AUDITING ELECTRONIC DATA PROCESSING (EDP) SYSTEMS

by

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I. INTRODUCTION

Throughout history, the total structure of society and the practice of accounting have run in the same direction. Many factors : economical, sociological, legal, and technological have influenced the development of public accounting practices.

Technology is one of the most important factors that influence the public accounting practices in this country. Although technology already exists for revolutionizing the information collection, which is the heart of the accounting function, the very speed of technological change is increasing at a geometric rate of growth. As a result, most data processing systems of today cover all activities of the business and they are integrated into one computerized system. Manual accounting systems have become as obsolete in these days as single-entry bookkeeping, and even the smallest business organization uses some kind of automated procedures in its accounting work.

Therefore, one of the great challenges facing the auditor today is the everincreasing utilization of electronic data processing equipment. Farmer stresses that :

> The challenge of the computer has meant more than a change in the way business information is pro-

cessed and preserved. It has meant change in the way we, as accountants, undertake to control, review, and audit that information. The methodology we choose will have an important bearing on our future ability to fulfill our responsibilities to our clients and to the interesting public. 1

Also, Lamb and Nolan have recognized the impact that the use of computers will have upon auditing concepts and procedures, as follows :

> In the decade since the computer began to be widely used for business data processing, we have steadily progressed from the use of auditing procedures which, in effect, ignored computer systems entirely to the full application of computer - oriented procedures. The present computer environment requires us to develop and use new techniques to permit : (1) compliance with generally accepted auditing standards and (2) the performance of more efficient examinations. 2

In summary, the challenge of new computer systems to auditors can be defined in a way that the auditor should not "audit around" computers but should use the computer to improve and expand his auditing skills. In order to accomplish this objective, auditors should have an understanding of electronic data processing activities and concepts. Also, familiarity with the types of controls in electronic systems is important for the auditor's evaluation of internal control and for the use of computers in auditing. Therefore, the purpose of this paper will be to discuss the nature of the EDP systems in order to evaluate their impact on auditing standards and procedures. Furthermore, using the computer as an audit tool and some of the challenges in this area will be examined.

1 Jerome Farmer, "Auditing and the Computer: A Suggested Program," **The Journal of Accountancy** (July 1970), P. 53.

2 Edwin H. Lamb and John Nolan, "Computer Auditing in the Seventies," **Arthur Young Journal** (Special issue, 1970), P. 5.

II. THE NATURE OF AUDITING FUNCTION

AND THE EDP ATTRIBUTES

The purpose of this section is to provide insight into the function of auditing and the EDP attributes. This insight is considered to be necessary background in order to see the impact of the computer on auditing which will be discussed in the next sections of this paper.

1. The Nature of Auditing Function

The services performed by CPAs in these days include those which are substantially of an auditing nature, those which involve principally accounting work, those pertaining to income taxes, and others. However, the financial examination type of audit is the most widely recognized service performed by CPAs.

The objective of this ordinary examination of financial statements by the independent auditor is the expression of an opinion on the fairness with which they present financial position and results of operations. 3 The auditor conducts his examination in accordance with generally accepted auditing standards. General standards, standards of field work, and standards of reporting should be considered carefully in conducting an independent audit. These standards require that a report be submitted, either expressing or disclaiming an opinion on whether or not the financial statements are presented in conformity with generally accepted accounting principles applied on a consistent basis from period to period.

In general, a financial examination involves the following tasks ·

3 Committee on Auditing Procedures, Auditing Standards and Procedures : Statement on Auditing Procedures No. 33 (New York : AICPA, 1963), P. 9.

1. A general review of the accounts and records, and a comparison of the figures shown on the statements with the sources from which they are drawn.

2. A review of the system of internal control, and of the accounting principles regularly followed by the client as well as a consideration of any departure from these principles.

3. Independent sampling, through inspections, correspondence, or other means of the existence and values of assets.

4. Application of various audit tests to determine as far as reasonably possible that all liabilities are reflected in the balance sheet in actual or approximate amounts, and are appropriately stated.

5. Analysis, tests, and overall review of the income and expense accounts.

6. Test procedures designed to determine the authenticity and general reliability of the financial statements prepared from the accounts, including adequacy of headings, notes, and other important matters. 4

Both, the above auditing tasks and auditing standards are influenced by the introduction of electronic data processing systems in business. Therefore, auditors should have a basic understanding about EDP attributes which have a major impact upon their work.

2. EDP Attributes

An EDP system usually consists of a computer and related personnel and equipment for getting information into and out of the computer. An EDP system is not just a computer as is many times thought. Porter states that an EDP system consists of the following elements :

4 Mary E. Murphy, **Advanced Public Accounting Practice** (Homewood, Illinois : Richard D. Irwin, Inc., 1966), P.36.

1. An electronic data processor (the central processing units) .

2. Associated peripheral equipment, such as data preparation, input, and output devices. This central element performs arithmetic, logic, storage of data during processing, and control.

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.

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. 5

A. The changed Nature of Audit Trail.

The first attribute that an auditor faces is the changed nature of the audit trail which is summarized from general ledger accounts. The auditor will find that many accounting steps have been processed and stored on magnetic tapes or discs through the computer system. 6 Therefore, auditors should seek their computer print-outs of information in order to prepare their own listings. Converting such information to readable form requires a separate and costly action and should be conducted carefully.

B. The Power and Accuracy of the Computer.

The next atrribute which should impress and concern auditors is the power and accuracy of the computer as one of the main components of any EDP system. The computer has phenomenal ability to answer many inquiries concerning the status of any information which is in its memory in a relatively short time. Furthermore, the computer has been proven without any

5 W. Thomas Porter, **Auditing Electronic Systems** (Belmont : Wadsworth Publishing Co., 1966), P. 1.

6 Cordon B. Davis, **Auditing and EDP** (New York : AICPA, 1968), PP. 117-130.

doubt to be far more accurate than either people or any other machines in performing mechanical operations with data. As will be discussed later, this accuracy results from both build-in checks and checks that are programmed when using the computer. Another significant matter which contributes to this accuracy is the concentration attribute in an EDP system. Porter states this fact as follows :

> Electronic data processing enables a concentration of many processing steps into one department, thus eliminating the traditional internal control made available by the separation of duties in the recording process. 7

3. The New System Environment

Auditors have become increasingly involved in electronic data processing since the first generation computer was introduced in the mid-1940's. Now they must learn to handle the complex auditing problems of the third-generation as well as the rapidly approaching fourth-generation systems.

Lobel Jerome has recognized that the new systems environment has grown out of four generations of computer technology. The first generation of computers was introduced in 1946. They used vacuum tubes and were capable of handling a "stored program." The emphasis in these early computers was on computing ability rather than on input-output capabilities. 8

In 1958, with the advent of transistors, the second generation of computers surfaced. They were faster and included a greater range of input-output devices.

The third, or present, generation of computer systems is characterized by integrated circuitry which makes use of very small silicon chips. These chips serve basically the same function as vacuum·tubes and transistors in previous generations. Integrated circuitry has increased substantially the internal

7 W. Thomas, **op. cit.**, P. 5.

8 Jerome Lobel, "Auditing in the New Systems Environment," **The Journal of Accountancy** (Sept. 1971), P. 63.

processing speeds of today's computer. 9 Other characteristics of this generation include : multi-programming, real-time, continuous processing, and interrupt capabilities.

According to Lobel, we are now on the verge of the fourth generation of computer systems of what might be called the new system environment. 10 These advanced systems will probably include such things as graceful degradation (no loss of data as a result of computer power failure), advanced memory systems, and common or shared data banks and networks.

This means that more information than ever before is going to be stored in computers. Information will be more quickly and concurrently accessible to users everywhere. Also, information will be shared to a greater degree than ever thought possible before. Accordingly, auditors must now line up their sights on the training that will be needed and the techniques that have to be developed if auditing dilemma are not to be encountered. Auditors of today should have a substantial knowledge and basic understanding of EDP concepts. This knowledge is very important for solving many of the auditing problems in an EDP environment. The following questions should be considered in order for auditors to gain the required knowledge :

    a. What controls are involved in an EDP system ?

    b. What impact does an EDP system have on auditing standards ?

    c. What are the possible approaches for using the computer in auditing ?

    d. What are the important decisions related to the application of computers in the area of auditing

Therefore, the following sections of this paper will be devoted to answer the above questions.

III. CONTROLS IN AN EDP SYSTEM

One of the areas in which the auditor's professional judgement is important is in the review and evaluation of internal

9 Ibid., P. 64
10 Ibid.

control. Any auditor begins his work by evaluating the system of internal control regardless of the kind of accounting system used by his client. In manual and mechanized systems, internal control is achieved substantially by a division of duties among employees so that no one person has complete responsibility over a transaction and the work of one person is verified by the work of another.

In an EDP environment, the work formerly divided among many people is performed by the computer. Therefore, the auditor's study of internal control becomes a study of the controls built into the computer, the controls contained in computer programs, and the controls related to the computer center. The idea here is that the main considerations are whether the system procedures are adequate to accomplish the objectives of the system and whether those controls are sufficient to provide reliable data and prevent system manipulation. 11

In order to judge whether the controls in an EDP environment are sufficient or not, the auditor should have a basic understanding about the nature of these controls. Therefore, this section will provide a basic and summarized discussion for each of the important controls in an EDP system.

1. Organizational Controls

The centralization of data processing activities and concentration of data processing functions in most EDP systems emphasize the importance of proper control of the data processing center. John M. Horne points out two areas of control as follows

> Organizational controls fall into two areas : the placement of the EDP function within the organization and the division of duties within the EDP group. 12

11 W. F. Lewis, "Auditing On-line Computer Systems," **The Journal of Accountancy** (October 1971), P. 50.

12 John M. Horne, "EDP Controls to Check Fraud," **Management Accounting** (October 1974), P. 44.

As far as the organizational structure is concerned, the EDP department should be functionally independent in its relationship to other operating departments. Therefore, the EDP department would retain its service nature to all other functions within the organization and prevent domination of the equipment by any one user. 13

Also effective organizational control requires an organizational separation between the system's programming function, the computer operating function, and the EDP library function. This separation insures that no single individual is responsible for the complete processing of any transaction through the computer system.

2. Input Controls

A computer is accurate in its operation, but results obtained can only be as accurate as the data fed into the system. If an error is introduced anywhere between the origin of the transaction and its input into the computer, the error may easily pass through the entire system undetected. Therefore, the control techniques used to reduce their possibility become extremely important.

There are three distinct problem areas associated with error elimination in the input function. It is necessary to insure that original data is properly translated into machine language, that all transactions which took place are included, and that data are processed only once.

Many input controls might be used to insure the above requirements. A pre-audit of the source documents, key verification of punched cards, batch and control tatals, and machine listings are some of the input controls in an EDP system. 14

3. Hardware Controls

These are the controls built into the computer system by manufacturers. The primary purpose of hardware controls is to

13 Ibid., P. 44.

14 W. Thomas Porter, op. cit., P. 17.

assure that data are neither lost nor changed in the course of internal transfers from one computer element or program to another. 15 Examples of those controls are parity check, dual gap heads, diagnostic routines, and dual circuitry.

4. Software Controls

Software controls are controls related to the area of programming. Computer programming means more than writing the computer program. It is the preparation of flow charts, program listings, and computer operating instructions. 16 These elements should be kept in appropriate files and effectively documented. Examples of these documents are program run books, a console run book, and programming manual.

The auditor must have a basic knowledge concerning software controls. His understanding about the nature of program documentation will help him in the evaluation of the effectiveness of internal control.

5. Programmed Controls

Programmed controls are those which are coded into the machine operating programs. Such controls may constitute entirely separate programs or they may be integral parts of specific programs.

These controls usually are used for proofreading, comparing, counting, or any other purpose. Examples of the programmed controls are record counts, hash totals, limit ckecks, sequence checks, and control totals. In an EDP environment, auditors must understand and evaluate these controls in order to determine their bearing on audit procedures.

6. Output Controls

Output controls are used as the final check on the accuracy of the generated information. The objective of these controls is

15 Jennie M. Palen, **Encyclopedia of Auditing Techniques**, Vol. 1 (New Jersey : Prentice Hall, Inc., 1966), P. 84.

16 W. Thomas Porter, **op. cit.**, P. 27.

to determine that the processed data does not include any unauthorized alteration by the machine operators, and that data are correct and reasanable. Examples of output controls are control totals, prenumbering, and sampling.

In summary, the auditor must have a basic understanding concerning the nature of input, processing, and output controls. He should also be familiar with the controls which exist within the computer system and in the EDP department. These controls have greater implications for the auditor. A knowledge of these controls and their interrelationships is necessary to evaluate their impact on auditing procedures in an EDPenvironment.

IV. THE IMPACT OF EDP ON AUDITING STANDARDS

Many articles and books in auditing literature suggest that a suitable framework for analysis in the area of EDP auditing would include the concepts, standards, procedures, and techniques that are accepted or used by the auditor. But it is obvious that auditing concepts and objectives could not be eliminated in studying the subject of EDP auditing. Woods stresses that as follows :

> I think it is obvious that the objectives of auditing thus defined will not change with the advent of computers or any other form of mechanization. Regardless of what means are used to process business transactions, the auditor's responsibility with respect to the basic objectives will remain the same. He must satisfy himself that the transactions are legitimate, that they have been coded and recorded correctly and that the accounts have been summarized into financial statements in accordance with sound and generally accepted principles of accounting. 17

The auditing standards are general guides to procedures, and the procedures of auditing are affected by the introduction

17 Richard S. Woods, "The Development of Auditing Standards and Techniques for EDP Systems," N.A.A. Bulletin (Sept. 1961), P. 28.

of electronic data processing. Therefore, a brief re-examination of auditing standards in an EDP environment will help place the problems of auditing a computerized system in prospective.

1. General Standards

The first general standard implies that the examination is to be performed by a person or persons having adequate technical training and proficiency as an auditor.

> In the EDP environment, the first general standard clearly requires that the auditor be trained in examining computer-based accounting systems. The use of such systems-not only through in-house computer facilities but also through EDP service bureaus-has become so prevalent that no auditor today can ignore the need for special training in the EDP area. 18

The auditor must understand what computers can do and how data are processed in EDP systems. He must be knowledgeable about the nature of all equipment involved as well as its operation. Some electronic computers are so complex that they need specialized training to operate them. However, the auditor does not need to be a machine operator and therefore a knowledge to operate those machines is not required.

The auditor must know how to test computerized systems and how to use the computer in order to achieve compliance with generally accepted auditing standards. Also, he should have a degree of knowledge concerning the computer languages and types of documentation employed. Preparation of system flow charts, standard data sheets, and coded machine instructions should be understandable.

In summary, a basic knowledge of EDP is an essential element in achieving compliance with the first general auditing standard. Therefore, if the auditor does not have at least a basic understanding of EDP concepts, it is likely that he will be un-

18 Edwin M. Lamb and John R. Nolan, "Computer Auditing in the Seventies," **Arthur Young Journal** (Special issue, 1970), P. 5.

able to identify potential weaknesses in a computer based accounting system. 19

The second general standard implies that in all matters related to the assignment, an independence in mental attitude is to be maintained by the auditor or auditors. This standard presupposes the auditor is capable of making his own judgement. He cannot rely on the judgement of other specialists nor can he rely upon the explanations received from a client's own EDP staff. An examination requires competence in computer auditing techniques. Therefore, the auditor should be competent in the EDP area in order to maintain his independence.

The third general standard implies that due professional care is to be exercised in the performance of the examination and the preparation of the auditing report. In order to exercise this professional care, a critical review at every level of audit supervision of the work done and the judgements made by those working on the examination is required. Therefore, the third general standard requires the auditor to have the necessary knowledge and skills to use procedures specifically designed for the examination of computer-based accounting systems. 20

2. Field Work Standards

The first field work standard requires adequate planning of an audit engagement and careful consideration of timing problems. Sometimes this will lead the auditor to test the system throughout the year to satisfy himself that the EDP system is functioning correctly. It is also desirable for an evaluation and review of controls outside the computer area to be performed first to permit an assessment of the impact of the computer system on the remainder of the examination.

Adequate supervision also requires that each supervisor be skilled in reviewing the procedures employed by his assistance in examining the computerized systems. Without such super-

19 Thomas F. Samson, "Computer Auditing," **Arthur Young Journal** (Special edition, 1973), P. 27.

20 Edwin M. Lamb and John R. Nolan, op. cit., P. 6.

vision by an individual who has a sound understanding of basic EDP concepts, errors in judgement caused by inexperienced staff personnel might not be identified and corrected. 21

Study and evaluation of the existing internal controls, the second field work standard, presents the most important illustration of the need for the auditor to develop new skills in order to perform examination in the computer environment.

> The best starting point in the evaluation of internal control is to review documentation, then observe data processing activities and question the people who perform the activities. Such a review is necessary to determine the existence of an accounting system, and to evaluate controls for promoting adherence to company policies and for achieving operational efficiencies. 22

Attention must be paid to the controls which exist or which do not exist within the computer system and in the EDP operating department. The auditor should have a basic understanding of many controls in an EDP environment. These controls are organizational controls, input controls, hardware controls, software controls, programmed controls, and output controls. A basic discussion concerning the nature of these controls was conducted in the previous section of this paper.

Sufficient competent evidential matter, the third field work standard, is to be obtained through inspections, observations, inquiries, and confirmations to support the basis for the auditor's opinion. During the examination of noncomputerized systems the auditor generates and obtains considerable evidential matter from paper records. However, paper evidence has been affected by EDP systems. Developments in data collection equipment, communication facilities, and random-access devices have enabled many companies to eliminate source documents ordinarily used in manual or mechanized systems. An additional im-

21 Thomas F. Samson, op. cit., P. 28.

22 W. Thomas Porter, op. cit., PP. 48-49.

portant change is the elimination of certain historical records in EDP systems. Felix Kaufman stresses this fact as follows :

> The journal is not a part of the mainstream of processing nor is it a natural by-product of processing. It takes some specific action at a recognized cost to create transaction listings. In addition, as exception methods of reporting are employed, the journal diminishes in importance as a document for reporting purposes. Historical information in machine languages "ledgers" is really excess baggage which imposes an otherwise unnecessary cost increment on the system in two ways. The overall storage requirement of the system may be greater, both as to the files themselves and also in the effect on the size of high-speed storage, and the system must to some extent handle the historical information which does not require processing, along with the data that are wanted at any particular moment. 23

When the client's accounting system is computerized, the auditor will find that his working papers will contain many new items, such as flow charts, logic diagrams, and other EDP related materials and documentations. These items will form ., part of the auditor's evidential matter in a computer systems environment. An additional evidential matter is obtained from internal control questionnaires and different tests designed to cover the peculiarities of these systems. Therefore, the auditor must develop his knowledge of EDP to the point where he can study and understand the client's accounting system, and design audit procedures for obtaining competent evidential matter in an EDP environment.

3. Reporting Standards

Reporting standards govern the preparation of the auditor's report and are mainly related to the application of accounting principles on a consistent basis. It seems that EDP did not af-

23 Felix Kaufman, **Electronic Data Processing and Auditing** (New York : The Ronald Press Co., 1961), PP. 150-151.

fect this area of auditing substantially since the auditor cannot use EDP equipment to determine the accounting principles followed by his client. Furthermore, it does not appear that EDP can be generally utilized in determining the consistent application of these accounting principles. Therefore, the auditor must use his judgement concerning consistent applicability and effectiveness of accounting principles used by his client. 24

V. USING THE COMPUTER IN AUDITING

Computers have been used widely by auditors during the past two decades. Nevertheless, the impact that computers have had on the audit process depends to a great extent on the level of complexity of the computer data processing systems used by their clients.

Gordon B. Davis emphasizes this fact as follows :

> The auditor should be capable of using the computer for audit tests when its use is advisable, just as he should be capable of testing without the computer when its use is not advisable. Generally, it is not necessary or economical to use the computer to test simple data processing systems or to test files with a small number of records. Audit tests of advanced systems or of files with large numbers of machine-readable records are more likely to require the use of the computer. 25

When using computers in auditing, some questions have to be answered by the auditor. These questions are : What are the possible areas of application ? Which computer programs can be used ? What are the computers to be used ? And what are the EDP auditing techniques to be used ? It is the purpose of this section to answer the above questions.

1. Areas of Application

The auditor should identify the potential applications for computer use in auditing. It should be kept in mind that the

24 W. Thomas Porter, op. cit., PP. 44-46.

25 Gordon B. Davis, "The Auditor and the Computer," **The Journal** of Accountancy (March 1969), P. 47.

primary consideration in evaluating a potential application should be the cost and effectiveness of the computer application as compared to usual approaches. Other considerations might be the availability of computer programs, the availability of data in computerized form, the availability of computer time, and the training requirements.

The computer can be used to help auditors in performing routine clerical functions, and in applying more effective auditing techniques that sometimes are not practical manually. In the area of receivables, the computer could be used to select accounts receivable for confirmations, prepare confirmation requests, test the summarized receivables aging, and analyze any other features of accounts receivable. In the area of liabilities, the computer could be used to analyze accounts payable and to make any present value calculations. Other potential applications are statistical sampling, depreciation calculaions, inventory analysis, earning per share calculations, and finding income/expense relationships using statistical methods such as regression analysis. [26]

2. Computer Programs for Audit Use

Audit programs are generally classified into preprogrammed generalized packages and specially written programs. A generalized computer audit program is a pre-written program designed to automate part of the audit by providing a selection of appropriate routines which can be readily adopted by the auditor to the requirements of a given situation. [27] Generalized audit programs are available for many types of audit applications. They are written by many accounting firms and other software institutions. Examples of such generalized systems are Auditape, Auditpack, Auditronic-16, Audassist, Audittru, and Audex. In spite of their high costs, there seems to be much potential here for the future.

26 Howard J. Doherty and Jim L. Sorensen, "Use of the Computer in Auditing," **Arthur Young Journal** (Special edition, 1970), PP. 23-27.

27 Geoffrey B. Horwitz, "EDP Auditing: The Coming of Age," **The Journal of Accountancy** (August 1970), P. 53.

After identifying a potential computer application, the auditor must determine whether a special-purpcse computer program is required or an existing generalized program can be used. When a generalized audit program is not suitable for a specific audit situation, very often a specialized program can be substituted. A specialized program is one that is tailored to the needs of a specific audit situation. These programs could be written by the auditor himself or by any other programmers. The auditor has to make his judgement in deciding which way should be followed. However, in both ways, the specific audit application must have sufficient value and importance to the auditor to warrant the time and effort for developing, 'testing, and reviewing special audit programs. 28

3. Computer to be Used

There are three alternatives available for the choice of auditors. The computer to be used might be a client's computer, a service office's computer, or the auditor's own computer. In any choice the auditor should make his decision based on cost, volume of data, compatability of computers, and convenience for all parties involved.

4. The Two Fundamental EDP Auditing Techniques

There are two fundamental techniques available to the auditor for the audit of EDP systems. These techniques are the "around-the-computer" technique and the "through-the-computer" technique.

A. Auditing "Around-the-Computer" : Early attempts to audit EDP systems employed the "around the computer" approach This approach involves a direct verification of output from source documents without considering the changes that the data undergoes while being processed. The primary assumption of the "around the computer" approach is that if the input and output are verified to be correct then the intermediate processing must also be correct. This assumption is emphasized by Edward M. Milko as follows :

28 Howard J. Doherty and Jim L. Sorensen, **op. cit.,** P. 26.

This approach is based on the assumption that if the source data or system input can be proven correct and if the results of the system accurately reflect these source data, then the output must be correct and the manner in which the system processed the data is of little consequence. 29

Auditors have been using the "around the computer" approach because of its simplicity, and the minimum EDP technical knowledge requirement. Thus, perhaps the auditors with little understanding and actual fear of the computer have contributed to the widespread use of this method. 30

Although the "around the computer" approach has the above advantages, there are several problems which should be taken into consideration. The actual disappearance of the audit trail may make the tracing of the data through the system difficult. Another disadvantage is that if the client's system has a large number of items which are widely varied, it might make sampling procedures very costly and time consuming. A final important point is that the same results can often be obtained faster and more accurately through the use of computers.

B. Auditing "Through the Computer" : With the advent of advanced EDP systems, specifically the real-time systems, a continuous emphasis has been placed on the use of the computer in conducting the audit. This approach is known as the "through the computer". method or auditing with the computer. Jennie M. Palen in his Encyclopedia of Auditing Techniques points out the logic behind the "through the computer" approach as follows :

Essentially, the reasoning is that : 1) if the original data are correct and complete, and 2) if the processing system is correct and complete, then 3) we can

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29 Edward M. Milko, "Auditing : Through the Computer or Around ?" Management Accounting (August 1970), P. 45.

30 W. Thomas Porter, "Evaluating Internal Controls in EDP Systems,' The Journal of Accountancy (August 1964), P. 35.

assume that the end products of the system are correct and complete. 31

It could be seen that the major emphasis in this approach is upon testing internal control and procedures rather than upon the data itself. One of the important tools developed for this purpose was the test decks. A test deck is a hypothetical set of data which is run through the procedures of the EDP system and then tested for compliance. Shonting and Stone listed the steps which the auditor should take in preparing and using a test deck, as follows :

(a) Construct a group of simulated transactions using the same account numbers as are already on the computer. Include in these simulated transactions every possible situation, and some that are impossible which the computer should reject.

(b) On a work sheet prepare a solution for the simulated transactions.

(c) Request the computer center to search out this information and reproduce it on a separate tape, or if this information is already on an old tape, it may be used for the test.

(d) Ask the computer to run this set of simulated transactions and print out a report.

(e) If the answer to the simulated transactions agree with the predetermined answer on the work sheet, the auditor may conclude that the instructions for processing the data are correct. 32

In order to perform the above tasks, the auditor becomes tremendously involved with many computer problems. Auditing "through the computer" requires a fairly comprehensive know-

31 Jennie M. Palen, **Encyclopedia of Auditing Techniques** Vol. 1, P. 96.

32 Daniel M. Shonting and Leo D. Stone, "Audit Techniques for Electronic Systems," **Journal of Accountancy** (October 1958), P. 59.

ledge of computer operations, build-in controls, administrative controls, software controls, programmed controls, and input/output controls. Furthermore, the areas of application, the computer to be used, and the programs to be used are some of the important factors which should be decided by auditors, as explained earlies in this section.

A final note is necessary before ending this section. Auditing "around the computer" may imply to some writers in the literature of auditing that the auditor can ignore the computer and work around it. This is not true because the auditor is using the computer printouts as the basis for audit tests rather than testing the computer program directly. 33 Therefore, even when using "around the computer" approach of auditing EDP systems, the auditor must still make a thorough evaluation of the organizational, administrative, and procedural controls in the EDP department. 34

VI. SUMMARY AND CONCLUSION

One of the great challenges facing the auditor today is the ever-increasing utilization of electronic data processing equipment in business. With the advent of highspeed, reasonable cost computers, many companies in every industry have replaced their conventional accounting systems with computerized systems. The number of computer installations has grow rapidly in many countries of the world. Furthermore, the prediction has been made that by the end of this decade most accounting and bookkeeping machines will in reality be mini-computers.

In addition to the numerical growth of computers, developments in the areas of hardware and software have added new and complex dimensions to the EDP systems. Thus, the outlook for at least the next decade seems to be a very rapid growth in computerized accounting systems.

33 Gordon B. Davis, "The Auditor and the Computer," **Journal of Accountancy** (March 1968), PP. 46-47.

34 John M. Horne, "EDP Controls to Check Fraud," **Management Accounting** (October 1974), P. 45.

This means that more information than ever before is going to be stored in computers. Information will be more quickly and concurrently accessible to many users. As a result of this situation, the question today is not whether the computer will compel auditors to make changes in their audit practices, but rather how fast. This is also evidenced by the events that are occurring now in the day-to-day real world. There will be more time-sharing and on-line real time systems, more use of optical scanning, more use of television-type display units, and less hard copy source documents.

Computers are and will be used widely in auditing. Therefore, the auditors of today must have a substantial knowledge and basic understanding of EDP concepts. They should be competent to answer some of the relevant questions in this area such as : What controls are involved in an EDP system ? What impact does an EDP system have on auditing standards ? How can auditors use the computer as an audit tool ? What are the possible areas of application in auditing ? Which computer programs could be used ? What are the computers to be used ? And what are the auditing techniques to be used ?

Such questions are frequently asked by auditors when discussing the use of the computer in auditing. Accordingly, the objective of this paper was to review some facts related to the above questions. However, in answering them, auditors still need to use their own judgement. In evaluating a potential application of the computer in auditing, the cost and effectiveness of this application should be compared to usual approaches whenever possible. The cost and effectiveness criteria should also be considered in the choice of the computer to be used, the computer programs to be utilized and the computerized auditing techniques to be followed. Then, it is true that the computer is becoming a very valuable asset to auditors, but what it can't do is to replace the judgement factor in auditing. The writer believes that professional judgement of auditors cannot currently be automated and it will continue to be their most important asset in spite of the continuing developments in the area of EDP systems.

However, in order for auditors to use their judgement effectively, they should plan for a continuing training in the area of EDP. It is true when Terome Lobel indicates :

> To hit a moving target, you have to aim ahead of it, and if the target is accelerating, you must aim much further ahead. In essence, this portrays the dilemmà the professional auditor faces today, as a result of thè increasing use of electronic computers. 35

Most auditors of today have received little formal training in electronic data processing due to the fact that few departments of accountancy in the world provide an in-depth exposure to the study of computer based systems. Hopefully, the new movement toward professional schools of accountancy will encourage the development of this area in accounting education. Without continuing training and education in the area of EDP auditors of the future will not be able to provide the required service for their clients and auditing will collapse.

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35 Jerome Lobel, "Auditing in the New System Environment," **The Journal of Accountancy** (Sept. 1971), P. 63.

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