



# Technical Assistance Consultant's Report

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Project Number: 36207  
February 2007

## Kingdom of Bhutan: Strengthening of the Payment and Settlement System

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For Royal Monetary Authority  
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Asian Development Bank



**TA – 4386 (BHU)**  
**Strengthening of the Payment  
And Settlement System**

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**FINAL REPORT**

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*Submitted to:*

**Asian Development Bank  
Manila, Philippines  
and  
Royal Monetary Authority  
Thimphu, Bhutan**

*Submitted by:*

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## **Table of Contents**

|           |   |           |
|-----------|---|-----------|
|           | <b>Executive Summary .....</b>                      | <b>1</b>  |
| <b>1.</b> | <b>Introduction .....</b>                           | <b>3</b>  |
| <b>2.</b> | <b>Background .....</b>                             | <b>3</b>  |
| <b>3.</b> | <b>Terms of Reference Status .....</b>              | <b>4</b>  |
| <b>4.</b> | <b>Project Status .....</b>                         | <b>5</b>  |
|           | <b>4.1 Delivery of Equipment and Training .....</b> | <b>5</b>  |
|           | <b>4.2 Testing .....</b>                            | <b>6</b>  |
|           | <b>4.3 Parallel Testing – Thimphu .....</b>         | <b>6</b>  |
|           | <b>4.4 Parallel Testing – Phuentsholing .....</b>   | <b>7</b>  |
|           | <b>4.5 Other Issues .....</b>                       | <b>8</b>  |
| <b>5.</b> | <b>Legal Framework .....</b>                        | <b>14</b> |
| <b>6.</b> | <b>MICR Encoding .....</b>                          | <b>15</b> |
| <b>7.</b> | <b>Review of BECH Rules and Procedures .....</b>    | <b>16</b> |
| <b>8.</b> | <b>Additional Efforts for RMA .....</b>             | <b>16</b> |

### **Appendix I**

## **List of Acronyms**

|      |                                    |
|------|------------------------------------|
| ADB  | Asian Development Bank             |
| BECH | Bhutan Electronic Clearing House   |
| BIN  | Bank Identification Number         |
| BNB  | Bhutan National Bank               |
| BOB  | Bank of Bhutan                     |
| CASH | Clearing and Settlement House      |
| MICR | Magnetic Ink Character Recognition |
| RMA  | Royal Monetary Authority of Bhutan |
| TOR  | Terms of Reference                 |
| UAT  | User Acceptance Test               |

# Improving the Payment System Infrastructure Final Report

## Executive Summary

**Implementation status.** During the period from January 8 to 19, there was considerable testing of the new system to determine the level it met the technical specifications and RMA requirements. Many adjustments were made and reports were checked for accuracy. In addition, parallel tests with the exiting clearing operations were consummated and checked for accuracy. All exceptions to the numbers were easily identified and as staff became more familiar with the procedures, accuracy improved. At the end of the second week, the two existing clearing houses were becoming ready to move into a production environment for both the forward presentment process and the return (non payment of cheques) process. The old system was operated as a means to validate the new system was operating properly in calculating net settlement positions and to assure that RCH staff understands new operating procedures. It was found the banks were very meticulous in preparing their Batch Header and Delivery Statement control documents. During the parallel testing, no mistakes were found on the part of the banks in preparing the control documents and calculating the total amounts of the underlying cheques.

**Legal Framework.** Current Bhutanese law allows for RMA to operate clearing houses, but does not allow for images or photocopies of cheques to be used in the Bhutanese justice system to settle disputes. There is draft legislation awaiting enactment and RMA would do well to have it moved forward to provide a more effective legal framework for this new system. The new law should also note the statute of limitations for the length of time (e.g. six months) to save the original documents and then allow these cheques to be disposed of in a secure manner. During the interim, RMA and the banks signed an agreement to hold each other harmless and outlined the responsibilities of each party.

**Acquisition of MICR encoder.** One of the major difficulties in the current operation is that no documents are MICR encoded, the linchpin for the efficient operation of the RCH's. It is being proposed that the banks jointly procure a standalone MICR encoder to encode the control documents (Delivery Statement and Batch Header) with the bank identification code, batch number and the transaction code to improve the accuracy of the data entry process of control documents upon receipt of cheques for truncation and image processing. Further, the control documents could be color coded (e.g. "blue" for Delivery Statements and "yellow" for Batch Headers) to provide for simpler identification by RCH staff. Preliminary estimates show the capital cost could be recovered in two years time and reduce the number of potential errors during the data entry process.

**Review of BECH Rules and Procedures.** The BECH Rules and Procedures that had been drafted and presented to RMA in mid year 2006 were reviewed for content and accuracy. Modest amendments were made to coordinate the Rules and Procedures with the features of the NCR system. RMA staff will update these amendments and finalize the Rules and Procedures for consideration and adoption by RMA senior management.

**Summary of Recommendations.** As a result of this intervention, it is recommended that:

- The data entry portion of the User Acceptance Test (UAT) should be conducted on a frequent basis to have the RCH clerks become proficient in error correction procedures and to assure Batch Header and Delivery Statement control documents balance with the underlying cheques. The Clearing and Settlement House (CASH) supervisor, and



alternates, should practice the clearing and settlement procedures until a level of comfort has been achieved and there is no reliance on NCR.

- The Thimphu and Phuentsholing RCH's should have the bank representatives perform the data entry process until 80 to 90 percent of the cheques have been MICR encoded with the cheque number, the Bank Identification Number (BIN), and the account number.
- The RMA should encourage Bank of Bhutan (BOB) to have cheques issued to customers be MICR encoded using the new standard as soon as possible (but less than 12 months). This will improve the RCH operations and expedite the clearing process throughout Bhutan and eventually the benefit will go to the BOB customers.
- When collecting bank offices deposit non standard cheques for collection, there should be no more than three batches per Delivery Statement.
- BOB and BNB should consider assessing fees on customers who write cheques without sufficient funds in their account to cover the amount of the cheques or have not arranged for payment of the cheque before it is presented. If the bank does not wish to assess return cheque fees on customers, they should offer credit worthy customers an overdraft line of credit at a competitive interest rate to cover the payment of cheques for insufficient funds. If neither option is acceptable, the bank should close the account of frequent abusers and have RMA maintain a list of such customers to discourage them from opening accounts at other banking offices.
- The RMA should work closely with NCR to assure that the information about the status of cheques, both standard and non standard, is reflected with the image file under all conditions (e.g. truncated, location of the paper cheque, returned, etc.).
- The RMA should initiate a policy as to whether cheques undeliverable because of communication outages will be returned to Collecting Bank offices or determine who is to absorb the float for nonpayment of cheques not presented.
- NCR should provide for the automatic printing of RCH settlement reports at both CASH and each RCH to provide information about debits and credits settled for each banking office.
- The RCH Adjustment reports should be automatically printed at the sending RCH upon the submission of the file to CASH for clearing and settlement
- Control documents should be color coded to assist staff in easily recognizing them from cheques
- BECH should immediately commence the implementation of security features offered by the new system to assure the separation of duties
- The RMA technical staff should compare and prepare a report on the operations and functionality of the system with the Requirements Specification and the results of the UAT with the Statement of Work as outlined in the contract.
- BECH should train two or more staff members to become highly skilled for initiating and completing the settlement process on a timely basis each day.
- The RMA should encourage the appropriate parties to assure that legislation is enacted to allow images of cheques to be acceptable as evidence in matters involving disputes. Further, the legislation should identify a time frame when the original cheques may be disposed of in a secure manner
- BECH should encourage BOB and BNB to jointly acquire a MICR encoder machine and place it on BECH premises for each bank's use in preparing Delivery Statement and Batch Header control documents.



## 1. Introduction

During the period of January 8 – 19, 2007, an ADB payment systems advisor visited the Royal Monetary Authority of Bhutan (RMA) to facilitate the implementation of RMA's new Cheque Truncation and Image Processing system being developed by the NCR Corporation (India). The advisor reviewed parallel test results, User Acceptance Test results and assured proper arrangements were being made for moving the new system toward a production environment. In addition, the Bhutan Electronic Clearing House (BECH) Rules and Procedures were reviewed and amended for accuracy. At the completion of the visit the new system was continuing the parallel testing of the Thimphu Regional Clearing House (RCH) and the Phuentsholing RCH for receipt of cheques drawn on any banking office in Bhutan. Three other RCH's were prepared to receive cheque images for presentment to paying banking offices (branches). These latter RCH's will begin to receive cheques for collection at a later date. It was made known that very few cheques are issued outside of the existing cheque clearing areas. The current use of cheques for interregional payments is very infrequent. (A list of acronyms is found at the beginning of the report.)

The clearing and settlement process for the new system involving all cheques issued throughout the country was evaluated and found to be effective and accurate. RMA will begin posting the net debits and credits on a daily basis in the foreseeable future. Processing dishonored cheques (cheques being returned for non-payment) was also tested and evaluated. Efficiencies for operations and advising banking offices on the status of their cheque images needs improvement to keep clerks informed of processing delays and differences in accounting entries both at RMA and at the banking offices.

The advisor met with bank officials to assure they fully understood the importance of properly preparing documents for processing. RMA needs to encourage banks to have the MICR (Magnetic Ink Character Recognition) standard printed on cheques as soon as possible to improve the efficiency of the data capture operation in the RCH's. In addition, BNB (Bhutan National Bank) has agreed to receive one electronic file in Thimphu for cheques being drawn on any of their offices throughout Bhutan. Testing this capability is in process. BNB operates its own communications network to all branch offices.

The advisor thanks Mr. Daw Tenzin, Managing Director, Mr. D. Tshering, Deputy Managing Director, Mr. Pushpalal Chhetri, Head of Banking Division, Mr. Karma Rinzin, Project Coordinator, Mr. Jambay Tshering, IT Department and Ms. Harka Maya Sanyasi, Officer in Charge of BECH, for their highly valuable assistance in coordinating the mission, arranging meetings and catering to the needs of the advisor to assure a successful outcome. Also, thanks go to the NCR project team for their rapid response to customizing the operating procedures to meet the unique needs of RMA, BECH and the Bhutanese banking community.

## 2. Background

RMA in wanting to improve the efficiency of the payments system in Bhutan sought help through the Asian Development Bank (ADB) by conducting a study in 2005 on a variety of approaches whereby payments could be finalized throughout Bhutan in a matter of days rather than the weeks Bhutan was currently experiencing. The objective was to improve banking payment services that reduce reliance on cash as a medium of exchange for the purchase of goods or services. After reviewing several approaches, RMA decided that acquiring and installing a cheque truncation and image processing system would greatly reduce the time for transferring money between the maker of a cheque and the payee of the cheque. In late 2005, after analyzing a number of proposals from vendors to provide this service, RMA selected NCR Corporation (India) as the vendor of choice. In June 2006, a formal agreement was entered into



between RMA and NCR to install a cheque truncation and image processing system.

A new clearing house named Bhutan Electronic Clearing House (BECH) operating as a separate division of RMA would manage and operate the new system. It would have its own charter and by laws from an organizational perspective. In addition, there would be Rules and Procedures promulgated to cover the operating characteristics of the cheque truncation and image processing system. In the future, RMA may privatize BECH and the by-laws were developed for that possibility, but not for the present scenario.

### 3. Terms of Reference Status

ADB created the Terms of Reference (TOR), which is shown in Exhibit 1, to provide RMA assistance for implementing the project. There are six topics in the TOR for assisting RMA in the project. Three of the topics (contract negotiations, staffing needs, and Rules and Procedures) have already been completed and reported upon in the Interim Report filed in August 2006. In addition, a Cost Recovery Strategy document was filed separately in August 2006 to cover topic number 4. This report covers topics 2 and 6. The status of these two topics is discussed below.

*Topic 2. Assist the Government in monitoring the installation and supervising the implementation of the automated payment system. Provide advice and problem solving solutions to the Government and the Vendor when needed.*

During the visit to RMA, the advisor worked closely with the NCR project team to obtain a clear understanding on how the new system would work and where it differed from the technical specifications. Ideas were offered to reduce the number of keystrokes during the data entry process for nonstandard cheques. It resulted in a 30 percent reduction and some saving of time with improved accuracy of the BIN of the paying banking office. Also, several suggestions were made for the automatic processing of data by several modules of programs rather than involving manual procedures to activate clearing and settlement program sessions, which could become time consuming and error prone. It was noted that several manual procedures added little value to the process. In addition, relevant reports were reviewed for clarity, to assure availability of audit trails for subsequent use and to determine if the printed reports were really needed on a daily basis or on a demand basis. Report analysis by RMA, BNB and BOB continues.

Management Information and statistical reports were also proposed to be created by the system. However, there is continuing analysis underway to assure RMA obtains the appropriate reports. The requirement is considered completed with the submission of this report.

*Topic 6. Prepare (a) an inception report, within 15 days of fielding; (b) midterm review report after the second month of consultancy; (c) a draft final report for the TA, to be submitted 2 weeks before the end of the consulting term; and (d) finalize the draft final report with incorporation of comments from the Government and ADB.*

This is the final report for the project and has been reviewed by RMA. This report has been preceded by an Inception Report issued in March 2006 and an Interim Report issued in August 2006. This requirement is considered completed.

On January 30, 2007 the following three additional topics were added to the assignment:

*Topic A. To complete the User Acceptance Test and to observe whether the system is functioning properly.*

Several iterations of the User Acceptance Test (UAT) were completed during the visit. However, there was never a complete test performed by RMA staff without assistance of NCR technicians, nor was there a test to compare results with the terms of the Statement of Work as

outlined in the contract dated June 2006. No UAT was observed in other RCH's except Thimphu. More information about the UAT is expressed below.

Topic B. To recommend techniques to reduce the number of keystrokes by 30 percent for data capture.

This recommendation where the paying bank number is preprogrammed for the data entry cycle at the Thimphu RCH was implemented during the visit and is operational. It may be implemented at a later date at the Phuentsholing RCH.

Topic C. To familiarize the staff with processes designed to make the process more efficient once the User Acceptance Test is completed and RMA staff completes parallel test without the "hands on" assistance of NCR.

Several suggestions are outlined below to improve the efficiency of the system which include reducing operator intervention where there is virtually no value added to the process. The NCR system is a combination of many program modules, which work well independently, but in many cases an event is unable to cause another event to be executed without operator assistance. This approach, relying heavily on operators to start processes, can be error prone and time consuming. In one case NCR did make improvements, but they were never observed as actually working or achieving the results as originally envisioned.

## **4. Project Status**

RMA identified five regional sites named Regional Clearing House (RCH) in Bhutan whereby most banking offices could reach the RCH within one day's travel time. It was visualized that cheques would be presented for collection at one of five regional sites where they would be truncated and converted to images. The images would then be forwarded electronically for payment to any paying banking office in Bhutan where the cheque maker's account was maintained. The images would flow through a communications network to BECH in Thimphu for clearing and settlement. The image file would then be delivered to the appropriate paying banking office on a timely basis within a few hours after submission for clearing and settlement. Volume was low and all banking offices were expected to have a fax machine to receive images on a daily basis. Further, all cheques were to have the cheque number, paying bank identification number and the account number MICR encoded in the relevant location along the lower edge of the cheque according to Indian standards.

In July 2006, after RMA and NCR had signed their agreement, a meeting was held in Thimphu to develop the technical specifications for the new system using the standard integrated software products offered by NCR. NCR would take the technical specifications and modify their existing software to meet the RMA specifications with the intent to have all ready in January 2007. This report is a review of what was originally envisioned by the Bhutanese authorities in their objective to have a more efficient cheque collection system and what is actually happening to meet that objective.

### **4.1 Delivery of Equipment and Training**

During the period from July to November 2006, NCR was updating its software to meet the RMA requirements, ordering hardware and scheduling delivery of the hardware to RMA in Thimphu for setup and checking prior to final delivery to the RCH's. In November 2006, all the associated equipment was delivered to Thimphu for installation and connection to the communications system as required by the technical specifications. This event allowed NCR to check out the hardware and to assure it operated effectively and properly.

From mid December 2006 to year end, NCR conducted training for all parties throughout

Bhutan in Thimphu. People representing staff at the RCH's and most banking offices were trained and allowed to have "hands on" experience with the new equipment. Attendees were pleased to be able to work with the system. The training was reported to be enthusiastically received by the banks, RCH staffs and RMA management

During the first week of January 2007, equipment was relocated from Thimphu and installed in each of the RCH's. It was tested for connectivity with the communications system. There were some modest problems that were quickly resolved in a day or two. Thus, the hardware was in place and data could be transferred between RCH locations and BECH based in Thimphu.

## **4.2 Testing**

During the week of January 8, 2007, NCR began its integrated testing of all the software modules to assure they were operating effectively. Testing was very useful in that a number of situations were experienced even though not planned. The system handled all exceptions properly and demonstrated the ability to recover with no data being lost from an inadvertent short term electric power disruption. In addition, reports were customized to meet BECH requirements for settlement, RCH data entry exceptions, notifying banks of differences in their submissions, and RMA Banking Division requirements for posting net settlements for forward presentment of cheques and for cheques being returned for non payment. RMA is continuing to work with the RCH's to process "on us" cheques, local cheques and interregional cheques. RMA continues to post net amounts from the old clearing system as it continues to support the parallel testing of the new system.

A User Acceptance Test (UAT) was conducted, which went through a number of iterations to assure all features of the system performed properly. This process took longer than envisioned because changes had to be made based on NCR philosophy of operations to meet RMA specifications. Considerable NCR "hands on" assistance was required to complete the related tasks. The data entry portion of the latest UAT contained a number of error conditions to help with the training of the data entry clerks. The UAT data entry demonstrated the ability to process upside down cheques, reversed cheques, extra cheques, and missing cheques. The software performed flawlessly and the clerks gained experience in error correction procedures not seen during the parallel testing phases. The CASH staff also needs to become more comfortable with the clearing and settlement procedures that can be simulated through the UAT. However, no accounting adjustment reports were initially offered and none were automatically printed when an "in proof" file was forwarded to CASH. Printing such reports required RCH staff to manually initiate the printing process and they had to be frequently reminded to perform this procedure.

- **Recommendation.** It is recommended that the data entry portion of the UAT be conducted on a frequent basis to have the RCH clerks become proficient in error correction procedures and to assure Batch Header and Delivery Statement control documents balance with the underlying cheques. The CASH supervisor, and alternates, should practice the clearing and settlement procedures until a level of comfort has been achieved and there is no reliance on NCR.

## **4.3 Parallel Testing - Thimphu**

Parallel testing was conducted concurrently with User Acceptance testing. Parallel testing was accomplished by using the physical cheques currently exchanged by the two banks, Bank of Bhutan (BOB) and Bhutan National Bank (BNB) in Thimphu. BECH gained experience from this parallel testing in determining the amount of time to enter the data, verify the accuracy of the cheque deposits and to decide if the proposed time schedules were realistic as outlined in the BECH Rules.

It took the Thimphu RCH staff substantial time to key the cheque number, the bank identification

number (BIN), the account number and the amount as there are currently only non standard cheques in use in Bhutan without any MICR encoding. The new standard cheques will have the cheque number, the BIN and the account number MICR encoded along the lower edge of the cheque. It will take some time for the banks to acquire and distribute the new standard MICR encoded cheques to their customers.

The RCH staff was not skilled in handling cheques or proficient in reading important data elements from the existing cheques thereby causing the data entry and verification process to be rather lengthy. (This new skill had not been required from their previous job responsibilities.) A suggestion was made to preprogram the BIN for the two Thimphu city offices of BNB and BOB resulting in a saving of 30 percent in keystrokes. This helped significantly, but the data entry and verification time was still lengthy and more training in data entry processes and keying techniques will be required of RCH staff in Thimphu.

In a test to determine backup for the data entry in case of illness or vacation of the RCH staff, the BOB and BNB representatives keyed the data. They were much more proficient and were able to perform the data entry and initial validation of entries in less than half the time of the RCH staff. Alternatively, the Thimphu RCH could have representatives of the two banks, who are more proficient in understanding the position of the data elements on the cheques, perform the keying operation with the RCH staff being the backup for bank representatives until most non standard cheque have been eliminated with the introduction of MICR encoded cheques.

BNB reported that it will have MICR encoding on its cheques and distributed to its customers by April 2007. There has been no commitment from BOB. Once cheques are MICR encoded only the amount (up to 13 digits, but on average less than eight digits) will need to be keyed into the system. The standard cheques with MICR encoding will reduce the keystrokes by over 70 percent compared the number of keystrokes currently being experienced. RMA should evaluate the possibility of setting a deadline (e.g., six to twelve months) when all cheques are to be MICR encoded to be eligible for clearing and settling through BECH.

The parallel testing included the settlement process, but not the delivery of images to banks. However, a detail listing of the data was given to the banks for ready reference purposes. The settlement process worked accurately, but involved considerable NCR assistance resulting (even on the date the advisor departed from RMA) in taking more time than believed necessary to be appropriate. These procedures are to be more automatic once the CASH supervisor has accepted the files to be cleared and settled from all RCH's. This automated process should reduce the amount of time to less than 15 minutes. Upon completion of settlement, the image files should be automatically delivered to the RCH's for further delivery to the paying bank offices fax machines.

BNB in Thimphu will receive all files through an electronic computer arrangement and then deliver the images to their respective paying branch offices. This arrangement is expected to be operational in the foreseeable future and will improve the efficiency of the overall system. For BOB in Thimphu, BECH will create a CD of all image files payable at BOB. The CD will be able to hold up to 300 images. A second CD will be created when there are more than 300 images being presented on any given day. BOB is awaiting the availability of the proper CD drives on its computers.

#### **4.4 Parallel Testing - Phuentsholing**

Parallel testing was also accomplished independently for the current Phuentsholing clearing system. It was found that balances were accurate, both for the forward presentment and return cheque processing. However, staying within the time limits of the proposed Rules was an issue. While the Phuentsholing RCH staff (one staff member had missed the NCR training mentioned above) performed the data entry and validation procedures under direction from the NCR staff

(and later from the RMA staff), it is unknown how efficient the clerks were or the level of proficiency of the bank representatives.

It would be desirable to have the BOB and BNB staffs perform the data entry process at both Phuentsholing and Thimphu RCH's until there are a substantial number of MICR encoded cheques (over 80 percent) being deposited for clearing and settlement through the system. Bank staffs are more proficient in handling cheques with the current clearing process and are more skilled in finding the cheque number, account number and reading amounts on cheques. After BNB has introduced MICR encoded cheques, the data entry process should be divided between the two banks or have BOB perform all the data entry.

The RCH staff would perform the verification process and electronically forward the cheques for clearing and settlement to the CASH located in Thimphu. If a bank's normal staff is unavailable for a day or two, then the RCH staff could perform the data entry process, but this procedure may be cause for extending the clearing and settlement deadline. Once the cheques have been MICR encoded, the only data element needed to be keyed will be the amount, a much simpler process and less time consuming and should be easily handled by the RCH staff with appropriate data entry training. It should be noted that the images representing cheques drawn on BNB in Phuentsholing will be presented to BNB in Thimphu and BNB will make presentment to their Phuentsholing office. BOB may receive their images on a CD in Phuentsholing as in Thimphu.

- **Recommendations.** It is recommended that the Thimphu and Phuentsholing RCH's have the bank representatives perform the data entry process until 80 to 90 percent of the cheques have been MICR encoded with the cheque number, the BIN, and the account number.

It is also recommended that RMA encourage BOB to have cheques issued to customers be MICR encoded using the new standard as soon as possible (but less than 12 months). This will improve the RCH operations and expedite the clearing process throughout Bhutan and eventually the benefit will go to the BOB customers.

## 4.5 Other Issues

### 4.5.1 Limit Batches of Non Standard Cheques

Current procedures allow the collecting banking office to deposit as many batches as they wish with a Delivery Statement. There is no limit to the number of batches contained within a Delivery Statement. However, the number of non standard cheques currently being deposited each day by the two banks in Thimphu is frequently uneven. BNB, on a heavy day, deposits three or four times as many cheques as BOB. This approach places an undue burden on the data entry process, as the same data entry person must key the information from all cheques in one Delivery Statement. This imbalance of cheques for the data entry process can slow the overall verification and balancing steps and possibility the settlement process. In order to balance the data entry workload at the RCH with many non standard cheque deposits, it is proposed to limit the number of batches in one Delivery Statement to three batches (90 cheques) until most cheques (over 80 percent) are MICR encoded. (If a bank is depositing more than three batches, then the batches should be equally divided between the Delivery Statements.) This approach will allow the data entry staff at the RCH to share in the keystroke effort. It will become more important as BNB has an objective to have all its cheques MICR encoded by April; 2007, yet BNB will be depositing mostly non standard cheques drawn on BOB, which will place a heavy burden on the data entry person handling the BNB deposit.

- **Recommendation.** It is recommended that when collecting bank offices deposit non standard cheques for collection, there be no more than three batches per Delivery Statement.

### 4.5.2 Representment of Returned Cheques

The system provides for the automatic representment of cheques being returned for insufficient funds as outlined in the Technical Specifications. In most countries the Negotiable Instrument Act expects makers of cheques to have sufficient funds in their account before writing a cheque. While the number of return cheques in Bhutan may not be considered high (up to five percent during the parallel tests), return for insufficient funds was the most prevalent reason. It was learned that neither BOB nor BNB charge customers for returning a cheque for insufficient funds. Rather they place the burden back on the payee to resolve the difference with the cheque maker. The Clearing Rules allow for one representment at a later time (up to several days). The new system does provide for automatic representment at the RCH, but has not been implemented as yet. Management decided to defer implementation of this feature and agreed the means to control a second presentment would be on a manual basis at both the banks and the RCH.

In many countries, cheque writing is considered a privilege offered by the bank to its customer. Frequently, remedies are undertaken when makers of cheques do not follow the appropriate procedures thereby causing their bank not to pay the cheque when presented and return it to the collecting bank office. In these cases, makers are frequently penalized for the extra work involved when the paying bank has to return a cheque and incurs additional expenses for efforts in handling, controlling, monitoring, accounting and bookkeeping the values of return cheques. A change in philosophy for penalizing customers issuing cheques that are to be returned is in order at both BOB and BNB.

The banks may be missing a revenue generation opportunity by not assessing fees for cheques being returned for insufficient funds or payment “not arranged for”. Alternatively, the banks could offer their customers an overdraft line of credit, based on each customer’s credit worthiness, which would be a means to gain some interest income when paying such cheques. Another option for banks representing frequent writers of cheques abusing this provision is to close the account and have RMA maintain a listing of such customers that could be shared to reduce this concern among bankers.

- **Recommendation.** It is recommended that BOB and BNB consider assessing fees on customers who write cheques without sufficient funds in their account to cover the amount of the cheques or have not arranged for payment of the cheque before it is issued. If the bank does not wish to assess return cheque fees on customers, they should offer credit worthy customers an overdraft line of credit at a competitive interest rate to cover the payment of cheques for insufficient funds. If neither option is acceptable, the bank should close the account of frequent abusers and have RMA maintain a list of such customers to discourage the opening accounts at other banking offices.

### 4.5.3 Marking Image Files for Audit Trail Purposes

The BECH Rules call for the “paper” cheques to be returned to the Collecting Bank Office noting the ineligibility for collection through BECH. In this connection, NCR’s system should mark the image, or related data file, and note the original “paper” cheque was returned as ineligible for collection through BECH and not processed. Marking the image, or data, file would provide an up to date record for audit trail purposes should there be a subsequent inquiry. Alternatively, the image could be removed from the master files. Further, when a “paper” cheque is retrieved and given to a recipient based upon a court order for facilitating the resolution of a dispute, the RCH staff and/or the CASH staff should be able to update the longer held data base file and the appropriate record with current information about the release of hard copy evidence. The topic was discussed with NCR, without any decision on the matter.

- **Recommendation.** It is recommended that RMA work closely with NCR to assure that the

information about the status of cheques, both standard and non standard, is reflected with the image file under all conditions (e.g. truncated, location of the paper cheque, returned, etc.).

#### **4.5.4 Known Communication Outages**

The system relies heavily on a communications capability being readily available on demand between BECH and each RCH and between the RCH's and each banking office. There are occasions in the countryside where the communications connection may be out of service for some period of time. In these cases, the RCH should notify CASH of the outage. CASH would inform RMA so that RMA would not charge the paying banking office before the images are presented for payment.

The system should be able to handle deferred availability back to the Collecting Banking office without RMA having to absorb the float generated by such an event. The system is reportedly capable of handling two or three days of delayed availability based on a known outage, but the capability was never demonstrated. This situation needs follow up unless, because of small volumes and values, RMA wishes to absorb the float by providing credit to the Collecting Banking office without making an offsetting presentment to the Paying Banking office. An alternative process to this concern would be for the receiving RCH representing the paying bank office with a communication outage to return the cheques to the Collecting Bank office through BECH noting the reason for return and reducing the amount being collected. This process could involve several Collecting Banking offices.

- **Recommendation.** It is recommended that RMA initiate a policy as to whether cheques undeliverable because of communication outages will be returned to Collecting Bank offices or determine who is to absorb the float for nonpayment of cheques not presented.

#### **4.5.5 Updating Computer System Tables for Newly Licensed Banks and/or Branches**

Currently there are two banks and RMA participating in the net settlement process. RMA is reported to be reviewing two applications for new banking licenses. If such licenses are approved and the new banks wish to issue cheques, BECH staff is able to assign new banking numbers as outlined in the BECH Rules and calculate the appropriate check digit for the new bank identification number. In addition, BECH staff will be able to update the appropriate RCH and CASH tables in the new automated clearing system to allow processing of cheques issued by customers from the new banks.

Presently RMA does not participate in the clearing. However, the system has already been setup for RMA to participate. RMA could clear cheques it currently receives by developing procedures to present the cheques drawn on BNB and BOB directly to the Thimphu RCH. RMA is also considering issuing cheques in the near future. When these cheques are issued, they will be eligible for presentment through BECH and the net settlement position will be automatically generated. RMA accounting procedures should provide for handling the debit and credit entries resulting from the settlement process.

#### **4.5.6 RCH Net Settlement Reports.**

The new net settlement report for posting on RMA books shows the gross debits and credits for the banks and the net position for each bank. It is a very satisfactory report and represents an overall net position of the entire branch banking offices for each bank in Bhutan. However, there is no underlying report that shows the net settlement position for the offices served by each RCH. NCR has agreed to create the reports and this is a reminder for RMA to follow up and assure the reports are satisfactory. This report should show the gross debits and credits for each banking office served by the RCH and then the net position for each banking office. These



reports will be the supporting documentation to justify the net settlement position posted on RMA books. The same approach is required for the Return process.

The Banking Department has requested a batch number to be inserted as a reference number, but has not identified what it would reference. This is particularly important since in the foreseeable future cheques will not be returned and the batch number will have little meaning. The process is new, but has not been explained in depth to the accountants. The summary RCH net settlement reports should be created automatically in conjunction with the overall net settlement report for the entire clearing and settlement system on a daily basis. Currently operators have to manually initiate a separate print request to obtain these reports.

- **Recommendation.** It is recommended that NCR provide for the automatic printing of RCH settlement reports at both CASH and each RCH to provide information about debits and credits settled for each banking office.

#### **4.5.7 RCH Adjustment reports.**

From time to time banks will make mistakes in developing Batch Header total or Delivery Statement totals. In such a situation, the result may be a correction to a Delivery Statement with an adjustment to the amount the Collecting Banking office is expecting from the clearing and settlement process. NCR's system needs to develop an adjustment report to advise banks of the adjusted amount, the reason for the adjustment (e.g. missing cheque, unlisted cheque, amount error, addition error, etc.) so that the banking office will be able to reconcile with the RMA and RCH statements. In some cases the reason may need to be added manually to the adjustment sheet prior to faxing to the banking office.

During the parallel tests a number of events occurred where there were keying errors related to batch information. The RCH staff needs to manually initiate the print option to print the Delivery Adjustment statements for each Delivery Statement and manually note any errors and with the reason for correction. (Alternatively, NCR could automatically initiate the Adjustment report upon the verification clerk initiating the sending of the proven file to CASH for settlement.) This report, showing the appropriate adjustments and the reasons why, should be forwarded to the Collecting Bank office, unless there are only RCH errors. The report will assist the Collecting Bank Office in reconciling the credit it is expecting and the amount actually given cleared by the RCH in the net settlement.

- **Recommendation.** It is recommended that RCH Adjustment reports be automatically printed at the sending RCH upon the submission of the file to CASH for clearing and settlement.

#### **4.5.8 Control Documents**

Control documents (Delivery Statements and batch Headers) should be color coded to assist in their being readily identifiable. Using a solid color such as "blue" for the Delivery Statement and "yellow" for the Batch Header will make identification of these documents readily different from most cheques. However, BECH may select other colors, but the colors should be standardized for each type control document submitted by collecting bank offices. Other colors should not overshadow the black MICR characters.

- **Recommendation.** It is recommended that control documents be color coded to assist staff in easily recognizing them from cheques.

#### **4.5.9 Combining Forward Presentment and Return Cheque settlements.**

The new system is able to settle an unlimited number of Delivery Statements and could even combine the return cheque settlement amounts with the forward presentment settlement amounts. After becoming more familiar with the capabilities of the new system, BECH and RMA

may wish to consider combining the net settlement positions for the forward presentments and the net settlement positions representing the return cheques for nonpayment on a daily basis. In this connection, there currently would only be one net settlement operation with one net position for each bank on RMA books. Since this would be a significant change in the processing and reconciling procedures at the banks it is important to discuss the issue with the banks before moving the idea ahead.

#### **4.5.10 Statistical Reports.**

RMA needs to decide what information it wishes to collect on a daily, weekly or monthly basis to monitor the usage of this new system. Also, BECH needs to identify reports that would be beneficial for monitoring the daily operations. One report requested for NCR to produce was to evaluate the number and value of return cheques on a daily basis compared to the number and total value of cheques in the forward presentment processed the previous business day. A brief survey suggested that there are up to five percent returns on a daily basis. Since the forward presentment is low in volume the number of returns is very modest. However, if the system grows, as some are predicting, then the handling of return cheques for non payment could become a burdensome process. Five percent of 200 cheques is ten, but five percent of 2000 cheques is 100 and could take a significant amount of time to process. The goal for return cheques should be less than one percent on a daily basis. Having BNB and BOB initiate a fee on the maker of dishonored cheques would be an excellent first step toward achieving this goal.

Other statistical reports might be the total value of all cheques processed and cleared compared to the amount of the net settlement. Again, a brief survey showed in one instance the net amount was about 12 percent of total value, in a second instance it was less than three percent and more recently the net was over 75 percent of the total value cleared for settlement. Perhaps after maintaining the data for some period of time a trend may form allowing an evaluation of the system's impact on the velocity of money.

NCR will not allow RMA access to their database to download statistical information for subsequent analysis. RMA must identify the reports that are needed as best it can at present. After the NCR team has departed any new reports will require NCR presence and RMA will need to negotiate the fees for developing such reports. One such report might be a monthly analysis of cheques returned for insufficient funds by account to help identify possible abusers. It could also be prepared on a quarterly basis.

#### **4.5.11 Truncation of Cheques**

The new system provides for truncation of paper cheques at the RCH and the use of images for presentation of cheques. During the parallel testing, paper cheques were used for presentment purposes until the BNB electronic link and BOB CD procedures become effective. At some point BECH and RMA will need to decide when to truncate cheques and begin the storage of cheques and be prepared for the possible retrieval of cheques on a demand basis. This decision should be made while NCR technicians are still on site to assure all procedures work properly, cheques can be retrieved appropriately and storage retrieval files are noted appropriately.

While the numbers (values) in the tests have been accurate with the older system, the bank staffs have not reached a comfort level to accept the new reports or allow their cheques to be truncated at the RCH's. Currently BECH plans to return cheques until the MICR encoded cheques are introduced. Since this event will be phased in over time, procedures will need to be developed to manage paper cheques that are being truncated and paper cheques that are being physically presented to the Paying Bank offices. The master image file may require updating for BECH to know which cheques are maintained in its files and which cheques have been returned to the banks. The master image file will retain images of all cheques processed,

MICR encoded or not.

In another area, the system allows for banks to deposit “on us” cheques with the local RCH. No data is available on the volume of these type cheques, but at some point in the future RMA will need to determine if they wish to create images of “on us” cheques. Having some cheques at RMA as images and other cheques at banking offices as “hard copy” may create problems in attempting to resolve disputes in the future.

#### **4.5.12 Security Procedures**

The new software provides for separating duties between those who perform the data entry procedures and those who perform the validation and forwarding procedures. During parallel testing this capability of enforcing a separation of duties was not part of the process. BECH should implement these security capabilities immediately and begin to have the system make full use of insuring a separation of duties between two or more people and prohibit unauthorized access to the new system. The system will then operate in a more professional environment and NCR staff should begin to wean themselves from the daily operations. If bank representatives are going to perform the data entry for non standard cheques, the same security procedures should apply. Bank representatives would be given their individual user id code and password, which allow access for the data entry and initial balancing of the Delivery Statements. The RCH staff should always perform the verification, super balancing and forwarding the files to CASH for clearing and settlement. The Officer in Charge of BECH will have authority for sponsoring or removing authorized operating and maintenance personnel.

- **Recommendation.** It is recommended that BECH immediately commence the implementation of security features offered by the new system to assure the separation of duties.

#### **4.5.13 System Requirement Specifications**

In late July 2006, RMA and NCR jointly signed a technical specification document, which outlined the requirements for the new cheque truncation and image processing system. RMA technical staff should review this document and compare the requirements to what is actually happening with the new system. If there are significant differences, or some important features are not present, NCR should be notified and requested to make the necessary modifications. This Requirements Specification is part of the NCR agreement.

In addition to the above comparison, RMA technical staff should review the output of the UAT with the components as outlined in the Statement of Work appendix to the Master Agreement contract. While many of the components of the UAT have been satisfied, it is important that all components of the UAT be satisfied in a manner of how the system would operate as originally envisioned by RMA.

- **Recommendation.** It is recommended that the RMA technical staff compare and prepare a report on the operations and functionality of the system with the Requirements Specification and the results of the UAT with the Statement of Work as outlined in the contract.

#### **4.5.14 BECH Staffing**

It had been decided early on that there would be two clerks at each RCH to provide for data entry and verification processes. During the visit the question of providing backup to the RCH staff (in the event of vacation, illness, or some other unplanned absences) was discussed. It was noted that the banks would provide staff backup in that they could perform the data entry process and the RCH staff would complete the verification procedures and forward the files to CASH for clearing and settlement. It seems like a reasonable approach.

However, there is very little expert backup for the BECH Officer in Charge, who must initiate and

assure that the settlement process is completed on a timely basis. It would be prudent for RMA to identify an additional person(s) who could perform this process on a rotational basis, thereby providing a proficient alternative for the Officer in Charge of BECH who is required to attend various meetings, coordinate with bankers and perform many administrative responsibilities including system security authorizations. This additional person(s) would initiate the settlement on a scheduled rotational basis so that the skill level would be highly proficient at all times. This approach would provide coverage for vacations, illnesses, and other unscheduled last minute absences.

BECH should have more than two people proficient in the settlement process, which is the most critical part of the overall operation for the cheque truncation system. It is the one process that must be accomplished in a timely manner each and every business day.

- **Recommendation.** It is recommended that BECH train two or more staff members to become highly skilled for initiating and completing the settlement process on a timely basis each day.

## 5. Legal Framework

The TOR did not require analyzing the legal requirement for this project. However, under the Core Principles for Systemically Important Payment Systems issued by the Bank for International Settlement (BIS), the first item is; **“The system shall have a well-founded legal basis under all relevant jurisdictions”**. Currently Bhutanese legislation provides RMA the authority to operate clearing houses in Bhutan, but does not allow copies or images of cheques to resolve disputes.

The issue with this new system is that the Bhutanese legal system does not recognize images or photocopies as evidence. It is noted that there is draft legislation to overcome this obstacle, but the legislation has not been enacted as yet. In the meantime, RMA has created an “Agreement” which was signed independently with both banks to hold RMA and BECH harmless in any dispute (Signed on January 31, 2007.) However, BECH will cooperate with the banks in providing assistance and retrieve the original document from its files under court order instructions. The Agreement also outlines the responsibilities of each party using the cheque truncation and image processing system. Management was satisfied with this interim arrangement, but was encouraged to push for enactment of the legislation.

- **Recommendation**

It is recommended that RMA encourage the appropriate parties to assure that legislation is enacted to allow images of cheques to be acceptable as evidence in matters involving disputes. Further, the legislation should identify a time frame when the original cheques may be disposed of in a secure manner

## 6. MICR Encoding

Currently there is no capability in Bhutan to perform MICR encoding. It was reported that some Bhutanese commercial printers are interested in acquiring this capability, but have not yet made the investment. Control documents (Delivery Statements and Batch Headers) and cheques containing MICR encoding are obtained from India. Lack of MICR encoding on cheques and control documents will create inefficiencies, be susceptible to keying errors, and require more time for resolving differences in this system at the RCH's until there is a high usage of the MICR standard on cheques and control documents.

A standalone MICR encoder is reportedly estimated to cost about 70,000 to 90,000 rupees or a little less than USD 2,000. The encoder could be available on one month's notice after issuing a purchase order. If the two banks were to acquire one encoder and place it in BECH, they could begin encoding their control documents (Delivery Statements and Batch Header documents) rather than waiting for the control documents to arrive from India. These documents will be of low usage, probably no more than 250 of each type document for most banking offices on an annual basis, resulting in higher printing costs than normal cheques. The larger collecting bank offices in Thimphu and Phuentsholing will probably require more control documents because of sending multiple batches and delivery statements each day. During the parallel test, each day a minimum of three batches of cheques were observed as being presented for clearing and settlement from both BNB and BOB offices in Thimphu. At a cost of two rupees per document from a commercial printer (and maybe more, plus shipping and handling) it is estimated that the return on investment of this equipment could be as little as two years and help improve the data entry and verification operation at each RCH.

Under this scenario, it is envisioned that the banks would come to BECH to MICR encode their respective Delivery Statements and Batch Header documents for each of their branch offices on a periodic basis. The banks would be responsible for distribution of the documents to their respective branches. The saving would be the ready availability of MICR encoding in Thimphu rather than ordering from India and then waiting for that delivery and paying the shipping costs from India. Control documents are very important for the verification and validation of the cheques being captured for image processing. Currently all information is keyed from each control document. With MICR encoding only the number of batches or cheques and the value of those cheques being controlled by the Delivery Statement or the Batch Header Document would be keyed. The MICR encoding would contain the sending bank office BIN and a transaction code identifying the document as a Delivery Statement or a Batch Header document. In addition, a unique batch number could be encoded if the machine has the capability of increasing a number for one of the fields that it is encoding. MICR encoding will also save the clerks in the banks from having to write the BIN of the sending bank office with the cheques and assure that the proper banking office receives credit for cheques forwarded with a Delivery Statement.

In earlier discussions it had been noted that banks and their customers would be allowed to use their existing supply of cheques before acquiring new cheques with MICR encoding. This was to allow depletion of existing inventory. The new system accommodates this transition without any problems. However, non standard cheques do require extensive keying for entering data into the system. (MICR encoding would reduce keystrokes by over 70 percent, a significant saving of effort during a critical time period.) This new encoding equipment might be able to allow the banks to MICR encode their existing supply of cheques with the cheque number, paying banking office BIN, and account number prior to providing new customers a supply of cheques. This approach would speed the transition process for all cheques to be MICR encoded. It is not known if the design of existing cheques could accommodate this possibility, but if the design would work then the return on investment would be less than the time stated

above.

- **Recommendation**

It is recommended that BECH encourage BOB and BNB to jointly acquire a MICR encoder machine and place it on BECH premises for each bank's use in preparing Delivery Statement and Batch Header control documents.

## **7. Review of BECH Rules and Procedures**

RMA management and the Payment System Advisor reviewed the BECH Rules and Procedures in detail and made some modest adjustments to better describe the actual process. Originally the Rules and Procedures were developed using theory and the details of how the NCR system operated was unknown. From the parallel testing a number of issues were raised and these formal documents required some modest amending. The amendments have been completed and RMA intends to promulgate the Rules and Procedures formally. The Rules and Procedures contained in the Interim Report were used as a guide during the training process held at the end of 2006.

## **8. Additional efforts for RMA**

While the new system is operating effectively in parallel mode at Thimphu and Phuentsholing, there will be the need to move forward and have banking offices deposit cheques at the other three RCH's. Also the banking offices outside of the RCH centers will need to develop approaches to speed the delivery of cheques to the RCH.

It was reported that the time for the Postal System to move mail from Paro to Thimphu is one week, compared to less than a two hour drive. In this case RMA will allow the two banks in Paro to exchange cheques on a daily basis and not have them use the new system. Local bilateral exchanges may occur elsewhere in Bhutan and thus the number of cheques to be converted to images may be considerably less than originally envisioned. It is expected that mail delivery may also be of similar times, or longer, in other regional areas and there may be some local exchanging around the new system for a period of time. However, to speed collection of cheques between banking offices outside of local exchanges, it is necessary to get the cheques out of the Postal delivery system in some manner. This issue has been experienced in other countries. Often alternative delivery systems were organized to speed up the collection of cheques, substantially reduce the clearing time and improve the final availability of funds to the cheque's payee.

To encourage usage of the new system, RMA will need to develop a public information plan to encourage cheque writers to begin issuing cheques interregionally to pay for goods and services. Once the system has stabilized, it may be desirable to develop several articles for newspapers and other publications to educate cheque users about the capabilities of the system and the improvement in the time to clear and settle cheques throughout Bhutan. These articles should describe the objective of the system and the broad use of telecommunications throughout Bhutan to achieve the improvement in speed (meaning less time to finalize a cheque payment) of transferring bank balances and information between banking offices. As the system becomes used on a wider scale, perhaps BECH could solicit some personal testimonies about the capabilities in an effort to educate cheque writers to make greater use of cheques for both local and interregional payments, thereby reducing their reliance on cash. Further, BECH should work closely with the banks to promote the system usage and encourage the banks to seek positive testimony from their customers.

## Appendix I

### OUTLINED TERMS OF REFERENCES

(From ADB)

- (1) Assist the Government and ADB in negotiating and contracting with the final Vendor to procure, install, implement, and maintain the new electronic payment system, including reviewing the legal documents of purchase agreement, identifying required hardware and software requirements, and recommending necessary training, and maintenance services.
- (2) Assist the Government in monitoring the installation and supervising the implementation of the automated payment system. Provide advices and problem-solving solutions to the Government and the Vendor when needed.
- (3) Preparing staffing recommendations for clearinghouses and RMA, a work/business plan, and responsibility of clearinghouse staff for operating an automated system.
- (4) Recommend possible ways for cost recovery for the Government for its investments and operational costs incurred in operating the automated payment system.
- (5) Review and finalize the draft Bhutan Electronic Clearing House Rules based on the final electronic payment system design.
- (6) Prepare (a) an inception report, within 15 days of fielding; (b) midterm review report after the second month of consultancy; (c) a draft final report for the TA, to be submitted 2 weeks before the end of the consulting term; and (d) finalize the draft final report with incorporation of comments from the Government and ADB.