Usability

The issue of image quality has challenged the banking industry since the early-to-mid 1990's, when the idea of image interchange became a viable concept. Various entities have undertaken work on this topic, but virtually all of the work has focused on image quality in forward collection rather than in the returns process.

Perhaps the most "broadly-accepted" or well-recognized work on image quality involved a joint effort between members of the Image Archive Forum and the FSTC "PACES" **(**Paperless Automated Check Exchange and Settlement**)** Project. Their collaborative effort resulted in a public document on image quality, titled *Image Quality White Paper*, that addresses quality issues relative to forward collection image file exchanges. The FRB/Industry Image Returns Task Force's position on quality relies in large part on the work documented in the white paper. This document supplements the white paper by providing information about quality issues specific to the return process. Below is a summary of the white paper followed by a discussion of additional quality considerations for returns.

White Paper Discussion

The white paper assumes that the purpose of the (PACES) environment is to truncate the paper check at the bank of first deposit and send the image of the item forward as presentment, thus resulting in images becoming a critical element for back-office processing by the paying bank. Since the paper item generally does not follow this transaction, the quality of the images exchanged becomes a primary concern for participating banks. In an image returns environment, the paper return item would be "truncated" at the paying bank, with the image sent to the BOFD.

In an image environment, both parties to the file exchange have an interest in the issue of image quality. The sending bank would generally warrant the quality of images sent/presented, and the receiving bank needs to be certain that the image files contain images of sufficient quality to be usable. The white paper acknowledges that establishing quality standards is a difficult task, and that measurement would be difficult and expensive.

The white paper references the IRS' definition of legibility and readability, which is as follows: *"Legibility is the quality of a letter or numeral that enables the observer to identify it positively and quickly to the exclusion of all other letters or numerals. Readability is the quality of a group of letters or numerals being recognizable as words or complete numbers".* The task of defining image quality led the authors to differentiate between quality and usability. For example, a good quality image of a bad source document could result in an unusable image. Differentiating between quality and usability led to the following definitions:

- **Image Quality** is that characteristic defined as a faithful digital representation of the source document.

- **Image Usability** is that characteristic defined by the degree of legibility and readability necessary to perform a specific function. The usability of an image can be subjective since it depends on the use of the image.

  Image usability is a particularly important issue for returns, since the return reason, BOFD endorsement and account information can be difficult to read, even when looking at the original item. Additionally, the use of carrier envelopes in the returns process by many banks exacerbates the readability problem. (This issue is addressed later in this section).

The authors of the white paper performed or reported on a number of tests related to quality issues, including:

- A transcoding test, to determine whether the exchange of grayscale images would pose interoperability problems and quality issues. The results of the test showed no problems.
- Several image-quality sampling tests, where a number of specific conditions were identified as reasons for unusable images. The conditions included damaged items, use of carrier documents, partial images, "piggybacked" items, and other conditions. Test results showed that out of a total sample population of almost 4.3 million items, less than 500 were tagged as unusable, for a very low "unusable rate" of .01%. Source document problems were cited as the predominant cause for these failures.
- A comparison of image quality versus microfilm, which concluded that images were at least equal to, if not better than, microfilm.
- The results of Chase Bank's experience receiving images from the Federal Reserve Bank for over two years, which indicated that the quality of images received was considered to be "good" to "extremely good".

To ensure quality images, the white paper recommends actions for banks and for vendors who provide image solutions to banks. The recommended actions for banks include implementing vendor-recommended quality procedures; adherence to ANSI standards; and requiring that imaging banks take reasonable steps to correct suspected quality problems where possible. Vendors should provide detection or prevention capabilities for several conditions at image capture.

Finally, the white paper suggests that an image meets the standard for exchange if the following conditions are satisfied:

- It is a full image of the check (not a partial image).
- It is an image of a single check (not a piggyback).
- There are no streaks or bands across the image.
- It is within tolerance of a compressed image size.

A copy of the white paper is provided in Appendix 5.

Additional Return Item Considerations

As noted previously, there are important differences in quality issues when comparing the use of images in forward collection and the imaging of returns. As a supplement to the quality issues raised in the white paper, the Image Returns Task Force identified the following additional considerations specific to the return process:

- Identification of the BOFD information on the back of a check is usually very important in the returns process. The "usability" of an imaged return may hinge on BOFD legibility.
- Different colors of ink are typically used in the returns process, such as the use of red ink to indicate the reason for return of the item. Such markings may or may not be legible with different image capture devices and formats.
- Return items tend to be "busier" with regard to endorsements and other markings on the check, which may make it more difficult to ensure legibility.

There are two additional issues related to image returns quality. First, the use of certain carrier envelopes in the return process can result in unusable images due to a bad source document. Carrier envelopes are generally used for one of three reasons: the item is torn or otherwise mutilated; there is some type of additional documentation being attached and sent with the item: or, a paying bank is using the envelope to "qualify" a return item by placing a "2" in position 44 of the MICR line and encoding the BOFD's routing transit number and the dollar amount. Almost regardless of the reason for use, the imaging of carrier envelopes containing checks (particularly return items) may result in unreadable information on the image, particularly for the back of the check. Limited testing of carrier envelopes suggests that there are types of envelopes that can result in legible images of the front and back of a check. Given that the payments system is moving toward greater reliance on imaging, all participants will need to take responsibility for ensuring that the selection and use of carrier document materials in the check collection and return process does not result in illegible images.

The second quality-related issue involves black-and-white versus grayscale images. Section 2.B of this document provides operational and technical design assumptions regarding implementation of an image return process, including assumptions about the use of grayscale versus black-and-white images. Section 4 of this document also provides some perspective on the issue, based on the experience gained in the image return portion of the Montana Electronic Presentment Image Check (EPIC) Project.

Summary

In summary, the Image Returns Task Force endorses and has relied heavily on the approach to quality taken in the *Image Quality White Paper*. However, as discussed above, there are quality-related issues that tend to be more prevalent for returns. The approach to quality described in this section is intended to provide direction to payments industry participants who are interested in exchanging image returns.

I. Operational Issues and Exception Resolution Procedures

The use of image returns will introduce new operational issues and change the way returns are reconciled and adjusted. The specific operational issues raised will depend to some degree on the image return model used by individual participating institutions, including factors such as the method used to initiate the image return and whether the process used involves image replacement documents (IRDs). In the adjustments area, the use of an image return process may affect the availability of certain pieces of information normally used in the paper-based adjustment process, potentially requiring a different approach to reporting or handling certain types of errors. The use of image returns also may reduce or eliminate the occurrence of certain types of adjustments and could eliminate the need for paper attachments when reporting certain types of errors.

The intent of this section is to show some of the unique issues that may occur within various image return processing environments and describe potential procedures for addressing the issues. The information provided in the tables below reflects the experience gained thus far in two recent tests of concept -- an image return test between EasCorp (Eastern Corporate Credit Union) and the Federal Reserve Bank of Boston, and a test between the Helena Branch of the Federal Reserve Bank of Minneapolis and its Montana territory customers (i.e., the EPIC project). Section 4 of the document provides more details about lessons learned from the two tests.

The tables included in this section describe issues and potential image return procedures associated with the four approaches listed below and compare the image-based processes with those for paper-based returns, where appropriate.

- Repassing Qualified Return Checks to Create the Image Return Transmission File (FRB Boston/EasCorp Model)
- Internet Access to a Central Image Archive (FRB Helena EPIC Model)
- Image Returns with Original Paper to Follow (Short-term Industry Model)
- Use of Image Replacement Documents (FRB Helena EPIC Model)

Additional tables at the end of the section provide information related to handling returns involving forged endorsements or signatures as well as examples of the types of adjustment errors that could occur in an image returns environment.

Due to the limited number of image exchange initiatives available to serve as a basis for developing exception resolution procedures, this section only reflects experiences gained through tests involving the Federal Reserve. As a result, certain details provided in this section may be specific to the Federal Reserve's processing environment. However, since image exchanges between other industry participants are likely to involve a number of the same issues discussed here, some of the exception resolution ideas included here for specific processing models could have broader application within the industry.

Repassing the Qualified Return Checks to Create the Image Return Transmission File (FRB Boston/EasCorp Model)

The two tests of concept discussed in this section use different methods to initiate the image return. The Helena Branch model involves image capture of all forward collection items. The image return is initiated from the forward item, thus eliminating the issues with carriers and red ink stamps. In the EasCorp/FRB Boston model, the Boston Reserve Bank captures an image of the qualified return checks (QRCs) and then creates a transmission file of returns for delivery to EasCorp. The table below shows some of the operational issues that can arise when the image file is created from the qualified return rather than the forward item and potential procedures to address them.

Issue/Process and Description	Paper-based Procedure	Potential Image Return Procedure
Quality of Image in Carriers Imaging of return items in carrier envelopes may result in unreadable information on the image, particularly the back of the check.	Item is removed from carrier to read the endorsement information.	• Separating the item and carrier before image capture is a solution but can be very labor intensive. • Utilize a type of envelope/carrier that results in a legible front and back of the check.
Red Ink Stamps Red ink is normally used to indicate the reason for return on an item. Red or purple ink is typically not readable depending on the capture device and format.	Red and purple ink is used to clearly indicate endorsement data and the reason for return.	• Educate the banking industry on the use of red/purple ink • Develop standards that support image processing and enforce the standards.
Balancing Repass of Returns The returns are listed to a pocket for the BOFD on the initial processing of the return. The checks are run a second time to create the accounting charge and to image the returns.	Not applicable	• A job is run to extract the images from the archive. The job is not linked to the order that the returns were run. • A transmittal is created and is contained as a record in the image file. • The number of items and total dollar amount from the return cash letter are compared to the transmittal.
Reconcilement of Image Return Transmission The BOFD that accepts an image return transmission file reconciles the transmission totals to the original items received and also to the charge on their accounting statement.	Reconcile items processed with cash letter total.	• If the BOFD does not receive the image file, they report a missing cash letter to the Fed. • Unlike the paper process, the handling of the images is a manual process. An adding machine tape is run to balance the number of items and the dollar count. These two figures are compared to the transmittal. • Error reporting involves reporting the difference between the received image information and the comparison to the transmittal data.

Internet Access to a Central Image Archive (FRB Helena EPIC Model)

As indicated above, in the EPIC model all forward items are imaged and the image return is created from the forward image. Participating institutions can access the central image archive via the Internet to initiate or receive image returns. The following table provides examples of some of the operational issues that can arise when paying institutions initiate image returns, or the bank of first deposit receives image returns, by accessing the centralized image archive.

Issue/Process and Description	Paper-Based Procedure	Image-Return Procedure
Initiating Image Returns		
Image Returns with illegible or missing endorsements - Source of Receipt (SOR) Forward item in the image archive that must be returned but the BOFD endorsement is either illegible or missing.	Item is charged to the drawee with a request to supply source as a cash item (presentment). FRB will re-credit, trace, and charge the item to their depositor.	• Same as paper-based procedures. • Physical item must be retrieved. • If physical item cannot be read, item is researched to determine source of receipt.
Image cannot be located in the archive Forward item that needs to be returned cannot be located on central archive.	Not applicable	Original item must be retrieved and returned.
Image to be returned is not within established decision processing window The decision window for initiating returns in the EPIC image return system is currently 3 days.	The return deadline for a paying bank is by midnight on the day following presentment. If an item is discovered within this deadline, the item can be returned through normal return channels. If not, a return adjustment is made.	If item to be returned falls outside this window, the original item must be retrieved and returned.

Issue/Process and Description	Paper-Based Procedure	Image-Return Procedure
Reconcilement of Image Return Cash Letter Deposit Items marked in the image archive, as returns are reconciled between the initiating Paying Bank and the FRB.	Reconcile credit on statement with cash letter total.	• Paying Bank prints a pick list of images marked as returns and faxes to the FRB along with a completed Image Return Balance Summary Sheet. • Paying Bank reconciles credit on statement with totals on Image Return Balance Summary Sheet.
Accepting Image Returns		
Reconcilement of Image Return Cash Letter Charge The BOFD accesses and queries the FRB image archive via a secure Internet connection. Images returned are reconciled between the BOFD and the FRB.	Reconcile charge on statement with cash letter total.	• The Helena Branch faxes an image return summary report that includes a detailed return item list, item count and dollar amount to the BOFD. • BOFD verifies charge on accounting statement from FRB.
Illegible Image Returns A BOFD cannot read their endorsement on the image.	BOFD initiates a return adjustment requesting credit.	• Based on EPIC experience, if the grayscale image is used the illegible endorsements can be read approximately 50 percent of the time. • As a value-added service for its truncation customers, the Helena Branch will pull the original item or research source information. • If the item was missent an adjustment is initiated. • A non-truncation customer would follow paper-based procedures.
Request for Original Return Item that was truncated with the FRB During the pilot phase of the EPIC project the BOFD has the option to continue to receive the original return items or truncate them at the Helena Branch. For a fee, a BOFD can request retrieval of an original return item within 120 days after receipt of the image return.	Not applicable	• BOFD submits a completed "EPIC Retrieval Request" form to the Payor Services Department within 120 days of receipt of the image return. • Helena Branch sends the item in an envelope clearly marked "Do not Process" – Items for documentation only.
Missent Image Return - Not Our Item (NOI) A BOFD determines that it is not the BOFD for an image return it has received	BOFD submits a completed check adjustment request form denoting "Not Our Item" and requesting credit.	Same as paper-based procedure

Issue/Process and Description	Paper-Based Procedure	Image-Return Procedure
Late Image Return - **Late Return Disclaimer** If a BOFD believes that the paying bank returned late a check image in the amount of $100.00 or more, the BOFD can dispute the return.	BOFD may dispute the return by furnishing the returned check and a signed statement that the BOFD believes the paying bank returned the check late.	Same as paper-based procedures

Image Returns with Original Paper Items to Follow (Short-term Industry Model)

As noted earlier in this document, in the short term, image return exchanges are likely to involve delivery of the paper items to the bank of first deposit following delivery of the image return file. The table below indicates potential procedures to help prevent double-posting of return items in the near-term processing scenarios (i.e., posting both the image return and the paper return).

Issue/Process and Description	Paper-based Procedure	Image Return Procedure
Image Return sent with Original Paper Returns to Follow The electronic return file makes transfer of value for a return. Original paper returns follow either same day or on a delayed basis.	Not applicable	• Paying Bank or FRB will send the paper-to-follow returns in a bright yellow bag clearly marked "Do not Process" - Items are for documentation only. • BOFD will develop internal procedures to prevent double posting of paper-to-follow returns. • BOFD will install software that notifies when a double posting has occurred to prevent degradation in customer service.

Use of Image Replacement Documents (IRDs) (EPIC/Industry Model)

The Montana EPIC Project, and some of the near-term image return process flows discussed in this paper, include the use of image replacement documents. The table below describes some of the potential operational issues associated with the use of image replacement documents, and suggests potential image return procedures to address the issues, based on experience gained in the Montana EPIC Project.

Issue/Process	Paper-based Procedure	Image Return Procedure
Reconcilement of IRD Cash Letter Charge IRDs returned to a BOFD are reconciled between the BOFD and FRB.	Reconcile items processed with cash letter total.	• IRD print file receivers: • Print IRDs on duplex/MICR ink printer and process returns as normal. • Receive a faxed IRD item summary report that includes a detailed return item list, item count, dollar amount and charge date.

Issue/Process	Paper-based Procedure	Image Return Procedure
		• Verify the charge on accounting statement.
Request for original paper return that was truncated at the Paying Bank or FRB A BOFD may request the original paper return after an indemnified IRD return was released to its depositing customer.	Not applicable	• BOFD will submit a completed "EPIC Retrieval Request" form within 120 days of receipt of the IRD return. • Paying Bank or FRB will send original return in a bright yellow bag clearly marked "Do not Process" – Item for documentation only. • BOFD will mark the original return with a "Item Not Negotiable" stamp • BOFD will implement audit trails and develop controls to prevent double posting.
Redepositing Image Replacement Documents (IRDs) A BOFD wants to redeposit the IRD for collection.	Not applicable	• An IRD can be redeposited the same as an original item and included in the BOFD's forward collection cash letter. • An indemnification stamp is preprinted on the back of the IRD. The BOFD agrees in writing to hold harmless each collecting bank and paying bank by having an authorized representative sign the back of the IRD.
Illegible IRDs A BOFD cannot read their endorsement on an IRD return.	Depositary Bank initiates a return adjustment requesting credit.	• As a value-added service for its truncation customers, the Helena Branch will pull the original item or research source information. • If the item was missent an adjustment is initiated. • A non-truncation customer would follow paper-based procedures.
Missent IRDs - Not Our Item (NOI) A BOFD determines they are not the true BOFD for the IRD received.	BOFD submits a completed check adjustment request form denoting "Not our Item" and requesting credit.	Same as paper-based procedures
IRD of IRD A Paying Bank returns an IRD it received as a redeposited forward collection item.	Not applicable	• Depending on the legibility of the original item, the quality of the image can be degraded as the image gets smaller. • Follow illegible IRD procedures if item cannot be read. • Design an IRD module that scales the image when the IRD is created.

Forged Endorsements/Signatures and Image Return Adjustment Errors

The table below provides information related to the potential handling of returns involving forged endorsements or signatures in a paper-based versus image return environment. The second table describes the types of adjustments that could occur in an image returns environment. Since the procedures for handling image return adjustments associated with BOFD processing are expected to be very similar to the current process for paper-based returns, the table shows different types of errors but does not compare paper-based versus image-based procedures. Appendix 6a. provides detailed information about how these types of adjustments could be handled, based on the image return processing model used in the EasCorp/FRB Boston test of concept and the Federal Reserve's adjustment system. The proposed procedures included in Appendix 6a. for different adjustment types, while specific to the Federal Reserve's adjustment process, also provide examples of how an image-based return process could affect the availability of information currently used in the paper-based process and how image returns could eliminate the need for paper attachments when reporting certain types of errors.

Error Type/Reason Type	Paper-based Procedure	Image Return Procedure
Paying Bank Processing		
Forged Endorsement A return check in which the payee's signature has been forged.	If discovered within the return deadline (24 hour midnight), return through normal return channels. An affidavit is not required to accompany the item through normal channels, but should be forwarded directly to the BOFD. After the return deadline, deal directly with the BOFD. An affidavit is required.	The EPIC image return system currently does not allow forged endorsement returns to be initiated through the image return system due mainly to the comfort level of the BOFD not having the physical item in a forgery litigation case.
Forged Signature A return check in which the maker's signature has been forged.	If discovered within the return deadline (24 hour midnight), return through normal return channels. An affidavit is not required to accompany the item through normal channels, but should be forwarded directly to the BOFD. After the return deadline, deal directly with the BOFD. An affidavit is required.	Same as forged endorsement procedures above.

BOFD Processing *– potential image return adjustment error types could include:*	
Noncash Item (NCH)	A check or instrument that cannot be returned to the BOFD. Examples are an empty carrier or a control document.
Missing Cash Letter/Bundle	The BOFD was charged for a return cash letter, but the image transmission was not received.
Extra Cash Letter/Bundle	The BOFD receives an image transmission, but it is not charged for the transmission.
Enclosed Not Listed (ENL)	Return item received free in image file (transmission). This is detected when the number of items and total dollar amount in the file is greater then the items/dollars listed in the transmittal.
Listed Not Enclosed (LNE)	Return item charged but not received in the image file (transmission). This is detected when the number of items and total dollar amount of the file is less then the transmittal.
Encoding Error (ENC)	The dollar amount of the item in the code line is the same as the amount encoded on the MICR line of the return but these two amounts are different than the legal line of the check.
Listing Error (LST)	An item was listed for an amount different than the encoded amount.
Free Items (FREE)	Item(s) received free in the image file (transmission) and the institution is not the BOFD. This is detected when the number of items in the file is greater than the number in the transmittal.
PAID (PAID)	The institution has been charged with two images of the same item.

J. Security / Fraud

The concept of imaging returns and exchanging the images in lieu of conventional processing of paper return items brings into play new issues concerning security and fraud. There are both pluses and minuses to this approach that need to be considered, along with new technologies that might mitigate the potential drawbacks.

Clearly the plus associated with exchange of imaged returns is the potential improvement in speed in delivering to the bank of first deposit and its customer a clear representation of a "bounced check". Any improvement in whole days could represent significant loss avoidance where an original item was fraudulently negotiated. This is particularly true for counterfeit fraud, maker endorsement fraud and alterations of original checks. An extra day's notice to the BOFD or their customer can mean the difference between timely holds being placed on deposit accounts and the real loss of the value of the item in question.

The second greatest plus with imaged returns may be the ability to augment traditional return item notification with image archive research. To the extent that return item notifications can contain any information that allows the BOFD to successfully inquire into either its local image archive of transit items or inquire into an image archive of the returning bank, clear and complete information might be more readily available with which a bank could take meaningful action to safeguard against losses.

However, with exchanges of image returns, new opportunities for fraud may unwittingly be introduced to the return collection and any subsequent redeposit service of items. This may become especially true with image replacement documents (IRDs). What may be needed for short- and long-term validity of items that move into and between image archives is a digital certification that the image is a genuine and that it has not been altered. To this end, at least two technologies are known that might provide some assurance that items are genuine and continue to be unaltered through new processes of image exchange, transformation and interchange. Digital watermarking and two-dimensional barcode are two such technologies.

Digital watermarking is a process wherein the imaging process would imbed in the stored digital image invisible data that would record both key variable information from the original check (dollar amount, account number, routing transit number, etc.) plus unique information that would confirm the image to be genuine and unaltered. The digital watermark technology appears resilient to subsequent iterations of the image passing to IRD status.

Two-dimensional barcode is a process that prints on a physical document encrypted data that appears like traditional barcode yet jumbled on the horizontal plane. The data would record key variable information from the original checks (dollar amount, account number, routing transit number, etc.) plus public and private encryption keys that would allow legitimate payments system participants to obtain knowledge and

confirmation of the valid data on the check while preventing (via the private key) any perpetrator the opportunity to alter any information on the check.

Some test of concept may be needed to certify the operational viability and benefits of either or both of these technologies.

Section 3: Legal Considerations

This section attempts to summarize the general legal issues involved in agreements to exchange image returns. The issues arise under both the Uniform Commercial Code (UCC), a generally uniform state law governing checks and check collection, and Regulation CC of the Board of Governors of the Federal Reserve System (12 CFR Part 229), a federal regulation which supersedes the UCC in the event of a conflict, as well as under general law.

Image Returns in Today's Environment

Under both the UCC and Regulation CC, a paying or returning bank may send an image in place of the original returned check (sometimes called a notice in lieu of return) only if the original is unavailable for return.[6] The Regulation CC commentary states that an image is permitted in lieu of return only when a bank does not have and cannot obtain possession of the check. The commentary also states that a check is not unavailable for return if it is merely difficult to retrieve from a filing system or from storage by a keeper of checks in a truncation system.[7] In a recent rulemaking, the Board of Governors (Board) noted that this Reg CC limitation was desirable because under the Reg CC direct return system, depositary banks may receive returned checks from banks with which they have no previous relationship.[8]

The UCC and Regulation CC permit parties to a check to vary the image return (notice in lieu) provisions by agreement, but an agreement under Regulation CC may not affect parties, such as bank customers or the payee of the check, that are not a party to the agreement or otherwise bound by it.[9] In a recent rulemaking proceeding, the Board stated: "Although banks would be able to obtain agreement to the terms of an electronic return arrangement from their customer through account agreements, under Regulation CC they would not be able to bind remote parties to the check, such as non-depositor payees."[10] Under limited circumstances, these remote parties could be adversely affected by a returned check image exchange arrangement. The payee of a check deposited for collection and not finally paid generally remains the "owner" of the original check and so

[6] UCC 4-301(a)(2); Reg CC, 229.30(f) and 229.31(f). Note that Article 4 of the UCC is generally excluded from the coverage of the Uniform Electronic Transactions Act (UETA) (section 3(b)(2)) and the Electronic Signatures in Global and National Commerce Act (E-Sign Act) (section 103(a)(3).

[7] On the other hand, the Official Comment to UCC 4-301 states that a check may be considered unavailable if the check is retained in a check truncation system. It is not clear, however, whether the UCC contemplates return of an image other than to the presenting bank or pursuant to clearinghouse rules under which the check was presented.

[8] See 64 FR 59607 (November 3, 1999) for a more detailed discussion of these matters.

[9] Reg CC, 229.37. UCC 4-301(b) allows clearinghouse rules and Reserve Bank operating circulars to be effective as agreements whether or not specifically assented to by all interested parties; Reg CC does not adopt this special treatment for clearinghouse rules and the like.

[10] Ibid. at 59608.

would be affected by an image return arrangement.[11] The depositor of the check may desire to demand payment of a dishonored check directly from a nondepositor payee or the drawer of the check, and that party may demand surrender of the original before making payment in order to avoid the risk of double payment. The Board stated, "Except to the extent that other parties interested in the checks assent to or are bound by the banks' agreements, banks entering into such agreements may be liable under Reg CC or other applicable law to other interested parties for any losses caused by the handling of returned checks under such agreements." The Board characterized the risk of such loss as "quite low."

Based on its assessment that it lacked authority under the EFAA[12] to affect nonbank parties to checks, the Board concluded it could not limit banks' possible, though unquantified and probably low, risk of liability to such remote parties. Instead, the Board decided simply to allow banks to agree among themselves to experiment with image returns. It stated, "If the cost savings of an electronic return system will be as great as some check system participants expect, then the risk of Regulation CC claims of loss by non-assenting remote third parties may be outweighed by those savings and could be absorbed by participating banks."[13] It may be noted that most remote parties can be covered by bank-customer agreements. The depositary bank may bind its customer, the depositor of a check, to reasonable collection agreements.[14] The paying bank may similarly bind the drawer through account agreements. In addition, the risk of loss to remote parties could be reduced by providing the original returned check to the remote party on request.[15]

Legislative Developments

The Board staff is working with interested parties on proposed legislation (currently referred to as the Check Truncation Act) that, in its current form, would permit a bank to convert a check or returned check to an electronic check in the form of a digital image of the front and back of the check, and to reconvert the electronic check to a substitute paper check which would have all the legal attributes of the original check. Under such check conversion legislation, the depositary bank receiving an electronic image return could convert the electronic check to a substitute paper check and give the substitute check to its customer. Because the substitute check is in paper form, it may be re-presented for payment at the option of the customer and could not be refused by a payor simply because it is not the original. The converting or reconverting bank would

[11] UCC 4-201(a). This presumption of continued ownership generally applies only to a bank customer, but the drawer of the check may also be a remote party that would not be bound by an agreement between the depositary bank and a paying or returning bank.
[12] Section 611(f) of the Expedited Funds Availability Act, 12 USC 4010(f).
[13] The Board noted the electronic returned check pilot program operated by the FRB Minneapolis in Montana as an example.
[14] David Graubart, Inc. v. Bank Leumi Trust Co., 399 N.E. 2d 930 (Ct. App. N.Y., 1979); Federal Reserve Bank of Richmond v. Malloy, 264 U.S. 160, 167 (Sup. Ct., 1924); Official Comment to UCC 4-103.
[15] There is no specific deadline in the UCC for the depositary bank to give a returned check to its customer, as long as the bank gives notice of the return to the customer within the midnight deadline. Reg CC 229.33(d), 229.35(b); UCC 4-202(a)(2), 4-214(a), 3-503.

make a variety of warranties and would hold parties harmless if they were unable to identify information on the copy that they could identify on the original.

One significant benefit of check conversion legislation is that it could establish a baseline with respect to many of the issues that an image return agreement should address. Issues such as warranties, rights and responsibilities of the parties to a converted or reconverted check, and the legal status of a paper image of a check could be addressed in such legislation. If the legislation were passed at the federal level it could also have the effect of providing a uniform and consistent national framework for such arrangements.

Other Issues

Under current law, banks that wish to pursue image returns will have to establish agreements to govern those arrangements. In preparing such agreements, consideration will need to be given to issues including: the nature and scope of warranties; allocation of liability; standards for image quality and content; the use and effect of a paper copy of the original check; and, retention and availability of the original. Careful consideration will also need to be given to the scope and applicability of such agreements, especially as the interests of remote parties may be affected.

As image return systems have been discussed, a few basic questions have been raised regarding practical and legal aspects of systems that might be pursued. Although each of the following questions could be the starting point for extensive discussion, at this point an attempt has been made simply to highlight some of the issues involved. Of course, the advent of legislation addressing some or all of these matters would lend much more certainty to any discussion of image return arrangements.

Issues Involving Usability of an Image

1. Does current law cover liability for lack of usability?

   The first issue that this question raises is the definition of "usability". In some contexts usability might refer to legibility or readability – referring to the ability of an individual or a machine to read the image. Viewed another way, usability could refer to the completeness of an image, i.e., does it contain the required information and is the information in the right form or location. For a technical/operational discussion of "usability", see the discussion in Section 2.H., above.

   Current laws do not specifically address "usability" of image returns. However, sections of Regulation CC and the UCC could bear on usability questions. For example, sections dealing with sufficiency of a notice in lieu[16], with the ability to identify the bank of first deposit (BOFD)[17], and with failure to exercise ordinary

[16] Regulation CC, 229.30(f) and .31(f).
[17] Regulation CC, 229.30(b) and .31(b).

care[18] could be applied, at least by analogy, to disputes dealing with the ability to make use of an image return. The IRS has also provided definitions of legibility and readability that may be instructive.[19]

2. Where does liability lie for an unusable image?

   In most cases liability would lie with the bank or party who converted the item to an electronic image file or to an image replacement document (IRD). Of course, an intervening entity that somehow tampers with or modifies an image return/IRD after it has been converted could also become liable if it has made the return unusable. In the foregoing situations, liability could be couched in terms of breach of warranty, failure of ordinary care, or violation of a statute, regulation or agreement.

3. If the BOFD sends a paper cash letter to the Paying Bank and the Paying Bank creates an image that does not allow the BOFD to verify that it was in fact the BOFD, who bears the responsibility to prove the item was returned appropriately?

   In this situation, the burden would generally be on the paying bank since it was the institution that converted the physical item to an image that impaired the ability to identify the BOFD.

Warranty Issues

4. Where in the image return process are warranties required? How do participants deal with these warranty issues?

   Warranties are essential throughout the image return process and facilitate the transfer of returns between institutions. The existence of appropriate warranties is also critical to acceptance of image returns by customers or by the public in general.

   Warranties can be created by statute, regulation or agreement. As with the paper check collection and return process, image return warranty chains should be created in which a warranty made by a returning institution is also made by subsequent transferors of the return. For example, a converting bank would normally be expected to warrant that the image file or IRD provides an accurate representation of the front and back of the original item. Subsequent transferors would make the same warranty and would also warrant that the image file or IRD has not been altered or modified. Typical warranties regarding timeliness and authority would also be made.

   An unsettled aspect of the process involves warranties that may be made regarding reintroduction of an original item into the payments system. Putting the

[18] Regulation CC, 229.38.
[19] Rev. Proc. 97-22, § 4.01(3).

original returned check back into the collection system after an IRD has been created poses a clear risk of multiple charges resulting from a single payment order. One approach to this issue is reflected in a recent NCCUSL draft of UCC §4-214(b) which provides that a collecting bank that returns an image of an item, rather than the item itself, warrants that the original will not be presented or returned in the future without consent of the customer. Under this approach, a customer who asks to receive the original check after receiving an image return might be presumed to have consented to any subsequent presentments of the original.

5. Does the organization/individual that truncates an item automatically warrant that the original will not be reintroduced into the payments system?

   No. There currently is no such "automatic" warranty. As discussed in the previous question, some thought will have to be given as to exactly what a truncating bank should warrant – especially in an image returns system that permits the original item to be retrieved and provided to the original depositor. Any such warranties could be created by statute, regulation or agreement.

6. What are the warranty concerns if an electronic image return is sent to a customer?

   It is assumed that this question addresses electronic files rather than IRDs. Once the BOFD sends an electronic image return file to its customer, it appears that the BOFD should become liable, vis-à-vis other institutions, for any subsequent misuse or alteration of the file. Accordingly, it will be critical for the BOFD to establish an agreement with a customer to whom it plans to forward image return files, in order to allocate liability between the BOFD and the customer. Any such customer agreement would likely place limits on the permissible uses of an electronic file once it leaves the BOFD and would provide that once the electronic file is transferred to the customer, the customer would become liable for any subsequent fraud, negligence or misuse of the file.

IRD Information Issues

7. Who, if anyone, should have the right to print "Do not redeposit" on an IRD?

   There is no current statute or regulation that confers this "right" on any party with respect to an image return or, for that matter, a check. Some clearinghouse agreements may currently address adding such a notation to checks at some point in the collection/return process.

   Even without express authority, in the absence of an express prohibition a bank, such as a paying bank, would be free to add a "do not redeposit" instruction in circumstances when it is clear that a redeposited item would only be returned again, such as when the drawer's account is closed. However, adding such

language could give rise to liability if the notation resulted in some sort of damage e.g., it causes a portion of the IRD to be unreadable or to be misread. It also may be unwise to rely on having added the notation since it may not have any binding effect on subsequent handlers of the IRD.

At present, it appears that the best approach to establishing an image return system would be to track the standards and procedures of the paper check system, except when the electronic/image aspects of the process demand something different. Consequently, in most instances an IRD could carry the same notations as would be appropriate for a paper check that has been returned. A special issue would be raised, however, by a system that would make the physical item available on request. In such a system, the co-existence of an IRD, the original check and the electronic image would certainly give rise to redeposit concerns.

8. If the paying bank sends an IRD that says "Do not redeposit" and the BOFD prints the IRD who has the liability if the document is redeposited?

   In the absence of regulatory or contractual provisions that address such circumstances, the issue would be whether or not there was damage caused and, if so, whose actions caused it.

9. What information may the different parties want to print on the IRD?

   Since an IRD is intended to be a replacement for the original check, it should be a reproduction of the check in all material respects. In addition, an IRD may need to reflect its own processing history. Finally, the IRD should bear a legend that identifies it as a reproduction of an original item. It may also include any other information appropriate to the image return arrangement, e.g., warranties, restrictions, indemnification statements.

General Issues

10. What are the key elements that should be included in an image return agreement?

    In general, the purpose of any agreement is to clearly describe the rights and obligations of the parties. Specifically with respect to image return arrangements, an agreement might include provisions that, among other things, address the following:

    - Definitions. Define special terms, such as "IRD" or terms that may have special meaning in the context of the agreement, such as "receipt". Additional definitions might include terms such as "eligible item," "image," or "transmission."
    - Technical issues. Spell out technical requirements. These can include matters such as format, conversion and reconversion, means of transmission, method of storage, use of carrier documents, and security issues.

- Image content. Address matters such as minimum contents of image, standard of legibility, and IRD requirements.
- Disposition/retention of original. Indicate status of the original, how long it will be retained, and if it is available on request. If it is available, describe the process for obtaining the original. Specify how long, where, and in what form an image file will be retained.
- Timeframes. Address issues such as deadlines for transmission, time of receipt, timeframe for requests, timeframe for responding to requests.
- Warranties. Among other things, warranties may address conversion of the original item to an image, reconversion if an IRD is to be created, content and technical sufficiency of an image and issues related to reintroduction of the original item into the payments system (see question 4, above).
- Liability. Specify how the liability is to be allocated among the parties with respect to the handling of the original item or the creation and handling of an image or IRD. Address the standard for assessing liability, calculation of damages and what limits, if any, are placed on liability for damages.
- Indemnification. Indicate the extent to which one party will be responsible for handling a claim or for reimbursing the other party if that other party is sued or becomes liable to someone else in connection with the image return arrangement.
- Other duties. Any other duties or responsibilities of the parties should be specified, e.g., as the converter's duty to cooperate in establishing the admissibility of an image (see question 13, below).

The foregoing simply highlights some of the specific provisions that might be included in an image return agreement. The most important aspect of the agreement is to make sure it accurately reflects the understanding of the parties as to what their respective duties and rights are under the arrangement in question.

11. What needs to be done to facilitate institutions reaching agreement on who has liability?

    Institutions are more likely to reach agreement on image return arrangements if they have a thorough understanding of their rights and duties and feel comfortable with the allocation of liability under the arrangement. In the absence of express statutory or regulatory guidance, the parties are left to negotiate individualized agreements. The availability of well thought out model arrangements or agreements could provide baseline terms for most aspects of an image return process and would likely facilitate agreement between institutions.

12. Is there a distinct difference between a return electronic image cash letter and an indemnified IRD that is printed at the Paying Bank?

    Yes. Under existing law an indemnified IRD printed at the paying bank may constitute a notice in lieu of return under sections 229.30(f) or .31(f) of Regulation CC. Consequently, in the absence of an image return agreement, an

IRD that meets the requirements for a notice in lieu may flow back to the BOFD on that basis. Use of an electronic image return cash letter would currently require a special agreement.

13. If the original is no longer available, will an image of the item be admissible in court?

    Although there has been a growing trend in state statutes and rules of evidence to accept images in place of original documents, there has been a great deal of inconsistency from jurisdiction to jurisdiction. The recent passage of the federal E-Sign Act and the adoption of UETA in a number of states, however, may serve to eliminate many real or perceived obstacles to image use.[20] The practical impact of these statutes has yet to be determined.

    In the absence of a statute that establishes the admissibility of an image, the rules of evidence for the jurisdiction in question would be applied to determine if an image is admissible. Under general evidentiary principles, a party attempting to use an image in a court proceeding must be able to establish the authenticity of the document. This means that the court must be satisfied that the image capture process is reliable, that captured data has not been tampered with, and that the process has produced an accurate copy of the original item. This would ordinarily be accomplished by introducing evidence describing the imaging procedures and the controls that are in use to produce and maintain accurate copies. Part of the image return arrangement should involve an agreement to cooperate, as necessary, in establishing image authenticity. By offering testimony detailing the imaging process, storage arrangements and security controls, the proponent of an image copy of an item would more than likely be able to satisfy the court that the image was accurate when captured and has not, in all reasonable probability, been changed in any material respect.

    If objections were to be raised as to admissibility of an otherwise authenticated document, the grounds cited would most likely be that the information contained in the image constitutes "hearsay" or that, in the absence of the original, the image is not the "best evidence" of the content of the original. While courts may operate under different evidentiary rules and may adopt varying interpretations of those rules, as a general matter properly authenticated images are likely to fall within the "business records" exception to the rule against hearsay and should also qualify as an acceptable substitute for the original in the context of the best evidence rule.

    Business records that meet certain requirements are excepted from the rule against hearsay because of their inherent reliability. Business records are considered reliable because of their systematic preparation, the reliance placed upon them by businesses themselves, and the duty of employees to make accurate records as a

[20] See provisions governing admissibility of electronic documents (UETA § 13) and retention of images of checks (E-Sign Act § 101(d)(4) and UETA § 12(e)).

part of their employment. The underlying rationale for the business records exception is that regular business practices in a business environment encourage the making of accurate records. In the context of an image return arrangement, a party seeking to introduce an image of a check into evidence will likely be able to establish that the image should be treated as a business record. The proponent of an image should be able to provide evidence that establishes that the image was captured in connection with a service provided in the regular course of business and that parties to the arrangement regularly rely on the images. This evidence coupled with the evidence necessary to authenticate a document is likely to overcome a hearsay objection.

A party seeking to exclude an image of a check may also object to the image under the "best evidence" rule. That rule provides that the best evidence of the content of a document is ordinarily the original document itself. However, the rule generally acknowledges that a duplicate can be used to the same extent as the original unless there is a genuine issue as to the authenticity of the original or if, somehow, it would be unfair to admit the duplicate instead of the original. Consequently, the proponent of an image will more than likely be able to make a sufficient showing that the image is a duplicate that should be admissible.

Ultimately, the admissibility of evidence is a question for the judge in each case. Unless the jurisdiction has a statute that specifically addresses the admissibility of images, a judge will use his or her discretion when deciding whether the applicable evidentiary rules should allow the admission of an image. Consequently, although general evidentiary principles should allow the admissibility of an image, the final decision will rest with the judge.

14. How long should the original item be retained in a “paper on request” arrangement?

    This question touches on issues of state and federal statutes and regulations, rules of evidence and law enforcement concerns. State laws and banking regulations, in particular, have tended to establish specific retention requirements for certain types of original documents. However, with respect to checks, both the E-Sign Act and UETA address the circumstances under which an electronic record can satisfy a statutory requirement to retain an original.[21] In addition, the unavailability of the original item may affect the acceptability of an image return system from the perspective of remote third parties due to evidentiary issues of proof. For some law enforcement purposes images may not be sufficient, e.g., fingerprints, forgery detection.

    All of this is to say that there is no “right” answer to the retention question. Without a truly uniform approach to legal acceptance of images, and as long as an image will not suffice for certain law enforcement activities, institutions will have to balance the risks and benefits of any retention period that is proposed.

[21] E-Sign Act § 101(d)(4) and UETA § 12(e).

Appendix 7 provides some background information about discussions between staff from the Helena Branch of the Federal Reserve Bank of Minneapolis and representatives from the State of Montana Attorney General's Office and other local law enforcement agencies regarding the recommended retention period for items processed through the Montana EPIC Project's image return process. As noted in Appendix 7, the Attorney General's Office initially recommended retaining the physical return items for at least one year for evidentiary and litigation purposes. However, after learning more about the image process used in the EPIC project, and further discussions, the Attorney General's Office was comfortable with a 120-day retention period for the physical return items.

Section 4: Tests of Concept -- Lessons Learned

Over the past few years the industry has undertaken different tests of concept to explore the possibility of using image to improve the return process. This section discusses some of the key lessons learned thus far about various aspects of image returns from four tests of concept. The first two tests described below are underway currently; the remaining two tests were completed previously.

Test # 1: Montana Electronic Presentment Image Check Project (EPIC)

The Helena Branch of the Federal Reserve Bank of Minneapolis has been working with financial institutions on a project to create an image-supported electronic check environment in the State of Montana. The project, known as the Montana EPIC Project, has provided an opportunity for the Helena Branch to implement a process that allows participating financial institutions to initiate and receive image returns. Currently, fourteen financial institutions access the Helena Branch's image archive and make pay/no pay decisions by viewing and "marking" images of exception items. Since the BOFD routing number is not currently part of the archive information, initiating financial institutions must view each potential return item to determine the BOFD. If the item is to be returned, the initiator must select the return reason code and enter the BOFD routing number. Some of the key lessons learned thus far from the process of initiating image returns are as follows:

- Use of the JPEG (grayscale image) back is critical:

  The availability of a JPEG image (i.e., a grayscale image rather than a black-and-white image) of the back of the check is critical for items being returned through this process. Statistical data indicates that image return initiators depend on the enhanced information contained on the JPEG back, particularly the BOFD endorsement, for 55 percent of the items they mark for return.

- Need to automate entry of the BOFD information:

  Relying on the initiator to enter the BOFD routing transit number for each item they are returning is not a viable solution for large volume return initiators. For the process to work for large volume initiators, the BOFD information has to be populated during the forward collection capture process with an ECE file (i.e., an electronic check exchange file or incoming electronic cash letter file) or post-captured with a data insertion file. A short-term solution may be to offer an unqualified image returns service.

- Need to provide an automated process for identifying potential exception items:

  Financial institutions that initiate large volumes of returns rely on an automated exceptions process. They can submit a file containing a list of exception items to the

Helena Branch. The file is loaded into the image archive system and items in the file are "matched" against the images in the archive. Matched items are flagged as exceptions in the archive so that initiators can easily query and view those items. This eliminates the need to enter ad-hoc queries for large numbers of exceptions.

- Participation as an initiator results in dual return processes (paper and image):

  Financial institutions initiating image returns have to manage both the traditional paper returns process and the image returns process until the time that all BOFDs participate in the image returns process. Returns to nonparticipating BOFDs are sent through the traditional paper returns process while returns to participating BOFDs are sent through the EPIC system. Managing the dual process is burdensome for participating image return initiators.

There are currently four financial institutions participating in the EPIC project that receive image returns by accessing the Helena Branch's image archive. They can print and fax copies of the returns as needed. The financial institutions receive their image returns one or two days sooner than they receive their paper returns. Key learning points associated with the process of receiving image returns are as follows:

- Use of the JPEG (grayscale image) back is less critical for receiving image returns but needed in specific situations:

  BOFDs receiving image returns are less likely to require the JPEG back than image return initiators. However, there are two scenarios where availability of the JPEG back is critical.

  1. Image Replacement Documents (IRDs): BOFDs that receive IRDs indicate that the JPEG back would improve the quality and enhance the acceptance of the IRD as a negotiable instrument. Also, if the IRD is redeposited and returned a second time, the JPEG back improves the ability of the paying bank to distinguish the BOFD.

  2. If the depositing customer has multiple accounts, the JPEG back enhances the BOFD's ability to determine the sequence number that identifies the appropriate account to charge back.

- Customer acceptability is greater for an IRD than for an image copy:

  IRDs were expected to provide an interim solution as financial institutions gradually moved their customers from a paper-based returns process to an image-based process. However, initial results of the EPIC returns pilot indicate that the IRD provides a longer term solution in many cases. IRDs have all the basic characteristics of a check. They look like checks, can be redeposited and can be processed on sorting equipment. Conversely, image copies have none of the characteristics of a check.

They look like a photocopy of a check and there is uncertainty about how these copies are used in the payments system.

Three banks are now participating in the Image Replacement Document (IRD) pilot. They receive IRDs for all return items from the Branch and the original returned checks are truncated at the Helena Branch. Prior to the pilot, the banks used the image system to receive notification of their returns; however, none of the banks were comfortable returning an image copy to their customers. The banks received the information one day earlier and used the information to place holds on accounts but they did not charge the account until the original item arrived. With the IRD pilot, IRDs are returned to the customer in place of the original return item. The banks report very high customer acceptance of the IRDs. In fact, since the pilot began, less than 2 percent of the banks' depositing customers receiving IRDs have requested the original item. Experience with these financial institutions indicates that receiving IRDs is preferred over the return paper-to-follow model.

- Indemnification language in the IRD replaces the need for some agreements:

  A depositing customer that receives an IRD has several options for collecting unpaid funds. One option is to present the IRD for payment directly to the paying bank which may not participate in the EPIC project. Placing indemnification language on the IRD that is authorized by the BOFD eliminates the need for bilateral agreements with those nonparticipating financial institutions.

- Participation as an image returns receiver results in dual processes, but the use of IRDs helps to minimize the impact:

  BOFDs have to manage both the traditional paper-based return process and the image return process until the time that all financial institutions participate in the image return process. Returns from nonparticipating institutions are received through the traditional paper-based return process, while returns from participating institutions are received through the EPIC system. Managing the dual process is burdensome for participating BOFDs. However, the dual process has little impact on BOFDs that receive IRDs. Their internal workflow changes are minimal.

Test # 2: EasCorp/FRB Boston

Since October 2000, EasCorp (Eastern Corporate Credit Union) and the Federal Reserve Bank of Boston have been participating in an image returns test of concept to provide feedback on the feasibility and value of an image return process. The purpose of the test is to gather information about technical, processing and legal issues. Specific objectives of the test include: 1) demonstrating a practical application for using image returns; 2) collecting information to help support a future image returns system without paper; 3) obtaining end user reaction, feedback and suggestions for value-added services;

4) assessing potential limitations of the process; 5) determining hardware and software requirements; and 6) exploring options for resolution of operational and legal issues.

The planned test of concept involves four phases. Phase 1 involved using test documents to verify normal processing, exception processing, and volume levels. Phase 2 initiated the actual production process, whereby the Boston Fed began sending a daily informational image file of return items qualified to EasCorp, followed by delivery of the physical return items later the same day. Phase 3, currently underway, expanded the test to include imaging qualified return items drawn on approximately 30 EasCorp member banks, with same-day delivery of their return items to EasCorp. EasCorp is receiving an average of about 50 image returns a day in Phase 3 of the test. Phase 4 would involve next day delivery of the physical return items. During Phase 4, the option to reclear items prior to dispatch will be explored. Appendix 6 provides more details about this test.

Some of the key benefits gained from the test of concept thus far include a faster, more streamlined and automated returns handling process for EasCorp, as well as earlier and higher quality return information for EasCorp's participating customers. Some of the lessons learned thus far include the need to properly educate internal staff and external customers about the process, and the need to address issues that affect the quality and usability of return images, such as the widespread use of carrier documents and certain ink colors (red, bright pink).

Test # 3: FRB Jacksonville/Sixth District Institutions

In November 1997, the Jacksonville Branch of the Federal Reserve Bank of Atlanta began a six-month test to deliver low volumes of image returns to ten local financial institutions. As described below, the basic image return process used in the test was very labor-intensive and time consuming, and yielded important information about some of the operational issues associated with image returns. The process used in the test was as follows:

- Eligible returns were sorted into separate pocket during high-speed processing
- The items were sent to a control desk to be prepped prior to imaging. Prepping included separating items contained in carrier envelopes from stripped items. Items in carrier envelopes were removed from the carriers and control numbers were stamped on both the envelope and the return item.
- Return items (and carriers) were imaged on a medium-speed sorter;
- Return items were matched with and reinserted into the appropriate carrier envelopes, sorted to the appropriate BOFD and dispatched to participating institutions.

One of the key findings in the Jacksonville test involved the significantly higher than anticipated use of carrier envelopes in the returns process. Carrier documents are principally used by medium and smaller institutions as a less costly alternative to a more automated stripping and encoding process. Approximately 40 percent of the eligible

qualified returns imaged during the Jacksonville test of concept were contained in carrier envelopes. Even at a rate of 25 percent use, carrier envelopes would pose significant obstacles to widespread use of image returns because of the manual handling that would be needed to obtain a clear image of both sides of the items. Many of the existing carrier documents have clear fronts and solid backs. To capture the endorsements on the back of an item in this type of carrier, the return would have to be manually removed from the carrier before imaging, and then matched and reassembled afterwards. Better quality carrier envelopes have onion skin textured backs but the opaque backing also makes it difficult to obtain a clear image of the back of a return item. Under the current regulatory requirements, the excessive time needed to handle returns in carrier documents made it difficult to perform the necessary tasks and ensure timely delivery of the original return items to participating institutions. One of the recommendations that came out of the test was to encourage all institutions using carrier documents for qualified returns to migrate to the use of strips. An alternative approach would be to work with vendors to develop a carrier document that is more conducive to an image environment.

Another key issue identified in the Jacksonville test involved the need for standards for return reason code stamps and endorsements. In the image returns test, light colored return reason code and endorsement stamps were not clearly visible on return images captured with a black and white image camera. Since the acceptance of images in lieu of the original item is contingent on the BOFD being able to read the information on the front and back of the check, one of the recommendations that came out of the test was to develop new standards for return reason codes and endorsements to allow for more legible images of items captured using black and white or grayscale image cameras.

Test # 4: New York Clearing House (NYCH)/Chase Manhattan Bank/FRB Boston

From October 1996 through late 1998, the New York Clearing House, the Federal Reserve Bank of Boston, and Chase Manhattan Bank participated in a test of inter-regional check image exchange. The objective of the test was to demonstrate the technical and operational feasibility of exchanging check images between banks in different regions using different vendors' equipment.

During the two-year test, the Chase Manhattan Bank (a member of NYCH) exchanged images of returned checks with the Federal Reserve Bank of Boston via the Clearing House Electronic Check Clearing Return System (CHECCRS) operated by the New York Clearing House. Grayscale images of the front and back of returned checks were captured at each bank's processing center: the Federal Reserve Bank of Boston used hardware and software from Unisys, and Chase Manhattan used NCR/DMP hardware and software. After capture, the images were transferred through an interface to CHECCRS. Chase Manhattan Bank would dial up the CHECCRS system to retrieve return images coming from the Federal Reserve Bank of Boston. For returns coming from Chase, the Federal Reserve Bank of Boston's system would retrieve the images from CHECCRS via a data communication line and forward the images to the appropriate participating

BOFDs via an automatic fax connection. The test allowed participating BOFD institutions (Chase and Federal Reserve Bank of Boston customers) to receive high-quality images up to a day earlier than the actual return item and, if necessary, take actions to prevent funds from being withdrawn inappropriately.

Although a number of banks have implemented image processing within their own institutions only a limited number of image exchanges occur between different institutions. The test successfully demonstrated the feasibility of image exchange across different regions of the country and indicated some of the benefits to the return item process.

Section 5: Stakeholder Perspectives - Summary of Qualitative Market Research Findings

The Industry Image Returns Customer Issues Group was formed as a subgroup of the Industry Image Returns Task Force to identify the stakeholders, and issues impacting them, in a potential image return process. The Customer Issues group identified the various stakeholders in the returns process. Group members were each assigned particular stakeholder segments and made preliminary assessments regarding potential impacts of an electronic/image returns system on these various stakeholders. The group gathered some existing information (secondary research) related to customer acceptance of electronic images and returns, as well as how some organizations are making the move to electronic/image returns. Subsequently, a project plan and timeline were developed to help direct the flow of group work. Also, an informal interview guide was developed based on preliminary assessments of stakeholder impact and secondary research. Information from these informal interviews was used to develop a customer issues list, as well as a research methodology for conducting focus group interviews and more focused stakeholder interviews.

A consultant conducted the focus groups for small businesses, consumers, and smaller banks. A screening firm developed lists of representatives to supply participants for the focus group meetings in Minneapolis, Boston, Atlanta, and San Francisco. The twelve focus group meetings were completed in October 1999.

Following the focus group interviews, guideline documents were developed to assist in conducting more focused one-on-one and telephone interviews. The one-on-one and telephone interviews were conducted with government organizations, brokerage firms, retailers, cash management companies, check processing software vendors, and check collection agencies. Results from the focus groups and one-on-one interviews between Customer Issues Group members and stakeholders were periodically presented to the Industry Image Returns Task Force at various meetings during 1999 and 2000. This document is a summary of the Customer Issues Group research findings.

Research Approach/Methodology

Members of the Customer Issues Group gathered qualitative comments from key stakeholder groups potentially affected by the proposed change to the image return approach. Understanding the qualitative nature of the data is important, since qualitative marketing research is exploratory work intended to be helpful in generating ideas but is not meant to make statements of statistical certainty. Research like this is a common and useful first step because it provides insight into how people really talk about issues relevant to the research topic. This approach produces hypotheses that can be subjected to further testing to find out how widely certain perceptions are held.

This qualitative data was gathered in a series of focus group discussions and personal interviews. Focus group discussions were held in four diverse cities (Minneapolis, Boston, Atlanta, and San Francisco) with each of the following stakeholder

segments: consumers, small businesses, and small to medium-sized financial institutions, for a total of twelve focus group meetings. Findings from personal interviews with members of stakeholder groups including brokerage firms, retail companies, and government agencies were summarized along with the focus group findings for 1999. Input from other important stakeholder groups such as check processing software vendors and check collection industry members, which was obtained in 2000, was summarized and combined with the 1999 findings for this document.

Research Participants

It is important to remember that participants in the focus group discussions and interviews were asked to share their honest opinions. Overall, the groups were well recruited and were made up of individuals who worked hard to answer the research questions. Those with a more sophisticated knowledge of payments may recognize that certain issues raised and statements made by focus group participants and interviewees reflect misunderstandings about how the payments system works. The focus group facilitators and interviewers did not usually correct these misstatements, except if they hindered understanding of the image return concept description. Regardless of whether beliefs are based on real or perceived premises, the important issue is that these perceptions and ideas should be considered in implementing an image return program.

Findings

The research approach was effective at profiling the returned check volume of many stakeholder groups that participated in this research effort and at what each stakeholder group experiences as far as handling, fees, risks, and costs in the current process. The focus group participants provided excellent first impressions of the image return concept, and focus group facilitators were able to gauge each group's reaction to using dual systems of paper and image returns, which is a likely scenario in the initial stages of the industry's conversion to image returns. In addition, the check processing software vendors and check collection agencies addressed somewhat more technical issues and real world business applications of image returns. All stakeholders were fairly adept at communicating perceived benefits and barriers related to a potential image returns system. The research findings begin with a discussion of the participating stakeholders' existing returns environment. The remainder of the findings deal with a potential image returns environment and are organized in the areas of Benefits, Concerns, Preferred Delivery Methods, and Desired Incentives and Service Enhancement Opportunities.

<u>Existing Environment</u>

The Customer Issues Group realized at an early stage of this effort that understanding various aspects of the existing returns environment would be important to the research. Major aspects impacting stakeholders include the frequency and amount of return items, how returns are actually used, and the information needed from return items.

The following list illustrates the range in the number of returns received by stakeholders that participated in the research.

- Frequency of Returns
  - Small Bankers 1 – 300 Daily
  - Small Businesses 2 – 120 Annually
  - Consumers 1 – 15 Lifetime
  - Retailers 250 – 19,000 Monthly
  - Brokerage Firms 600 – 3,000 Monthly
  - Government Entities 4,800 Monthly

Of course, the frequency of returns experienced by check collection agencies varied widely depending on the number and nature of their clients, which included but was not limited to various sizes of financial institutions, retailers, and other businesses and individuals.

The primary uses of returns include a means to determine authenticity, a source for collecting on bad items, and a document to use for re-presentment. The primary information needed by stakeholders is the name and phone number of the check writer and the amount of the check. Other information needs that were mentioned include social security number, drivers license number, address, bank name, and account number. In addition to information on the front of the check, check collection agencies typically use information from the back of checks, such as the signature and return information.

Small to medium-sized paying banks use the return items for pay or return decisions. Some banks have software programs by which they can only see an amount before making a pay or return decision. The primary factor in this process seems to be the amount of the check. Banks of first deposit that receive return items from the paying bank or intermediary largely use return items to decide whether to charge back the item or re-present *("run it back through")* the item. Both paying and depositing banks make copies of the item for various reasons, but mainly to send to the check writer or depositor. While a few collection agencies are already using imaging technology in their businesses, most still make copies and use faxes of paper return items. Check processing software vendors mention difficulties in the current returns environment derived from carrier documents, mangled items, multiple endorsements, and strips, which all detract from current system effectiveness.

Benefits

An important objective of this project was to find out what stakeholders considered beneficial about the image return concept. Members of the financial institution focus groups identified a long list of potential benefits that financial institutions might derive from implementing image returns. The primary benefit of the image return concept to financial institutions is the ability to access returned checks more quickly. Other important benefits stem from efficiencies in accounting and processing functions, improvements in delivery of return items, and reduction in financial losses.

Appendix 8, *Exhibit 1* at the end of this document lists the various benefits cited by small to medium sized financial institutions. Members of the small business and consumer focus groups also saw benefits. These advantages come from earlier receipt of returned checks, improved cash flow management practices and more efficient handling of accounting and processing functions. Benefits cited by these two groups are listed in Appendix 8, *Exhibit 2*. Both financial institutions and their customers identified potential benefits from reducing the impact of check fraud primarily due to the shortened turnaround time of the returned check process.

Brokerage firms, retailers, and government agencies considered acceleration of the returns process one of the major potential benefits to their organizations. Representatives of a major brokerage firm noted that image returns could reduce some labor-intensive tasks such as key entry and telephone calls, resulting in significant savings. Retailers, government agencies, and check collection agencies also cited the potential for fraud reduction from image returns as a major benefit. Perceived fraud reduction benefits are listed in Appendix 8**,** *Exhibit 3*.

Acceleration of return items is especially important to check collection agencies. In fact, timing is significantly more important in check recovery than in other types of debt collections, according to those organizations that engage in various types of collection/recovery services. While no statistical data were available, interviewees engaged in check recovery stated that for every day earlier that a returned check item is received, there is a corresponding increase in the ability to collect on those items. The ability to generate electronic statements is another benefit cited by collection agencies. Respondents from this stakeholder segment believe that color images would be better than the current process of using black and white copies, including faxes, for collections. Interviewees stated that even the check design could be important in the recovery of items. Apparently, many collection agencies provide a copy of the front and back of an item on statements that they send to individuals and organizations from which they are trying to collect. Some collection agencies are currently using images of checks, usually, color, along with electronic statements for this process and have found it to be very efficient. Collection agencies also perceived that image returns has the potential to help reduce check fraud. Appendix 8**,** *Exhibit 4* lists collection agency perceived benefits.

Some check processing software vendors make more use of image technology in their applications, and in their strategic planning, than others. Most agreed that imaging is a beneficial solution to automate pay/no pay return decisions of their clients, which are mostly financial institutions. One software vendor respondent mentioned a client that currently uses a very manual returns process, involving data entry of up to 38 different fields from the front and back of checks. The client believes that making the transition to image returns will increase productivity and decrease overall processing costs. In addition, software vendors stated that another benefit of image returns is the capture of handwritten fields, such as drivers license number and approval codes, early in the processing stream to avoid the degradation of that information, which can occur when paper items are handled multiple times. Benefits cited by check processing software vendors are listed in Appendix 8**,** *Exhibit 5*.

Concerns

Another critical objective of the research was to identify perceived concerns, barriers, and drawbacks of the proposed image return concept. Representatives of stakeholder groups expressed concerns about how long the original paper checks need to be kept before they can be destroyed. Stakeholders saw potential risk and security problems inherent in electronic delivery of images. They expressed concerns related to whether Internet transmissions could be protected from hackers if the Internet is used to access image returns. They also had qualms about quality and legibility of images, such as whether or not they would be able to obtain all the needed information from the image copy. In certain instances, participants questioned whether images could ever be acceptable substitutes for paper checks, such as situations where law enforcement officials might need to examine the original paper or ink in order to provide evidence for a fraud case. Customers of both financial institutions and businesses are also affected by this proposed change, and those organizations had concerns regarding their customers' reactions to a move to image returns. Appendix 8**,** *Exhibit 6* lists these concerns.

Representatives of every stakeholder group questioned the legality of images, including whether or not an image is a substitute for the original check in the eyes of the law, and who is liable in case of a dispute. They also mentioned concerns regarding retention laws that vary from state to state, and whether or not images will be legally acceptable by agencies such as the IRS. Collection agencies referred to the fact that while a copy of a check can supposedly be used in court when the original item can not be obtained, in practice, there are many county judges that will not accept a copy. Several examples were given where county judges, from various states, would not initially accept a copy of the check until additional legal documentation was provided to prove the original item could no longer be obtained. A government entity was also concerned with contingency preparedness in the event an image return could not be obtained. In addition, some retailers had concerns regarding their relationships with collection agencies that currently require the original check to collect on bad items. The issues raised by stakeholders related to the legality of images are listed in Appendix 8**,** *Exhibit 7*.

Ironically, all check collection agencies interviewed, including a major collection agency association, were positive about the move to image returns and did not have a problem using an image of a return item as long as it included the front and back of the check. All check collection agencies were very concerned, however, with the manner in which redeposit would be handled in an image returns environment. This stakeholder group also had many of the same concerns as the other groups, including retention issues, quality issues, and security issues. One interesting barrier mentioned by check collection agencies was economic concerns. They were not concerned for their own businesses but for the small financial institutions that make up a portion of many agencies' client base. The concern centered around the issue of whether small financial institutions could afford, or would be willing to invest in, the technological investment to participate in an

image returns system. Appendix 8**,** *Exhibit 8* lists the potential concerns/barriers mentioned by collection agencies.

Check processing software vendors mentioned paper check quality as a barrier to image returns. The software vendors believed that the quality concerns, mentioned at the first of this paper, such as carrier documents and mangled items need to be addressed for the full benefits of image returns to be realized. In addition, the software vendors stated that the business case for financial institutions to move to image returns is much more compelling on the "receive-side" than the "send-side." Meaning, investing in the technology to receive images may be financially justified, but investing in the technology to capture and send images may not be justified in the current environment. In addition, software vendors mentioned that the majority of financial institutions under the top 50 do not currently have image-enabled returns systems. The larger check processing software vendors do not typically target smaller financial institutions in their sales efforts, which can be a barrier for image returns since smaller financial institutions are the disproportionate source of carrier documents. The potential concerns and barriers cited by check processing software vendors are listed in Appendix 8**,** *Exhibit 9.*

Preferred Delivery Methods

Stakeholders were asked how they would like image returns delivered to them. Various alternatives were assessed. Financial institutions commented on delivery over Internet access via a personal computer, fax, mail, courier, Fedline, data file transmission, CDs, and other methods. Business representatives and consumers also considered which delivery methods they would prefer and why. Participants recognized that there might be equipment limitations preventing electronic delivery of returns, such as ownership of, or access to, a personal computer or fax machine. They suggested that a variety of methods are needed to accommodate all stakeholders, and that it is important for the recipient of the return to specify which delivery methods are acceptable. Business and consumer representatives were keen on being notified by telephone or e-mail that a check is being returned in advance of the delivery of the image return. Check collection agencies preferred that their clients have on-line access to their imaged return items, which could be downloaded and e-mailed to the collection agencies.

Desired Incentives and Service Enhancement Opportunities

Bankers were asked what incentive third party processors could offer financial institutions to encourage the acceptance of the image return concept. They offered a wide variety of suggestions, ranging from allowing around-the-clock access to the image archive to free software for financial institutions and their customers. They made pricing suggestions, too, such as offering low fees, incentive pricing, and even variable fees based on return volume.

Business and consumer participants were asked what incentives financial institutions could offer to make them accept image returns. Many suggestions were offered, such as free checks, interest on checking accounts, free software, and a toll-free

customer question line. They suggested that financial institutions should avoid charging new fees for image return services. Some customers (who all had been victimized by accepting unpaid checks) questioned the premise of the payee being the one responsible for collecting on the check. Some wanted financial institutions to assume responsibility for collecting unpaid checks. Some participants wanted the paying bank to make the check writer pay all fees associated with a returned check. Some also suggested that the banking system should assume responsibility for notifying the check writer that a check is not being paid earlier in the process. And, some of the participants wanted paying banks to let creditors "get in line" electronically to collect on unpaid checks.

Businesses and consumers considered the primary benefit of the image return approach as providing earlier delivery of returned checks. A nuance perceived by some participants is that the approach should also lead to greater certainty regarding how long it takes to collect a check. Some suggested that financial institutions offer, as an incentive, a guarantee of how many days it will take before it is safe to write checks against a deposit. Another recurring theme was that customers wanted advance notification (telephone was most often suggested) from their financial institution prior to the delivery of an image return.

Many stakeholders recognized that consumers might be particularly reluctant to embrace the image return concept. Some people advocate the cautious approach of slowly introducing the change. Others maintained that consumers have such limited experience with returned deposits that financial institutions could just implement the image approach and explain it to affected customers as cases arise. Others believed that an extensive public education campaign is necessary to explain the benefits of the image return approach.

A couple of collection agencies, as well as a few other stakeholders, mentioned a request regarding a database function for stored images, rather than just archives. This database could supposedly be queried by financial institutions for a variety of purposes. According to the interviewees, this is one capability that could help the business case for investing in imaging technology by financial institutions. Smaller banks could even justify the investment due to the increased ability to collect on bad items and prevent future repeated fraud attempts from the same sources, according to respondents.

Implications of Findings

There are several inferences that can be drawn from the research findings. Most important are the design implications for any organization or group that decides to implement an image returns system. While the following list is not exhaustive, it displays the highlights of the most frequently raised issues from the research.

Overall Design Implications

Any organization and/or group interested in implementing an image returns program may want to consider some or all of these design issues.

- *Speed* – all stakeholders interviewed deemed the acceleration of return items an important benefit.

- *Image of front and back* – Some stakeholders only need information from the front of the check while others need information from both the front and back.

- *Grayscale versus black and white* – Many stakeholders stated that a black and white image of a check is sufficient for their needs while others argue that there are certain instances where a grayscale, or color, image is preferable.

- *Redeposit* – How redeposit is handled in an image return process was important to virtually all stakeholders interviewed. Image Replacement Documents are cited as a possible solution to this issue.

- *Security/Controls* – Most stakeholders were sensitive to the issues related to security and controls that would be needed with image returns, especially regarding how easy or difficult it would be for someone to manipulate check information in images.

- *Image database versus image archive* – Several stakeholders cited the ability for financial institutions to query a database of their imaged items as a major selling point for image returns.

- *Retention/storage mediums and methods* – Stakeholders mentioned that electronic data storage mediums are becoming less expensive while physical storage of paper documents is becoming more costly.

Handling of Redeposit

One of the issues raised in the 1999 research was the manner in which redeposit would be handled in an image returns environment. The Industry Image Returns Task Force began discussing the potential of using an Image Replacement Document for this purpose. When, in 2000, the issue of redeposit in an image return process was repeatedly brought up as a concern among collection agencies, the interviewer mentioned the concept of using an Image Replacement Document without specifically mentioning a name associated with the concept. For example, the interviewee would be asked "what if there were a common paper document, containing the necessary check information, or a paper copy of the image, that could be used for redeposit?" Most interviewees said that they would be comfortable with that process as long as the document used for redeposit was standard for everyone. One interviewee stated that "there should not be dozens of

different kinds of redeposit documents floating around, or we will not be any better off than with the current system."

Overall Impressions

Overall, most stakeholders were positive regarding a move to image returns. While all groups raised potential concerns and barriers to an image returns environment, most would accept an image return process if the major barriers and concerns are addressed. In addition, most respondents believed that the potential benefits of an industry move to image returns outweigh the potential drawbacks. Some stakeholder groups were much more knowledgeable of the payments process than others, and some were much more objective in their responses than others. All groups, however, provided information and perceptions that are useful in developing an image return process. While the scope of this research effort could not address the impact on every potential stakeholder from an industry move to image returns, the Industry Image Returns Customer Issues Group hopes that organizations will find this information helpful in pointing out some important issues that should be considered in developing an image returns system. In addition, the desire of the Group is that the qualitative information provided in this document could be used by others to perform statistically relevant studies related to this area.

Section 6: Image Return Cost Benefit Analysis

This section presents the results of the Cost Benefit Work Group's analysis of the costs and benefits of replacing paper check returns with images. As discussed in Section 2 of this paper, the FRB/Industry Image Returns Task Force identified three near- and longer-term process flows for implementing an image return system. The three flows – Charts A, B, and C – involve truncation of the paper check at different points in the collection stream. The cost benefit study focuses on one specific scenario, labeled "Scenario B", where the bank of first deposit forwards an image to the paying bank, followed by the original paper checks, and the paying bank returns an image to the BOFD. The original paper return item is truncated at the paying bank. Scenario B corresponds to Chart B in Section 2.

The Cost Benefit Work Group has determined that the results included in this analysis are highly sensitive to assumptions and would change considerably under an alternative set of assumptions. In particular, the results would vary if scenarios pictured in Charts A or C are adopted. Moreover, both costs and savings vary substantially with the size of financial institutions participating in the return process. For those reasons, the study concentrates on outlining the potential impacts on each party involved in the check return process rather than providing a bottom-line result. The study is intended to serve as a guideline for indicating how each party might be affected; the findings are not sufficiently robust to determine whether image returns would provide positive net societal or social benefits overall.

The information for financial institutions is based on the experiences of two banks: one processing 75 returns a day and the other processing approximately 10,000 returns a day. The banks are labeled "small" and "large," respectively. Rather than providing simple averages, the analysis includes the individual results for the two institutions and identifies which bank (small or large) provided the information. The results of the analysis suggest that the total cost of processing returns would increase slightly for a small bank, but could decrease substantially for a large bank, provided that paper checks remain at a paying bank and that there is no mixed environment (i.e., there are no dual processes to handle both paper and image returns), as assumed in Scenario B. Cost reduction will be less apparent to smaller financial institutions because their equipment and salary costs are shared with the forward collection process, whereas larger financial institutions have equipment and personnel dedicated to the returns process which could be reduced by processing images instead of the physical returns.

The remaining pages provide the assumptions adopted in Scenario B and the results of the analysis. The results are shown for each party involved in the check return process -- maker, depositor, bank of first deposit, paying bank, and collection agency. The individual effects on each party are listed in bullet form under each party, with the positive and negative effects grouped together under italicized headings. The results of the analysis indicate that the financial institutions participating in the process (the BOFD and the paying bank) are affected the most, while there are few impacts on other parties.

When available, the analysis includes specific, quantitative results, which are highlighted in bold font for easy identification. The flow chart at the end of the section depicts an image return process. Although the flow chart differs from Scenario B in that it does not show paper checks following image delivery on the forward side, it does show image transmission for both the forward collection and return process.

Scenario B - Assumptions

Below are the assumptions that underlie the cost-benefit analysis for image returns.

1. The cost-benefit analysis is of an exchange of checks between two banks. Because a process involving many banks would require a different infrastructure (e.g., a central telecommunications switch would be needed), the analysis cannot easily be extended to a network of many banks.

2. All of the returns are processed with image. There is no mixed environment (i.e., dual processes to handle paper-based returns and image returns).

3. The analysis only considers the costs and benefits of the return side; it does not consider costs and benefits for the forward check collection process.

4. Both financial institutions involved in the returns process are image-capable and have infrastructures for both image capture and archive. The image capabilities are either available in-house or obtained through intermediaries.

5. The cost benefit analysis compares a base scenario of forward image (with paper to follow) and paper return, with a scenario of forward image (with paper to follow) and return image. In Scenario B, the bank of first deposit sends an image forward cash letter to the paying bank, followed by the original paper checks. The paying bank then sends an image return cash letter to the BOFD. The paper return is truncated at the paying bank.

6. The format for the image return cash letter already exists.

7. Settlement of returns is based on the digital image.

8. The physical items remain at the paying bank.

9. The BOFD creates image replacement documents (IRDs) from the images and returns them to the check depositor. If the depositor re-presents (redeposits) the check for collection, they use the IRD rather than the original item.

Scenario B – Costs and Benefits for Each Party in the Return Process

The potential costs and benefits of replacing paper returns with image returns are shown below for each party involved in the check return process. As noted earlier, the study is intended to serve as a guideline for indicating how each party might be affected rather than providing a bottom-line result; the findings are not sufficiently robust to determine whether image returns would provide positive net benefits overall.

Maker (check writer)

The following potential negative effects were identified for the maker of the check:

- The check writer receives an IRD instead of the original return item.
- The check writer must pay for the checks sooner. (The maker may be caught if they are check kiting. The use of image may have no effect if the maker has no funds.)

Depositor

The following potential benefits were identified for the check depositor:

- The depositor is notified of the return item at least one day sooner, increasing his or her ability to prevent loss. Earlier notification of the return would enable some depositors to stop the buying power of the check maker, either by preventing future purchases or stopping the delivery of goods or services if the maker paid in advance.

Estimated Loss Prevention Savings for Personal and Commercial Checks

Personal Check Usage for 2000	
Total check value (billions)[22]	$2,076.56
Number of checks (billions)	21.76
Average Check Size (value/number)	$95.44
Personal Check Savings at 1.7%[23]	**$1.62**
Personal Check Savings at 1.5%	$1.43
Personal Check Savings at 2%	$1.91
Estimated % return check value that can be recovered on commercial checks (see footnotes)	12.79%
Commercial Check Usage for 2000	
Total check value (billions)	$43,796.00
Number of checks (billions)	27.82
Average Check Size (value/number)	$1,574.26
Commercial Check Savings at 1.7%[24]	**$3.42**
Commercial Check Savings at 1.5%	$3.02
Commercial Check Savings at 2%	$4.03
Weighted Average Loss Prevention per Check Using 1.7% (Personal & Commercial.)	**$2.63**

(*source: see footnote)*

[22] Personal and commercial check volume and value from *The Nilson Report* (July 1995), 1994 data and forecast. Personal check data include POS, Housing and Automobile.

[23] Based on E-Funds' calculations of how much a retailer would gain by moving to electronic check. The gain is due to acceleration of return data that allows retailers to stop multiple bad checks on the same account. E-Funds estimates that 1.7% of return check value could be saved as a result of a shift to electronic check, and that a range of 1.5% to 2% should be used. E-Funds used actual data from their check verification system in the analysis. Information was provided by Louise Clynes.

[24] The charge-off recovery rate on personal checks is .86% of total check value, while the charge-off recovery rate on commercial checks is only .11% of total check value. It was therefore assumed that compared to personal checks, only 12.79% (0.11/0.86) of the return check value can be recovered on commercial checks. 12.79% × 1.7% × $1,574.26 = $3.42. Thus business-to-business checks have greater average value, but lower preventable losses.

Some of the other reasons for loss prevention savings include:

1. Image gives more flexibility for re-presentment, so that the depositor may be able to receive credit faster.
2. Large retailers or lockboxes can distribute return information quickly among their locations around the country; earlier notification increases the likelihood of preventing losses.

- Account receivable systems can be updated with the return file, resulting in cost savings. The table below, which is based on old lockbox data, provides some sense of potential cost savings.

Using old lockbox data:	Estimated Cost Savings
Retail Data Transmission Items	$0.02
Wholesale Data Transmission Records – Unverified	$0.12
Wholesale Data Transmission Records – Verified	$0.14

- It costs less to redeposit image than paper since the process requires less handling of the original paper item. (The cost savings may be more applicable to retail depositors than consumers.)

The following potential negative effects were identified for the depositor:

- The account is debited sooner resulting in loss of interest or investment opportunity by at least one day. The table below estimates the weighted average rate of loss on an annual basis.

Interest for consumer transaction accounts	1.00%
Fed Funds rate	6.50%
Value of Personal Checks for 2000 (in billions)	$3,751*
Value of Commercial Checks for 2000 (in billions)	$43,796
Annual Weighted Average Interest Rate Lost (apply to aggregate return check value)	**6.0661%**

* This number is higher than the $2076 figure used in the chart on the previous page. The $2076 only includes consumer payment categories where there might be loss prevention; the $3,751 includes all consumer payment categories since all categories would be affected by float loss.

- The depositor has to pay the BOFD to retrieve the original return item.

Montana EPIC Project price to retrieve physical return item $1.50

Bank of First Deposit

The following potential positive effects were identified for the bank of first deposit:

- The bank of first deposit can obtain workflow savings when creating return notifications for customers. For example,
  - Image returns can be automatically sorted; the BOFD does not have to sort the paper items or capture images from the paper returns.
  - The BOFD can print the notification letter and the IRD at the same time on the same 8½ × 11 document.

- Accounting is less expensive with image than with paper returns, reflecting workflow savings associated with less handling of the paper items.

- Earlier notification of return items increases the likelihood of preventing loss. For example,

  - Earlier notification of returns will allow a greater number of returns to be collected.
    Based on a survey performed by ECCHO, a high percentage of uncollected returns (80-90%) could have been collected if the collecting bank was notified at least one day sooner.

  - Earlier return notification could prevent/reduce check kiting: the BOFD could catch kiting schemes earlier and stop them at lower amounts.

- Image returns can provide new revenue opportunities: for example, the BOFD could charge the depositor:
  - to receive the return sooner.
  - to retrieve the image from the archive.

The following potential negative, one-time (fixed) costs were identified for the BOFD:

- Software costs:
  - to receive and process image cash letter file (returns).
  - to generate IRDs.
  - to represent images.
- Hardware costs for an IRD printer.
- Training costs for:
  - staff and call center
  - consumer education
  - expanded customer service.
- Telecommunications setup costs for transmitting image files.

The following potential negative, on-going (variable) costs were identified for the BOFD:

- Costs for producing IRDs: i.e., costs for paper, MICR toner, printing. Printing costs may vary depending on whether the IRD is printed from a grayscale or black and white image.

  Estimated increase in printing costs: 2.5 cents per item for high-volume institutions, 4 cents per item for low-volume institutions.
- Telecommunications costs: per-item costs for transmitting image files.
- Security costs: these will increase, especially with the use of IRDs. The BOFD will need to make sure that the IRD and original item do not both get into the payments system.
- Per-item retrieval costs: these will only be incurred if the item is requested (e.g., if the depositor can't read the image).
- Customer communication costs: for example, costs for marketing IRDs via statement inserts.

Paying Bank

The following potential benefits were identified for the paying bank:

- Work flow savings: The paying bank could achieve workflow savings by running the exception process from the digital images instead of the paper items and processing during off-peak times when it has excess capacity. The table below shows some of the estimated cost reductions for a large bank and a small bank, based on the experiences of two institutions.

Estimated Cost Reductions	Large Bank	Small Bank
Personnel costs	**30%**	**0**
Equipment costs	**60%**	**0**
Supply expenses for carrier documents	**80%**	**100%**
Large $ notification fees through Fedline	**---**	**100%**

- Transportation savings: the paying bank could achieve transportation savings by not returning the paper return items to the bank of first deposit, although the fixed costs of transportation would still have to be incurred if the institution sends paper checks to other institutions.

- Loss prevention: A faster return process could prevent/reduce check kiting. The paying bank could catch kiting schemes earlier and stop them at lower amounts.

The following potential negative, one-time (fixed) costs were identified for the paying bank:

- Software costs to create and send image cash letters.
- Telecommunications setup costs for transmitting image files.
- Costs to archive the paper return items: the paying bank would need a setup sufficient to retain 1% of collected checks for 60-90 days.

The following potential negative, on-going (variable) costs were identified for the paying bank:

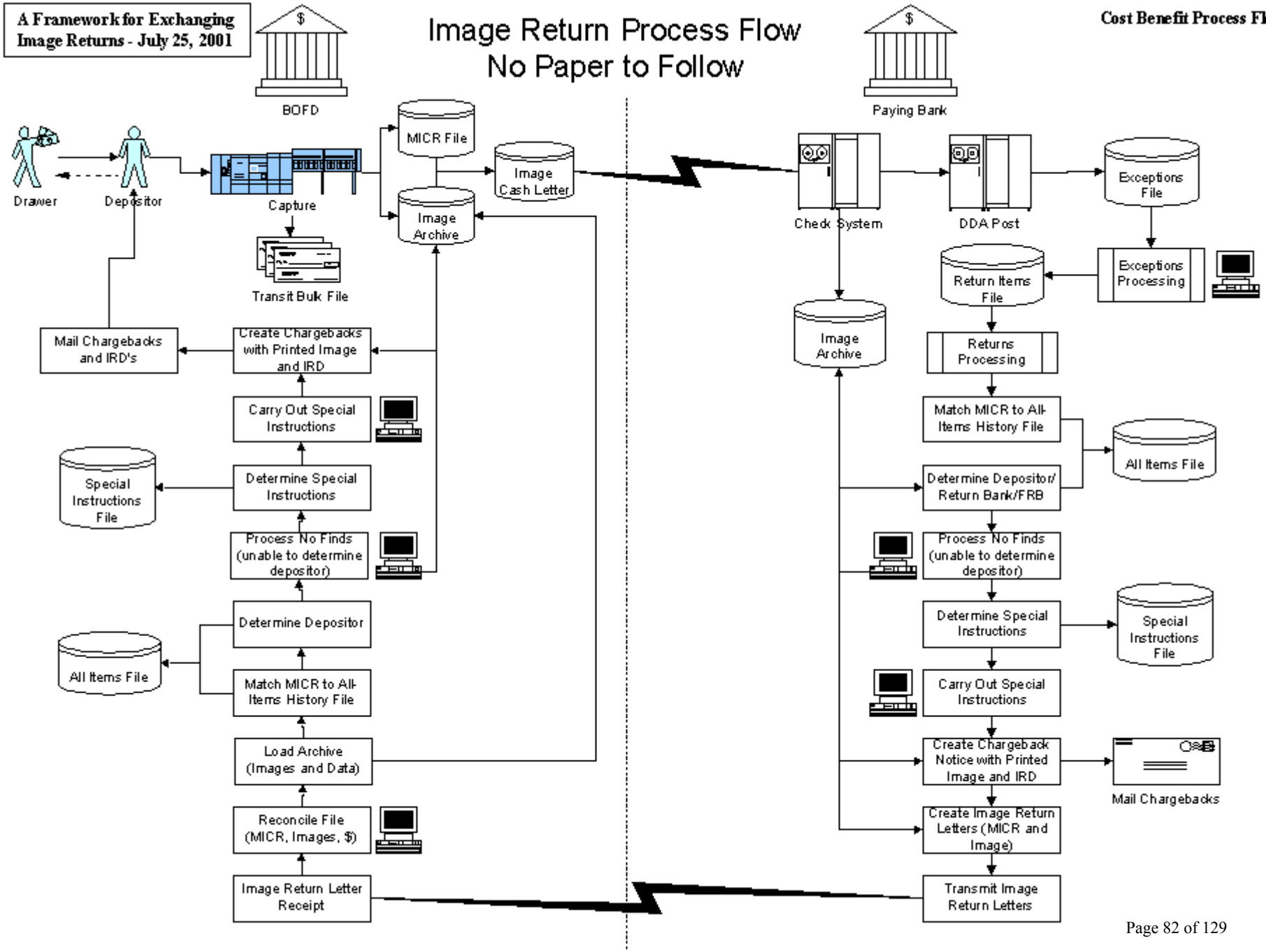
- Per-item costs for sorting and archiving paper items to accommodate future retrieval requests.
- Image transmission costs.
    - **Estimated increase in telecommunications cost: 1 cent/item at a large bank.**
- Security costs: these will increase as the paying bank implements procedures to make sure that items are not double-posted to the payor's account.
- Increased loss of funds: losses could increase due to duplicate IRD re-presentments.

Collection Agency

The following potential effects were identified for collection agencies.

- There will be fewer return items to collect.
- The remaining return items will be more difficult to collect.
- Fixed costs will have to be recovered from lower volumes, resulting in higher costs of collection per item.

Image Return Process Flow
No Paper to Follow



Appendices

1. Current Paper Return Process Flow

2. Shared Industry Long-Term Vision for Returns & Key Success Criteria

3. Sample Copy of a Return IRD

4. Detailed Matrix of Potential Process Flow Scenarios

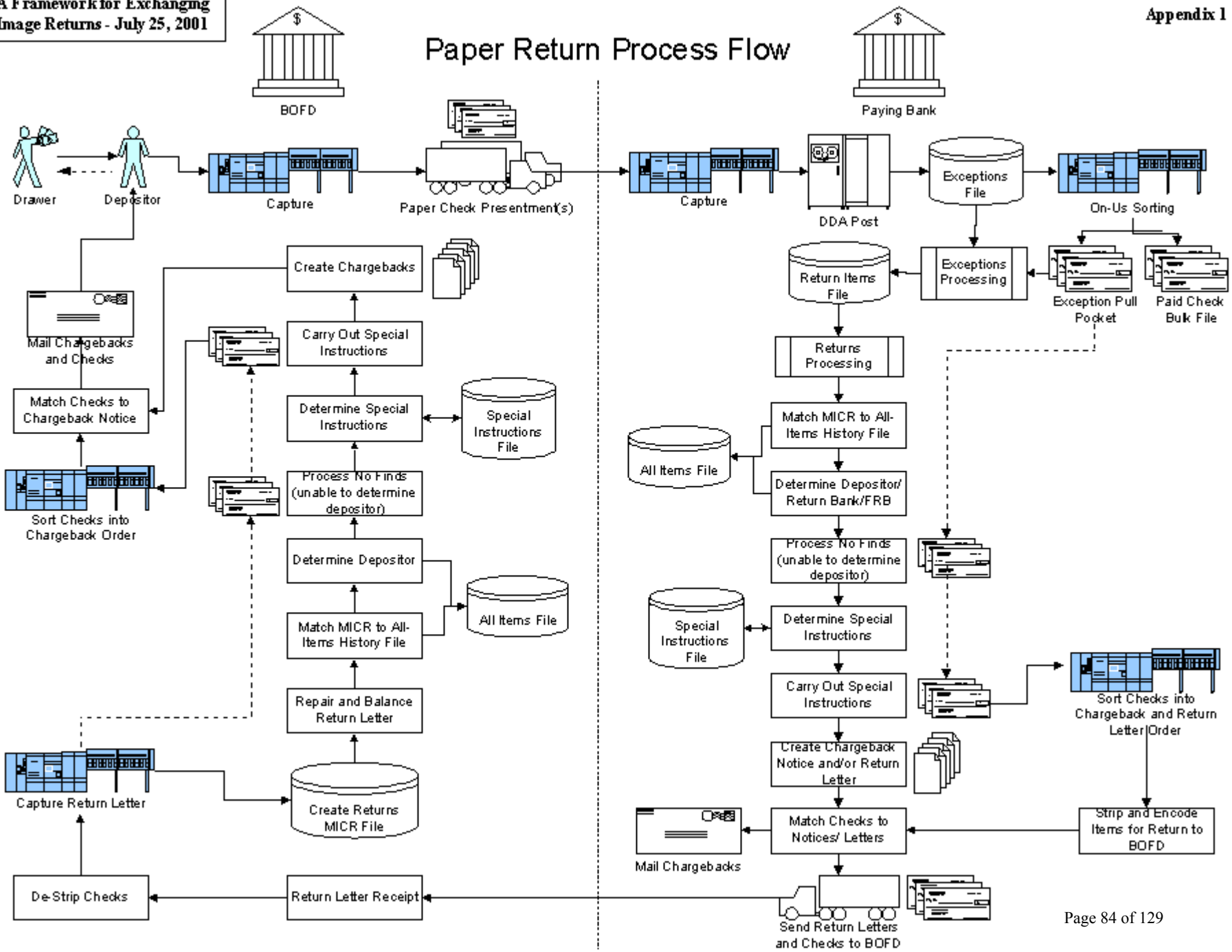
5. Image Quality White Paper

6. EasCorp/FRB Boston Image Return Test Criteria
   Appendix 6a. - proposed exception resolution procedures based on the image return process being used in the test.

7. Retention Periods in an Image Returns Environment – FRB Helena's Discussions with Law Enforcement Agencies

8. Market Research Findings – Lists of Perceived Benefits, Concerns and Barriers

Paper Return Process Flow



Appendix 2

"A Shared Vision For Electronic Collection Of Returned Checks" 3/6/99

In December of 1997, the Federal Reserve's Electronic Check Presentment (ECP) Industry Advisory Group that includes representatives from a broad spectrum of banks, interested industry participants, associations, and Reserve Banks developed "A Shared Vision for Electronic Collection of Checks". This collaborative effort anticipated significant benefits to moving the nation's check clearing infrastructure to a more electronic environment. These potential benefits include accelerated presentment and return of checks, reduced operational expense, fraud reduction, and new, value added services to bank customers.

Industry efforts and initiatives consistent with this ECP vision have identified that potential near-term opportunities are significant in the "electronification" of the return item process. "Electronic Returns" would facilitate the evolution to electronic check presentment but also could provide real benefits to participants in the paper check collection process. The current obligation and practice of the payor bank to return the physical check to the bank of first deposit, and ultimately the customer, can be an important inhibitor to the growth of nation-wide ECP. Accordingly, the ECP Industry Advisory Group supports a Federal Reserve sponsored Image Returns Task Force charged with designing an electronic return item clearing solution to remove this substantial obstacle to national check electronification.

Image Returns Vision Statement

The vision is of a nation-wide all-electronic clearing system that accelerates the delivery of electronic return item information to the Bank of First Deposit (BOFD) or its agent. The charter for the Image Returns Task Force, and the challenge for the banking industry, is to design and implement an all-electronic environment that improves the overall efficiency and service without sacrificing safety, security or risk. This will require developing the appropriate legal and operational infrastructure to speed electronic return item information to the collecting and paying banks and for the timely resolution of return item transactions. The electronic information flow would be supported by an image-copy of the check. An image of the paper return item may accompany the transmitted electronic information, or access to the return image may be provided as per instructions within the return item record received.

A fully electronic image based returns clearing environment should improve the functionality of the current process. The accelerated information flow would permit the earlier placement of an account hold or a debit to the account of the depositor at the (BOFD) and an earlier, accurate notice to the customer. As such, the risk of loss to parties in the process would be reduced. In fact, providing faster access to information should reduce institutions' and depositors' exposure to fraud. An electronic return item service would permit end to end automation and the opportunity to enhance customer service, particularly to larger customers that experience considerable risk of fraud from third parties. In addition, a fully compatible electronic audit trail will help ensure the integrity of the check-clearing environment. Unique information requirements may be specified dependent on the type of return item inquiry.

The evolution from paper to electronic check return will occur over a period of time. During transition the physical check could be delivered on an exception basis to the extent legal and customer rights require. The legal, regulatory and operational framework will evolve to facilitate the transition to an electronic returns process. In addition, service and operational standards will be developed to meet the needs of both paying and depositing institutions and their customers. Standards, formats, warranties, and service levels related to electronic check return and image delivery for the various parties involved will be clearly defined to promote efficient processing and appropriate risk reduction. An image based return re-clearing process will be designed. The availability of multiple service providers will ensure a competitive marketplace. Enhanced products and services will be coupled with proper incentives to provide high-quality services to consumers and businesses and encourage customer acceptance.

Criteria to Guide the Re-engineering Process for Image/Electronic Returns **3/7/99**

Redesigning an existing payments process is a daunting task. To be successful, the returns re-engineering effort must result in proposed approach(es) that meet certain basic criteria. Specifically, the proposed changes to the return process must:

* Be developed collaboratively, with input from various participants in the payments process;
  - stay abreast of related industry and Federal Reserve initiatives
  - communicate work from this project to appropriate industry groups

* Result in payments system improvements in the form of accelerated return time frames and/or more efficient processing overall;
  - recognize opportunities for reducing check fraud and other losses to the banking industry and its customers
  - identify shifts of costs and responsibilities among participants
  - improve the quality and timeliness of return information

* Ensure the safety, soundness and security of the new system;
  - reduce overall risk of the check return process by identifying business, payments, legal, and technical risks associated with alternative processes and their implementation
  - ensure that any shifts in risks and liabilities are understood

* Address end user issues and rights;
  - recognize the impact of new processes on different end users, e.g.: consumer and business

* Be implemented in a way that does not "shock" the industry;

  - provide a realistic framework for changes by institutions and end users,
  - start with bilateral or multi-lateral agreements to encourage early participation
  - include tests of key concepts to identify/correct problems in the new system prior to widespread implementation
  - coordinate operational changes to allow time for any needed regulatory changes
  - reflect a pace that considers the evolution of the long-term returns processes based on evolving knowledge and success gained in the early stages
  - address the appropriateness of implementation issues, such as implementing in phases and establishing a transition plan for the industry to stop using old processes

* Meet the needs of depository institutions of all sizes in both the near-term and the long-term;
  - identify and address known weaknesses in the current system, including those related to the return notification process
  - recognize the diversity of needs, particularly during the transition period
  - ensure that services are available at reasonable cost for institutions that do not want to adopt the new infrastructure
  - provide flexibility regarding institutions' transition to the new process
  - to the extent possible complement other related industry efforts

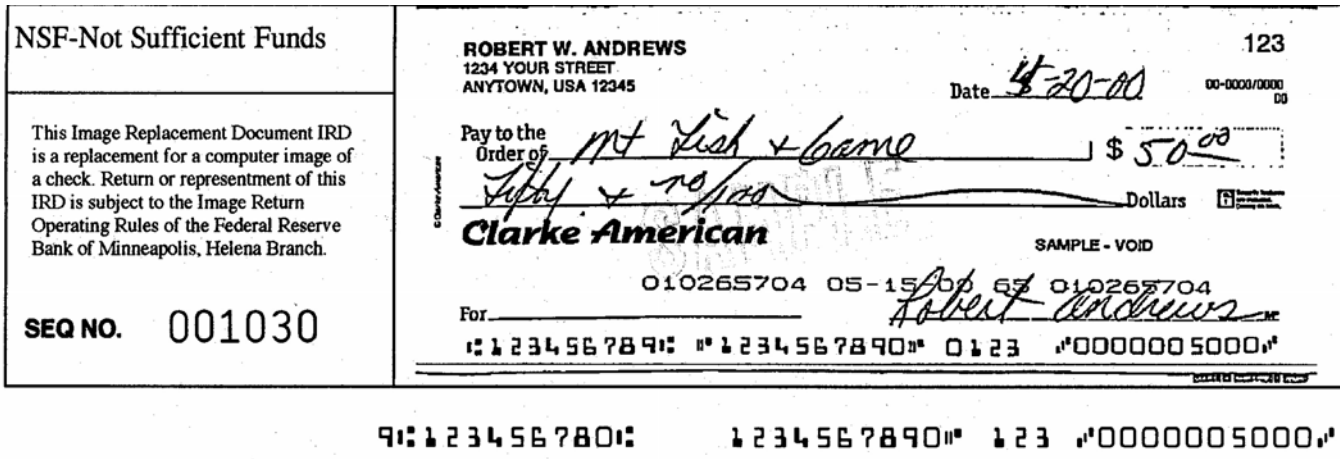
* Support a returns reclearing process
  - provide at least the functionality of the current process

* Support or facilitate forward collection of checks in both paper and electronic environments;
  - ensure compatibility with infrastructures that support ECP/truncation
  - focus on items covered by check law

Appendix 3

Sample Copy of A Return Image Replacement Document (IRD) – Front Side Only
From the Montana EPIC Project

A return IRD is a copy of the front and back of the returned check, created from an image of the item, printed on special paper, encoded in machine-readable MICR ink and containing a legend indicating that it replaces the original item.



⑆123456789⑆ ⑈123456789⑈ 123 ⑈000005000⑈

Appendix 4

Detailed Matrix of Potential Return Scenarios

The matrix below includes the most likely near-term returns scenarios discussed in Section 2.C as well as other potential scenarios that are either outside the scope of this project or would require special agreements or enabling legislation. The six process flow combinations described in Section 2.C are identified by the numbers in parentheses in the first column of the matrix. Each scenario below shows the media that would be used in the forward and return processes (i.e., original paper items, electronic, image, IRD) based on the particular requirements or processing environment of the BOFD, the Paying Bank and the check depositor. The "notes" column indicates those scenarios that are outside the scope of the image returns project. For scenarios involving IRDs, the "notes" column indicates which party in the process would be responsible for producing the IRD.

Scenario	BOFD Process	BOFD has an Image Archive?	Forward Media	Paying Bank Process	Return Media for BOFD	Return Media For Check Depositor	Notes
1	Paper Only	No	Paper Check	Paper Only	Paper Check	Paper Check	Outside scope of project
2 (4)	Paper Send and ECE Receive	No	Paper Check	ECE Return Send	ECE	Paper Check	Outside scope of project
3	Paper Only	No	Paper Check	Image Returns	IRD	IRD	Paying bank prints and returns IRD
4 (1)	Paper Send and Image Receive	No	Paper Check	Image Return Send	Image	IRD	BOFD prints IRD from Return
5	ECE Send and Paper Receive	No	ECE	ECE Receive Only	Paper Check	Paper Check	Outside scope of project
6 (2)	ECE Send and Receive	No	ECE	ECE Send and Receive	ECE	Paper Check	Outside scope of project
7	ECE Send and Paper Receive	No	ECE	Image Returns	IRD	IRD	Paying bank prints and returns IRD
8 (3)	ECE Send and Image Receive	No	ECE	Image Return Send	Image	IRD	BOFD prints IRD from Return
9	Paper Only	Yes	Paper Check	Paper Only	Paper Check	IRD	BOFD prints IRD from Archive
10 (4)	Paper Send and ECE Receive	Yes	Paper Check	ECE Return Send	ECE	IRD	BOFD prints IRD from Archive

Scenario	BOFD Process	BOFD has an Image Archive?	Forward Media	Paying Bank Process	Return Media for BOFD	Return Media For Check Depositor	Notes
11 (1)	Paper Send and Image Receive	Yes	Paper Check	Image Return Send	Image	IRD	BOFD prints IRD from Archive or Return Image
12	ECE Send and Paper Receive	Yes	ECE	ECE Receive Only	Paper Check	IRD	BOFD prints IRD from Archive
13 (2)	ECE Send and Receive	Yes	ECE	ECE Send and Receive	ECE	IRD	BOFD prints IRD from Archive. Most practical without legislation and agreements.
14 (3)	ECE Send and Image Receive	Yes	ECE	Image Return Send	Image	IRD	BOFD prints IRD from Archive or Return Image
15	Image Send and Paper Receive	Yes	Image	Image Receive Only	Paper Check	IRD	BOFD prints IRD from Archive
16 (5)	Image Send and ECE Receive	Yes	Image	Image Receive and ECE Send	ECE	IRD	BOFD prints IRD from Archive
17 (6)	Image Send and Receive	Yes	Image	Image Receive and Send	Image	IRD	BOFD prints IRD from Archive or Return Image. Most practical without legislation and agreements.

Note: The matrix above assumes the same definitions for Forward (paper, ECE and Image) and Returns (ECE and Image) as described in the Matrix of Likely Near-term Return Scenarios in Section 2.C of this document.

I. 

II. FSTC PACES Project Document

A. TITLE: Image Quality White Paper

By: Mariano Roldan, Jr.
Organization: Chase Manhattan Bank
Date Submitted: February 18, 1999

A. Description

- **Business Requirement being addressed**

  The primary business requirement being addressed is: The images in the image file must meet a minimum standard. Given this, there are other requirements that follow.
  - The collecting bank will append the resulting quality check to the image file prior to sending to the paying bank.
  - The paying bank is responsible for verifying the quality of the image prior to archiving.
  - Image quality must be sufficient to support the BackOffice functions.

- **Problems and issues associated with the topic**

  Since the purpose of the PACES environment is to truncate the paper check at the bank of first deposit and send the image of the item as presentment, the images sent by the collecting bank become the critical element for BackOffice processing and image statements. The quality of the images exchanged has therefore become a primary concern among the banks.

  The issues associated with image quality exist on both sides of the exchange, i.e. at the collecting bank and the paying bank. If the collecting bank has to warrant the quality of the images to be presented, what then is good quality and how does the collecting bank meet this warranty? If the collecting bank has to append the quality check, what is the definition for the quality check? On the other side, if the paying bank is responsible for verifying the quality of the image prior to archiving, how does it measure quality?

  In examining this topic, there were initial problems that stood in the way. Many people believe that image quality is subjective. This topic has been examined previously and a lot of time and money has been spent without conclusive results. Other people believe that it is possible to set standards for image quality but measurement would be difficult and expensive. Despite all this, image quality remains to be a concern as banks embark on image interchange, especially with truncation as the final goal of the PACES model.

If quality is a measure of goodness or badness, then image quality can be said to be the goodness or badness of an image. But what is a good image? There are two factors that make a good image. One is that it is sharp and clear, and the other is that for checks where the data of interest are the MICR data, the payee, courtesy amount field, amount, signature and endorsements, a good image is one where the data of interest are legible and readable. We will adopt the IRS definition of legibility and readability. According the IRS (1981-2 C.B. 621; 1981 IRB LEXIS 242, *2; REV. PROC. 81-46, Section 5), **legibility** is the quality of a letter or numeral that enables the observer to identify it positively and quickly to the exclusion of all other letters or numerals. **Readability** is the quality of a group of letters or numerals being recognizable as words or complete numbers.

A working definition was initially drafted as follows: **Image Quality** is that characteristic defined by the degree of legibility and readability necessary to perform a specific function. However, this definition did not clarify the matter and prevented the work group from making progress. The problem is in the use of "good image" and "bad image". Since goodness or badness is a quality rating, we associate the term "good image" with high quality and "bad image" with poor quality. However, we use the same term "good image" to mean usable and "bad image" to mean unusable. This is where confusion starts. The term " good image" is used interchangeably to mean good quality and usability. We need to separate quality from usability.

There is general agreement that an image has good quality if it is a faithful representation of the source document. There is no argument on quality when the image of a good document is sharp and clear. However if the source document is bad, the resulting image which could be the best picture that can be taken may still be considered by some as bad. This is where we should make the distinction between quality and usability. The image should be classified as having good quality but unusable. Now on the other hand, if we have a good source document and the image is a partial picture, then the image can be labeled as having poor quality and at the same time unusable.

This leads us to redefine **Image Quality** and define **Image Usability**. The following are the definitions that the work group has agreed to use:

- **Image Quality is that characteristic defined as a faithful digital representation of the source document.**
- **Image Usability is that characteristic defined by the degree of legibility and readability necessary to perform a specific function**.

The usability of an image can be subjective since it depends on the function or application being performed. What is usable in POD may be unusable in Signature Verification. Other applications are Key Entry, Exceptions Processing, Research and Adjustment, Statement Rendering and CD Creation.

There are several factors that affect image usability: (1) the source document itself, (2) the capture equipment, (3) the check life cycle which consists of document creation, document circulation, document preparation and document capture. The check life cycle extends beyond capture but for purposes of this study, the stages after document capture have been excluded from our scope.

With the definitions proposed above, we could equate high quality with the term good image. A good image then is one that has high quality, i.e., a faithful digital representation of the source document (good or bad). A good image may be usable or unusable. Likewise, a bad image can be usable or unusable. The table below shows how all this terminology is used.

	Quality	Source	Good Image	Usable
Case #1	High	Good	Yes	Yes
Case #2	High	Bad	Yes	Yes
Case #3	High	Bad	Yes	No
Case #4	Poor	Good	No	Yes
Case #5	Poor	Good	No	No
Case #6	Poor	Bad	No	No

Our supposition here is that an image with high quality is a good image. A good image will more than likely produce a usable image and a bad image will more than likely produce an unusable image. As shown in the table, a good image can be either usable or unusable, e.g., cases #1, #2, #3. Also shown above, a bad image of a good source document could be usable, e.g., case #4. (See Appendix for illustrations of these images)

Piggyback conditions cause exceptions to the above supposition for all cases. Regardless of quality rating and source document condition, images of piggybacks are unusable. Therefore even though the images of piggyback checks have excellent quality and the source documents are good, the image is unusable. It would be expected that these conditions will be detected by the capture equipment and rejected for repair processing, but in the event that these are erroneously accepted, then these images must be labeled as unusable.

- **Work Group Activities**

  During the course of this study, the following activities were performed:
  - Banks and vendors were asked to report on Quality Assurance
  - Four capture vendors (BancTec, IBM, NCR, Unisys) were asked to respond to a questionnaire prepared by the Image Archive Forum
  - A transcoding exercise was performed to determine the feasibility of grayscale image exchange
  - Image Quality Sampling Tests

From the reports on Quality Assurance, it was determined that banks have in place a quality assurance process. Image capture vendors have also presented their views on quality assurance and although all vendors have the capability to detect suspect items, the measurement is not standard and these suspect flags have yielded many false alarms. Findings from the Image Archive Forum survey include: (1) Vendors reported that their customers have expressed interest in image quality, (2) All platforms have Image Quality Assurance capability, (3) Customers are concerned with image quality, (4) Image Quality standards are needed but measurements may be difficult, (5) All vendors have measurement capability but they are not standardized.

The work group's observations were: (1) There is no clear definition of image quality, (2) image quality is subjective but there should be a level below which an image can be classified as bad, (3) It is generally believed that bad images are due to bad documents but no measurement data is available to support this, (4) An institution should not be told how to run its shop, (5) A desire exists for early detection of bad quality, i.e., at capture time, (6) Image quality control is both prevention and detection, (7) Suspect identification techniques are not standard across platforms and create many false alarms, (8) Image capture equipment available today have good quality capabilities, (9) Vendors are actively involved in image quality.

- **Transcoding Test**

The transcoding test was performed in 1998 to determine whether the exchange of gray scale images would pose interoperability problems and quality issues if these images were transcoded to bitonal images (black/white) for image statement rendering. SunTrust provided four similar test decks to each capture vendor. Each capture vendor was asked to send to the other three vendors a set of gray scale images which would then transcoded into black/white and printed.

The following were proposed for the test:

- Each capture vendor will capture using the JFIF/JPEG format at the vendor's standard resolution, using a packet size within the range of 16-20K.
- Only the front of the check will be imaged.
- The gray scale image will be binarized to obtain the black/white print images.
- The image will be 50% of life size to accommodate current banks' practice providing statements with 8-10 retail checks per page.
- Printer density will be 300 bpi where possible.
- IBM will capture gray scale images in two formats, JPEG and ABIC.

The results of the test showed that there were no interoperability problems in that all vendors were able to process each other's images. The images were transcoded into black/white and printed with satisfactory results. It was however noted that the quality of the printed images could be improved by tuning the algorithms accordingly to the capture platform.

- **Image Quality Sampling Test**

  During the course of this study, several institutions reported that their experience showed a very low percentage of "bad" images. In addition these "bad" images were due to bad source documents. However no statistics were available for publication to support this. The work group then set up this test to (1) obtain some data on the number of occurrences of "bad" images, and (2) identify the reason for classifying the image as "bad". (What are called bad in these situations are really unusable images.)

  The work group identified the following as reasons for unusable images:

  - No Image
  - Damaged Item (i.e. torn, folded)
  - Carrier Document
  - Partial Image
  - Blurred Image (i.e. smudged)
  - Piggyback
  - Orientation (i.e. upside down, backwards)
  - Skew
  - Too Dark
  - Too Light
  - Streaks or Banding
  - Bad/Poor Quality
  - Original Document
    - Ink Color
    - Problems with check background
    - Other
  - Check Writer Problem
    - Print Quality
    - Ink Color
    - Missing Data
    - Other
  - No Reason Found

  Three banks provided test data results in time for analysis for this white paper. A total of seven tests were performed. BankBoston performed the quality checks at key entry and balancing, Comerica at balancing, while Chase examined all items flagged as suspects after prime pass capture.

  The total sample population was 4,269,624 items where 465 were tagged as unusable.

  The following observations and conclusions were drawn from the test results (see appendix for test results statistics):

  1. Number of unusable images is very low compared to the total sample population: 0.01%
  2. Source document was the predominant cause for unusable images.

3. Other cause for problems was mechanical.
4. Piggybacks, which result in unusable images, are due to either poor document preparation or equipment mechanical problems.

The test results support the contention that many have stated before, i.e. that many of the unusable images are due to bad source documents.

The banks must address bad source documents where possible. A good source document was deemed to be one that:

- conformed to ANSI Standards
- good handwriting/printing, i.e. correct ink color, good point of sale courtesy amount writers/printers, legible/readable handwriting
- no missing data
- undamaged, i.e. not torn, no holes, no folds, etc.

- **Related circumstances**

The Federal Reserve Bank has done a study on image quality but it was primarily geared to a comparison between images and microfilm. It is the work group's understanding that the result of that study was that images are at least equal if not better than microfilm. Other studies by the Federal Reserve had concluded that bad images were primarily due to bad source documents. However, supporting data cannot be released due to confidentiality restrictions. Other studies, such as those started at the FSTC ICI project, did not yield any conclusive results.

Chase has been receiving images from the Federal Reserve Bank for over two years now, one from the Dallas FRB and another from the Philadelphia FRB. Experience has shown that there have been no issues with the quality of the images received except in very few instances during the early stages of exchange. Random sampling is performed in all cases, i.e. a random check of 10% of all batches. However in some instances when the calculated average image size deviates by over 20% from the established FRB threshold, the file is reviewed with closer scrutiny. The average image size is calculated based on the file size and the number of images in the file. The reports from the two locations of Chase that receive images from the Federal Reserve are that the quality of the images received is good to extremely good.

B. Alternative Solutions Considered

Four options were reviewed to address the above problem.

Option 1:

Quality Assurance Process/Risk Management. This option assumes no measurement or standards in place. It relies on good faith that all exchange partners have good quality assurance processes in place within their shops. The advantage of this option is that there is no cost involved at all. However, banks do not want to be told how to run their shops and therefore all exchange partners must rely on their ability to examine images received and negotiate and agree with its partners on what constitutes a good image. This imposes a burden on a bank to clearly define with each and everyone of its exchange partners what a good image is. However based on the test

results, the study verifies good quality of images in general and the associated low risk of problem images.

Option 2:

Define a standard for the creation and image interchange of checks. This option would recommend a standard(s) for source document creation, such as the X9.7 ANSI standard, as well as the X9.46 ANSI standard for image interchange, where specific parameters would be required for the interchange. Examples of specific parameters are the density (dpi), compression algorithm, etc. The advantage of this option is the standardization of the source document and the capture platform, which would eliminate potential (if not the most probable) causes for bad images. The disadvantages include the problematic situation where the banks are not able to enforce the use of a standard for document creation, especially with corporate customers. Another is the difference in the various capture platforms.

Option 3:

Define a set of metrics for image capture. This option would establish a set of measurements for image quality. Examples of this would include the image size, suspect flags, etc. The advantages of this solution include the objectivity of the mechanism to measure image quality. The disadvantages include the lack of standardization of the suspect flags, and that the suspect flags yield too many false alarms.

Option 4:

Perform quality control inspection. This solution uses random sampling technique to gauge the condition of a set of images. Based on the number of items inspected, the probability of assuring the quality of the entire lot is raised. Statistically speaking, the standard deviation from the mean can be made smaller by performing inspection of more items. Visual inspection may be used or a more objective measure may be used using existing technology, or a combination of both. The advantages include a lower cost by inspecting only a small percentage of the lot or using a hardware monitor, and similar quality control procedures used by the sending and receiving banks. The disadvantage of this solution is that it cannot be 100% accurate.

C. Recommended Solution

- **Banks**
  - Banks must implement vendor-recommended quality procedures and must monitor results
  - Adherence to ANSI Standards pertaining to check design for "image friendly" source documents (see Appendix for list of relevant standards)
  - Imaging bank must take reasonable steps to correct suspects where possible
  - Imaging bank must identify capture platform and pass information in the X9.46 interchange file
  - Imaging bank must pass "error/suspect" code in the X9.46 interchange file
  - MIS quality reporting must be provided by the receiving banks (at least during the pilot)
  - Quality control sampling of the X9.46 interchange file (both by the sending and receiving banks)

- **Vendors**
  - Provide detection and/or prevention capabilities at image capture time for the following conditions:
    - Camera phasing
    - Partial image capture
    - Uncorrectable skew
    - Piggyback
    - Image Camera "Off"
    - No Image
    - Streaks & Bands
    - Out of range compressed image size (minimum/maximum)
  - Provide enhanced capability of detecting above conditions at transaction capture time.

The above recommendation is a combination of features from all of the alternative solutions identified earlier. The steps recommended for banks address specifically the issue of bad source documents and the two requirements in PACES namely,

- The collecting bank will append the resulting quality check to the image file prior to sending to the paying bank
- The paying bank is responsible for verifying the quality of the image prior to archiving.

The detection of specific conditions at capture time is a requirement posed to the vendors and is indicative of a standard implicitly stated for image quality. This standard should further reduce the number of instances of unusable images. At a minimum, case #5 and case #6 should be eliminated. Piggybacks, which render unusable any image regardless of quality and source document, must be eliminated as well. Case #3 is one that can only be addressed by a good source document.

The standard can be stated as follows: An image meets the standard for exchange if the following conditions are satisfied:

- full image of the check (not a partial image)
- image of a single check (not a piggyback)
- not skewed (uncorrectable skew)
- no streaks or bands
- within tolerance of a compressed image size

The condition where there is no image is not a question of quality. However, this condition must be detectable by the imaging platform, identified and flagged by the sending institution.

D. Appendix: Supporting Documentation

- **Image Quality Subgroup Position Paper**

Team Members: Chase - Mariano Roldan
BankBoston - Maritere Mendez
Citibank - Lottie Tann
Comerica - Antonio Silva
Federal Reserve Bank - Rich Puttin
Federal Reserve Bank - Mike Desman
BancTec - Jeff Harpster
Check Solutions - Richard Benz
IA - Jim Anderson
IBM - John Hillery
NCR – Wayne Doran
NCR - Ray Higgins
NCR - Nancy Stefanuk
Unisys - Thomas Hayosh
Unisys - Michael Higgins-Luthman

Image Archive Forum
Chase - Patti McEvoy
Check Solutions - Rudy Chittenden
SunTrust - Danny Raynor

The purpose of this subgroup is to define Image Quality to support image interchange. The ultimate goal is to determine whether or not a minimum quality standard can be defined to address the PACES business requirement: "The images in the Image File must meet a minimum quality standard." The proposed activities for this group are:

- Define Image Quality
- Collect Facts
  - Vendor Views
  - Bank Views
  - Past studies/results
  - Statistics collected relevant to image quality
  - Quality measurements
- Analyze QA capabilities of capture platforms
  - Commonalities
  - Differences
  - Applicability to image interchange
- Identify options
  - QA practices/Risk Management
  - Metric/Standard
  - Measurement

- Identify and resolve issues
- Identify/analyze feasible solutions
- Develop recommendation

At the last PACES General Session, the banks and the image capture vendors presented their views on image quality assurance. Unisys, NCR and BancTec have provided white papers documenting their views on image quality. All this information will be used by the Image Quality subgroup in its analysis. A survey was also sent to the four capture vendors to respond to as additional input to the analysis.

Milestone Dates:
1. October 21 - Present findings to date
2. December 7 - Present recommendation

- **ANSI Standards and Technical Guidelines Pertaining to Check Design**

  - TG-2 Understanding and Designing Checks
  - TG-6 Quality Control of MICR Documents
  - TG-8 Check Security Guidelines
  - X9.7 Bank Background and Number Convenient Amount Fields
  - X9.13 Specification for Placement and Location of MICR
  - X9.18 Paper Specifications for Checks
  - X9.27 Print and Test Specifications for Magnetic Ink Printing
  - X9.29 Check Carrier Envelope Specification
  - X9.40 Check Correction Strip Specification
  - X9.51 Document Fraud Deterrent
  - X9.53 Specification for Check Endorsements

- # Transcoding Test

TRANSCODE TEST

DESCRIPTION:

Each of the following capture vendors transmitted one copy of each of the gray scale image files that they created to each of the archive vendors. The archive vendors than converted the gray scale images to black/white and subsequently printed those images at 50% of original size to accommodate current banks providing retail checks of 8 - 10 per page.

CAPTURE VENDORS
Compression / dpi / hardware

BANCTEC
JPEG / 133 / BancTec E-Series

IBM
JPEG / 80 / IBM 3890
ABIC / 80 / IBM 3890

NCR
JPEG / 100 / NCR 7780
CCITT G4 / 200 / NCR 7780

UNISYS
JPEG / 100 / Unisys NDP500

ARCHIVE VENDORS
hardware / bpi setting

CHECK SOLUTIONS
IBM 3835 / 240

BANCTEC
/ 150

IA

NCR

UNISYS

PURPOSE: To examine the interoperability of the image platforms when exchanging gray scale images and evaluate the quality of black/white images transcoded from gray scale.

VENDOR OBSERVATIONS:

NCR	Resultant black & white image quality is inconsistent for different vendor images. Causes due to differences in capture platforms: resolution, brightness, contrast, color response, image enhancement. Possible Solutions: (1) Based on capture platform, analyze the images to determine which transcoding algorithm or parameters should be used to produce an optimum and consistent image quality. (2) Normalize the images to a consistent gray scale model from which a single transcoding algorithm can produce optimum and consistent images.
UNISYS	Gray to black/white processing steps while well matched for Unisys images did not produce optimal results for other vendor images. Changes (e.g. threshold changes) were required to handle other vendor images.
CHECK SOLUTIONS	Image print quality could have been substantially improved if the half-toning algorithms were set at 480 dpi or higher. It appears possible to programmatically tune the half-toning algorithms to optimize the quality of each vendor type.
BANCTEC	Gray to black/white statement print image conversion steps will have to be modified to produce optimal images from all sources.

- # Image Quality Sampling Test

Table 1: Test Results by reason codes as listed in report form.

	Co Test 0	Co Test 1	Co Test 2	BB Test 1 & 2	Ch Test 1	Ch Test 2	Total	% of "Bad"
No Image		5	1	19	1		26	5.59%
Damaged Item	4	10		5	15	6	40	8.60%
Carrier Document	8	7	5				20	4.30%
Partial Image	7	46		4	3	20	80	17.20%
Blurred Image				7		1	8	1.72%
Piggyback	2	10	3	4		19	38	8.17%
Orientation		9		3	27		39	8.39%
Skew							0	0.00%
Too Dark	1			3		9	13	2.80%
Too Light	6			1			7	1.51%
Streaks/Banding			1	9			10	2.15%
Original Doc							0	0.00%
Ink Color		4		5	1		10	2.15%
Ck Background			2	2	6	2	12	2.58%
Other	33	14	4				51	10.97%
Check Writer							0	0.00%
Print Quality	36			22			58	12.47%
Ink Color				2			2	0.43%
Missing Data	5			17			22	4.73%
Other				27			27	5.81%
No Reason Found		1					1	0.22%
Decomp Error					1		1	0.22%
Total "Bad"	102	106	16	130	54	57	465	
Items Inspected						1330		
Total Population	750000	579000	542000	1158807	683926	555890	4269623	
% "Bad"	0.01%	0.02%	0.00%	0.01%	0.00%	0.01%	0.01%	

Table 2: Test Results compiled according to 5 categories: (1) No Image, (2) Capture Equipment, (3) Source Document, (4) Document Preparation, (5) No Reason Found

	Co Test 0	Co Test 1	Co Test 2	BB Test 1 & 2	Ch Test 1	Ch Test 2	Total	% of "Bad"
No Image		5	1	19	1		26	5.59%
								5.59%
Partial Image	7	46		4	3	20	80	17.20%
Blurred Image				7		1	8	1.72%
Too Dark	1			3		9	13	2.80%
Too Light	6			1			7	1.51%
Streaks/Banding			1	9			10	2.15%
Decomp Error					1		1	0.22%
Piggyback	2	10	3	4		19	38	8.17%
Skew							0	0.00%
								33.76%
Damaged Item	4	10		5	15	6	40	8.60%
Carrier	8	7	5				20	4.30%
Document								
Original Doc							0	0.00%
Ink Color		4		5	1		10	2.15%
Ck			2	2	6	2	12	2.58%
Background								
Other	33	14	4				51	10.97%
Check Writer							0	0.00%
Print Quality	36			22			58	12.47%
Ink Color				2			2	0.43%
Missing Data	5			17			22	4.73%
Other				27			27	5.81%
								52.04%
Orientation		9		3	27		39	8.39%
								8.39%
No Reason Found		1					1	0.22%
								0.22%
Total "Bad"	102	106	16	130	54	57	465	
Items Inspected						1330		
Total Population	750000	579000	542000	1158807	683926	555890	4269623	
% "Bad"	0.01%	0.02%	0.00%	0.01%	0.00%	0.01%	0.01%	

Table 3: Additional Sampling Test Performed by Wachovia Bank

FSTC PACES
Image Quality
Test Results

	Wachovia Bank (POD AK, BAL) (NCR 7780 b/w images)	
Reason for bad image	test 1&2	test 1&2 (with ck writer ink problems removed)
No Image		
partial image	9	9
blurred image		
too dark		
too light		
streaks/banding		
decomp error		
Piggyback	7	7
Skew	1	1
Source document:		
damaged item	8	8
carrier document	6	6
Original doc:		
Ink		
Ck background	2	2
Other		
Check Writer:		
Print Quality		
Ink	165	0
Missing data		
Other	11	11
Orientation	11	11
No Reason found		
Total "Bad" Items Sampled	220	55
Total Population	432,868	432,868
% "Bad"	0.05%	0.01%

Check Writer Ink Problems:	
Problem ink color such as fluorescent pink, fluorescent orange, silver, gold	36 items
Faint dot matrix print on money orders	90 items
Faint dot matrix on cash tickets	19 items
Illegible print on other types of documents which were typically checks	20 items
Total	165 items

Appendix 6

Draft
FRBB/EasCorp Image Returns Pilot
Test Criteria

September 25, 2000

Introduction

The return image pilot between EasCorp and the Federal Reserve Bank of Boston is one of several test of concept pilots currently underway to provide feedback on the feasibility and value of an image return process. The purpose of the pilot is to gather information about technical, processing, and legal issues. Objectives of this pilot include: (1) demonstrating a practical application for using return images, (2) collecting information to assist in supporting a future image return system without paper, (3) obtaining end user reaction, feedback, and suggestions for value added services, (4) accessing limitations, (5) determining hardware and software requirements and (6) exploring options for resolution of operational and legal issues.

The Pilot will consist of four stages. Phase one will be test phase using test documents to verify normal processing, exception processing and volume testing. Phase 2 begins production with sending an image file daily for returns qualified to EasCorp. The physical items will be sent later on the same day. Phase 3 adds additional EasCorp member banks for image processing. Phase 4 will begin next day delivery of the physical items. During Phase 4, the option to reclear items prior to dispatch will be explored.

Processing Overview

A key discussion item of the pilot was the timing of image delivery and the physical return of paper. A method was needed to provide images in a timely manner without inflicting artificial deadlines from pilot implementation. Additionally, it was thought that sending the paper too early would result in less reliance on images. To meet these needs we elected to defer the shipment of the paper until after the image delivery deadline The paper returns normally sent to EasCorp at the 8:00 AM RCPC dispatch will be sent with EasCorp return city items at the 12:00 PM City dispatch. To accommodate the image delivery process, items from our high-speed return process will be outsorted for subsequent image processing. Deadlines for image processing and reconcilement will be set 9:00 AM in order to provide delivery of images by 10:00 AM.

Outsorted paper returns from high speed will be processed on a Unisys DP550 low speed image sorter to capture return images using TIFF 6.0 and CCITT compression. Edits in the image sort patterns consist of R/T, amount and a “2” in position 44. The image capture pass and reconcilement set for completion at 9:00 AM will allow time for reconcilement, quality review and preparation of the images for delivery by 10:00 AM. Accounting, adjustment and image data will be collected from the image pass.

After Image processing is complete, the image capture pass will be reconciled to the high speed return item pass. Any misreads will be corrected with changes to the MICR and accounting information on the capture system. When settlement is complete, an extract file will be sent to the archive system for image reconcilement. Image reconcilement is used to adjust differences for capture system changes or note any missing or extra images. Missing or extra images are typically caused from jam conditions.

The current FRBB export system does not have the capability to create a file. Instead, images are exported first to rewritable CD. Rewritable CD are recycled after 10 days. The separate TIFF front and back images are collected into one file in Common Output Format (COF), version 1.3. The COF format provides a means to transport a collection of images regardless of hardware and software used. Additionally, the return images will be archived if needed to recreate images for a processing date or for pilot review purposes.

Export selection is based on a search of the archive by processing date and R/T. Due to the limitation of export selection, images from other processes could be included in the image file. This should be unlikely based on the timeframes involved. During CD-ROM creation, the export system reports the number of items written. This item count is verified to the return letter recap of the paper returns. Any differences will be noted. Items that cannot be processed will be photocopied and manually faxed to EasCorp. Item in carriers or items identified as poor quality may be faxed during the image delivery process or upon request.

A daily standard email template will be used to provide reference and accounting information along with the attached image file. The accounting information will be similar to that found on the paper returns and return letter recap EasCorp will receive with the City dispatch. Additionally, the standard email will note any reconcilement differences between images and the paper returns, processing and project comments, and include comments about the quality of each image. Each image will be reviewed for quality prior to delivery.

The Federal Reserve currently does not support an electronic delivery means for bulk images. As an interim solution, the image file will be zipped, password protected, and delivered over the Internet as an attachment in an email. Both FRBB and EasCorp have agreed that this is an acceptable means for the pilot, but plan to move to the FRS standard when developed.

Paper returns will be dispatched to EasCorp with the 12:00 PM City dispatch. It is intended that the image is used as much as possible. Any need to use the paper should be documented as part of the analysis.

FRBB will use existing hardware and software to capture and distribute return images. EasCorp made software modifications to process the COF formatted image files, extract images in TIFF format and convert them to PDF format. The PDF formatted images will be sent to EasCorp customers using email and FAX.

Assumptions

1. Only one Image Return Letter per day will be created.
2. Volume will not exceed 300 items.
3. WinZip is used to create zip archive and password protected file.

4. Images will be captured using standard black and white images and sent using Common Output Format 1.3.
5. Paper will be returned same day during initial stage of pilot. Next day delivery of images will be implemented as pilot progresses.

Test Criteria

Validation

Validate that the following have occurred after transmission received by Eascorp:

- Total numbers of items sent are received.
- Total dollars sent are received.
- Valid MICR codeline information is passed with images.
- Review quality of each image, front and back, documenting information of images having poor quality. Copies of poor quality images will be retained for documentation.
- Endorsements and return reasons are legible.
- Note above in standard email template used to send image file. Email will include Return Letter totals for processing.

Exception Handling

Determine procedures to report and handle the following:

- Files don't balance – items and/or dollars, Differences will be noted in email with images.
- Items are missing or extra: Missing and extra items will be noted in email with images.

- Images are unreadable or of poor quality. Reported in email.
- Images cannot be processed: Note difference and reason in email with images.
- Images are in carrier docs. Scan or photocopy after processing items in carrier documents.
- Misreads: Note difference in email with images.
- Fields are missing. Sort Pattern requires RT, Amount and Position 44. Other fields should not have values.

Volume Requirements for Test and Pilot

- Phase 1: Test Documents.

Phase 1 will occur over a one-week period to review operational procedures and consist of three tests. The test documents will be made from a combination of strips and carriers and qualified to EasCorp FCU (2113-9177-3) and Winthrop FCU (2113-8692-4). Test documents will include return reasons.

- Start date October 3, 2000.
- One 30 image good item/image test to simulate normal processing.
- One 30 items exception test consisting of various exception conditions.
- One volume test consisting of 300 items. No exceptions are required.
-

- Phase 2 – Initial Pilot - EasCorp returns only.

Phase 2 will use live items for duration of two weeks. No new volume of banks will be added during this period. Return reasons will be added during week 2.

- Start Date October 11, 2000.
- 10 - 40 live items per day.
-

- Phase 3: Additional EasCorp Banks

  - Phase 3 adds two or three additional EasCorp Banks

  - 20 - 300 items per day.

  - Timeframe: To be determined

Test Preparation (Phase 1)

- Create test document samples – good data, bad data, missing, unreadable for 'test' first.
- Prepare 30 test items to simulate normal processing. No exceptions.
- Prepare 30 test items that include the following error conditions: incorrect amount, unreadable amount, incorrect r/t, unreadable r/t, unreadable position 44, missing position 44, unreadable image, jam condition, extra image condition, missing image condition, extra image (not part of deposit), extra item, missing item, non return item, non EasCorp item.
- Prepare 300 items for volume testing only.

Problem Reporting and Resolution

- FRB will provide daily email to send images and report difference exceptions and problems. FRB will deliver email with images and comment by 10:00 am.
- EasCorp will provide daily email reply noting differences, exceptions and problems from their processing by 2:00 pm.

- Contacts at FRB:
  - Mike Sheridan (617) 973-3738
  - Ron Alexis (617) 973-3164
  - Check Computer Room (617) 973-3124
- Contacts at EasCorp:
  - Don Cross
  - Chris Smith
- Biweekly status call to be held to discuss pilot issues.
- Maintain list of issues during course of pilot.
- Evaluation of pilot.

Electronic Delivery

- Determine electronic delivery times, track time based on email send/receive times.
- Test re-send / recreate capabilities if failure.
  - Under 10 days, file can be retrieved from CD ROM. Same process is required to zip image file and send to EasCorp.
  - Over 10 days or anytime, images for processing day can be extracted from archive file and new CD ROM. Same zip and send process as original.
- Process if partial or incomplete file received. Partial transmission will result in the inability to unzip the file.

Develop Operation Procedures for Daily Pilot:

- Time of day to run and send (by 9:00 AM to process by 10:00 PM to send)
- Delivery process -
  - WinZip is used to create password protected compressed image file.
  - Created zip archive is sent to predetermined email address.
  - New password will be distributed to EasCorp monthly.
  - Sort Pattern 39810000 (Boston Image) will be used to process EasCorp returns.
- Mike Sheridan will be responsible to ensure end-to-end process.
- Image Operations will be responsible for image settlement/reconcilement.
- High Speed Supervisor will be responsible for return of paper.
- Develop Image Return Operating Guidelines during Phase 1, 2 and 3.

Procedures

Steps to Send Image File to EasCorp

Process Returns and Imaging

1. Hold EasCorp Image pocket from return repass pocket 24 for image processing. (No accounting). High Speed Sorter Supervisor will deliver pocket to Low Speed for image processing.
2. Process EasCorp Image Pocket by 9:00 am on image DP using 3981 sort pattern. Accounting entries are generated from this pass. Low Speed Supervisor will notify Computer Operations when processing is complete.
3. Image Coordinator will reconcile image Pass with return item pass. IPS recaps and details from each pass will be used for reconcilement. Return recap will be adjusted accordingly for missing items and misreads.
4. High Speed Supervisor will ship return items to EasCorp with 12:00 City dispatch.

Create Image CD

An option to directly create a file is not currently available. The image file will be retrieved from a rewriteable CD.

1. Computer Operations will create an image extract file from the return image sorter run.

2. The Image Coordinator will perform Manual Reconcilement image codelines to ECP codelines.
3. The Image Coordinator will create rewritable CDROM for EasCorp return images. Export items based on EasCorp RT 2113-9177 and processing date. COF will be selected as the format type for the deliverable.
4. The Image Coordinator will verify and note the following:
   - Item counts from processing with those written to CDROM
   - Valid MICR information is passed with images.
   - Quality of each image, front and back.
   - Legibility of endorsements.

Create Compressed Password Protected File

1. Insert rewritable CD.
2. Go to my Computer and open d:
3. Open c:\EASCORP
4. Move cof00001 from D drive to EASCORP directory on c:drive

5. Run WINZIP.

Appendix 6 (continued)

6. Create new zip archive in c:/temp, name IMmmddyy, where mmddyy = date
7. Select options menu select password
8. Select ADD menu
9. Enter agreed password for EasCorp (must be correct or EasCorp will not be able to access file)
10. Add COF00001 from C:/EASCORP directory
11. Ensure file contains a "+" to indicate a password has been assigned.
12. Close WINZIP

Send Image File and Return Presentment Information to EasCorp

1. Select predefined and preaddressed Image Returns draft email message.
2. Attach COF image file, IMmmddyy from c:\temp directory
3. Complete predefined email. Add return item letter totals, amount and items from Eascorp return recap or details in message area. Note any exceptions or out of balance conditions in email.
4. Send file to EasCorp. Set return receipt for email.
5. Forward email to selected distribution. No attachment or images.
6. Save CD-ROM for 10-day cycle (will also be archived).

Password Controls

1. Password will be provided to Chris Smith using alternate delivery method.
2. Password to change on the 1st day of each month.
3. Password to contain eight alphanumeric characters and include special characters.

Image Return Pilot Email Template

FRB Boston to EasCorp

Subject: Image Return File mm/dd/yy.

Return Letter Date:

Key Block:

Return Letter Items:

Return Letter Amount:
Commingle breakdown by routing transit number of dollars and items.
Number of images:
Note images of suspected quality:
Note missing or extra images:
Other comments and notes:

EasCorp to FRB Boston

Subject: Re: Image Return File mm/dd/yy.

Number of images:
Note images of suspected quality:
Note missing or extra images:
Other comments and notes:

FRB Boston/EasCorp Test of Concept
Proposed Returns Image File Reconcilement and Adjustment Procedures

The use of Returns Image Files will change the way that this work is reconciled and adjusted. The following describes the current process used in the paper-based return environment and provides detailed descriptions of potential reconcilement and adjustment processes for an image-based return environment. The proposed procedures are specific to the Federal Reserve's adjustment process, and are based on experience with the image returns test of concept currently underway between EasCorp and the Boston Reserve Bank. The detailed descriptions of individual corrections and adjustments explain how different types of adjustment errors could be reported in an image environment and provide a sense of how an image return process could affect the availability of certain pieces of information and eliminate the need for attachments when reporting certain types of errors.

Current Process for Paper Returns

The Fed processes return letters received from paying banks. The returns are received as qualified returns or as raw returns. The raw returns are encoded with the routing transit number, amount and a "2" in column 44 and then processed as qualified. The MICR line of the qualified item is read and sorted to the appropriate pocket for the BOFD. As each item is read to the pocket, the MICR details are written to a file. When the job is complete, the individual MICR detail is written to a bundle listing and the bundle listings are aggregated to create a return letter recap. The total of this recap is also passed to IAS to debit the BOFD's account. The individual items, bundle listings and recap are delivered to the BOFD.

If the BOFD does not receive the return letter, they report a missing cash letter to the Fed. When the BOFD receives the return letter, the recap is used to reconcile to the charge on the statement. The detail listings are removed and put aside. The return checks are run through a sorter or manually added to reconcile to the recap total. If the items agree with the total, the return letter is in proof. If not, the individual items or a listing from the processing job are compared to the detail listings from the Fed. If an entire bundle is missing, the BOFD reports a missing bundle to the Fed. Since the checks are sorted to the pocket in the same order as the detail listing, this is a relatively straightforward process. Missing items, extra items and listing errors are detected. These errors are reported to the Fed. When completed, the recap and listing are filed in the event that they are needed for future adjustments or research.

After reconcilement, the individual returns are reviewed by the BOFD to determine the BOFD's customer. If it is determined that the item was not deposited with the BOFD, they report an NOI. If the item is an empty carrier, they report a NCH. The customer may also find encoding errors and original and photos charged (PAID) at this point or sometimes afterwards. If the item cannot be charged to the customer's account (NSF/Account closed) and the item was returned late, the BOFD will report a Late Claim.

Returns Image File Process

As above, the returns are listed to a pocket for the BOFD, however, the checks are run a second time to create the IAS charge and to image the returns. After the image pass is complete, it is compared to the prior pass and, if necessary, reconciled to the incoming deposit. If required, adjustments are made to the captured codeline to provide corrected details, corrected codeline in the images and correct recaps/charges.

When image pass reconcilement is complete, recaps are printed and a match file is created. The match file (similar to an ECP file) is sent to the image system to highlight any differences in image captures and codelines associated with the images. If needed, codelines are corrected with the match file codelines. Any reconcilement differences are reported to the image-balancing operator and noted. When image balancing is complete, reports are available for comparison to the recap.

When image balancing is complete, an export job is run to create an image file for transmission to the BOFD. The images are not placed in the image files in any particular order. The image file is attached to a predefined email template that represents the electronic recap. Information from the paper recap including the charge and reference information is entered into the template. Any errors or discrepancies are noted in the email before delivery to the BOFD.

If the BOFD does not receive the image transmission, they report a missing return letter. The BOFD accumulates the dollar value of the images from the amount field of the embedded codelines within the images. The total is compared to the email recap. Any differences or errors are reported to the FRB for resolution. If the FRB fails to report differences to the BOFD in the email, common differences can still be detected by the BOFD. Extra images can be found by the odd sequence numbers associated with the extra images and misreads can be found by viewing the images. Adjusting the accumulated image totals and comparing the email recap should then balance.

Individual Corrections and Adjustments

Enclosed Not Listed (ENL) – item received free in the image transmission. This will be detected when the number of items in the file is greater than the number of items listed in the transmittal and the total dollar amount of the items in the file is greater than the total dollar amount of the cash letter in the transmittal. The BOFD will submit an adjustment request and select the ENL investigation type (ITYP). The cash letter entry date is obtained from the date in the cash letter transmittal. The amount will be the difference between the sum of dollar amount of the items on the file and the cash letter total in the transmittal. If the number of items in the file less the number of items in the transmittal is greater than zero, the number of items will be reported in the Comments. The Cash Letter Total in the transmittal will be used for both the cash letter total and the bundle total. This is all the information that is available to report. When received, an adjustment case will be opened. The Fed will research the case, by comparing a copy of the transmission to the extract file to "reconcile" the transmission to the extract. This will determine which items in the transmission are ENL.

Listed Not Enclosed (LNE) – Item charged but not received in the transmission. This will be detected when the number of items in the file is less than the number of items listed in the transmittal and the total dollar amount of the items listed in the file is less than the total dollar amount of the cash letter in the transmittal. The BOFD will submit an adjustment request and select the LNE ITYP. The cash letter entry date is obtained from the date in the cash letter transmittal. The amount will be the difference between the sum of the dollar amount of the items on the file and the cash letter total in the transmittal. If the number of items in the file less the number of items in the transmittal is greater than zero, the number of items will be reported in the Comments. The Cash Letter Total in the transmittal will be used for both the cash letter total and the bundle total. This is all the information that is available to report. When received, an adjustment case will be opened. The Fed will research the case, by comparing a copy of the transmission to the extract file to "reconcile" the transmission to the extract. This will determine which items in the transmission are LNE.

Encoding Error (ENC) – The dollar amount of the item in the codeline is the same as the amount encoded on the MICR line of the return and these two amounts are different than the legal line of the check. If the encoded amount of the return is the same as the encoded amount of the forward MICR line, no adjustment should be reported (the BOFD was charged the same amount on the return that they received when the cash item was deposited). If the amount in the codeline is different from the encoded amount, report a LST error. If the BOFD is reporting an encoding error, they need to report the difference between the encoded amount and the legal amount as the difference amount. The cash letter entry date is obtained from the date in the cash letter transmittal. The Cash Letter Total in the transmittal will be used for both the cash letter total and the bundle total. The sequence number is found in the codeline of the image. The betweens are not available. The listed as amount is the encoded amount of the return, while the should be amount is the legal amount of the check. A copy of the image must also be sent.

Listing Error (LST) – An item was listed for an amount different than the encoded amount. If the codeline amount is both an encoding error (the encoded amount in the MICR line of the return is different than the legal amount) and a listing error (the amount in the codeline is different than the encoded amount) the error should be reported as a listing error. If the BOFD is reporting a listing error, they need to report the difference between the codeline amount and the legal amount as the difference amount. The cash letter entry date is obtained from the date in the cash letter transmittal. The Cash Letter Total in the transmittal will be used for both the cash letter total and the bundle total. The sequence number is found in the codeline of the image. The betweens are not available. The listed as amount is the codeline amount of the return while the should be amount is the legal amount of the check. A copy of the image must also be sent.

Noncash Item (NCH) – An item that was not a valid item was included in the file. Examples are an empty carrier or a control document. This will not be detected until the bank attempts to charge the item to its customer. The BOFD will submit an adjustment request and select the NCH ITYP. The cash letter entry date is obtained from the date in the cash letter transmittal. The amount will be the amount of the item. The Cash Letter Total in the transmittal will be used for both the cash letter total and the bundle total (these are both optional fields). The sequence number is found in the codeline of the image. The bank will not need to send the Non Cash item as an attachment, since the Fed can retrieve the image.

Free Item (FREE) – item received free in the image transmission and the institution is not the BOFD. This will be detected when the number of items in the file is greater than the number of items listed in the transmittal and the total dollar amount of the items in the file is greater than the total dollar amount of the cash letter in the transmittal. The BOFD will submit an adjustment request and select the FREE ITYP. The cash letter entry date is obtained from the date in the cash letter transmittal. The amount will be the dollar amount of the item. The Cash Letter Total in the transmittal will be used for both the cash letter total and the bundle total (these are optional fields). The sequence number is found in the codeline of the image. The bank will not need to send the Free item as an attachment, since the Fed can retrieve the image.

Not Our Item (NOI) – An item was charged to the wrong institution. This will not be detected until the bank attempts to charge the item to its customer. The BOFD will submit an adjustment request and select the NOI ITYP. The cash letter entry date is obtained from the date in the cash letter transmittal. The amount will be the amount of the item. The Cash Letter Total in the transmittal will be used for both the cash letter total and the bundle total (these are both optional fields). The sequence number is found in the codeline of the image. The bank will not need to send the item as an attachment, since the Fed can retrieve the image.

Source of Receipt (SOR) – A request to identify the source of an item. This usually occurs after the processing date and involves a dispute over the item. The BOFD will submit an adjustment request and select the SOR ITYP. The cash letter entry date is obtained from the date in the cash letter transmittal. The amount will be the amount of the item. The cash letter total in the transmittal will be used for both the cash letter total and the bundle total. The sequence number is found in the codeline of the image. The item before and the item after are not required.

Missing Cash Letter (MCL) – An institution was charged for a return letter, but the image transmission was not received. The BOFD will submit an adjustment request and select the MCL ITYP. The cash letter entry date is the date on the Statement. The amount is the amount of the charge.

Missing Bundle (MBDL) – This is the same as a missing cash letter.

Extra Cash Letter (ECL) – The institution receives an image transmission, but is not charged for the transmission. The BOFD will submit an adjustment request and select the ECL ITYP. The cash letter entry date is obtained from the date in the cash letter transmittal. The amount will be the amount of the cash letter total in the cash letter transmittal.

Extra Bundle (EBDL) – This is the same as an Extra Cash Letter.

PAID (PAID) – The institution has been charged with two images of the same item. The BOFD will submit an adjustment request and select the PAID ITYP. The cash letter entry date is obtained from the date in the cash letter transmittal. The amount is the amount of the item. The cash letter total in the cash letter transmittal will be used for both the cash letter total and the bundle total. The sequence number is found in the codeline of the image. The bank will not need to send a copy of the item, since the Fed can retrieve the image.

The following ITYPs (investigation types) would not normally be used as part of the image transmission or subsequent processing:

- furnish disposition (DISP)
- photocopy request (PREQ)
- advice request (AREQ)
- entry in error (ERR)
- duplicate entry (DUP)
- late return claim (LC)
- late return disclaimer (LR)
- information request (INFO)
- forgery (FORG)
- reclamation (RCLM)
- indemnified photocopy (PIL)

Retention Periods in an Image Returns Environment
Recap of the FRB Helena's Discussions With Local Law Enforcement Agencies

Retaining Physical Returns Initiated Via Image

Helena Branch staff met with the State of Montana Attorney General's Office in the third quarter of 1999. The first objective was to provide information about the EPIC project. The second objective was to receive input on the appropriate period of time that a physical return item should be retained for evidentiary purposes. Attorneys within the Federal Reserve System believed that 120 days was an acceptable retention period given that the image would be available for seven years. The initial response from the Attorney General's office recommended that physical return items be retained for one year. Subsequent meetings resolved this issue and the Attorney General's office is now comfortable with the 120-day retention.

EPIC Simplifies Research and Can Aid In Criminal Investigations

FRB Helena Branch management attended a Montana County Attorney Association meeting in November 1999 to provide information regarding EPIC and the efficiencies that can be gained by accessing the check image archive. Local law enforcement officials noted the use of EPIC as a tool to aid in criminal investigation surrounding dog killings in the Helena area. The Helena image archive was used by a local banker to locate the image of a check that was linked to the purchase of poison used in the killings. Meetings with the Montana State Attorney General's office and local law enforcement agencies indicated that the quality of the images, and the viewing capabilities produced by the EPIC system, would be beneficial when trying to retrieve check information for investigative and litigation purposes.

More Detailed Notes from EPIC Meeting with Attorney General's Office and Local Law Enforcement:

FRB Helena staff presented an overview of the project in general and the image return process specifically. They also provided officials with a tour of the equipment and a demonstration of the process. They presented the process of holding the physical return item for 120 days and referred to the letter that they received from the Attorney General's Office in July 1999 regarding keeping the physical items for at least one year for litigation purposes.

The results of the meeting were as follows:

- The image system would be a very good tool for investigations
  - The fast access and the ability to zoom in on different areas of the check would be very beneficial.
  - The zoom feature would have significant value for use in handwriting analysis.
  - It currently can take weeks for law enforcement to receive a check from financial institutions for an investigation.
  - Normally, law enforcement personnel are working from poor photocopies of the item. Also, in the normal course of business, a copy is used for investigation and the original is needed if the case goes to court

- Relying on an image (in court) depends on the integrity of the system producing the image.
  - If credibility of the image can be established it could be used in court.
  - The Federal Reserve needs to document its quality control and security control procedures for the image system and share them with law enforcement and the legal system
  - Federal Reserve staff may be asked to appear in court to describe the image system and how the original cannot be altered.
  - Using an image will come from experience and education and how the integrity of the system is portrayed.

- Time frame for retaining the physical return item
  - Original recommendation from Attorney General's Office was to retain the physical return items for one year for evidentiary purposes.
  - After receiving an overview and a demo of the image system the head of the criminal investigation unit for the Attorney General's office noted that the one year recommendation was not firm and that he would share the information that he had learned during the meeting and obtain further feedback from the Attorney General's office.
  - Conspiracy cases can take six to nine months to complete. An example of such cases involves people printing their own checks.
    - Need to compare ink from the printer
    - May involve hundreds of items and multiple states
  - If a business receives a forged check and notifies the police the next day, the 120 day retention period would suffice.
  - In Helena, the local law enforcement agency has one officer working on check forgeries alone; working an average of 30 cases per month. The cases can take days or weeks to complete.
  - Image could be used for the investigation but the original would be needed for court – for comparison of paper type and ink.
  - The requirement to use the original item in court depends on the judge – some demand the original and some are more flexible.

- Recommended further discussion with the following groups:
  - Input from the Secret Service – they have expertise with forged documents
  - Judges – educate on the quality of images
  - Local telephone company – may be a good resource for documentation of quality and integrity as a result of having to produce telephone call details for investigations.

Image Returns Market Research Findings
Lists of Perceived Benefits, Concerns and Barriers

As discussed in Section 5 of this document, the following tables (Exhibits 1-9) list some of the perceived benefits, concerns and barriers related to image returns that were identified by different stakeholder groups during the qualitative market research effort.

Exhibit 1
Perceived Benefits to Small Financial Institutions
From the Proposed Image Returns Approach

(1) Earlier Access to Returned Checks

(2) Efficiencies in Accounting and Processing of Returns

- ✓ Cleaner copy provided by images may streamline processing
- ✓ Easier research on returns
- ✓ Reduced incorrect routings of returns
- ✓ Reduced labor needed to process returns
- ✓ Remove third party processors from return handling process
- ✓ Reduced paperwork in handling returns
- ✓ Contingency back-up

(3) Improvements in Delivery of Returns

- ✓ More reliable delivery of returns
- ✓ Reduced transportation costs
- ✓ Returns received more quickly by outlying financial institutions

(4) Reduction in Financial Losses

- ✓ Reduced losses from releasing uncollected funds to depositors
- ✓ Reduced losses by avoiding opening new checking accounts for known bad check writers
- ✓ Reduced losses from check fraud

(5) Improvements in Customer Service

Exhibit 2
Perceived Benefits to Small Businesses and Consumers
From the Proposed Image Returns

(1) Knowing about returned deposited checks earlier
- ✓ act faster to collect debt
- ✓ avoid giving goods or services to bad check writer
- ✓ avoid taking another check from that individual

(2) Improve cash flow management practices
- ✓ more quickly identify which deposited check was returned
- ✓ avoid NSF and overdraft fees
- ✓ avoid dipping into savings or reserve accounts to cover checks written against uncollected funds

(3) More efficient handling of accounting and processing functions of returned checks
- ✓ be notified electronically
- ✓ forward image to check writer via e-mail, saving time and postal fees
- ✓ have electronic audit trail
- ✓ experience fewer errors due to electronic processing
- ✓ retrieve data from digital images
- ✓ use electronic redeposit which would be more convenient
- ✓ have electronic deposited returns presented ahead of paper ones in the DDA process
- ✓ save time
- ✓ avoid having to copy checks
- ✓ lessen storage requirements
- ✓ have returns sent electronically directly to collection companies

Exhibit 3
Perceived Benefits from Check Fraud Reduction
From the Proposed Image Returns Approach

(1) Providing fraudulent returns to law enforcement more quickly

(2) Reducing losses by allowing business customers to build current "hit list" of people from whom they want to avoid taking checks

(3) Limiting losses from check kiting schemes

(4) Giving business owners/managers earlier notice of employee fraud

Exhibit 4
Perceived Benefits to Collection Agencies
From the Proposed Image Returns Approach

(1) Acceleration of returned check item
- ✓ Time is the most critical element in the ability to collect on bad items.

(2) Electronic Statements
- ✓ Include image of front and back of check
- ✓ Color images would help because sometimes even check designs are important
- ✓ Preferable alternative to black and white paper copies and faxes

(3) Document Storage
- ✓ Electronic storage is more efficient
- ✓ Cost of electronic storage is decreasing while cost of physical storage is increasing.
- ✓ Retrieval of items would be easier

(4) Service Fees
- ✓ Image returns is a preferable alternative to other types of electronic payments for the ways in which collection agencies charge for their services.
- ✓ Could be helpful for electronic billing.

Exhibit 5
Perceived Benefits to Check Processing Software Vendors
From the Proposed Image Returns Approach

(1) Automates decision process related to returns for financial institutions

(2) Can increase productivity

(3) Can reduce processing costs

(4) Avoid degradation of check information that can occur with multiple handling of paper items

Exhibit 6
Perceived Concerns/Barriers of Small Financial Institutions,
Small Businesses, and Consumers
From the Proposed Image Returns Approach

(1) Concerns/Barriers related to retention of physical items
- ✓ Physical checks may be needed as evidence by law enforcement/courts.
- ✓ Retention periods need to be identified in disclosure statements to customers.
- ✓ Keep checks until quality of images is verified.
- ✓ Don't destroy checks until they are collected: keep the returns

(2) Concerns/Barriers related to image quality
- ✓ Reliability of Image Technology
- ✓ Will someone monitor image quality and completeness?
- ✓ Will Federal Reserve Banks and other service providers have compatible image services?
- ✓ Minimum quality standards are needed.
- ✓ Some check designs produce poor quality images
- ✓ Red ink doesn't show up on images
- ✓ Contingency preparedness issues

(3) Concerns/Barriers related to legality of images (See Exhibit7)

Exhibit 7
Perceived Concerns/Barriers
Voiced by all stakeholders
Related to legality of images

(1) **Concerns related to whether images could be substituted for paper checks in court**
(2) **Concerns related to whether paper checks can still be obtained if needed for physical evidence for investigations**
(3) **Even where images are said to be acceptable substitutes if the original checks are not available, in practice, some county judges will still not accept images**
(4) **Retention laws vary from state to state**
(5) **Some state laws require return of the original paper check**
(6) **There is a need for indemnification to show image is "authentic"**
(7) **Concerns related to whether IRS will legally accept images**
(8) **Concerns related to who is liable if images are unavailable or altered**
(9) **Concerns related to whether or not image returns program will really work if not Federally mandated**
(10) **Concerns related to what will constitute legal proof that original document was destroyed.**

Exhibit 8
Perceived Concerns/Barriers of Collection Agencies
From the Proposed Image Returns Approach

(1) Retention Issues
- ✓ Collection agencies are often asked to collect on items that are over 1 year old

(2) Quality Issues
- ✓ Poor paper documents make poor images
- ✓ Quality standards may be needed
- ✓ Reduce multiple handling of physical items before image is captured

(3) Security Issues
- ✓ Fraud is a big problem under paper system, so security controls need to be put in place up-front in image returns system

(4) Redeposit Issues
- ✓ Manner in which redeposit is handled in image returns environment is very important to collection agencies and their customers
- ✓ Concerns related to how financial institutions can automatically redeposit or delay redeposit of items
- ✓ Standard, controlled method of redeposit should be a priority

(5) Economic Issues
- ✓ Concerns related to whether small financial institutions will be able to afford imaging technology

(6) Legal Issues (see Exhibit 7)

Exhibit 9
Perceived Concerns/Barriers of Check Processing Software Vendors
From the Proposed Image Returns Approach

(1) Business case for financial institutions is not strong on the "send" side
(2) Imaging works best if set up on both ends as sender and receiver
(3) Failure to change quality problems in the paper check process could be major obstacle to image conversion.
(4) Not many financial institutions under the top 50 have image-enabled returns systems on send or receive side currently
(5) Check processing software vendors do not target smaller institutions for sales
- ✓ Smaller financial institutions are the disproportionate source of carrier documents

(6) Need for development of a business case for smaller institutions and third-party check processors