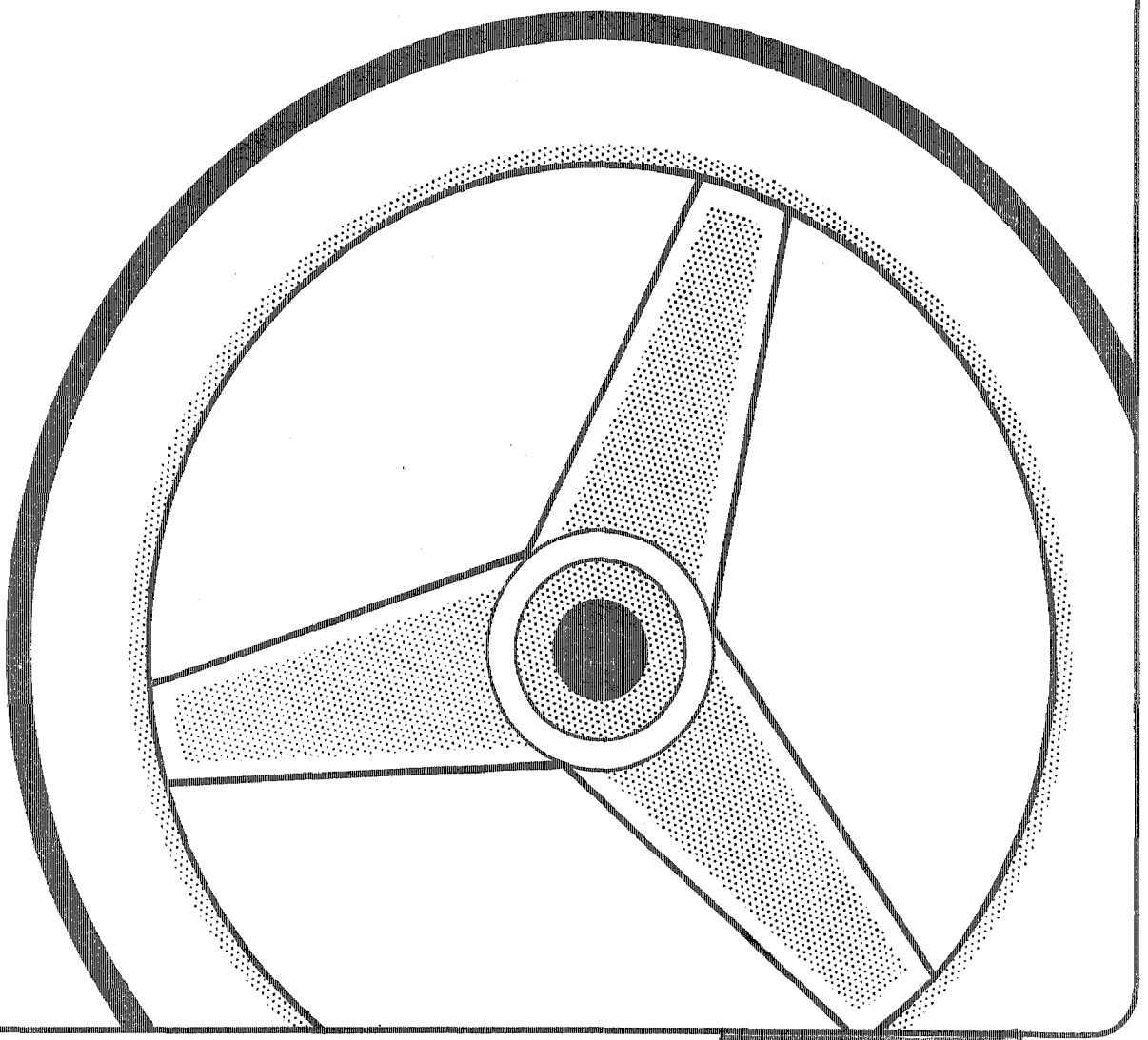
Using The Computer As An Ally

(Using Statistical Sampling to Test the Accuracy of Recording Accounting Transactions)

UNITED STATES
GENERAL ACCOUNTING OFFICE
1972



PREFACE

This case study discusses, in detail, the computer-aided techniques used in auditing the financial statements of Government Services, Inc. (GSI), a corporation formed to operate concessions and provide other services on Federal property. The study illustrates how the use of a computer, scientific sampling, and regular audit procedures were combined to obtain a more comprehensive review of financial events resulting in greater confidence that financial statements fairly present the financial condition of the audited organization.

In the typical financial audit, the accuracy of bookkeeping is verified by an analysis of the transactions entered into specific accounts to see that they have been properly categorized and that the bookkeeping is therefore reliable. This approach is referred to as the traditional audit-by-account method. We approached this audit in a different manner--we verified the accuracy of bookkeeping by reviewing a statistical sample of all transactions processed for the year to see if these selected transactions had been properly categorized and charged to the appropriate account. Our theory was that, if a statistical sample of transactions was correctly handled, the bookkeeping methods used could be considered sound and the amounts in the individual accounts could be relied upon. A computer made this approach, which we refer to as the audit-by-transaction method, possible.

The basic difference of this approach is not statistical sampling which has been used in auditing for some time. Instead, the basic difference is that the computer made it possible for the auditor to select a statistical sample from the universe of all transactions processed for the year, rather than selecting separate samples of transactions from many individual accounts. The method outlined in this study might not be appropriate in certain audit situations because of the nature of the transaction files maintained; however, the auditor should consider using computer-aided techniques and/or scientific sampling when it is applicable and he should do this before the audit plan is developed.

This case study is discussed in four chapters. Chapter 1 outlines the need for a new audit approach and provides background information on GSI's accounting system.

Chapter 2 evaluates GSI's system of internal controls. The system is divided into four functions which are evaluated separately.

Chapter 3 presents a detailed discussion on the sampling and testing of GSI's financial transactions, the major departure from the traditional audit-by-account method.

Chapter 4 is a summary and general evaluation of the audit approach. Advantages of the statistical approach over the prior year's judgmental approach are presented.

This report is a supplement to an earlier study entitled "Case Studies of Auditing in a Computer-Based Systems Environment" (B-115369, June 1971).

Director, Financial and General
Management Studies Division

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CHAPTER 1

INTRODUCTION

Government Services, Inc. (GSI), is a nonstock, nonprofit-sharing membership corporation formed to operate concessions and provide other services on Federal properties. GSI operates cafeterias, lunch stands, newsstands, shoeshine stands, and recreational facilities in Federal buildings and on Federal grounds. These services are provided under contractual arrangements with Federal agencies. An organization chart is included as appendix I.

Our audit was to determine whether (1) the financial statements were fairly presented and in conformity with generally accepted principles of accounting and (2) such principles were consistently applied in the preparation of the financial statements of the current period in relation to those of the preceding period.

NEED FOR NEW AUDIT APPROACH

During past years the annual audits of GSI relied heavily on manual procedures and controls. However, since GSI's accounting data was processed and summarized by computer, the audit program continued to become outdated and yearly revisions were necessary to make it usable.

In addition to computerizing its processing, GSI has substantially increased its operations over past years. For example, GSI manages the operations of 150 different accounting units in three States and the District of Columbia. These accounting units include such diversified operations as cafeterias, lunch counters, snackbars, parking lots, marinas, refreshments stands, barbershops, shoeshine stands, and recreational facilities. Over 400 accounts are included in the general ledger. This growth placed an exceptionally heavy burden on the audit staff to perform a satisfactory audit in the time allowed. Many of the manual audit procedures were unnecessarily time consuming because they did not make maximum use of the computer.

It therefore became clear that a revision of the audit approach was necessary to facilitate the audit work. Maximum use of the computer was desired to minimize the amount of clerical checking and verification work done previously. We set out to develop an audit approach that would establish the reliability of the financial records, reduce the number of financial transactions to be audited, and improve the audit program.

THE AUDIT PLAN

We divided the audit work into three phases: a review of the internal controls, an audit of transactions, and a verification of the existence of assets and liabilities.

The review of internal controls would consider not only the usual manual internal controls but also those built into the data processing system by the computer manufacturer and those included in the computer programs.

The real difference in our audit approach was in the phase involving the audit of transactions. In prior years the accuracy of bookkeeping was verified by the traditional audit-by-account approach which included an analysis of transactions entered in specific accounts. The auditors selected judgmental samples of transactions to be audited on the basis of such factors as the dollar balances in the accounts and the accounts' activities. The proportion of transactions obviously varied from account to account. We departed from this traditional approach by considering a sample of all transactions processed during the year. Our theory was that, if a statistical sample of transactions was correctly handled, the bookkeeping methods used could be considered sound and the amounts in the individual accounts could be relied upon. A computer made this approach possible.

In the third phase of the audit, we used traditional verification procedures and used the computer only to save audit time in such clerical verification functions as preparing lists of assets or liabilities or checking inventory extensions.

BACKGROUND ON GSI'S ACCOUNTING SYSTEM

GSI's automated general accounting system is divided into four books of original entry. GSI divides the calendar year into 13 accounting periods of 4 weeks each. Thus, all accounting transactions are identified by a book of original entry and by accounting period. In addition, each of the four books of original entry contains all voucher and vender numbers necessary to trace a financial transaction from the output through the computer to its source document. The four books of original entry are:

Cash Book--Used to record all daily reports of sales and collections received from the operating units, vending-machine commissions, and parking and marina activities. Thus, all cash receipts, accounts receivable, and related income transactions are recorded in this book.

Transfer Register--Used to record the transfer of inventory items from the central warehouse to the operating units or between operating units.

Voucher Register--Used to record all vouchers paid or to be paid during a specified accounting period. All expense items are vouchered before payment and recorded in this book.

Journal Voucher Register--Used as a general journal to record all financial transactions not recorded in one of the other three books.

To facilitate the processing of accounting transactions, GSI assembles them into groups of related transactions called batches. The transactions, depending on their nature, are batched and processed daily, weekly, biweekly, or by accounting period. For example, voucher register transactions are batched and processed biweekly, and journal voucher transactions are batched and processed by accounting period. Predetermined control totals, called batch totals, are established by the Accounting Division before the detailed financial transaction information is submitted to the Data Processing Department. The Data Processing Department uses batch totals to assure the department that all transactions have been submitted for processing.

CHAPTER 2

EVALUATION OF INTERNAL CONTROLS

Four functions involved in processing GSI's financial transactions include

--data collection and recording,
--computer processing,
--information and/or check distribution, and
--operation monitoring.

To evaluate the internal controls over each of the four functions, we first identified the flow of financial data through the automated accounting system by reviewing and updating the system flow charts. A summary flow chart is included as appendix II. The charts identified all the sources of financial data and the processing procedures used for each function. Our evaluation of these charts showed us where specific controls were needed to insure data processing reliability.

DATA COLLECTION AND RECORDING FUNCTION

The data collection and recording function included the initial collection of financial data, the recording of the data on a source document, the procedures and devices used to transmit the data from its point of origin to the Accounting Division, and the procedures used to convert the data into machine-readable form.

Generally, source data is the weakest link in the data processing chain. Although computer equipment is very reliable and a computer program usually can be quickly and successfully debugged, the problem of source data is a continuing one which affects the entire data processing system. Source data may be in error if it is incorrectly recorded at the point of origin, incorrectly converted to machine-readable form, incorrectly processed when read by the computer, or lost in handling.

Most source documents were originated by GSI operating units, the central warehouse, banks, vendors, customers,

or the GSI Personnel and Purchasing Divisions. The source documents were forwarded to the GSI Accounting Division and distributed to clerks who reviewed the documents for completeness and accuracy, compared them with related documents to help insure their authenticity, and grouped related documents into batches. A voucher was then prepared for each batch. The voucher was numbered, and the number was used as the primary identifying characteristic to distinguish one batch from another during all subsequent conversion operations.

In addition, the clerks prepared monetary control totals for each batch and punched the control totals into paper tape along with all the other information (vendor number, accounting period, book of original entry, and account number) necessary to process the data. The paper tape machine also produced a printed proof tape which listed all the information recorded. The clerk compared the proof tape with the previously prepared adding-machine tape and noted any differences. These differences were marked on the proof tape and forwarded with the punched paper tape to the Data Processing Department for appropriate corrections.

We traced the daily report of sales and collections through the automated accounting system. We selected this report because cafeteria meal sales were the principal source of GSI revenue and were reported to the GSI main office.

The initial amount of a cafeteria sale was determined by the cashier who mentally added the items on the customer's tray to arrive at a subtotal; on the basis of this subtotal, the cashier calculated the sales tax. The sum of these two calculations represented the amount charged the customer and recorded on the cash register. At the end of the day, the beginning and ending cash register readings were recorded on the daily report of sales and collections. The difference between the two readings should equal the amount of sales. The reports and cash were forwarded daily to the GSI main office, but in some instances, the cafeteria manager banked the cash receipts and forwarded a deposit ticket with the daily report.

COMPUTER PROCESSING FUNCTION

The Data Processing Department converts the paper tape to punched cards and locates any errors noted on the proof tape. Correction cards are punched and substituted for the erroneous cards before computer processing. Once the punched cards have been read by the computer and the batch totals have been verified by the computer operator, processing is controlled by the computer hardware and programs.

Built-in controls

To identify the hardware controls, we obtained information from the equipment manufacturer. The controls included parity checks, echo checks, and read-after-write checks.

In using parity checks, a parity or check bit is added to separately identified groups of magnetic bits which move through the computer. Each group of magnetic bits represents an alphabetic character, a number, or a special character such as a period or dollar sign. For GSI's system the parity for each group of bits is made odd and checked electronically as it moves through the computer. Loss of a magnetic bit will convert the number of bits in a group to an even number, which will cause the character to be rejected by the computer.

Echo checks are used to verify the accuracy of data transmission. The received data is returned to the sending end for comparison with the original data. These checks are used with output devices to insure correct response to the electronic signals received from the computer.

Read-after-write checks are used to insure the accuracy of the data written on magnetic tape. Magnetic tape units with dual-gap read-write heads are used. When a character is written on the tape, it is immediately reread and compared with the signal transmitted. If the two signals are not the same, an error has occurred and the tape is backspaced and instructed to rewrite the proper data. Read-after-write checks monitor the accuracy of data transmitted within a single device.

Programed controls

The computer programs at GSI calculated batch and debit control totals (a financial control total of the debits) that had to agree with similar totals developed by previous processing. The computer operator determined if the two control totals balanced. When errors were detected, either (1) the operator and the data processing supervisor halted processing and corrected the errors or (2) the computer generated a record of the imbalance for later correction and continued processing. We tested their use to be certain that the control totals had been included and were effective for their intended purpose.

The computer programs also included:

--A validity check to insure that only authorized accounts were used. The assistant comptroller resolved discrepancies by correcting account numbers or by opening new accounts.

--A limit check in the payroll processing routines to prevent the printing of a check in excess of $999.99.

Other internal controls over computer processing

Appropriate separation of duties among data processing personnel minimizes access to the computer for personnel having sufficient knowledge to make unauthorized changes to the data being processed. GSI's Data Processing Department was staffed by a supervisor, an assistant supervisor, two programers, a computer operator, and an accounting-machine operator.

In some computer systems a record of all operator actions at the console is recorded by a console typewriter. The GSI computer system does not include a console typewriter; a manual log is kept of the computer operations.

A tape library, staffed by a librarian, can be used to control magnetic tapes and system documentation. Because GSI has a relatively small number of tapes, it does not have a librarian; instead, it stores the tapes in a fireproof safe.

Program documentation

Just as system flow charts helped us identify overall system controls, the detailed program documentation helped us make a preliminary evaluation of computer program controls. It also helped us select programs to test and identify data files from which we could extract information.

INFORMATION AND/OR CHECK DISTRIBUTION FUNCTION

The information and/or check distribution function consists of all reports, documents, and records resulting from the processing function. Such information may be in the form of printed reports or listings or may be in machine-readable form, such as magnetic tape or disk.

The reliance which can be placed on the distribution function depends on the reliance which can be placed on the data collection and recording, computer-processing, and operation-monitoring functions. We concluded, on the basis of the tests conducted throughout our audit, that management controls over the data-recording, data-conversion, and operation-monitoring functions were sufficient to provide a high degree of reliance on the distribution function.

OPERATION-MONITORING FUNCTION

The monitoring function is intended to alert operating and managerial officials to any data processing problems for corrective action. To keep informed of data processing problems, GSI officials received a wide variety of reports, such as invalid unit account listings and zero balance listings.

Our tests of selected reports showed that they were reliable for their intended purpose and that operating-level officials generally took quick corrective action when these reports brought errors to their attention.

CONCLUSION ON INTERNAL CONTROLS

We concluded we could place a high degree of reliance on the accuracy of GSI's processing.

CHAPTER 3

SAMPLING AND TESTING THE FINANCIAL TRANSACTIONS

We believed that a statistical sample would enable us to perform a more thorough audit using fewer transactions. We directed our work toward ascertaining the reliability of GSI's four books of original entry. In the GSI accounting system, each debit and credit in every financial transaction was treated as a separate and independent transaction and was entered in one of the four books of original entry. Thus, if we could determine the extent of reliance which could be placed on the four books of original entry, we could place the same degree of reliance on the current year's financial statements. This view was based on the premise that the four books of original entry served as the primary connecting link between last year's financial statements and the current year's statements. Since our audit staff had audited last year's statements, the account balances reflected in them served as our starting point in the development of a statistical-sampling plan. We considered that any change in those account balances would result only from financial transactions processed through one of the four books of original entry. Accordingly, in developing a sampling plan, we considered

--the number and dollar amounts of financial transactions processed and

--known error rates and dollar amounts of errors.

In checking the number and dollar amounts of transactions, we decided stratification was necessary to get representative coverage.

We reviewed last year's workpapers to determine expected error rates and the dollar amounts of errors. From this information we decided to be 95 percent certain that the true error rate did not exceed 5 percent of the transactions and that the average error did not exceed a monetary value of $25. If an audit of the sample disclosed conditions greatly exceeding these limits, the audit work would be

extended and it might be necessary to qualify our opinion on the financial statements.

On the basis of these considerations, the financial transactions for a one-year period ended in November 1970 were stratified and sampled as shown below. (Recommendations for future samples are included as appendix V.)

Strata	Total transactions		Sample transactions	
	Number	Amount	Number	Amount
$50,000 or more	537	$100,717,140	537	$100,717,140
$10,000 to $49,999.99	1,538	30,471,053	149	2,989,083
$1,000 to 9,999.99	24,755	61,369,461	241	597,837
$100 to 999.99	89,806	28,667,750	88	27,952
$10 to 99.99	175,697	6,595,168	20	717
$1 to 9.99	94,937	455,716	2	9
Less than $1	34,770	11,063	0	0
Total	422,040	$228,287,351	1,037	$104,332,738

In selecting the sample, we used a systematic selection procedure and a random start for each stratum. The sampling interval was determined by dividing the total number of transactions in each stratum by the stratum sample size and by rounding the quotient down. The sample comprised 0.25 percent of all transactions and 46 percent of the total dollar value.

SELECTION OF THE SAMPLE

For every accounting period a magnetic tape containing all detail accounting transactions was produced. GSI personnel agreed to write the computer programs to assist the audit staff in selecting the sample from the tape files. We had to take special precautions, however, to make sure the programs were correctly written and processed to extract a valid random sample from GSI's tape files.

We examined the program documentation to insure the program logic followed our sampling plan. Next we obtained a source program listing showing the actual computer instructions stored in the computer's memory and the sequence in which the computer executed these instructions. This listing was compared with the program documentation to make sure there were no differences. We have retained copies of the system documentation and source listing to serve as a basis for similar comparisons in the future.

To minimize the possibility of GSI personnel placing improper or unauthorized transactions in intervals that would never be selected, the programs were designed so the audit staff would provide the computer operator with the number of transactions to be selected from each stratum while the programs were being run. Thus, GSI personnel have no advance knowledge of the size of the interval.

Finally, we designed the program so the audit staff must also give the computer operator the starting point in each strata. Each starting point must be equal to or less than the sampling interval and may be selected from a table of random digits or the numbers on a dollar bill. Prior to selecting the starting point, every transaction is eligible for selection.

Using these computer programs we processed the current detail accounting tapes (see app. II) which provided us with three printouts.

1. A statistical summary including the total number of transactions and dollar amounts for each stratum. This summary is used to insure that all transactions were subject to selection in the sample. This is

done by comparing these totals with similar control totals developed by GSI personnel when the transactions were first processed.

2. A detailed listing of sample transactions and control totals by strata.

3. A detailed listing of sample transactions sorted first by accounting period, then by book of original entry, and finally by voucher number. This listing facilitates the audit work because it places the sample transactions in the same sequence as filed source documents.

TESTING THE SAMPLE TRANSACTIONS

Following the selection of the sample, it was necessary to develop four sets of audit procedures, one for each book of original entry. A general description of these procedures follows.

Cash Book--Cash vouchers are filed by voucher number in the Accounting Division. The cash voucher consists of a computer printout showing all the accounting entries to record the cash transactions. Other documents filed with the voucher include the daily reports of sales and collections from each unit, copies of the deposit slips, and the original adding-machine tape and proof tape. A cash voucher usually reflects transactions of 1 or 2 business days.

Cash voucher transactions in our sample included debits to a cash account and credits to income accounts. To audit a debit to cash, the cash totals from each report of sales and collections must be footed. This amount is traced to the deposit slip and the bank statement. To audit a credit to an income account, the daily report of sales and collections is reviewed and the income amounts are arithmetically verified.

Transfer Register--Transfer vouchers, filed by voucher number, consist of a computer printout showing the accounting entries. Commissary requisitions and transfer documents are also filed with the vouchers.

Our sample included debits to purchase accounts and credits to perpetual inventory accounts. To audit a transaction, it is necessary to extend each item and unit price on the transfer document and to foot the extensions. To facilitate this procedure and to assure ourselves that our computations were correct, we designed a computer program to perform these simple, but repetitive, computations. The program extended each item used as input, printed a total for each page of the voucher, and printed a final total for the particular inventory account.

Voucher Register--Invoices, receiving reports, and purchase orders which support Voucher Register transactions are filed by vendor number in the paid vouchers files. Attached to these documents are (1) a check stub showing the total amount paid and the voucher number and (2) an adding-machine tape or proof tape showing the accounting entries.

Our sample included debits to perpetual inventory or purchase accounts, debits to accrued tax expense, and credits to the vouchers payable account. To audit these transactions, we matched vendors' invoices with related purchase orders and receiving reports and verified the computations.

A separate set of audit procedures was developed to audit grouped payroll transactions made through the Voucher Register. These procedures are included as appendix III.

Journal Voucher Register--Journal vouchers, including computer printouts of accounting entries, are filed by voucher number by accounting period. About 100 journal vouchers are used each accounting period. They include manual entries and computer-generated entries. In some cases, supporting documents for the manual entries are filed with the computer printout. No source documents are prepared for the computer-generated entries.

Each journal voucher must be audited individually. For example, Journal Voucher 6, Bank Transfer of Funds, is supported by debit memorandums, deposit slips, and a

manually prepared schedule of transfers to GSI's main disbursing account. We traced each transfer to the bank statements.

To audit computer-generated journal voucher entries, such as distribution of general overhead, we reviewed the computer program documentation used for preparation of the voucher.

PROCEDURES FOR CLASSIFYING ERRORS

Errors which affect net worth are designated as either type I or type II errors. Errors directly related to transactions in the statistical sample are type I errors. Type II errors are located by auditing the sample transactions, but they are not directly related to the sample transactions.

The following example illustrates the difference between type I and type II errors. Two transactions selected for the sample were:

Book	Voucher	Account	Unit	Debit	Credit
2	0105	001003	200	$1000	$ -
2	0105	300000	350	-	200

Examination of Cash Voucher 0105 may indicate that the actual transaction includes:

Book	Voucher	Account	Unit	Debit	Credit
2	0105	001003	200	$1000	$ -
2	0105	300000	349	-	100
2	0105	300000	350	-	200
2	0105	301000	350	-	450
2	0105	300000	351	-	250

If the supporting documents for Cash Voucher 0105 disclosed an error in the debit of $1,000 to account 001003 for unit 200 and/or an error in the credit of $200 to account 300000 for unit 350, these would be type I errors, since they are directly related to transactions in the sample. If supporting documents for Cash Voucher 0105 showed errors in any of the other credits in the voucher, they would be recorded as type II errors.

Type I and type II errors may include both errors of amount and errors of classification. The effects (whether the error increases or decreases net worth) of all type I and type II errors were recorded in the working papers for subsequent evaluation.

EVALUATION OF SAMPLE RESULTS

We audited 1,037 transactions (500 transactions under $50,000 and 537 transactions over $50,000) with a value of $104,332,738. The errors found are summarized in the following table.

	Number	Amount
Errors decreasing net worth	10	$443
Errors increasing net worth	8	182
Errors not affecting net worth	-	-
Total	18	$625

A statistical evaluation of the errors disclosed the following information.

1. We can be 95 percent confident that the net error can range from an overstatement of net worth by $30,792 to an understatement of net worth by $24,476. (Net worth reported by GSI was $4,713,685.)

2. We can be 95 percent confident that GSI's net worth lies between $4,682,893 and $4,738,161. There is only a 1-in-20 chance that the results of a complete audit of all transactions would be outside this interval.

3. The probability is approximately 97.5 percent that the rate of occurrence of all types of errors affecting net worth does not exceed 0.88 percent.

CONCLUSIONS

These findings are not considered material enough to adversely affect the financial statements or their interpretation. Thus, our audit of the financial transactions showed that we could place a high degree of reliance on them. However, we still had to assure ourselves of the existence of the indicated assets and liabilities recorded in the accounts. The procedures we followed are discussed briefly in appendix IV.

CHAPTER 4

SUMMARY AND EVALUATION OF AUDIT APPROACH

During prior years the annual audit of GSI included a review of internal controls, verification of the accuracy of bookkeeping by an audit of the accounts, and verification of the existence of assets and liabilities. Primary reliance was placed on manual procedures and controls. Verification of the accuracy of bookkeeping by the traditional audit-by-account method included an analysis of transactions entered in specific accounts. Judgmental samples of transactions to be audited were selected on the basis of dollar balance in the account and account activity. Tedious and time-consuming verification and balancing of each major account were performed. This manual procedure had become complex and burdensome because GSI maintained over 400 accounts by computer.

Under our newly developed audit approach, we divided the audit work into three phases: a review of internal controls, an audit of transactions, and verification of the existence of assets and liabilities.

In practice, the review of internal controls differed from regular audit procedures in that we considered not only the usual manual internal controls but also those built into the data processing system by the computer manufacturer and those included in the computer programs.

The real difference between the two approaches was in the second phase involving an audit of financial transactions. Instead of verifying the accuracy of bookkeeping by an analysis of transactions entered in specific accounts, we considered a statistical sample of all transactions processed for the year. We checked to see if selected transactions had been properly categorized and charged to the appropriate account.

GSI's computerized operation lent itself to our new approach because each debit and credit was treated as a separate and independent transaction and was entered in one of the four books of original entry. Thus, if we could determine the extent of reliance that could be placed on the

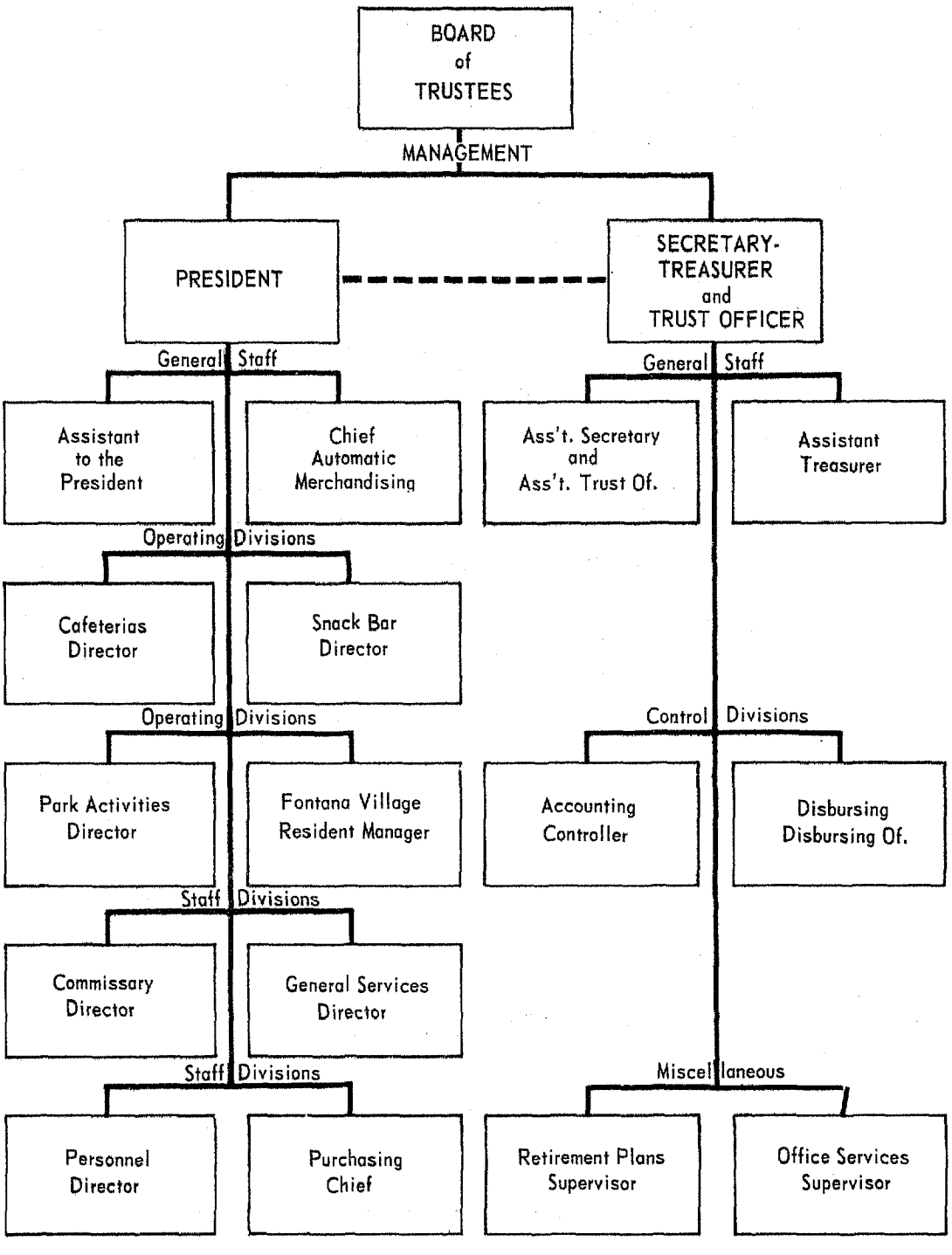
four books of original entry we could place the same degree of reliance on the current year's financial statements. This view was based on the premise that the four books of original entry served as the primary connecting link between last year's financial statements and the current year's statements. Since our audit staff had audited last year's statements, the account balances reflected in them could serve as a starting point in developing a statistical-sampling plan. We considered that any change in the account balances would result only from financial transactions processed through one of the four books of original entry. If a statistical sample of all the transactions processed during the year was handled properly, the bookkeeping methods used could be considered sound and the amounts in the individual accounts could be relied upon.

Under this new approach, broader and more reliable coverage of financial transactions was possible. Each transaction had a known probability of being selected for audit. Statistical sampling provided a more scientific and independent basis for evaluation and resulted in measurable reliability. Results of reviewing the sample items were well within the limits of accuracy required by the auditors. Therefore, a high degree of reliance could, we concluded, be placed on the bookkeeping methods used.

Traditional verification procedures were used to verify the existence of assets and liabilities. The computer was used to perform clerical work, which saved audit time.

In summary, we were able to establish the reliability of the financial records, reduce the number of financial transactions to be audited, and improve the audit program. We concluded that (1) GSI's financial statements were presented in conformity with generally accepted principles of accounting and (2) such principles were consistently applied in the preparation of the financial statements of the current period in relation to those of the preceding period.

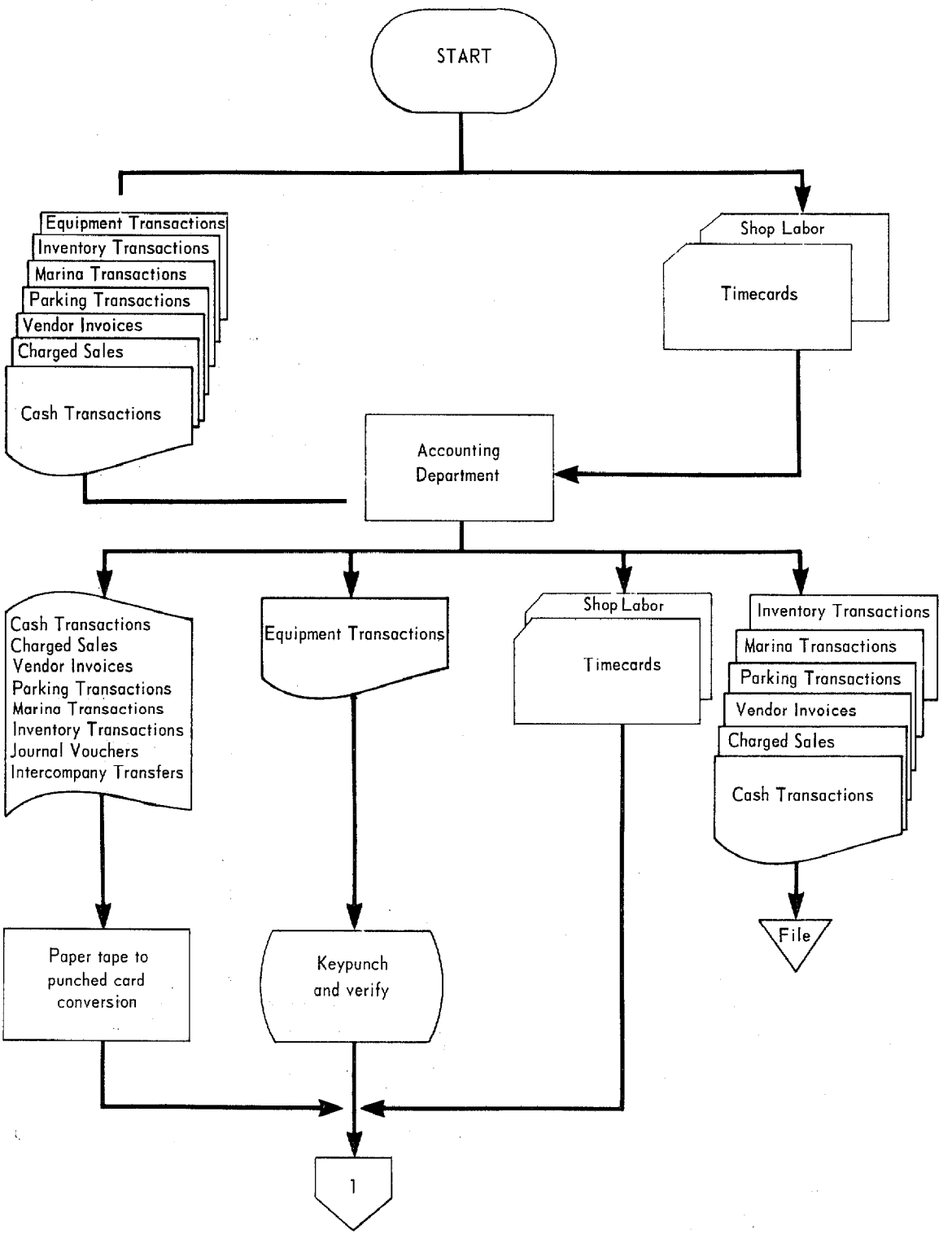
ORGANIZATION CHART

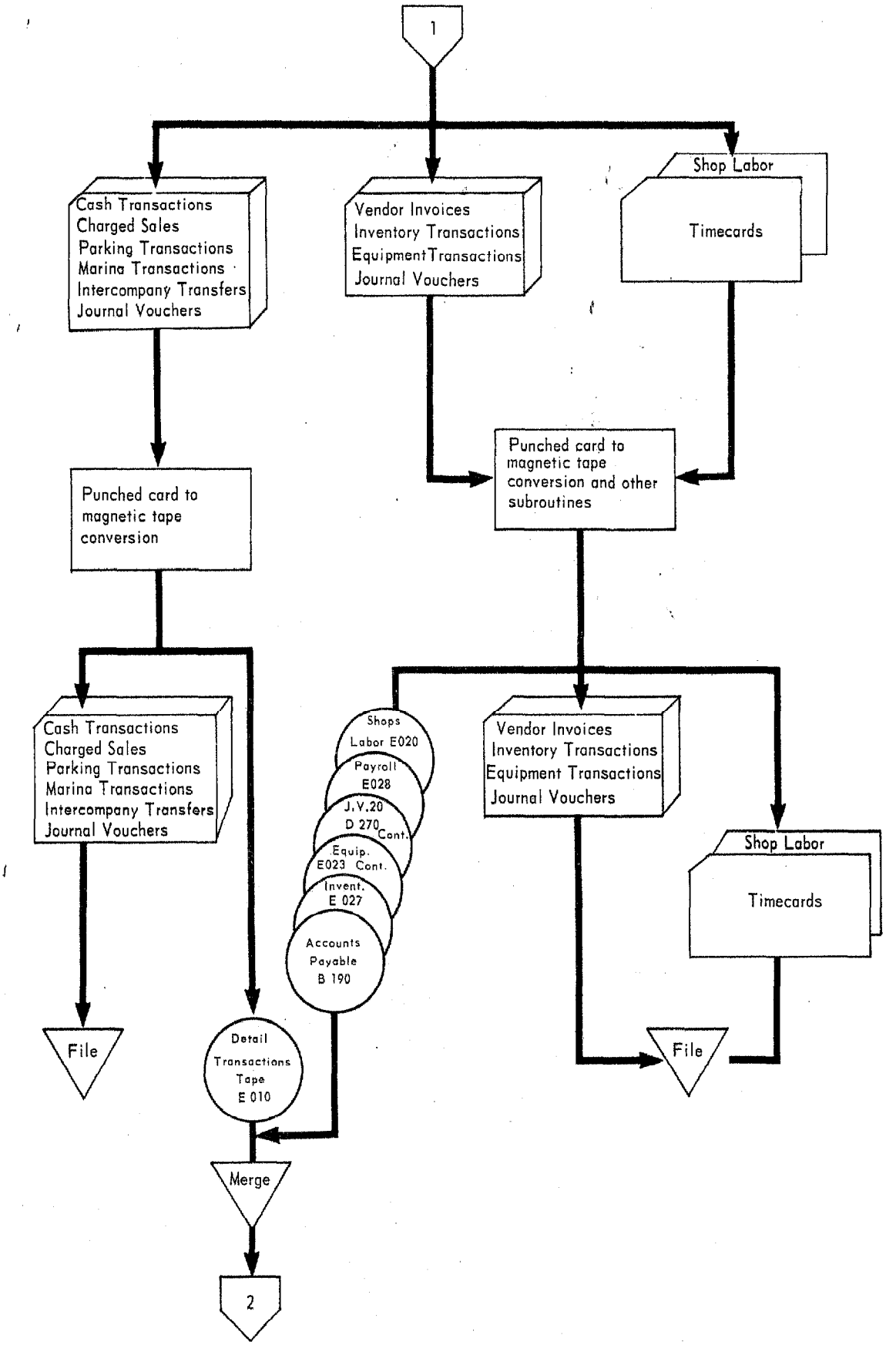


Note: This chart represents GSI's organization at December 31, 1969. By December 31, 1971, GSI had been substantially reorganized. The primary change in the organization eliminated the position of Secretary-Treasurer and Trust Officer and created two positions, Secretary and Comptroller Treasurer, both subordinate to the corporate President.

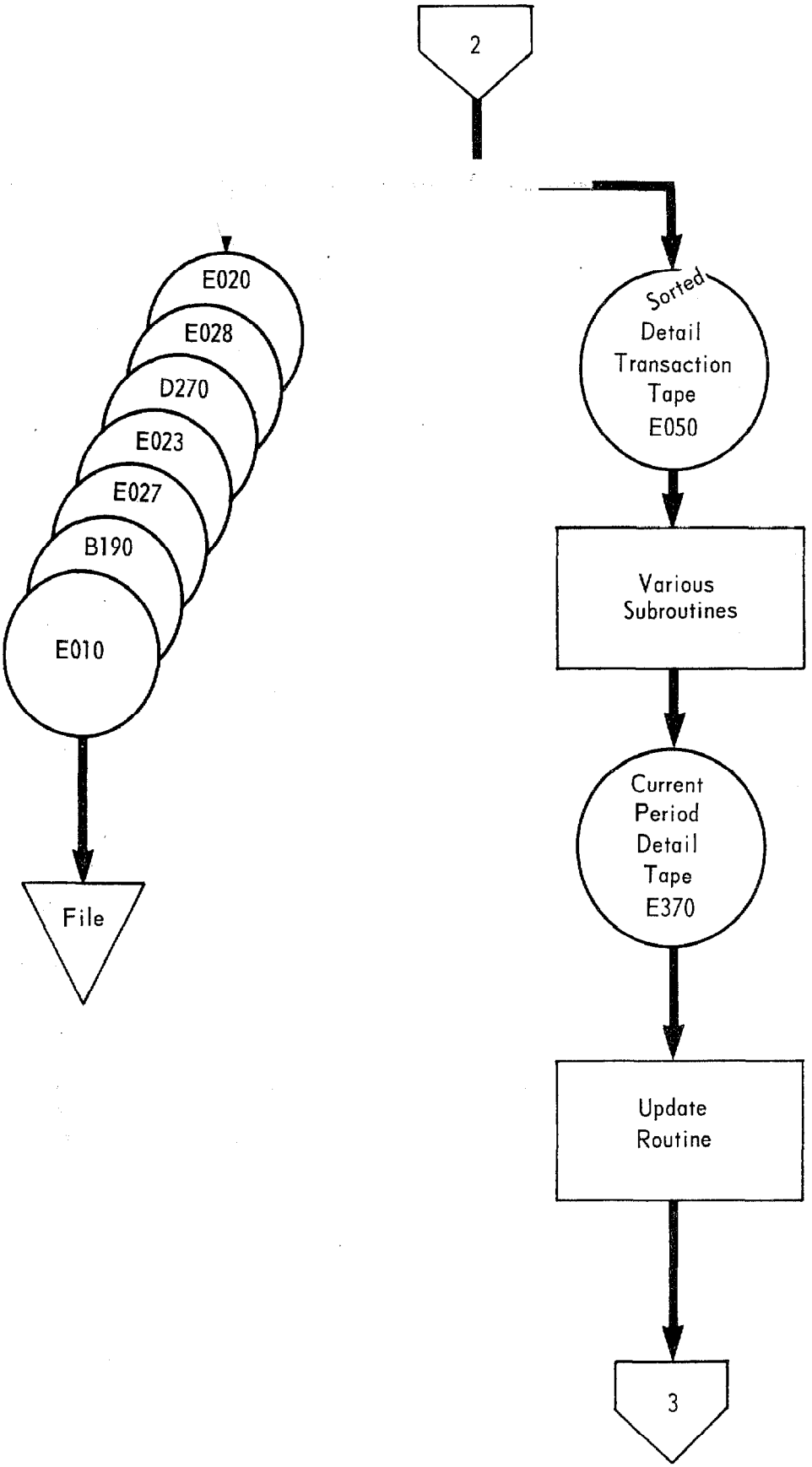
APPENDIX II

GENERAL FLOW CHART OF THE GSI ACCOUNTING SYSTEM




1
Cash Transactions
Charged Sales
Parking Transactions
Marina Transactions
Intercompany Transfers
Journal Vouchers
Vendor Invoices
Inventory Transactions
Equipment Transactions
Journal Vouchers
Shop Labor
Timecards
Punched card to magnetic tape conversion
Punched card to magnetic tape conversion and other subroutines
Cash Transactions
Charged Sales
Parking Transactions
Marina Transactions
Intercompany Transfers
Journal Vouchers
Shops Labor E020
Payroll E028
J.V.20 D 270 Cont.
Equip. E023 Cont.
Invent. E 027
Accounts Payable B 190
Vendor Invoices
Inventory Transactions
Equipment Transactions
Journal Vouchers
Shop Labor
Timecards
File
Detail Transactions Tape E 010
File
Merge
2

APPENDIX II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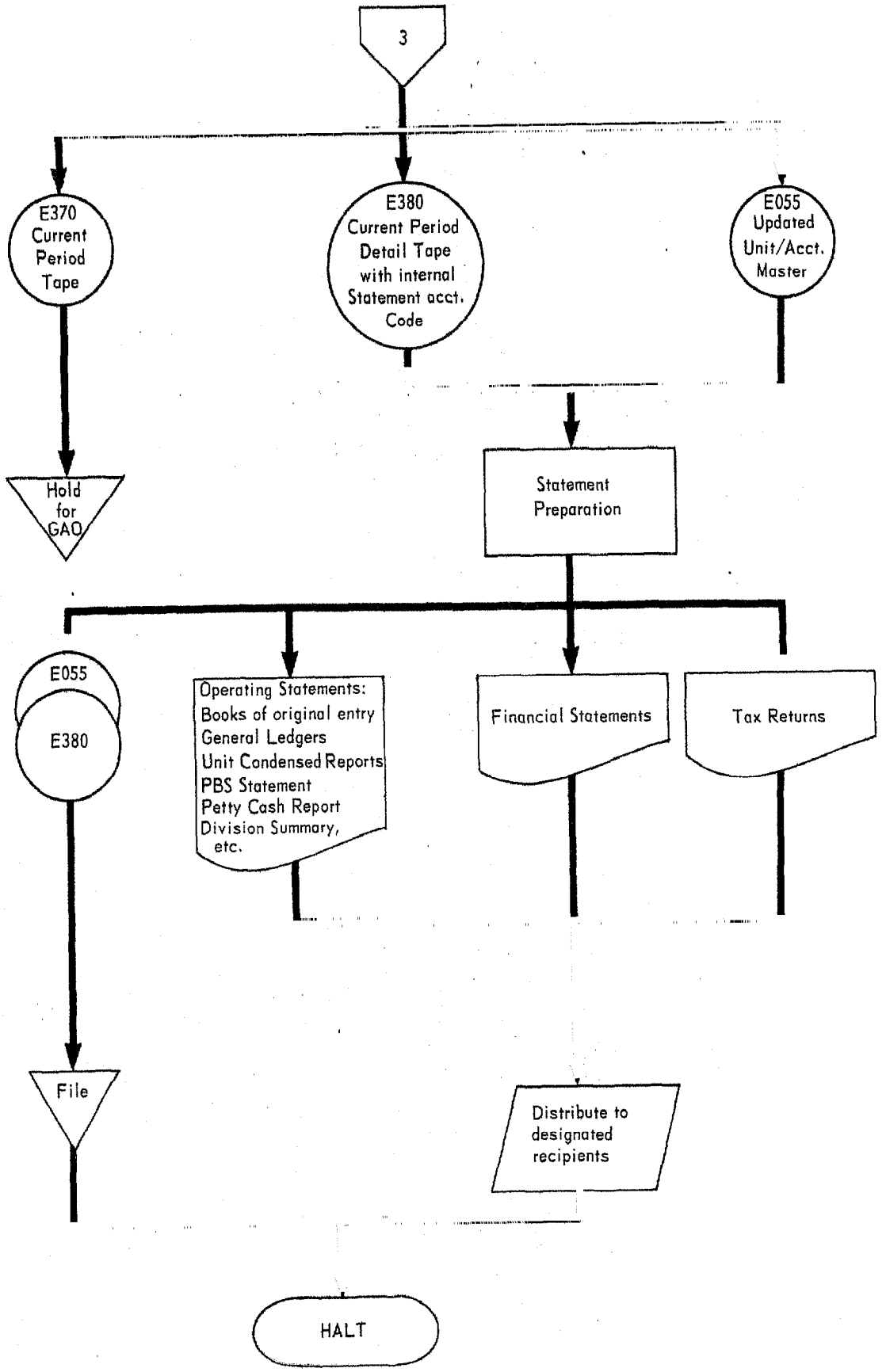
E020
E028
D270
E023
E027
B190
E010
File
Sorted
Detail
Transaction
Tape
E050
Various
Subroutines
Current
Period
Detail
Tape
E370
Update
Routine
3


3
E370 Current Period Tape
E380 Current Period Detail Tape with internal Statement acct. Code
E055 Updated Unit/Acct. Master
Hold for GAO
Statement Preparation
E055
E380
Operating Statements:
Books of original entry
General Ledgers
Unit Condensed Reports
PBS Statement
Petty Cash Report
Division Summary,
etc.
Financial Statements
Tax Returns
File
Distribute to designated recipients
HALT

APPENDIX III

AUDITING GROUPED PAYROLL TRANSACTIONS

Two vendor numbers are used for payroll transactions: 61973 for the executive payroll and 61972 for all other payrolls. Timecards, other supporting documents, and detailed payroll registers are filed in the Accounting Division. During payroll processing the detailed payroll information for each employee is grouped into unit accounting entries for such accounts as payroll expense, Federal withholding taxes payable, and unemployment compensation expense. The net amounts payable to the employees are grouped as a credit to the GSI main office vouchers payable account. Therefore, it is generally not possible for payroll transactions selected in the sample to represent a transaction for a single employee.

To audit grouped payroll transactions selected in the sample, we:

1. Traced the accounting entries to the payroll register.

2. Footed the selected transactions from the payroll register to ascertain the mathematical accuracy of the transactions.

3. Selected from 5 to 10 percent of the items on the selected payrolls and tested by:

   a. Reviewing and evaluating the controls over the preparation of source documents to insure the correctness of the hours worked, the gross pay, the deductions, and the net pay.

   b. Testing the deductions and determining that all were properly authorized; investigating amounts shown as other deductions and determining their validity.

   c. Tracing names, hours worked, pay rates, meals, etc., to timecards.

   d. Tracing pay rates from the payroll register to (1) personnel cards, (2) union agreements or salary schedules, and (3) Notices of Personnel

Action; investigating all differences.

e. Examining timecards and timesheets to determine if time had been computed correctly.

f. Comparing endorsements appearing on canceled checks with employees' signatures on file and investigating any discrepancies.

4. Listed employees receiving salaries of $9,000 or more a year on the executive payroll. (Did not include administrative personnel on this list.) Compared salaries with previous year and determined that increases were properly authorized.

5. Listed employees, other than executive employees, receiving salaries of $7,000 or more a year on the administrative payroll. Compared salaries with previous year and traced all increases to Notices of Personnel Action or other authorizations.

ASCERTAINING THE EXISTENCE OF ASSETS AND LIABILITIES

Generally accepted auditing standards require that sufficient evidence be obtained through inspections, observations, inquiries, and confirmations to give an opinion on the existence of the recorded assets and liabilities. The standards require also that, when these inspections, observations, inquiries, and confirmations are not performed, this fact must be shown in the audit report. The audit report must be appropriately qualified if the amounts involved are material. The procedures used to ascertain the existence of assets and liabilities are outlined below by major account groupings.

CASH AND RELATED ASSETS

1. We obtained confirmations of account balances and cutoff statements for the various bank accounts. For each bank account we appropriately reconciled the cutoff statements with the general ledger.

2. We conducted a cash count of the main office petty cash fund and the receipts collected for the last business days of the year under audit.

3. We inspected and counted noncash items of the main office petty cash fund.

4. We counted undistributed payroll checks held for employees and verified that the amounts of these checks had been properly recorded in the general ledger.

5. We counted the savings bonds held on consignment from the Federal Reserve Bank of Richmond and reconciled them with the amounts recorded in the general ledger.

6. We obtained confirmation of the number of savings bonds on consignment from the Federal Reserve Bank of Richmond.

7. We conducted surprise cash counts at three cafeterias.

8. We confirmed the petty cash funds of all operating units.

ACCOUNTS RECEIVABLE

1. We mailed confirmations to selected debtors.

2. We appropriately reconciled the confirmations returned.

INVESTMENTS

We verified various investments either by confirmation or physical inspection; for example, we (1) confirmed savings and loan shares by direct communication with the savings and loan institutions, (2) confirmed U.S. Treasury bills by either physical inspection and count or by direct communication with the trustee holding the certificate, and (3) counted the U.S. Treasury bonds.

INVENTORIES

1. We observed GSI taking their year end inventory at the commissary.

2. We took a physical inventory of selected items during our visits to various operating units.

3. We obtained copies of the physical inventory of the maintenance shops at Washington and reconciled them with amounts shown in the general ledger.

4. We obtained confirmations for the merchandise stored in public warehouses.

LIABILITIES

1. We verified selected payables through direct confirmation with vendors.

2. We verified the mortgage payable account by direct confirmation with the mortgagor.

EMPLOYEE RETIREMENT AND BENEFIT TRUST FUND

1. We requested a confirmation of the balance as of December 31, 1970, from the appropriate bank and a cutoff

bank statement, together with canceled checks, as of January 15, 1971.

2. We obtained a confirmation of the securities held by the Wellington Fund and the American Security and Trust Company as of December 31 and reconciled them with the general ledger accounts.

3. We examined and counted the securities held by GSI in its safe deposit boxes, and we reconciled these counts with amounts shown in the general ledger.

SUPPLEMENTAL PENSION FUND

1. We requested confirmation of the balance as of December 31 from the bank and a cutoff bank statement and canceled checks as of January 15, 1971. We verified the proper recording of cash balances in the general ledger.

2. We requested a confirmation of the securities held by the American Express Investment Management Company and the American Security and Trust Company as of December 31, 1970. We verified the proper recording of securities in the general ledger.

The procedures used, including inspections, observations, inquiries, and confirmations, were sufficient to assure us of the existence of the recorded assets and liabilities.

RECOMMENDATIONS FOR FUTURE SAMPLES

The low error rate detected by the sampling plan indicated that the number of strata and transactions audited could be reduced while maintaining essentially the same confidence levels. Therefore, until we obtain evidence of a drastic change in the occurrence of errors in GSI accounting, the audit team should, in future audits:

1. Examine all transactions of $50,000 or more.

2. Examine a random sample of 400 transactions from the transactions of more than $1 and less than $50,000, disregarding the size of the transaction.

3. Ignore transactions of less than $1. It may be desirable to audit a small sample of these transactions from time to time.