

A STUDY OF THE VETERAN ADMINISTRATION'S
MANAGERIAL CONTROLS IN AN EDP SYSTEM

A Thesis

Presented to ,

the Faculty of the Graduate School
Southwest Texas State University

In partial Fulfillment
of the Requirements for the Degree
Master of Business Administration

by

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December 1971

PREFACE

It is the writer's experience of five years as an accountant at a Veterans Administration hospital and another five years in the Veterans Administration's Department of Data Management as a Systems Auditor, that led to the awareness of a need for management to become knowledgeable in EDP.

During that time I had the opportunity to participate first as a user of an EDP system, then as a participant in the development of EDP systems for users. Some of the information presented will be from these past experiences in the V. A.

It was then for the purpose of pointing out this need and presenting a solution for the problem that this study was made.

For their cooperation, support, time, and effort in making this project possible, I am most grateful to the following people: I am greatly indebted to Dr. Mayron Shields, my thesis chairman, for the time he has spent guiding and counseling me in this project. For their criticism and helpful

suggestions, I would like to thank Dr. Marvin Johnston and Dr. Leland Wilson.

I am especially grateful to my loving wife, Gladys, for her patience, encouragement, understanding and help during the months it took to prepare this manuscript.

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CHAPTER I

INTRODUCTION

Opening Statements

A tremendous amount of emphasis in this space age is being placed upon the electronic computer. Electronic computers are used to place men on the moon and the electronic computers are used to perform various and sundry transactions for management. Electronic Data Processing equipment is having an increasing impact on the processing of data in most companies today. Companies began by using Electronic Data Processing equipment to replace the standard punched cards and manual procedures. However, the expanded use of electronic computers together with other new devices and equipment has led to centralizing several data processing operations formerly discharged in various organizational units of a company. Top management in the past was conservative in the use of Electronic Data Processing. Now they are realizing the tremendous potential of the computer in promoting operational efficiency and effective decision making.

Problems Involved in Introducing a Computer

There are many advantages in using EDP equipment, however, one must recognize that there are some new problems.

. . . The computer does not automatically solve problems: it is only a tool and someone must devise a way to use it in a particular application. But before we can get around to solving the problems for which we obtained the computer, it is necessary to face many problems that the computer itself creates.¹

The data processing system of an organization is very complicated. Many functions that were accomplished by other divisions of the organization are now being centralized into the data processing division. "The data processing system is inextricably interrelated with the entire organization, so that changes in the data processing system may have an extreme impact upon the performance of the organization."²

What Is Data Processing

"The concept of data processing involves the manipulation of facts and figures--according to a pre-arranged

¹ Edley W. Martin, Jr., Electronic Data Processing An Introduction (Homewood, Ill.: Richard D. Irwin, Inc., 1965), p. 470.

² Ibid.

plan--to produce new, more desirable information."³ Data processing then is the gathering of information and processing it by sorting, adding, subtracting, multiplying, dividing or any other manipulation that will aid in identifying the information. Whether it is accomplished manually by hand or mechanically by machines, it is still data processing. Then the data may be used in decision making.

Executives base their business decisions on information, or data, such as operating costs, inventory levels, sales and manufacturing statistics, and so on. Other things being equal, the man with the greatest amount of accurate business data at his command has the greatest competitive edge over his business rivals.⁴

It is important that data be processed as accurately and quickly as practical. Raw data is of little use to executives until it has been processed. "A data processing system . . . is a group of people and/or machines which are organized to work together to perform the data processing requirements of an organization."⁵

³ Data Processing Management Association, Principles of Automatic Data Processing (Park Ridge, Ill.: Data Processing Management Association, 1965), p. 7.

⁴ Ibid.

⁵ Ibid.

More recently, various types of business machines--notably the electronic computer--have taken over this task, thereby providing more valuable business data upon which to base decisions, faster and less expensively than ever before. With more data and faster and more reliable interpretation of data, much of the guess-work and uncertainty of decision-making is being reduced or eliminated.⁶

What Is EDP

An electronic data-processing system is not just a computer as it is sometimes thought. An EDP system has a number of elements. These elements perform certain functions in the system.

An electronic data-processing system consists of the following:

1. An electronic data processor (the central processing unit)
2. Associated peripheral equipment, such as data preparation, input, and output devices
3. Procedures that tell what data are needed and when, where they are obtained, and how they are used
4. Instruction routines for the processor to follow
5. Personnel to operate and maintain equipment, analyze and set up procedures, prepare instructions, provide input data, utilize reports, review results, and supervise the entire operation.⁷

⁶ Ibid.

⁷ Robert H. Gregory and Richard L. Van Horn, Automatic Data-Processing Systems (2nd ed.; Belmont, California: Wadsworth Publishing Company, Inc., 1963), p. 15.

The first two items mentioned above, the central processing unit and the associated peripheral equipment is called "hardware." The hardware may be purchased or rented from one or more companies that build the equipment. Most EDP equipment companies build peripheral equipment that is compatible to other company equipment so that one can have an IBM central processing unit utilizing Ampex tape drives and Telex disk drives as its peripheral equipment.

Problem Stated

It is the writer's opinion that the user of an EDP system or systems within the Veterans Administration have not been enlightened as to the principles and concepts of EDP.

The Department of Data Management established

The Veterans Administration is one of the largest federal governmental agencies in the United States. Due to the need of automation for its systems, the Veterans Administration established the Department of Data Management in 1962. And at this time, there are some 1,600 employees in this department.

These employees are charged with the responsibility of designing, developing, installing and operating the EDP

systems within the Veterans Administration. Since this department has been given these responsibilities, the using departments do not become as involved as it seems they should.

Some Veterans Administration's ADP systems

In order to size up the magnitude of the situation here are some of the systems involved.

The insurance EDP system. This is the system that services and maintains "about 5.6 million life insurance accounts for veterans with a face value of over \$38 billion." The mechanics of this system includes "the payment of dividends and insurance awards and the processing of policy loans, cash surrenders and matured endowment."⁸

The compensation and pension EDP system. "This system services about 4.6 million accounts automatically. This system authorizes the issuance of close to 57 million checks to veterans and their beneficiaries each year in amounts totaling \$4.4 billion."⁹

⁸ Data Processing in the Veterans Administration (Washington, D.C.: Government Printing Office, 1970), p. 5.

⁹ Ibid.

The payroll system. This system creates a magnetic tape that is used by the Treasury Department "to issue salary checks and U. S. Savings Bonds for about 170,000 VA employees."¹⁰

The other two V. A. departments

There are three departments within the Veterans Administration. The Department of Data Management has already been mentioned. The remaining two are The Department of Medicine and Surgery and The Department of Veterans Benefits.

The Department of Medicine and Surgery. This department is by far the largest of all three departments. It is responsible for operating 165 hospitals throughout the United States.

The Department of Veterans Benefits. This department is responsible for the operations of some forty regional offices. These offices serve as contact points for veterans and their beneficiaries.

Segregated departmental duties

Since each department has its own primary duties, it is difficult for some to see the need of becoming involved

¹⁰ Ibid.

understanding the other department. Herein lies the problem. It is a problem of understanding and communicating between the user of the EDP system and the developer and operator of the EDP system.

Purpose of study

It is the writer's opinion that this is a managerial problem within the Veterans Administration. If it is true within the Veterans Administration, then it may be a problem in other governmental agencies and perhaps some private enterprises.

Therefore, a study has been undertaken in order to explain an electronic data processing system in a way that management of all levels within the Veterans Administration might be more aware of the various managerial controls available for their use. This EDP knowledge will enable management to aid in the decisions as to what managerial controls are to be installed in their EDP system.

Chapter II will list and define these controls. Then the policies and procedures of how the controls are applied will be in chapter three along with the analysis of telephone inquiry to various Veterans Administration hospitals

and to the Central Office in Washington, D.C. as to the
"users" EDP knowledge.

CHAPTER II

ADMINISTRATION AND OPERATING CONTROLS

The head of the computer department is not always in the same place in the table of organization from company to company. However, if he is a member of the top management team and participating in policy decisions, he is in a position to understand the interrelationship of the functional areas. From this vantage point he should be able to manage the EDP department so that it will service the other functions of the company.

Equipment Selection

Before management makes a decision as to equipment selection, they should first decide on the desired degree of automation for the system or systems.

In order to make a rational choice of equipment, facts must be collected about equipment and its suitability for proposed applications. These facts can be obtained from manufacturers' publications, contract schedules, and solicited proposals; from personnel with knowledge or experience; and from other users of equipment. In analyzing

competing equipment, it is important to use an identical specification base and desirable to examine all manufacturers' equipment suitable for the application.¹

Management or the user should require the manufacturers to specify in detail the characteristics of each piece of equipment. Usually, several models and/or makes of one type of equipment are available. For example, the term "magnetic-tape unit" is not specific enough. Tape units of a particular manufacturer can have different read-write speeds, densities and rewind times.

Sizes, weights, and recommended floor space for all equipment must be specified so the user can prepare housing for the equipment. Arrangements must be made for bringing in necessary electric power and for wiring units together by under-floor, false-floor, or overhead conduits. . . . The user needs guidance on the amount of space he should provide for the following:

1. Data-processing equipment: input, processor, output, and supporting units
2. Related equipment: air conditioners, water coolers, and motor-generator sets, if required
3. Personnel: supervisors, analysts, programmers, coders, operators, and technicians
4. File vaults and supply storage
5. Maintenance parts, testing equipment, and testing operations
6. Visitors gallery²

¹ Gregory and Van Horn, Automatic Data-Processing Systems, p. 630.

² Ibid., pp. 632-33.

Hardware Controls

Electronic Data Processing equipment manufacturers build checks into the equipment to ensure that data are correctly read, processed, transferred within the system, and recorded on output media. These checks are usually called "hardware" controls.

Parity check

The most universally used machine-circuit control is the parity check.

This particular check verifies each binary-coded character. A character is one of a set of elementary symbols that may be arranged in ordered groups to express information. In all computers, characters are read from input media and converted to machine code. The machine code is a configuration of magnetic spots, or bits, in the recording channels that make up a character. Since all information in machine code is presented in binary zeros and ones, it is easy to state as a rule that every character shall contain an equal or an odd number of ones. For example, if an odd parity check is used in a system, a character that has four bits will have a check bit added by the processor in the bit channel. If the character has three bits, the parity bit channel is left blank. . . . In addition to vertical parity check, a horizontal (longitudinal) parity check is made for each record. At the time a record is written, the bits of each horizontal row are counted. At the end of the record, a check character is recorded. Most systems use the parity check for reading from magnetic tape, recording on magnetic tape, and at all internal points where transfer of information takes place, such as memory registers

and accumulators. Any addition or loss of a bit in a character will result in incorrect parity, and the machine will either stop or transfer the processor to an error routine at the option of the programmer. Thus, the machine will detect the rare occurrence when a bit is added or deleted, but it will not check for the extremely unlikely occurrence of an even number of bits changing.³

Read-after-write check

Magnetic tape units and random access memories make a read-after-write check. That is, after the information has been recorded, the computer reads it right back, and it is checked by a variety of schemes that test its accuracy.

Tape reels

Each tape reel has a circular groove in which a plastic ring may be inserted. A computer may read a tape whether the ring is in the groove or not. But a tape without a ring in the groove cannot be written upon. This is intended to prevent loss of data by the erase and write on to the tape accidentally.

Disk checks

"These checks insure that the track area is in proper condition, the data is of proper parity and the

³W. Thomas Porter, Jr., Auditing Electronic Systems (Belmont, California: Wadsworth Publishing Company, Inc., 1966), p. 20.

read and write functions are handled properly."⁴

Printer synchronization checks

"The printer checks assure correctly printed characters, correctly positioned characters and proper forms movement and control."⁵

Punched card and punched tape units

These units have a dual-read feature, by which cards or tapes are read twice as they are being fed into the machine.

All computers have checks to detect certain types of programmer errors and equipment malfunctions. Things like an arithmetic overflow is automatically detected in most computers. If the sum of two six digit numbers results in a seven digit answer, and the programmer has allocated a storage capacity of only six digits to store the answer, an error is signaled. Also, if the program attempts to perform arithmetic with alphabetic data, the mistake is detected and the computer will cease processing. These errors are indicated on the console by a series of control lights illuminated

⁴Data Processing Practice, Project Management, "Systems Control," DPP 2805 (August, 1968), p. 12.

⁵Ibid.

when unusual or erroneous conditions occur. These lights alert the console operator to errors or possible errors. However, the operator must be knowledgeable of actions necessary and not overlook these signals.

Hardware checking on some computers is dependent on the Operating System used, but it will usually indicate these errors through the console typewriter. The appropriate Operating Systems manual should be consulted for precise error handling procedures.

Programmed Checks

These are controls programmed into the system to control the flow of data from one run to the next. These edits are instructions coded by the programmer to check the validity of input data. Input data to a run or module quite often is the output from a previous run or module processing in the same system.

Hash total

"A 'hash total' is a total of one or more information fields for all of the records in a batch used as a control mechanism. The total does not need to have an intrinsic

significance."⁶ For example, the sum of customer telephone numbers may be used to check for changes from one operation to another. Therefore, the change in hash totals between one operation and the next operation may indicate a loss of an item of data during processing.

Control data

"The 'control total' is a total of one data field for all of the records in a batch."⁷ An example would be the total value in a batch of purchase orders. This is one of the most valuable controls which can be used to control data throughout a system and from one period to another.

Record count

A record count is the number of records processed by the computer. The resulting total can then be compared with a predetermined count. Normally a record count is established when the file is assembled, and the record count is carried as a control total at the end of the file or reel and is adjusted whenever records are added or deleted.⁸

⁶The Control and Audit of Electronic Data Processing Systems (Lybrand, Ross Bros. & Montgomery, August, 1965), p. 48.

⁷Ibid.

⁸Porter, Auditing Electronic Systems, pp. 21-22.

Reasonableness test

"Reasonableness checks are used to test record fields to see whether certain predetermined limits have been exceeded."⁹ When both upper and lower reasonableness limits are established, the computer compares items such as gross pay, invoice amounts, or purchase orders against both limits to ascertain that the transaction falls between the limits.

Comparison tests

Comparison tests are used to determine whether significant code numbers are valid. Programmed logic should reject invalid codes. For example, an invalid account number may be detected because the corresponding record cannot be located in the general ledger master file. It may be necessary to detect invalid account codes before the transaction reaches the processing step. Therefore, the account code should be compared to a table of valid account numbers at the beginning of the run.

Completeness test

This is ". . . a form of programmed validation check that tests to see that all necessary fields of information

⁹Ibid., p. 18.

are present in a transaction."¹⁰ A program edit may be installed to check an accounts receivable transaction for an account number, invoice number and amount data to be present in the input data.

Consistency check

Another program edit may be used to assure that data fields accompanying a transaction are consistent with the transaction code. Possibilities of using this type of test often occur in integrated processing systems. Various transactions including sales, receipts, purchases, payments and adjustments may be the input for processing. When transaction coding is well planned, fields of data may be compared to the transaction code to determine whether they are consistent.

What Is a Program

A computer program is "the complete sequence of machine instructions and routines necessary to solve a problem or process data."¹¹ The programmer must be careful and

¹⁰ The Control and Audit of Electronic Data Processing Systems, p. 47.

¹¹ Ibid.

systematic so that the instructions are all inclusive and placed in a logical order that will cause the proper output. The programmer is a kind of a supervisor of the computer. He should be able to understand the problems to be solved so that he can instruct the computer in a step-by-step method through the entire problem.

He must be able to understand the capabilities of the computer and translate the logical steps of the problem-solution into a set of instructions, or a program for the computer which is stored in the computer's memory. The ability to follow the instructions set down by the programmer, to progress step by step through any portion of any stored program, thereby, producing the desired output without direct human supervision, is the essential characteristic of a computer.¹²

Stored Program Characteristics

The fundamental principles of the stored-program computer has four logical components. They are input/output, storage, arithmetic, and control.

Input/output

The means of communicating with the computer's central processor has always been a problem.

¹² Robert M. Smith and John J. Connelly, "Computer Components and Concepts," Accounting and the Computer (American Institute of Certified Public Accountants, Inc., New York, N.Y., 1966), p. 21.

The input unit accepts data from machines or human beings, and provides these data to the storage unit, where they are retained. The output unit takes data from the storage unit of the computer and provides them to the human users or to machines. Thus, the input and the output units serve as communication ties, and provide the gateways through which data move into the automatic computer to be processed, and out, after processing.¹³

Since all input/output devices involve some type of mechanical linkage the methods are relatively slow. There are several methods used as input/output devices. "The most common forms for input/output of data are punched cards, magnetic tape, punched paper tape, and the typewriter."¹⁴ Multiple magnetic tape units, magnetic disc units, and printers may be attached to one central processor.

Storage

Storage is the general term used for any device capable of retaining information.

Computer storage, the single component that is probably most glamorized, is often referred to as a memory analogous to the human memory. This popular

¹³ Ned Chapin, An Introduction to Automatic Computers (Princeton, N.J.: D. Van Nostrand Company, Inc., 1963), p. 22.

¹⁴ Kenneth P. Swallow and Wilson T. Price, Elements of Computer Programming (New York: Holt, Rinehart and Winston, Inc., 1965), p. 18.

representation can be misleading, since the storage unit is better compared to a file cabinet capable of storing vast quantities of information in an orderly fashion.¹⁵

Internal storage. Internal storage is magnetic-core within the central processor. It consists of small circles of wires that can be magnetized in either of two directions with perpendicular wires running through the circles.

Without an internal storage or memory device, a computer could not accept a program of instructions and perform automatically and sequentially the operations specified. Program instructions are read from magnetic tape or punched cards into the computer memory unit. The computer retrieves from storage one or several instructions at a time, performs the operations called for, and puts them back in the memory unit so that they are available when needed again.¹⁶

External storage. The physical characteristics of external storage may be in the form of magnetic discs, tapes, or drums. "Thin metal disks, coated on each side so that data can be recorded in the form of magnetized spots, are the media of magnetic disk storage."¹⁷ Magnetic tapes are

¹⁵ Beryl Robichaud, Understanding Modern Business Data Processing (New York: McGraw-Hill, Inc., 1966), p. 121.

¹⁶ Ibid.

¹⁷ Ibid., p. 123.

reels of tape similar to the common tape used on tape-recorders. "The computer can write out on tape at the same speed at which it reads data from tape. As new information is recorded on tape, old information on the tape is destroyed."¹⁸ A magnetic drum is "a rotating cylinder made with a special surface so that data can be stored on it in the form of magnetized spots."¹⁹ Therefore, a storage device outside the computer which can store data in a form acceptable to the computer is called external storage.

Arithmetic

The arithmetic function of the computer is the performance of a calculation.

The primary purpose of every digital computer is to perform computations of one type of another with numbers. The arithmetic and logic units of the computer contain the electronic switches, transistors, and so on, necessary for these computations. These are analogous to the wheels and gears of a desk calculator and provide the capability to perform, directly or indirectly, operations of addition, subtraction, multiplication, and division.²⁰

¹⁸ Ibid., p. 125.

¹⁹ Ibid., p. 124.

²⁰ Swallow and Price, Elements of Computer Programming, p. 19.

Control

The control function is to determine what is to be done with the information at each stage of the processing. "It obtains instructions from storage, interprets them, and makes certain that they are carried out as required."²¹ The control device tells ". . . the input, the central processor, storage, and output devices when and how they should operate."²²

Systems Control

By definition systems controls are those means used to regulate the operation of a system. These controls may result in visible output such as printed totals or they may be the interactions within or between system segments that test for equality or inequality among masses of accumulated data.

Controls designed

A well-designed system must have a well-designed control system. A well-designed control system may be almost

²¹ Ibid., p. 19.

²² Robichaud, Understanding Modern Business Data Processing, p. 112.

entirely automatic with very little need for human inspection once it is in operation. This would point toward the ideal situation of complete automation, however, there is a need to leave audit trails and the very normal need to be able to reassure managers of systems that they are in control of their systems.

Controls determined

The control function should not be tacked on as an afterthought. It is best to determine the necessary controls, audits, and error tolerance limits during the systems design period.

The necessary controls are determined as a parallel activity to the establishment of required logic and arithmetic rules, the design of input forms, design of output forms, design of file specifications, design of system test requirements.²³

The control function should also include the ability of recovery and update or downdate of the files when there is a systems failure. The systems failure may come as the result of a program malfunction, hardware malfunction or the mere fact of a split second power shortage due to lightning

²³ Data Processing Practice: Series 2000 - Project Management (August, 1968), p. 1.

in the area. Just a blinking of the lights caused by lightening is often times enough shortage to cause a need for recovery, update or downdate and reprocess.

There is no simple answer as to what point are there too few, just enough, or too many controls. By applying some guiding principles, some basic knowledge of the present system and sound judgment should go a long way toward the design of a very workable set of controls. Usually, it is easier to remove a control should there be too many than it is to add one if there are too few.

Responsibility of Programmed Controls

The Systems Division or Staff is responsible for the total control system by design and program. However, part of this responsibility is passed on to the Operations Division or Staff and the ultimate users of the system. The development of complete and adequate controls should be verified by consultation with these groups and the audit staff.

The user

The user should participate in the design and the monitoring of the input/output controls. The user is most

likely very knowledgeable about the input data and is probably in the best position to test the output of the system for validity. He is aware of current problems and current weaknesses that the new system should guard against.

The systems division

The systems division has the responsibility for the inter-phase of modules and the inter-run controls, and at the same time they must abide by the documentation or standards developed by the systems design staff.

The operations division

The operations division should be concerned with their ability to properly operate an ongoing system. By utilizing the "run manual" they must find explicit instructions for clearing difficulties the controls have revealed. It is necessary that the controls be clear, simple, and easy to administer.

The systems auditor

The systems auditor should make his requirements known for program specifications for audit trails and he should work closely with the "user" and the systems division in testing and evaluation of the system.

A general statement as to the purpose of the audits performed by the systems auditors is that they ". . . provide management with an independent evaluation of the propriety and accuracy of new and existing ADP systems, and assure that they provide adequate controls (internal and external) and audit trails."²⁴

²⁴ Veterans Administration Department of Data Management, ADP Systems Audit Guide, AG 30-1.

CHAPTER III

POLICY AND PROCEDURE CONTROLS

System Control

System control ". . . is the control an individual member has over the total achievement of the organization." Management may execute control "through the control of other members or through direct task input, such as problem-solving, the search for information, or the manipulation of material or other resources."¹ In order for management to be able to accomplish this goal, there must be related policies and procedures.

The function of systems controls

Systems controls are the procedures and techniques that enable management to supervise systems processing and determines whether the systems results are consistent with

¹Thomas L. Whisler, "The Impact of Information Technology on Organizational Control," The Impact of Computers on Management, ed. by Charles A. Myers (Cambridge: The M.I.T. Press, 1967), p. 20.

the results that have been designed. Through these controls management should be able to spot inconsistencies caused by machine failure, human error or intended fraud.

Source data accountability

Source data are the items of information at the point of origination. For example, in the accounting department receiving reports from the warehouse constitute the source documents that the accountant uses to extract information. This document provides the accountant with the cost of materials and supplies, with the accounts payable information and other related information such as time discounts and transportation charges. The receiving report is the source document and it must be controlled and counted.

At this point, in an automated accounting system, there must be a control of the transcribing of the data from the receiving reports onto the code sheets and into proper format acceptable to the computer program. The proper format may very well be all of the pertinent data from the receiving report transcribed in proper sequence onto a magnetic tape via a punch-tape unit.

Procedures must be established as to the handling of the source documents and the performance of data

processing techniques from the source documents. For example, the accounting clerk must choose the proper code sheet for the transaction of a receiving report. On that code sheet he must code the data necessary for completing the transaction. Groups of like code sheets may be batched and a "hash total" run on an insignificant data field such as purchase order number. The batch is taken to the punch-tape unit where the operator punches from the code sheets onto magnetic tape inserting proper record marks, field dividers and tape marks as prescribed by procedures. At this point a "record count" may be used to count all input transactions. Now all source data has been received from the point of origination and is ready to be entered into the computer. "The efficiency of a mechanized data processing system is especially sensitive to the effectiveness with which input information is prepared for machine processing."²

Computer input control

Once the input has been entered into the computer there should be but one of two things happen to the

²Edley Wainright Martin, Jr., Electronic Data Processing An Introduction (Homewood, Illinois: Richard D. Irwin, Inc., 1965), p. 465.

transaction. It should either be processed properly or rejected completely.

Processed transactions. Each type of transaction to be processed should result in a prescribed amount of generated reports such as a "Processed Transaction Record," "Accounting Journal Entries" and "Cost Accounting Reports." Also, each transaction processed should update the proper files. Inventory files and accounts payable files are two subsidiary files necessary in an accounting system.

Whatever the sequence of processing, whether the files are updated first or the reports are created first, it is necessary to hold all altered files and reports in core until all of the edits have been performed. Then the updated files may replace the old ones and the reports may be written out.

Rejected transactions. If the transaction cannot process properly, then it should reject completely. There are usually some edits performed upon the input transaction data fields. A "completeness test" is made to see if all data fields on the input are filled with pertinent data. That is, does the amount field have numeric data and not alpha characters. At this point of processing, a transaction

may be rejected before the files are altered or before the reports are created. All that is necessary is to create a reject message with enough information to identify the transaction being rejected. Additional information could indicate what caused the reject, such as "Non-Numeric Data In Amount Field."

Should the input transaction pass all the edits prior to processing, it still may be rejected during processing due to certain file conditions. For example, if the transaction indicates the issue of \$1,000.00 of parts from a particular inventory account when there was an opening balance of \$800.00, the transaction must be rejected. A check could be made before updating the file by comparing the input amount against the inventory balance and if the input is greater, reject the transaction.

Processing errors identified

There must be a means of identifying, locating, and correcting processing errors when they happen.

Identifying processing errors. Reconciliations of output data will identify many processing errors. For example, in the automated accounting system the "Expense Accounts" in the "General Ledger" may be checked against

the "Cost Accounting Reports." If they do not agree, the difference is identified as a processing error.

Locating processing errors. After the error has been identified, it is necessary to determine the cause of the processing error. Usually processing errors are caused by program "bugs." Therefore, it becomes the systems programmer's responsibility to look into his program assembly or compiler listing and find the problem.

Correcting processing errors. When the programmer locates the "bug" in his program, he must correct the program, reassemble or recompile the program and retest the new version. The new program test should be audited by systems auditors before the program is placed into production.

Timely and proper re-entry of corrections

After a processing error has been identified, located and corrected for a program "bug" or a system malfunction, it is still necessary to correct the incorrect file or report that was processed incorrectly.

Any attempt to change a production file other than by normal transactions must be very closely controlled and reported. Program "bugs" often cause a file condition that cannot be corrected by a normal transaction. It becomes

necessary to manipulate the files. This may be done by a special created program that by-passes the normal transaction edits. Policy and procedure should require a display of the file before correction, and a display of the file after correction. These actions must be closely supervised and a report of the actions should be sent to the Data Processing Manager.

Other processing errors caused by the use of wrong input tapes or a malfunction of the "hardware" may be corrected by a downdate of the files and reprocessing in proper sequence all data from the downdate to current processing status.

Validated output from the computer

Output from the computer should be validated by a designated staff.

The most basic output control is the comparison of control totals of data processed with totals independently obtained from prior processing or original source data. Systematic sampling or individual items processed affords another output control. The testing can be performed by the originating group, by the control unit, or by the internal audit staff.³

The user aids in the evaluation of output from the computer.

When the output is not like the output he is used to receiving, he will normally call it to the attention of

³Porter, Auditing Electronic Systems, p. 26.

someone responsible for determining the accuracy of the computer processing.

Internal or fiscal auditor. The auditor may use random sampling as a technique of selecting a cross-section of items that he will do manual calculations upon and then compare them to the computer generated results.

The auditor may use programs written to aid him in his audit. "Where extensive and detailed tests are needed in an area involving voluminous calculations, a . . . computer program can be substantially more practical and effective than a manual audit." Other audit type programs may be written for the "exception cases." "Programs can be written to identify all items in a population that fail to meet particular criteria."⁴ This is effective only when the edits were not installed in the operational program to prevent these conditions from happening.

Systems auditor. One of the surest ways of validating output from the computer is to sufficiently test and control the programs before they are put into production.

⁴The Control and Audit of Electronic Data Processing Systems (Lybrand, Ross Bros. & Montgomery, August, 1965), p. 36.

A systems audit staff will examine the test of a program to assure its operational correctness. The test should include conditions to execute all routines in the program both the processing and rejecting routines. The test must include the expected and the unexpected data as input.

After the program has been tested thoroughly and validated by the systems auditor, it may then be moved from its stored position on the test disk pack or tape to the production disk pack or tape. Policies and procedures should be established to ascertain that the program that was tested is moved into production. By moving the program from its test position to production by copying instead of reassembling the source deck, it makes certain that the program as tested is put into production.

Protection of company assets

Due to the centralization of functions with an EDP operation, there are new ways in which the company assets must be protected. For example, in an EDP system where the payroll is processed by a computer program and salary checks produced as a result, the blank checks must be properly controlled and safely stored.

Audit trail

"The first attribute that an auditor faces as he looks at electronic data processing is the changed nature of the audit trail; that is, the trail which is available to show how data from a document arrived in some summary figure in a general ledger account balance."⁵ Many of the actions that take place are not visible to the human eye. "The visibility of audit trails is also reduced by several new data processing techniques which are currently coming into more widespread use."⁶ Terminals or recorder devices are used to input transactions into the computer without a printed copy that could be used as a source document.

One other technique involves the use of "turn around" documents, where previous output data is used as input material. For example, punched cards are often used as public utility bills so that when returned by the customer with payment they can be used as cash receipt input transaction cards. Although such documents might be available for inspection by the auditor, the circular nature of the process complicates the retracing of a transaction, because one document has served two purposes.⁷

⁵Gregory M. Boni, "Audit Around or Through the Computer?" Accounting and the Computer (American Institute of Certified Public Accountants, Inc., New York, N.Y., 1966), p. 95

⁶The Control and Audit of Electronic Data Processing Systems, p. 20.

⁷Ibid., p. 22.

Documentation of program and operations

"Documentation is the process of recording every step in a procedure or a system in such a way that it can be completely replicated in the future if it becomes necessary to do so."⁸ The user should work with the systems analyst as he designs the system. If the user will document what he wants in the new system and the systems analyst will document how it is to be done by the system, then the programmer can program from these instructions and the systems auditor can use the documentation to make certain that the user gets the results that is expected from the EDP system.

Modifications recorded and properly authorized

Any modification to an existing system must follow the same procedures as the original instructions to create the system. Occasionally, it is necessary to make on the spot modifications when the time factor does not allow the original procedures to be followed. For example, a program malfunction may happen during off duty hours when those personnel normally providing instructions are not available.

⁸Richard W. Brightman, Bernard J. Luskin and Theodore Tilton, Data Processing for Decision-Making (Toronto, Ontario: The Macmillan Company, Collier-Macmillan Ltd., 1968), p. 82.

The programmer must find the problem, fix it, and test the new version. At this point another person, such as the systems auditor, should check the modification and require follow-up documentation as soon as possible.

Record retention established and followed

Each EDP application should have record retention procedures.

The most common form of magnetic tape records retention is the so-called grandfather-father-son principle. When a master file is brought up to date by posting transactions to it, the master file that is read into the computer is called the "father" file, and the updated version that is written out is called the "son." The next time this file is updated, the previous "father" becomes the "grandfather," the previous "son" becomes the "father," and a new "son" tape is created. Current practice is to retain all three generations of these tapes, for both the master files and the transactions. If something should occur to damage or destroy the "father" tapes, for instance, they can be recreated from the "grandfather" tapes. When the "grandfather" tapes reach the "great grandfather" status, their data are considered obsolete and they are usually returned to work to become new "son" tapes.⁹

Additional requirements of retention may be necessary on particular data. If so, then these policies and procedures must be communicated to the operations division and tape librarian. It is the tape librarian's ". . . responsibility to see that tapes are not released for reuse until the

⁹The Control and Audit of Electronic Data Processing Systems, p. 17.

information they contain is no longer required, and that worn-out tapes are retired when they begin to cause excessive machine errors."¹⁰ Header labels on the tapes with the retention date included will aid in the prevention of using a tape before the retention date has expired. This is clarified in the next heading, compliance with government regulations.

Compliance with government regulations

Each level of government has regulations that must be followed.

Today, the regulations and demands for data by state, local, and municipal authorities are almost as great as those of the federal government. Some of the demands of government agencies may be summarized as follows:

1. Income taxes on employer, federal, state, and local.
2. Withholding of federal and state income taxes, and federal social security taxes, from personal income of employees.
3. Social security taxes (federal and state) on employer.
4. Sales taxes (state and local) collected from customers and paid by the seller.
5. Manufacturer's excise taxes on sales of luxury goods.¹¹

¹⁰Martin, Electronic Data Processing An Introduction, p. 467.

¹¹C. Orville Elliott and Robert S. Wasley, Business Information Processing Systems (Homewood, Illinois: Richard D. Irwin, Inc., 1965), p. 7.

Management must establish policies and procedures in the EDP system that will meet the requirements of the respective government bodies. The Treasury Department issued Internal Revenue Service requirements for taxpayers using EDP in 1964.

Under the Guidelines, a general ledger and necessary subsidiary ledgers are to be written out, with source references, "to coincide with financial reports for tax reporting periods." Audit trails are to provide for the identification of individual source items included in summary data, and the system must have the capability for any transaction to be traced both back to its origin and forward to a final total, plus the capability of reconstructing transactions not printed out at the time of processing.¹²

Government requirements for record retentions were also established for EDP systems.

The Guidelines require that the record-retention provisions of the 1954 Code and the regulations prescribed thereunder apply not only to source documents and printouts but also to magnetic tapes. Thus, the cycle for the retention of tapes would correspond with the cycle for manual records. Such retention, of course, would be necessary only to the extent that printouts of tape data were unavailable to meet all the other requirements of the Guidelines.¹³

¹² The Control and Audit of Electronic Data Processing Systems, p. 21.

¹³ Ibid.

Proper organization that provides appropriate segregation

Segregated duties are necessary for internal control.

Within the computer facility there should be at least four separate and distinct groups of individuals--the planners (systems specialists and programmers), the machine operators, a group responsible for output controls, and a record librarian. In this way no one group has direct and complete access to the record-keeping system. For example, the planners, who are intimately familiar with the stored program and the entire EDP system, should have no contact with the day-to-day operations. On the other hand, the machine operator's knowledge of detailed programs and the historical records should be sufficient enough to enable him to perform his job as an operator effectively; too much knowledge can lead to intentional or unintentional manipulation of data, but too little knowledge might reduce the efficiency of the entire data processing unit. Responsibility for output controls might be identified with the internal audit function or could be assigned to a separate group of individuals organizationally responsible to the data processing unit. The presence of a record librarian assures that programs, as well as historical records, will be adequately controlled. By assigning one individual--one who has no relationship whatsoever with any of the other data processing activities--the responsibility for the custody of all file information, only authorized changes can be introduced into computer programs or historical records.¹⁴

Very basically, organizational controls should provide

"a segregation of authorization, record-keeping, and

¹⁴ Robert E. Schlosser and Donald C. Bruegman, "Internal Control with EDP," Accounting and the Computer (American Institute of Certified Public Accountants, New York, N.Y., 1966), pp. 155-56.

custody of the assets."¹⁵

Adequate supervision for EDP personnel

Supervision for EDP personnel will introduce a new era for most companies. "Because of the newness of the information technology, the data-processing department finds itself deeply involved in planning, conducting, and attending educational programs."¹⁶

Although most of the training required is in the area of specific skills which are to be applied in the area of EDP, it must not be forgotten that EDP presents a new challenge for management also. Management personnel at virtually every level--even though they will have no direct connections with the program--must be orientated as to the potential and limits of an EDP system through educational programs. Again, full cooperation is necessary and a broad background is desirable so that the supervision and coordination of the data processing operation will be successful.¹⁷

Management of a data-processing department is becoming increasingly difficult as the role of EDP grows.

The managers of each of the subfunctions such as operations, programming, systems, research, and

¹⁵ Porter, Auditing Electronic Systems, p. 49.

¹⁶ Roger L. Sisson and Richard G. Cannin, A Manager's Guide to Computer Processing (New York: John Wiley & Sons, Inc., 1967), p. 74.

¹⁷ Elliott and Wasley, Business Information Processing Systems, p. 471.

development must function as specialists in their respective fields. The overall management of the function must not only be capable of planning, organizing, directing, and measuring the efforts of these specialists, but must also be able to interpret its own needs and act with a general management orientation. In other words, the overall systems function management must act as a generalist--not a specialist. In addition to the above, the overall data-processing manager must find time to develop and train his immediate subordinate managers in the differences between specialization and generalization so that one or more of them will be ready for promotion as he moves up the organizational ladder.¹⁸

Personnel adequately and effectively trained

It is obvious that the specialists must be trained for an EDP system, but it is also necessary to orientate employees throughout the company as to the particulars of an EDP system.

Employees retrained. "Personnel who have proven themselves satisfactory employees in the past should not be discharged but, if at all possible, should be retrained for new responsibilities within the firm."¹⁹ Not only does this enhance personnel morale, but these employees already

¹⁸ Norman H. Carter, Introduction to Business Data Processing (Belmont, California: Dickenson Publishing Company, Inc., 1968), p. 155.

¹⁹ Elliott and Wasley, Business Information Processing Systems, p. 470.

know how your company operates. So they need only to be taught the EDP method of accomplishing similar results. In addition to that, they can be a tremendous help to systems analysts and programmers that are brought into the company.

Employees acquired. "It is now possible to hire programmers who have been trained by special schools or have had experience in other companies."²⁰

The systems analysts should have a broad general training so that they will understand the principles involved in programming the specific computer in operation. They should have a thorough familiarity with the way the business operates and must be aware of the existing internal control system. They must have formal training in EDP, but only the background of at least two year's experience can develop a top-notch analyst.²¹

The minimum requirement for a programmer "is high school graduation with six months to two years of technical training in computer operations and in general principles of programming and coding, or equivalent job experience in these areas."²²

²⁰Sisson and Canning, A Manager's Guide to Computer Processing, p. 77.

²¹Elliott and Wasley, Business Information Processing Systems, p. 471.

²²Cater, Introduction to Business Data Processing, p. 183.

Computer operators may be trained by on-the-job training or by the computer manufacturer. The length of training will depend upon the complexity of the computer system and equipment.

If the company decides to have their own maintenance personnel they "are usually trained in their highly specialized skills in formal schools conducted by the manufacturer of the computer to be used."²³

Sufficient EDP staffing

Most companies begin with converting a portion of their operations to the computer and adding to the system as their experience and knowledge permits. Therefore, sufficient EDP staffing will be a management decision based on long range planning. "In the development of a large computer system, it is essential that an adequate number of suitably skilled men are available where and when they are needed."²⁴

A trade-off of computer utilization to personnel cost should be considered. The advantages of getting additional

²³ Elliott and Wasley, Business Information Processing Systems, p. 471.

²⁴ James Thomas Martin, Programming Real-Time Computer Systems (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1965), p. 345.

programs into production at a faster pace may more than offset the increase in EDP staffing necessary to do so.

Equipment efficiently operated in an approved manner

Management needs to know if the equipment is being operated efficiently and properly. Since it is impossible to look with the human eye and tell, procedures must be developed to give management this information.

Hardware control. A time clock installed on the central processor provides a method of keeping track of the time utilized by a program or a system. This time clock is controlled by the operator. When a job is ready for processing, the operator will record the clock time. Again, when the job has finished processing, the operator will record the clock time. The elapsed time is charged to the project whose program was being executed.

Most peripheral equipment such as printers, tape drives, and disk drives have a digital timer to record the total hours of operation. This timer is used for determining the charges for rented equipment and determining the time for preventive maintenance.

Programmed control. On large-scale computers with multiprocessing, it is not sufficient to use the time clock

to determine computer utility. During multiprocessing, it is necessary to have a stored program keep tabs on the central processor. For example, a large computer with 500 thousand bytes of core storage may be allocated into partitions of core storage. The control portion which includes the job accounting program will use, lets say, the first 20 thousand bytes. That leaves 480 thousand that may be divided into partitions. Four partitions of 120 thousand bytes of core storage are now available. It takes a control program to keep track of the jobs utilizing these partitions.

Proper scheduling of jobs by priorities

Some jobs can be run any time during the week or month, whereas, other jobs must be run with strict schedules. Policies must guide the operators as to which job to run when two or more jobs are ready at the same time. For example, the payroll processing has priority over a cost accounting report run. Production runs have priority over test runs. Therefore, priorities must be established and followed by the operators.

Preventive maintenance performed

"Most computer manufacturers provide the maintenance required to keep the equipment in top operating condition

under rental agreements."²⁵ Purchased equipment will have the additional cost of a maintenance contract. The very large companies may have their own maintenance personnel.

Management must establish the method and procedures for preventive maintenance. Since it is obvious that during preventive maintenance on the central processor all production is halted, then it should be scheduled at a time that causes the least amount of disturbance to production.

Providing machine backup

Management must consider the need of providing for an alternate machine in case of a machine breakdown. A compatible machine environment must be located and an agreement made so that should the need arise the procedures would direct the actions for continued production.

Recovery of data and programs

An important area of protecting the company's assets is the prompt and efficient recovery of data and programs when they are lost due to machine malfunction or a disaster.

Policies and procedures must be established to provide a plan whereby the programs and pertinent data are

²⁵ Elliott and Wasley, Business Information Processing Systems, p. 464.

copied and stored away from the computer site. This must be done on a timely basis in relation to program modification and data changes.

User EDP Knowledge

In the "Proposed Research" for this thesis a statement was made that "A management problem of today exists in the Veterans Administration due to the fact that management in general has not kept up with the advancements in data processing." In regard to this statement an inquiry was made.

Data source

The inquiry was by telephone to the "users" at the division chief level of several Veterans Administration Hospitals and the Controller's Office in Washington, D.C.

The supply division has been partially involved as a user by ordering from the Veterans Administration Supply Depot which uses a computerized logistic system. The supply divisions are now becoming more involved by connecting the hospital supply inventories to an EDP system.

The finance division likewise has been partially involved as an user in the area of payroll which is a

centralized EDP system for all Veterans Administration payroll processing. Now each station must convert its accounting to the centralized accounting EDP system. Baltimore Veterans Administration Hospital was the first station to begin using the new EDP system. Baltimore Hospital began "live" operations with EDP during October, 1971.

Since these two divisions have been users and are becoming much more involved, it was decided that the Chief of the Supply Division and the Chief of the Finance Division would be appropriate sources.

The additional source of the Controller's Office in Washington, D.C. was used due to their responsibilities of aiding in the establishment of the "Centralized Accounting for Local Management" EDP system policies and procedures.

The inquiry

In general, the inquiry was to determine the extent of EDP knowledge attained by the user. The division chiefs were asked to comment on what training they had received in regard to the EDP programs that they were using, or would be using in the near future.

Additional questions related to what training did the employees receive for these systems and what are the plans for employee training for the future systems in EDP.

Inquiry findings

The findings revealed by the inquiry showed absolutely no formal training in EDP for the "users" which includes the chief of the division and his employees at the Veterans Administration hospitals. In the Controller's Office in Washington, D.C. there were six employees equal to the position of the chief of finance at a hospital. These employees were responsible for establishing policies and procedures for the Veterans Administration's new EDP accounting system. Only one of the six had received formal EDP training and that was while he was assigned to the Department of Data Management prior to his transfer to the Controller's Office.

Training for current systems. EDP systems seminars were held for key employees to provide orientation. For example, those receiving orientation to the current EDP payroll system at a hospital were usually the assistant finance officer, chief of the payroll section and chief of the accounting section. The length of the seminars were about two days for the assistant finance office and chief of accounting section, and one week for the chief of payroll section.

A training package was developed by Controller's Office personnel to teach the hospital personnel how to create the input and interpret the output. The key hospital employees were responsible for leading the other hospital employees in operating with the EDP system by means of the training package.

Training for new systems. The plans for the future are for this same type of training. EDP systems seminars will be held for key employees within the using division. For example, those employees receiving training for the new "Centralized Accounting for Local Management" EDP system will be the finance officer, the chief of accounting section and other accounting technicians that can be spared for a one-week training session.

Again, the training package is being prepared by the Controller's Office personnel. This training package is currently being assembled by the six employees mentioned earlier of which one has received formal EDP training.

This training package is also being designed to teach hospital finance office employees how to prepare input for the EDP system and what to expect as output from the system.

Additional findings. The division chiefs were asked if they would be interested in reading a thesis written on the subject of managerial controls in an EDP system. The response to this question was, "Yes, if it is not written too technical."

They were asked to comment on their feelings toward new systems in EDP of which they are considered to be the "user." In general, they used the terms of "Greek," confusion, apprehension and fear to describe their feelings.

CHAPTER IV

FINDINGS AND CONCLUSIONS

Internal Control

Internal control has been defined as "The plan of organization and all of the coordinate methods and measures adopted within a business to safeguard its assets, check the accuracy and reliability of its accounting data, promote operational efficiency, and encourage adherence to prescribed managerial policies."¹ This definition is broad in nature and it focuses attention on the overall objectives of management's control. To achieve these objectives, a satisfactory system of internal control must be developed. Within management's system of internal control, there must be some basic elements:

1. A plan of organization which provides appropriate segregation of functional responsibilities;

¹Auditing Standards and Procedures, Committee on Auditing Procedures of the American Institute of Certified Public Accountants (New York, 1963), p. 27.

2. A system of authorization and record procedures adequate to provide reasonable accounting control over assets, liabilities, revenues and expenses;
3. Sound practices to be followed in performance of duties and functions of each of the organizational departments;
4. A degree of quality of personnel commensurate with responsibilities.²

Therefore, management should assure themselves that these basic elements remain in their electronic data processing system.

Objectives of controls

The objectives of management's control appear to be unaffected by EDP. However, EDP does affect the elements used to achieve these control objectives. New controls are necessary while the need for certain traditional control measures has possibly diminished. Management should know what affect EDP has had on methods of control in order to properly evaluate their system.

Significant changes. There are several significant changes from the traditional records normally available to management. In magnetic-tape and random access systems, the records in the files cannot be read in their natural state

²Ibid., pp. 28-29.

which is magnetized spots on magnetic coated plastic. Therefore, access to the records in file requires a computer program. The journal is not a part of the main actions of processing nor is it a natural by-product of processing. It takes a specific effort at a recognizable cost to create transaction listings. The journal also diminishes in importance as a document if the significant items for reporting are produced on an exception basis, as they may be in an EDP system. It is relatively inefficient in EDP systems to carry much previous activity in current files. In random-access files, previous status is usually displaced by new data. And in sequential files, intermediate processing results are usually not retained.

Organizational changes. One of the greatest effects of EDP systems has been upon existing organizational structures, particularly upon functions concerned with data processing. EDP systems enable the concentration of many processing steps into one department, thereby eliminating the traditional internal control made available by the separation of duties in the recording process.

Company organizational structures will vary from company to company; however, there should always be clear and apparent lines of responsibility and authority.

The division of functional responsibilities should provide for a separation between (1) the functions of initiation and authorization of a transaction, (2) the recording of the transaction, and (3) the custody of the resultant asset. Such a division of responsibilities, in addition to safeguarding the assets, provides for the efficiencies derived from specialization, makes possible a cross-check that promotes accuracy without duplication or wasted effort, and enhances the effectiveness of a management control system.³

Internal control changes. Management must be able to adjust to the new environment of controls.

Due to the capabilities of machines, many new elements of internal control have emerged which would have been impractical in manual systems. On the other hand, many of the elements of internal control which were applicable to manual systems have become obsolete due to mechanization. System designers and auditors have devised and will continue to devise methods of internal control which are tailored specifically to the capabilities of ADP equipment and the data processing systems for which this equipment is used.⁴

This does not mean that all of the traditional methods will be discarded. It does mean that management should become accustomed to the new elements of internal

³ Porter, Auditing Electronic Systems, p. 12.

⁴ Guide for Auditing Automatic Data Processing Systems, Department of the Air Force Comptroller Auditor General (Washington, D.C.: Government Printing Office, 1966), p. 6-2.

controls and be able to make decisions as to what controls are necessary without duplicating some controls or omitting required controls.

Centralized functions

Under the traditional methods, most of the individual operating departments such as accounting or inventory control did their own clerical paper work. Under the EDP center method, where previously the functions were separate, now they are centralized, thereby eliminating duplication of effort and tightening the coordination.

Centralization justified. Centralized EDP systems are justified when the time and the cost associated with processing data are reduced and, taking into consideration that management has more timely information on which to control effectively the company operations.

Centralized control. Changes in the organizational structure changes the control procedures.

The centralization of data processing into one department emphasizes the importance of proper control of the data processing center itself . . . one of the basic principles of internal control is the separation between those people who authorize a transaction, the people who have custody of the

asset acquired, and those people who record the accountability for the assets.⁵

For example, in an automated logistic system where the program is designed to reorder an item when the inventory balance reaches the reorder point by creating a purchase order. This may appear to be an elimination of proper authorization. However, the authorization has been assumed by the systems analyst that designed the system.

To maintain the continued integrity of the system where the authorization and recording functions are embodied in the program itself, it is necessary to separate the systems planning and programming function, the machine-operating function, and the program maintenance and tape-library function.⁶

In EDP systems where the source document is eliminated or is in a form that does not permit human review, there are two procedures to ensure proper recording of the input. Control can be established at the point of origin so that access to and use of the recording and transmitting equipment is properly controlled to prevent unauthorized or improper use. Or program the computer so that it would exercise the same review of the transaction that would be made by people.

⁵Porter, Auditing Electronic Systems, p. 13.

⁶Ibid.

V. A. systems audit

The EDP effect upon the responsibilities of the Veterans Administration and its mission has led to the need and the establishment within the Department of Data Management, a division that has been titled the "ADP Systems Audit Division," and "ADP Systems Auditors."

The systems audit activity. A general statement as to the purpose of the audits performed by the ADP Systems Auditors is that they "provide management with an independent evaluation of the propriety and accuracy of new and existing ADP systems, and assure that they provide adequate controls (internal and external) and audit trails."⁷

Auditing through the computer. Instead of using original documents and manual records, the ADP Systems Auditor will use test material that will actually be a partial core dump of what was in the computer at the address desired upon completing a particular instruction of the computer program. ADP Systems Auditors must provide management the assurance that the methods and procedures used in EDP will meet the objectives of management.

⁷ADP Systems Audit Guide, Veterans Administration Department of Data Management (Washington, D.C.: Government Printing Office, 1968), p. 2.

User needs of EDP knowledge

"Past experience has shown that it is normally easier to train a person thoroughly versed in the firm's operations to do computer work than it is to train a computer specialist to have the required in-depth insight of the firm's policies and operations."⁸ It seems apparent then that if the user received some fundamental training in EDP it would be highly advantageous to him and his organization. And by doing so it would be a giant step toward solving the problem of understanding and communicating between the user of the EDP system and the developer and operator of the EDP system.

A user with basic EDP knowledge has enhanced his capabilities of relating to the EDP systems analysts the type of controls desired in the system. In addition to the type of controls, he is more capable of determining the quantity of controls needed to sustain the system. Quite naturally then, the user will have more confidence in the EDP system.

⁸ Clarence Orville Elliott and Robert S. Wasley, Business Information Processing Systems (Homewood, Illinois: Richard D. Irwin, Inc., 1965), p. 470.

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