A. INTRODUCTION: Because of today's highly competitive business environment and the need to do more with less, computer-based management information systems (MIS) are becoming increasingly important to PHAs that want to remain competitive. Consequently, more and more PHAs are relying on information systems to effectively manage their operations. For this reason, operational reviews of these systems need to be conducted to ensure that effective PHA management controls are in place, including procedures in which to guarantee the integrity, efficiency, security, and reliability of the MIS.

The following MIS review guidelines describe a systematic procedure for the management, control and audit of information systems. They combine a multitude of directives on how to best monitor MIS operations. Using plain, understandable language, the guidelines present a model framework to help reviewers establish controls and document performance for these systems. The purpose is to enable the layperson to select and implement a monitoring review strategy with a minimum of dependence on technical personnel.

The process presented in these guidelines is generic, in that it attempts to address the whole range of management information systems, regardless of the size of the PHA, the system, or the budget. In trying to express all of the issues involved, the MIS review guidelines may be somewhat biased towards larger information systems. Therefore, when appropriate, the review process should be tailored to adjust its scope to that of the task at hand. Steps can be eliminated or minimized depending on the size of the PHA or the type of review. However, even when monitoring a simple information system, the considerations and component tasks are relatively the same.

Another important consideration in the review of MIS controls is the impact the system has on a PHA. Although the size and cost of a system is significant, other factors, such as its strategic importance to running the PHA and the upheaval caused by an ill-suited system dictate that the review process be carefully planned and executed.

For all these reasons, it is important to first understand each step of the MIS review process, its objective, approach, implementation, expected result and possible pitfall. Only then can an informed decision be made about how to best adjust the review process.

B. METHODOLOGY TO INTERNAL CONTROLS The overall approach presented in these guidelines is a qualitative judgmental assessment of the amount of critical controls that should be present and operating in a PHA's information system. The objectives of this type of approach are to assess the MIS environment and to determine if appropriate controls are present and working. The method to achieve these objectives, however, can be quite different depending upon the approach.
It is up to the PHA to identify those events and circumstances whose occurrence could effect the proper utilization of an information system. These events and circumstances usually lead to periods of exposed risk. Controls are those acts which the PHA implements to minimize the risks. Therefore, before any controls are put in place, it is important to know what risk is being addressed, what is the likelihood of its occurrence and, consequently, what is the PHA's financial exposure. In other words, to ensure that the cost of a control does not exceed the risk it was designed to prevent, detect and/or correct.

In addition to knowing the risk that a particular control is intended to act upon, it is also useful to know the type of role the control is intended to perform. There are basically four categories of control:

1. Deterrent These controls are designed to deter employees from undesirable or inappropriate behavior.

2. Preventive These controls prevent unwanted circumstances from occurring at all or, at least, minimize the possibility.

3. Detective When unacceptable incidents have occurred, detective controls report its existence in an effort to minimize the extent of the damage.

4. Corrective These controls are necessary to recover from a loss situation.

A system of internal controls within a PHA incorporates the policies, procedures and practices that are intended to ensure that MIS control objectives are met. The policies, practices and procedures will vary from PHA to PHA depending on the size of the PHA, the PHA's management style, and the technical knowledge of the PHA staff. However, the purpose of internal controls remains the same within each PHA. The combination of the four categories of control as previously described must, on a cumulative basis, provide assurance that a PHA's MIS control objectives can be met.

C. DEFINING CONTROL OBJECTIVES MIS control objectives for a successful PHA operation can be described in several ways.

The ultimate objectives are operational efficiency, competitiveness, management effectiveness, protection of assets, and continuity of business. For these reasons, many PHA's are looking to automation and technology in the form of information systems to play an increasingly important role in meeting these objectives. The impact that information systems can have on each of these objectives are as follows:

1. Operational Efficiency Information systems may be used
to reduce costs and improve productivity. They are two of the more alluring aspects of information systems. However, the trick is to discover how this can be done within the context of the particular PHA in question.

2. Competitiveness It is often necessary to develop new systems or modify existing systems in order to maintain overall effectiveness in an increasingly changing environment.

3. Management Effectiveness Management needs to be in a position to make fundamental business decisions based upon the output from information systems.

4. Protection of Assets Computer hardware and communications equipment are major physical assets of the PHA and need to be safeguarded against damage or destruction. Application systems and the data maintained on them are also important enough to warrant significant measures to protect the overall integrity.

5. Continuity of Business

(a) Many PHA's have come to the point of relying primarily on their information system. In the event of a system failure, these PHA's would be severely affected. Clearly, a contingency plan to deal with various levels of system interruption is necessary.

(b) Regardless of the objective, it is apparent that information systems have a major impact on the internal controls within any PHA that is more than just a casual user of technology. Therefore, it is important to combine the various definitions of meeting both the PHAs objectives and HUD's monitoring objectives in order to align the focus and priorities in the MIS review process.

D. SCOPE OF A MIS OPERATIONAL REVIEW The scope of a MIS operational review will vary depending on the PHA's management requirements, problems and the importance of the MIS to the agency. Management's concerns include cost/benefit relationships, plans and achievements, the acquisition and utilization of resources, and user relationships; therefore, a MIS operational review would usually consider the following matters:

1. The adequacy of systems development and implementation policies and standards to provide technical and operational compatibility and to ensure proper understanding by MIS personnel of such factors as project management, design practices, documentation, programming, and the roles of users.
2. The adequacy of administrative control exercised by top management including the degree of formal planning, the monitoring of MIS activities, the assignment of responsibilities, the methods of acquiring, developing, educating, and retaining competent MIS personnel.

3. The suitability of the hardware, software, and operating facility including planning, expanding, financial implications, resource utilization, security, and control.

4. The responsiveness of application systems in meeting the needs of the PHA and its users including whether users are satisfied with the services being provided and the adequacy of controls, file and program design, and integration of application systems.

5. The existence and adequacy of essential MIS documentation including system, application, operating and other related practices and procedures.

The results of a MIS operational review should provide reasonable assurances that hardware and software are safeguarded and information is timely and reliable. The results should also provide sufficient information to evaluate and encourage compliance with managerial policies and procedures as well as governing directives.

E. REMOTE MONITORING The importance of objective evaluations of the MIS sub-function increases as a PHA becomes more reliant on its data processing. It is obvious that a regular remote monitoring schedule is desirable, although the need clearly depends upon individual circumstances.

The MIS sub-function primarily focuses on the review of MIS controls, however MIS controls are difficult to monitor remotely. For that reason, the remote monitoring strategy for the MIS sub-function is different than the other sub-functions in that there are no Remote Monitoring Worksheets. Instead, guidelines are provided on how to use the information available in the Area Office to detect situations that would require a closer examination of the MIS functions.

Typical situations that trigger such concerns are these:

-- Receiving PHA reports consistently late and/or containing inaccurate information.

-- A proposal for a major hardware or software upgrade or acquisition;

-- Costs for MIS services that appear excessive;
--An excessive or increasing number of complaints;

--An inability to attract and retain competent MIS personnel;

--A proposal to consolidate or distribute MIS resources;

or

--Major systems that appears unresponsive to needs or are difficult to enhance or maintain;

There are a number of remote monitoring resources which are available in the Area Office. Following is a non-exclusive listing and brief description of those resources. Your office may have specific data, reports, and other information which should be included in the remote monitoring.

a. Automated Reports
Virtually every day the Area Office receives information from a PHA. Most of this information comes from the PHA itself in the form of reports, policies, and/or documents. If any of them are produced from the PHA's automated management information system, they can be used to measure the systems effectiveness.

An analysis of PHA reports, policies and/or documents enables the reviewer to develop a feel for the agency's operating environment, specific information needs and thus, the parameters of the PHA's existing MIS. Additionally, it will provide the reviewer with an objective frame of reference which can be used during the initial assessment to examine the PHA's own perceptions of its MIS requirements.

b. MIS Contracts/Specifications
If the PHA purchased the MIS, then a review of the approved contract and/or RFP will reveal the system characteristics. However, if the PHA developed the MIS, then you might have to obtain the system specifications from the PHA. The reviewer should focus on how the system was intended to function.

c. MIS Policies/Procedures
Every PHA utilizing a management information system should have developed various policies, procedures, rules or processes to assist in controlling the system. This includes controls dictated by standard ADP practices and those that are discretionary on part of the PHA. Review of these policies is a very useful remote monitoring exercise, therefore if the HUD Area Office does not have recent copies of the PHA's MIS Policies and Procedures, they should be requested from the PHA.
d. Organizational Chart/Position Descriptions
The organizational chart and position descriptions should indicate the MIS personnel structure, lines of communication, authority and responsibilities. The reviewer can use this information to get a feeling for the PHA's MIS administrative controls.

e. Financial Documents
The PHA's Operating Budget can be another source of information on different aspects of the MIS operation. The budget offers information on MIS staffing, plans for extraordinary expenses related to the MIS, and other PHA expenditure plans.

f. Prior Reviews and Audits
Past reviews and audits can offer insight into historical problems and issues at a PHA. You can use the information contained in these reports to get a perspective on how the MIS has performed in the past. However, keep in mind that a PHA's situation may have changed dramatically since the last review, due to turnover in staff, system enhancements, etc.

g. Miscellaneous Correspondence/Other Information
This category refers to any other correspondence, records, and reports you may have which give additional information on the MIS's performance.

F. SUGGESTED AREAS OF REVIEW FOR THE ON-SITE REVIEW
The management practices and operating procedures that might be included in a MIS operational review follow. These matters are not intended as a checklist but are an overview of subject areas that should be included when planning the scope of the review and preparing a review strategy. Circumstances leading to the decision to conduct a review, and good judgement, will dictate the matters to be investigated, the depth of the investigation, and the procedures to be employed to meet the objectives of the review.

The MIS controls, practices, and procedures can be broadly divided into five major, critical areas of operation which we will call "components." They are:

1. Development and Maintenance Controls
2. Administrative Controls
3. Operation Controls
4. Application Controls
5. Documentation Controls

Essentially, the scope of MIS controls needs to be broad and deep enough to ensure that the integrity of the system is maintained. For this reason, the components represent major
groupings of activities within the overall subfunction. While these divisions have been made to facilitate understanding of the MIS sub-function, the reader should also understand that all of the activities in the MIS area are interrelated.

The steps outlined in this sub-function are applicable to both large and small PHA's, but the time and effort required will vary greatly depending on the volume and nature of the processing requirements.

The following paragraphs offer a brief introduction of each MIS "Component". The reader should refer to the MIS On-Site review Worksheets found in Appendix 5 of this Guidebook for greater detail on the specific activities and tasks included in each component.

DEVELOPMENT AND MAINTENANCE CONTROL COMPONENT

MIS development and maintenance requires that certain procedures be followed and that the necessary controls be applied for that phase of the work which deals with the actual development of the system and programs their testing, implementation and maintenance.

The development and maintenance process requires a series of defined and disciplined steps in order to ensure that preliminary studies are complete and accurate, and that they form a sound basis for management decisions. These controls guarantee a sound, well organized approach to the work preceding the system and/or program installation and maintenance.

Development and Maintenance controls can be generally categorized into four control areas: Preliminary Studies; MIS Acquisition/Selection; Development Standards; and Maintenance and Change Procedures. These control areas would be reviewed depending on the development stage of the MIS at the particular PHA in question. For example: if a PHA is still considering whether to automate, then a review of only the preliminary studies would be justified; or if a PHA has already or is in the process of purchasing a MIS, then a reviewer might examine their acquisition/selection controls along with their preliminary studies; or if a PHA is developing its own MIS, then a check of their development standards and preliminary studies is warranted; or if a PHA has a functioning MIS in place, then a reviewer might just be concerned with the PHA's maintenance and change procedures.

The four control areas are discussed in further detail in the following paragraphs:

A. Preliminary Studies
When a PHA is considering to automate, management should select a team of one or more persons from within the PHA to undertake a preliminary survey which will attempt to answer two basic questions:

1. What will a MIS do for the PHA and what will be the total cost?
2. What are the alternatives to computer processing, how effective will they be and what will be the total cost.

The survey should determine the favorable application areas, including those where cost savings are likely to be experienced; as well as the non-profitable, but necessary computer processing operations.

If after reviewing the preliminary survey, the decision is made to follow a course leading to the acquisition or development of a MIS, PHA management should then arrange for a Feasibility Study to be undertaken. Generally, the study is related to the same areas as the survey, but should provide a much greater degree of detail in areas of problem description, systems definition, and costs and savings for each major application area.

Specifically, the objectives of the study should be the following:

1. To determine the appropriateness and feasibility of automating some elements or all of the PHA's operations.
2. To assist the PHA in assessing the relative cost/benefit of automation over improved manual operations.
3. To develop a cost effective strategy for accomplishing the desired automation.
4. To formulate a reasonable, realistic plan for the conversion to an automated environment.
5. To determine the probable impacts on existing staff and identify appropriate staffing plans as well as the need for staff development programs.

The results of the Feasibility Study should provide PHA management with a clear understanding of the proposed approach to the PHA's data processing problems, the anticipated cost and the benefits which can realistically be expected from the complete utilization of the MIS.

The Feasibility Study should also attempt to determine the most appropriate systems approach for each application area without regard to specific computer equipment. By setting out the results of the Study in this manner, the report can serve as the systems specification documentation (if a PHA
develops its own system) or request for proposal (RFP) from which computer manufactures and system vendors can prepare their proposals.

The Preliminary Studies approach should also be used when contemplating additional applications for existing MIS's.

B. MIS Acquisition/Selection (Hardware/Software)

Many PHA's do not possess the in-house staff capabilities to successfully develop and implement information systems. Therefore, consultants are often used to assist the PHA to determine its hardware and software needs, develop an RFP to solicit vendor proposals, evaluate the proposals and select a vendor.

For this reason, PHA management should ensure that comprehensive selection criteria are established and that all proposals are measured and evaluated against these. The vendor and/or system selected should be that which is most successful in meeting the criteria.

C. Development Standards

If a PHA decides to develop its own system, then management should establish standards to ensure the development of a quality system. The system should be developed in such a way that it can be easily modified and maintained by someone other than the original developer. Adequate attention must be given to the establishment of security and controls during the design phase to ensure that the system will have integrity once it is installed. Finally, the completed system should be subject to rigorous testing to provide assurance that the results produced are valid and reliable.

D. Maintenance and Change Procedures

Systems must continue to be adapted to meet changing HUD requirements and individual PHA circumstances. Modified programs should be subject to many of the same controls as newly developed systems. Most important among these is the requirement that there be thorough testing of the modified system. In addition, accurate records should be maintained that describe the change, the reasons for making the change, and the person responsible for making the change.

ADMINISTRATIVE CONTROL COMPONENT

Administrative controls generally are controls over the PHA environment in which MIS's exist. These controls can be generally categorized into three control areas:

A. Executive Administration
A large part of the operational effectiveness of a MIS is derived from the vision adopted by the PHA executive director and other top managers. The attitudes and actions of the end-users toward the issues of control and security will be determined in large part by the explicit and implicit initiatives and actions of these administrators.

Another major perspective of Executive Administration is the assignment of responsibilities or more specifically the separation of duties. This type of control deals with the organizational issues that are involved in being effective and efficient, as well as signifying whether or not there are adequate human resources to get the job done.

B. Personnel Policies

The productivity gains from well qualified and trained staff members are considerable. For that reason, it is essential that a PHA have effective personnel policies and procedures in place that incorporate adequate hiring, termination, salary administration, training, and employee development programs. Of particular interest, is the area of employee education as it relates to need for security and control.

C. Long-range Planning

Long-range MIS planning is achieved through the formulation of an information strategy. An information strategy is a plan to meet the PHA's needs over the next three to five years. It should deal with all aspects of MIS from the point of view of providing a long-term integrated business environment for the development, maintenance and operation of the PHA's system.

OPERATIONS CONTROL COMPONENT

Methods and procedures are established for the operation of the MIS in order to produce an environment intended to ensure effective production by the PHA staff and to provide security for the data maintained in it. These controls can be generally categorized into three control areas:

A. Security

Information is a valuable asset to the PHA. The accuracy and confidentiality of this information is essential to the PHA's operation. Accordingly, the information must be protected from abuses such as inadvertent misuse, disclosure and fraudulent activity. In terms of MIS, the software and the data processed by the software must be secure and must allow access on a "need to know" and a "need to do" basis.

B. Problem Management
A key attribute of MIS operations should be the ability to deliver consistent, high quality, and prompt service. Problems in data processing are a normal part of business, however the difference in performance is how a PHA manages those problems. PHA's should have the proper procedures in place to ensure that previous mistakes are not repeated, that problems are fixed on a priority basis, and that problems are detected before they become significant.

C. Contingency Planning

Every PHA needs to develop and maintain a disaster recovery plan for all MIS's that are critical to the ongoing operation of the PHA. The objective of the plan is to provide a continuity of business processes in the event major difficulties unfold in the primary MIS applications. An important part of contingency planning is the backup and recovery procedures which ensure that all information files can be recreated to the point just before the problem arose.

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APPLICATION CONTROL COMPONENT

Application controls for specific programs are needed to ensure that authorized, valid, complete, and accurate information are produced on a timely basis. These controls can be generally categorized into four control areas:

A. Input Controls

Input controls are needed to ensure that all input (i.e., records) is authorized, timely, complete and accurate before being processed. This includes the records to be processed by the system, and the associated processes from origination to storage in the MIS. Input controls can be both procedural (i.e., manual) and automated.

B. Processing Controls

Processing controls are needed to ensure that the input transactions are properly applied to the appropriate database records and files. It involves all computer processing after input has been accepted by the MIS, and before output has been created. This includes the processing that matches or merges files, modifies data, updates master files, and performs file maintenance.

C. Output Controls

Output controls are needed to ensure that the files and reports to be produced by the application system are actually produced, and in the case of printed reports, are distributed in a timely manner. This includes the preparation of output and reports produced by the system, and the associated manual processes from the computer to the user.
D. Storage Controls

Storage controls are needed to ensure that the application data is securely controlled between and during executions of the application system. This includes all program code/instructions and data files.

DOCUMENTATION CONTROL COMPONENT

Adequate documentation of system, application, operating and other related procedures is necessary for a complete and accurate understanding of MIS processing activities and the impact of such processing on end-users.

The MIS areas that require sufficient documentation are as follows:

A. Development

Documentation of the development process and strategy provides systems analysts and programmers with a reference to original design ideas and concepts. These documents could include the following: Preliminary Survey; Feasibility Study; Risk Analysis; Cost/Benefit Analysis; System Decision Paper; Project Plan; Functional Requirements Document; Request for Proposal; and Data Requirements Document.

B. Applications

Documentation of the MIS applications provides PHA management with a clear understanding of application objectives, concepts and output and to ensure that their policies are adhered to. These documents could include the following: System, Application, and Data Base Specifications; User's Manuals; and Installation and Conversion Plan.

C. Operations

Documentation of the MIS operations provides a convenient reference for systems analysts and programmers responsible for maintaining existing systems and applications. These Documents could include the following: Operations and Maintenance Manuals; System, Application, and Data Base Specifications; and Test Results and Evaluation Report.

G. PROBLEM ANALYSIS The MIS Problem Analysis Worksheets (Appendix 6) are an available tool to assist you in the process of analyzing the problems you've uncovered, regardless of the form of monitoring, and developing appropriate strategies. The GUIDE is structured by first identifying the problem itself, then listing the possible causes behind these problems, and possible strategies for addressing these causes.

Problem Identification Problems identified by the guide include the following:
1. Erroneous record keeping is the recording of transactions that are contrary to established policies. This may involve the timeliness, accuracy and completeness of information/data.

2. Business interruptions may include anything from a temporary suspension to a termination of the management information system.

3. Erroneous management decisions are objectionable in themselves but may also lead to other problems. Such decisions may arise due to misleading information, or errors in judgement.

4. Excessive costs include any expense of the PHA which could be readily avoided.

5. Loss or destruction of assets refers to the unintentional loss of physical assets, monies, or information assets.

6. Competitive disadvantage relates to the inability of an organization to effectively remain abreast of the demands of HUD or to respond effectively to housing demands.