Multifamily Information Systems

Management Study

September 30, 1996

U.S. Dept. of Housing & Urban Development
Office of Inspector General
Office of Audit
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Washington, DC 20410

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U.S. Department of Housing and Urban Development
Washington, DC 20410-4500

OFFICE OF INSPECTOR GENERAL

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MEMORANDUM FOR: Nicolas P. Retsinas, Assistant Secretary for Housing - Federal Housing Commissioner, H

Steven M. Yohai, Chief Information Officer, and Director, Office of Information Technology, AMI

FROM: Benjamin K. Hsiao, Director, IS Audit Division, GAA

SUBJECT: Management Study: *Multifamily Information Systems*

Attached is our report on HUD's efforts to develop information systems for its Multifamily programs.

We conducted a study to review Multifamily's past and current efforts to build information systems to support its program operations. This study was not done on any one particular individual system. Instead, it was a general look at the basic processes of systems building within Multifamily.

Our purpose for this study was to try to determine, if possible, the root causes which are preventing Multifamily from developing credible, effective information systems. We discuss what, in our opinion, are these causes and the possible solutions in our report.

We believe the conditions described in the report merit the attention of agency senior management because they could prevent successful development of useful information systems for Multifamily. Within 60 days, please give us, for each recommendation made in the report, a status report on: (1) action taken; (2) the proposed action and the date to be completed; or (3) why action is considered unnecessary.

Thank you for the assistance provided to us by your staffs during the course of our review. Should you have any questions or require additional information, please contact me at 708-3444, extension 149.

Attachment

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Purpose

This study began as an effort to review the development of Housing's Multifamily National System (MNS). This system was the Department's latest attempt at consolidating and updating the several systems that are currently in place. However, midway through this review, events occurred which caused us to redirect the scope of our work. The principal one being that the Deputy Assistant Secretary (DAS) for Multifamily Housing Programs stopped all development for the MNS project and began work on a new system. The reason given for this decision was the belief that MNS was not the solution to Multifamily's systems problems as originally intended, and that further efforts would not be fruitful. Following that decision, we decided to expand the scope of our work to look at the history of Multifamily systems development efforts and determine the root causes, if possible, for the repeated failures by the Department to develop useful information systems in this program area.

Background

HUD has had a long history of attempts to develop information systems for the Office of Housing's Multifamily programs. Despite numerous efforts during the past 20 years, the Department still does not have a dependable data system that provides timely and accurate information for the Office of Housing to manage HUD's portfolio of Multifamily properties.

Furthermore, the annual financial audit of the Federal Housing Administration (FHA) has repeatedly classified automated systems as a material weakness within its internal control structure. In their most recent report, the financial auditors stated: "Some of FHA's systems either do not provide needed management information or do not provide reliable information. The lack of modern systems and other tools make monitoring less productive and staff usage less efficient."

For our review, we traced the history of Multifamily's attempts to develop a single, integrated information system. We identified five separate major efforts, none of which was ever successfully completed. Their last attempted project, the Multifamily National System was canceled after expending much time and effort. Like its predecessor projects, other than elaborate plans, nothing of substance was ever produced.

Current Activities

After deciding to end the MNS project, Multifamily chose a long-term and a short-term approach to solving their information systems problems. In the short term, they intended to *stabilize* Field Office (FO)-MNS and construct a *Data Warehouse* as a central repository for Multifamily information. In the long term, they planned to try again to develop a single, integrated Multifamily information system.

We have several concerns over Multifamily's latest approach to solve its information systems problems. Multifamily staff must depend on the Office of Information Technology (IT) for the accomplishment of the stabilization plan. An IT estimate given to Multifamily for time required

for the work was 1,000 hours of programming and testing. IT has been working on it since June of 1995, spent over $100,000 so far and has yet to produce any material improvements.

Prior to the start of work on the stabilization, the former DAS for Multifamily Housing Programs put a freeze on any work on updating FO-MNS, and, essentially, no work at all was done on it for at least 15 months. Therefore, we are concerned whether IT has the ability and Multifamily has the desire to complete even this short-term fix. It would appear that a change in attitude will be required to assure that the desired results are carried out.

We have several concerns about the planning and implementation of the Multifamily data warehouse. The decision to establish a data warehouse was made to fill a recognized shortfall in Multifamily's operating systems. That is, the lack of accurate, reliable information. However, in its rush to establish the data warehouse, Multifamily management has overlooked some fundamental principles, which could prevent them from fulfilling their desired objectives.

The most important consideration here is with the quality of the data within the warehouse. The insights gained and decisions made from analyzing the data in a warehouse can be only as good as the quality of the information stored in the warehouse. The old axiom from the early days of database management, garbage in, garbage out, is even truer today when struggling to integrate legacy data into a data warehouse. Subsequent to our review, Multifamily informed us it established a Data Quality Team, and is working on a plan. However, the structure to identify and address data quality problems does not yet exist. While Multifamily should be commended for acknowledging that data quality problems must be addressed, it must be willing to provide adequate support to address data quality problems before new systems are developed, and ensure that the new systems have adequate controls to reduce the possibility of errors.

Problems

Many problems continue to plague the patchwork of information systems supporting Multifamily's operations. A recent survey sent out to its own Field users by Multifamily Headquarters staff revealed that serious problems continue to exist. As evidenced by their own past records, these same problems have gone on from year to year. The list of these problems follows.

- **Fragmentation of Data**
- **Inadequate System Interfacing**
- **Inaccessibility of Data**
- **Poor System Design and Testing**
- **Inconsistent System Design**
- **Slow System Response Times**
- **Emphasis on Data Entry Over Data Retrieval**
- **Inadequate Documentation**
- **Inadequate Training**
- **Inadequate System Support**
- **Inadequate Teamwork Between Headquarters and the Field**

• Causes

Several themes have reoccurred throughout our discussions with Multifamily management and staff in regard to likely causes for the poor quality of Multifamily information systems.

Lack of Upper Management Support

Successful development of a new information system depends on the unswerving support of upper level management. However, what we have found in reviewing the history of Multifamily's efforts is that maintaining management support has not been the case.

A recurring cycle of events seems to play itself out. First, either from external pressure or a realization that the current systems are unreliable, a project is started to finally fix the problems of Multifamily systems. There is enthusiastic support from the staff and current management. However, despite this initial support, the project is never really sufficiently staffed or funded. Then, because of this situation, at some point the work on the project stumbles. There is a reassessment of the project, with a consequent loss of direction and support.

Insufficient Qualified Systems Staff

In order to properly manage development and maintenance of Multifamily information systems, it is necessary to have sufficient qualified staff. However, the number of qualified systems staff in Multifamily has steadily declined over the last few years. For example, when the Information Systems Division was under the control of program management back in the 1980's, it had a staff of about 80 people. After the transfer to the Comptroller's Office, at one point this number declined to a low of seven.

Inadequate Budget

Sufficient and assured funding for systems development and maintenance is another essential ingredient for success in this area. A major cause of systems failure is that Housing has built systems and consistently failed to support them.

This situation is particularly true of Multifamily systems. A consistent theme of previous reports and current interviews is that there has been insufficient funds to develop and operate Multifamily systems.

Lack of Cooperation Between Information Technology (IT) and Housing

Time and again in discussions with Multifamily staff, we heard the same lament: IT does not give adequate support to Multifamily systems. In the present arrangement where there is a central IT organization supporting program systems, it is vital that these two organizations work in concert. Yet there is evidence to the contrary. The two organizations often appear to be working at cross purposes, or even at times in a confrontational manner.

Organizational Problems

Several years ago the division responsible for Multifamily systems was moved to the Comptroller's Office. This move followed several successive unfavorable reports on FHA's financial statements, in which the poor state of its information systems was regularly cited as a material weakness. While this move might have seemed justified at the time in light of the circumstances, it ultimately had a detrimental impact on Multifamily systems development. This was so, because the move put Multifamily systems personnel under the operational control of the Comptroller's Office.

• Recommendations

Need for Change in Multifamily's Organizational Structure for Systems Development and Maintenance

There are several organizational changes we are recommending. We believe that these changes are necessary for Multifamily to be successful in their latest efforts at developing an integrated information system.

- **Need for a Single Person In Charge**

It has been 5 years since Multifamily has had a person in charge of business systems. The lack of leadership in this important area has no doubt taken its toll. Multifamily reestablished the position of Business Systems Manager in February 1995. We endorse Multifamily's action, and encourage its full support by the DAS for Multifamily Housing Programs.

- **Program Side Should Be in Control**

Along with the establishment of the Business Systems Manager, it is equally important that this new position gain control over all Multifamily information systems. This move means transferring the Multifamily systems currently under the sponsorship of the Comptroller's Office over to the DAS for Multifamily Housing Programs.

Only those systems specifically intended for budgeting and accounting should be under the control of the Comptroller's Office.

- **Need for Better Systems Staffing**

Multifamily must acquire sufficient experienced and knowledgeable staff to support the new Business Systems Manager. The Business Systems Manager must be given sufficient staff to carry out the ambitious aims of the Information Strategy Plan (ISP). Otherwise, it may very well go the way of the many predecessor attempts at solving Multifamily's business systems problems.

- **Need for Professional Project Management**

For many years, construction and defense industries have successfully applied the concept of the "Project Office" as a tool to manage risk on major projects. The project office is responsible for ensuring that every reasonable step is taken to ensure the success of the project. We recommend that Housing establish such an office.

A Different Funding Mechanism

A lack of adequate funding has been one of the major causes for many Multifamily systems projects never being successfully completed.

- **No More Committee Approach to Funding Decisions**

The current approach to allocating funding to various systems projects, where a committee of program managers competes for scarce resources, is inefficient and not productive in the long run. A better method must be found.

The committee approach to making systems funding decisions should be replaced by a more professional method. The planning and allocation of funds to the various systems projects should be made by professional systems managers. These decisions would then be approved by the upper level program managers.

- **Danger of Short Term Funding**

All too often we have heard in our discussions with program staff that systems projects fail either because insufficient funds are initially allocated for the project, or that those funds are redirected or not sustained.

A mechanism must be found to unlink the annual budget process from the funding of multi-year projects.

- **Need for Total Life Cycle Project Funding**

System projects follow several distinct steps in their life cycle development. Unfortunately, these steps do not neatly fit into the annual budgeting process. All too often, funds have dried out in the middle of a project effectively killing it.

Once a project has been approved, funds should be allocated for the full project development life cycle period. Controls can be put in place to determine if the project is on course. *Go, No Go* decision points can be placed in the project plans for this purpose. In this manner, the project leader can concentrate on successfully completing the project, instead of looking over his shoulder wondering if funds will no longer be available at the next budget go-around.

Need for a Rapid Application Development Approach

Multifamily is using the Department's standard systems development methodology to plan for its new systems. This standard methodology, the Information Engineering Methodology (IEM) from James Martin, is quite thorough, but also can be quite time consuming.

Given the poor state of Multifamily's current systems and the pressing need to come up with a usable substitute, we would recommend that Multifamily look to one of the newly emerging so-called Rapid Application Development (RAD) methods for all of its systems development projects.

Need to Change Relationship With IT

There is considerable disagreement between Multifamily and IT about the best method to control their systems development projects. Perhaps before the appointment of a Business Systems Manager, there was some validity to the criticism that there was no one to act as sponsor for Multifamily systems. However, this should no longer be the case.

Multifamily should now take a more active role over its systems development projects. This means that IT will have to take a more subordinate, supporting role then before. Along with this more active role, Multifamily should take an active role in managing their contractors.

Need for a Different Relationship With the Field

The responses from Field staff and managers to the recent survey make it clear that there is inadequate support being given to the Field for Multifamily systems. Complaints of inaccessible data, inadequate training, inadequate systems support, and inadequate teamwork between Headquarters and the Field, among others, are a real indication that this unsatisfactory situation must be quickly addressed and rectified.

- **Must Be Able to Work Closer With Field**

Multifamily must establish an organizational relationship between the Business Systems Manager and the Field Office Multifamily staff. The Business Systems Manager must be able to exercise some form of control over the development of local systems. This would be necessary to ensure that they meet standards, are not duplicative of national systems, and are compatible with national systems.

- **Must Work With IT to Better Support Systems in Field**

The DAS for Multifamily Housing Programs must work with the head of IT and the Field service organizations in order to ensure that Multifamily systems are receiving sufficient support. It is obvious from the comments received from the Field that this is not currently happening.

• Departmental Comments and OIG Response

We provided the draft report to the Office of Information Technology (IT) and the Office of Housing on July 24, 1996. We received written comments from both offices. IT did not generally agree with the conclusions and recommendations of our study. Their comments and our response are provided in Appendix 1. The Office of Housing agreed in general with most of the study. Their comments and our response are provided in Appendix 2.

Chapter 1

Introduction

This study began as an effort to review the development of Housing's Multifamily National System (MNS). This system was the Department's latest attempt at consolidating and updating the several systems that are currently in place. However, midway through this review, events occurred which caused us to redirect the scope of our work. The principal one being that the DAS for Multifamily Housing Programs stopped all development for the MNS project and began work on a new system. The reason given for this decision was the belief that MNS was not the solution to Multifamily's systems problems as originally intended, and that further efforts would not be fruitful. Following that decision, we decided to expand the scope of our work to look at the history of Multifamily systems development efforts, and determine the root causes, if possible, for the repeated failures by the Department to develop useful information systems in this program area.

Outline of Report

In Chapter 2, we will give a brief history of Multifamily's efforts to unify its myriad and disjointed systems into a single integrated system. Chapter 3 will then address the present Multifamily systems development activities of the Department giving our perspective on its direction and prospects for future success. In Chapter 4, we will offer our analysis of past and current systems development efforts within Multifamily, and of the possible causes of past failures. Finally, in Chapter 5, we will offer our recommendations for a short-term and long-term solution.

Chapter 2

Background

HUD has had a long history of attempts to develop information systems for the Office of Housing's Multifamily programs. Despite numerous efforts during the past 20 years, the Department still does not have a dependable data system that provides timely and accurate information for the Office of Housing to manage HUD's portfolio of Multifamily properties.

Furthermore, the annual financial audit of the Federal Housing Administration (FHA) has repeatedly classified automated systems as a material weakness within its internal control structure. In their most recent report, the financial auditors stated "Some of FHA's systems either do not provide needed management information or do not provide reliable information. The lack of modern systems and other tools make monitoring less productive and staff usage less efficient."

Consolidated Multifamily System

The lack of reliable and efficient information systems has been a recognized problem within Multifamily nearly from the start of the program. Repeated studies have been made in the past in an attempt to rectify the problem. In one such early study published in December of 1978, entitled *Problems Facing Financially Distressed Multifamily Housing: A Field Study of the HUD-Insured, Unsubsidized Inventory*, it is stated:

> *Most field offices judged their management information systems (MIS) to be either "bad" or "very bad", and they added that they have <u>never</u> had an adequate system to work with. In fact, most were quite pessimistic that improvements could ever be made in this area. Thus, even though most felt that good systems would be of real value to them, they tended not to place as high priority on improving the systems as on obtaining the additional staff resources which were needed to perform well without a good MIS in place.*

Just prior to this study, in the fall of 1977, HUD had established a Multifamily Systems Consolidation Task Force to study the possibilities of consolidating Multifamily's fragmented and inadequate systems. As stated in the Task Force's report, "Such a comprehensive commitment on the part of Headquarters and Field organizations was necessary because most of the deficiencies of the existing systems are not new, and are not amenable to correction by any single organization which possibly contributed to the prior, piecemeal efforts for implementation."

This study identified eleven then existing systems, nine automated and two manual. The following table lists the nine automated systems.

ACRONYM	NAME	SYSTEM ID
FORMS	Field Office Reporting/Management System	D03
MIMIS	Multifamily Insured Management Information System	D03
CUPS	Computerized Underwriting Processing System	F07
MPMS	Multifamily Projects Management System	F18
MIAS	Mortgage Insurance Accounting System	F50
MHOS	Multifamily Housing Occupancy System	R02
MHDS	Multifamily Housing Default System	R11
OLMS	Office of Loan Management System	R18
SHACO	Subsidized Housing - Admissions and Continued Occupancy System	R43

In order to structure their study, the Task Force divided Multifamily operations into six processing phases: (1) Prior to Firm Commitment; (2) After Firm Commitment: Insurance Upon Completion; (3) After Initial Endorsement: Insured Advances; (4) Final Endorsement: Mortgage Insurance in Force; (5) HUD-Held Mortgages; and (6) Acquired Projects.

The Task Force identified the major functions performed at Field and Regional Offices and at Headquarters, and the organizations responsible for performing the major functions. The Task Force then identified the categories of data needed to perform these functions. They made extensive cross tabulations between data needs categories, processing phases, and relevant sections of statutes. After comparing the capabilities of the existing systems with identified data needs, it was concluded by the Task Force that the Multifamily MIS needs would be best served by a new single consolidated system.

The proposed Consolidated Multifamily System consisted of three subsystems:

1. ***The Multifamily Production Processing Subsystem (MPPS)*** - which was to support Field processing of all applications for insurance from receipt through completion of construction.

2. ***The Multifamily Management Processing Subsystem (MMPS)*** - which was to support Field monitoring of all insured projects (beginning at endorsement), direct loans, and HUD-Held mortgages, as well as Headquarters processing of HUD-Owned properties.

3. ***The Multifamily Insured and Direct Loan Information Subsystem (MIDLIS)*** - which would support the Departmental Operating Plan, Executive Management Report, special analyses, and historic data needs.

Despite a great deal of effort on behalf of the Task Force and the universal concurrence in its recommendations, only one of the subsystems, MIDLIS, was ever developed. The goal of the project, the development of a single, consolidated and integrated Multifamily Information System was never reached.

Only two of the existing systems, the Multifamily portion of the Field Office Reporting/Management System (FORMS) and the Multifamily Projects Management System (MPMS) were ever consolidated. They were used to form MIDLIS.

Multifamily Information and Processing System (MIPS)

In 1985, Multifamily was dependent on three principal information systems to support its operations: (1) the Computerized Underwriting Processing System (CUPS); (2) the Office of

Loan Management System (OLMS); and (3) the Multifamily Insured Management Information System (MIDLIS). At that time, it was determined that information provided by the OLMS, MIDLIS, and CUPS systems was cumbersome, untimely and often unused at the Field level. Further, the lack of use caused data at the national level to be inaccurate.

Multifamily management decided, again, to deal with the problem by establishing a new system which would consolidate the three with the goal of correcting the cited problems. The new system, called the Multifamily Information and Processing System (MIPS), had as its major objective to bring the processing of the Multifamily program to the Field level. It was hoped that by bringing the processing to the Field level, reports needed at the local level would be timely and accurate, and data being uploaded to the national level would be accurate.

The original concept for MIPS was that there would be three databases. There would be one database in Headquarters, a National Database (NDB), which would replace the existing MIDLIS and OLMS systems. Until the NDB was completed, MIPS would be used to update these two systems. Two other databases were planned for the regions. Each Field Office was to have its own Local Database (LDB) containing information on all active Housing development and Housing management projects. Each Field Office would also have its own CUPS Database to be known as the Underwriting Database (UDB).

This project never fulfilled its objective of producing a single integrated Multifamily information system. As a result, the only Database to be produced by this project was the Local Database. Since no National or Underwriting Databases were produced, MIDLIS and CUPS were not eliminated as planned. In fact, MIDLIS and CUPS continue to the present day.

3. FO-MNS

In October of 1993, MIPS was renamed as the Field Office Multifamily National System (FO-MNS). Along with the name change, the software was recompiled and certain modifications were made. However, there was no attempt at the time to identify or correct the problems associated with MIPS.

We have recently completed an independent review of FO-MNS, and have confirmed that the same problems plaguing MIPS, and already recognized by Multifamily, have carried over into FO-MNS. We have determined that much of the FO-MNS data are incomplete and inaccurate. Field Office staff agree that the system contains numerous errors and is unreliable. As a result, Field Office staff have been forced to create unofficial “cuff” systems on their own to record, maintain and process necessary data and reports.

We visited four Field Offices during our review and found that each had developed unofficial computer based systems to use either in conjunction with or instead of FO-MNS. Additionally, two of the Field Offices were also processing information manually to avoid using FO-MNS.

3. Multifamily National System (MNS)

In early 1992, Housing once again attempted to deal with Multifamily’s diverse and problem-filled information systems. The following systems were supporting Multifamily operations:

ACRONYM	NAME	SYSTEM ID
AHAS	Assisted Housing Accounting System	A45
LOCCS	Letter of Credit Control System	A67
SEAS	Section 8 Accounting System	A84
PAS	Program Accounting System	A96
Sec. 8 MIS	Section 8 Management Information System	F05
MMAS	Multifamily Mortgage Auction System	F14
HDGIS	Housing Development Grant Information System	F15
PMS	Multifamily Property Management System	F46
MFIS	Multifamily Insurance System	F47
MARS	Multifamily Accounting Reporting and Servicing	F49
IMF	Institution Master File	F51
FO-MNS	Field Office Multifamily National System	F52
MFCS	Multifamily Claims System	F75
TRACS	Tenant Rental Assistance Certification System	F87
CFS	Control Files Subsystem	F87
MIDLIS	Multifamily Insured and Direct Loan Information System	F90

Housing's view of these systems at the time was that they did not provide complete and accurate financial information. This condition was due, in part, to problems with interfaces between the systems, processing problems, and duplicate data entry.

Information on Multifamily projects was widely disbursed across several of these systems resulting in difficult and untimely retrieval of information and inadequate reporting capabilities. Headquarters had to access over 52 databases to retrieve data necessary to monitor and manage program activities. Further, much of the information could be retrieved only with the intervention of skilled systems personnel.

Several different systems were used to collect information about Multifamily loans. Often these systems contained conflicting and inaccurate information, and, in general, were determined to be unauditable.

Basically, Multifamily did not have information systems that provided accurate and reliable management and financial information to enable appropriate managing and monitoring of Multifamily projects.

q Purpose of MNS

According to project documents, the overall purpose of MNS was to:

> *...provide a centralized repository of accurate and consistent information on Multifamily projects to be used by auditors, management and all levels of HUD personnel. MNS will provide information critical to auditors and management in predicting the future risks of the Multifamily programs and accurately calculating future risk loss reserves. MNS will provide information to be used by Headquarters, Regional Offices and Field Offices personnel to enhance monitoring and management of Multifamily programs. This centralized information bank will contain all Multifamily projects, detailing the projects through their full life cycle. MNS will be used as a vehicle to improve data consistency between the existing Multifamily systems by becoming a clearinghouse for information exchange between systems.*

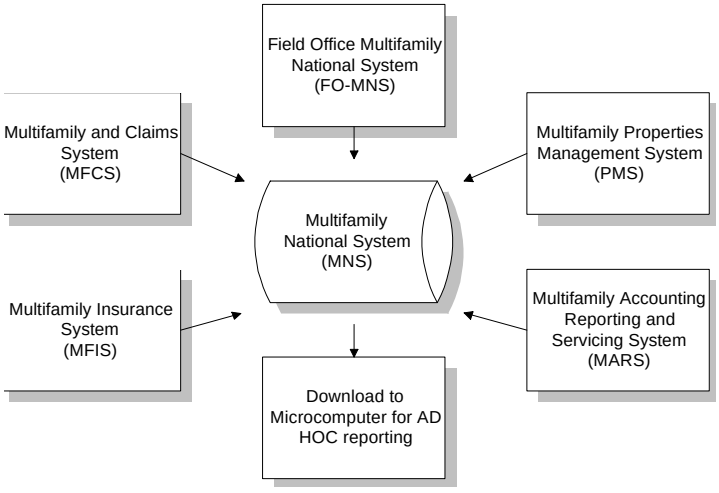
The objectives of MNS were to minimize future losses; improve management information services; improve financial reporting; eliminate data inconsistencies; provide timely and accurate information; increase efficiency; provide a stepping stone to the Financial Systems Integration Plan; and improve credibility.

Design of MNS

MNS was designed to be implemented in three phases. In Phase I, the MNS database was to define 1,500 data elements, and extract programs were to be written to load approximately 150 of the data elements from five source systems to meet short-term auditability goals. The five source systems were to be the Multifamily Property Management System (PMS), Multifamily Insurance System (MFIS), Multifamily Accounting Reporting and Servicing System (MARS), Field Office Multifamily National System (FO-MNS), and Multifamily Claims System (MFIC). The planned completion date of Phase I was November 1992.

In Phase II of MNS, the remaining data elements would be loaded from the five source systems and at least three additional Multifamily systems. MNS would be updated through interface programs from the source systems to MNS, which would be a clearing-house of information, and then pass data to any other system requiring the information. The planned completion date of Phase II was September 1993.

Multifamily National System - Phase I



A possible Phase III was envisioned that would include MNS as the sole source of data for Multifamily systems and work towards eliminating duplicate processing within Multifamily.

Status of MNS

Despite the efforts of all involved and the expenditure of thousands of dollars, the MNS project

was never completed. Work never went beyond Phase I and consisted of a single attempt to upload data into the MNS database. After several months of indecision, the then DAS for Multifamily Housing Programs finally decided to end all work on MNS, effectively killing the project. The reason given by the DAS, who inherited the project, was that the system would not fulfill the intended purpose of the design. It was felt that money spent on the project was wasted and any further money spent would also be a waste.

3.Current Activities

After deciding to halt the MNS project, Multifamily chose a short-term and a long-term approach to solving their information systems problems. In the short term, they intended to *stabilize* FO-MNS and construct a *Data Warehouse* as a central repository for Multifamily information. In the long term, they planned to try again to develop a single, integrated Multifamily information system.

3. FO-MNS Stabilization

Multifamily's intentions are to make short-term changes to the FO-MNS program code to give them enough time to find a more permanent solution. The first part of their stabilization plan would permit Field Office personnel to make corrections to all data they can enter into the system. They currently do not have this capability. This situation has contributed to the large error rates that now occur within the system.

They also want to automate the downloading of information from two feeder systems, Multifamily Accounting Reporting and Servicing System (MARS) and Multifamily Property Management System (PMS). This operation is currently done manually.

Further, they want to make modifications to the system to correct all errors that have been identified in the past. Finally, they want to add into FO-MNS all new sections of the Housing Code that have been enacted but never incorporated into the system. Some of these sections have been in existence for several years and still have not been put into FO-MNS. In general, Multifamily plans to include in their stabilization anything that has changed and affects monetary transactions.

Our Concerns About Stabilization

Multifamily staff must depend on the Office of Information Technology (IT) for the completion of the stabilization plan. An IT estimate given to Multifamily for time required for the work was 1,000 hours of programming and testing. Since June of 1995, IT has spent over $100,000 and has not produced any material improvements.

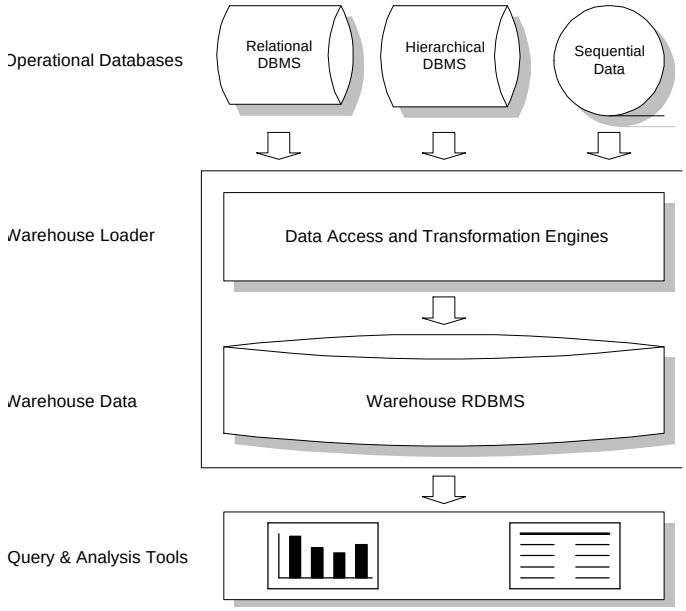
Prior to the start of work on the stabilization, the then DAS for Multifamily Housing Programs put a freeze on any work on updating FO-MNS, and, essentially, no work at all was done on it for at least 15 months.

Therefore, we are concerned whether IT has the ability and Multifamily has the desire to complete even this short-term fix. It appears that a change in attitude will be required to ensure that the desired results are achieved.

Data Warehouse

A *Data Warehouse* is a repository of integrated information available for queries and analysis. The warehouse itself is not an operational system for processing business transactions. It is simply a store of historical data. The warehouse is constructed from several different sources. The data is extracted and then transformed into a common data model, which permits integration of diverse data structures. The key advantage of the warehouse is that when a user queries the warehouse, the desired information is already there in one place in a form that is readily accessible. Data warehouses bring together large volumes of information from operational systems. It is essential that the information is cleaned and transformed so that it is complete and reliable.

Data Warehouse Architecture



As one of the short-term solutions to their data problems, Multifamily has chosen to create a data warehouse. It is their hope that it will meet Multifamily's informational and decision support needs. In addition, according to their Implementation Plan, "Another major expected result of the Warehouse is an improvement in the quality and accuracy of data in Multifamily Housing systems."

The warehouse has gone through an informal testing period at Headquarters. Staff in Housing, Policy Development and Research, Community Planning and Development, the Office of the Inspector General, and several contractors were among the first users.

Five data loads of the warehouse have been accomplished to date. Elements have been extracted from the following systems: Multifamily Preservation Processing System (MPPS), Control File System (CFS), Multifamily Insurance System (MFIS), Field Office Multifamily National System (FO-MNS), Ervin Annual Financial Statement system (AFS), Multifamily Accounting Reporting and Servicing System (MARS), Program Accounting System (PAS), Tenant Rental Assistance Certification System (TRACS), and (PDR).

Our Concerns About The Data Warehouse

We have several concerns about the planning and implementation of the Multifamily data warehouse. The decision to establish a data warehouse was made to fill a recognized shortfall in Multifamily's operating systems. That is, the lack of accurate, reliable information. However, in its rush to establish the data warehouse, Multifamily management has overlooked some fundamental principles, which could prevent them from fulfilling their desired objectives.

The most important consideration here is the quality of data within the warehouse. Insights gained and decisions made from analyzing the data in a warehouse can be only as good as the quality of the information stored in the warehouse. The old axiom from the early days of database

management, garbage in, garbage out, is even truer today when struggling to integrate legacy data into a data warehouse. Multifamily recently established a Data Quality Team to address this matter and is working on a plan. However, the structure to identify and address data quality problems does not yet exist. While Multifamily should be commended for acknowledging that data quality problems must be addressed, it must be willing to provide adequate support to address data quality problems before new systems are developed, and ensure that the new systems have adequate controls to reduce the possibility of errors.

In response to an earlier inquiry on this same subject, the previous warehouse administrator stated that it would be up to each individual system sponsor to ensure the quality of the data coming into the warehouse. This decision is of particular concern, because of the known poor quality of the data in the feeder systems. Without some mechanism in place, it is hard to understand how Multifamily can accomplish its stated goal for the data warehouse of "an improvement in the quality and accuracy of data in Multifamily Housing systems."

The appointment of a data administrator for the warehouse would be a start in the right direction. At present, no such position is included in the implementation plan. Such a person could establish standards and initiate a process for purifying the data. Data modeling through the use of Computer Assisted Software Engineering (CASE) tools such as the Information Engineering Facility (IEF) from Texas Instruments Inc., which the Department already has, might be used. In some cases, systems may need to be re-engineered to correct anomalies, consolidate data, and ensure data quality.

3. The New Multifamily Information System

Simultaneous with the efforts to stabilize FO-MNS and establish a data warehouse, Multifamily is making another attempt to develop a new unified information system. In this latest effort, it is using the Information Engineering Methodology (IEM) currently advocated by the Department. IEM is a structured methodology using a software engineering approach to systems development. IEM principles emphasize that data systems should directly support the business objectives of the organization and not just serve an immediate data requirement.

The method is heavily document oriented and goes through several carefully pre-defined steps. The initial step is to develop an Information Strategy Plan (ISP), which lays out the overall information needs of the organization. The ISP has just recently been completed. Following the principle of data systems supporting business objectives, the methodology requires an analysis of the business environment. This step is followed by the development of system and technical architectures.

User Survey

Prior to beginning this effort, Multifamily conducted a survey of the Field managers and staff to determine the opinions of the principal users of Multifamily's information systems. In answering the survey, they were asked to supply the names of all manual or automated systems used, including those locally developed. They were to respond regarding the usefulness, usability ("user friendliness"), and timeliness of those systems used. Comments were also solicited. It was the intention of Multifamily to use the results of the survey to give guidance on where to focus their resources, what enhancements or fixes are needed, and how to design the new Multifamily system.

There were over 1,700 responses to the survey. Multifamily collected and summarized the results.

The following points come from their summary:

Fragmentation of Data

Instead of developing a single integrated system or a few integrated systems, systems have been created on an "as needed" basis with no thought of the overall needs of the Multifamily programs.

Inadequate System Interfacing

Of those systems that were designed, little or no thought was given to the need for designing the ability for these systems to interface.

Inaccessibility of Data

In general, Headquarters systems are inaccessible by Field staff and vice versa.

Poor System Design and Testing

Edits and calculations in several systems are lacking and/or incorrect. FO-MNS was cited as an especially egregious example.

Inconsistent System Design

Because there has been no central direction over systems design, systems are unique in their user interfaces. There is no consistency in user screens, etc., making it impossible to transfer knowledge between systems.

Slow System Response Times

Users have repeatedly complained that the response times for many Multifamily systems are frustratingly slow.

Emphasis on Data Entry Over Data Retrieval

It is extremely difficult, if not impossible, for users to extract information from most systems. Systems will not permit the generation of ad hoc reports. This has resulted in the creation of local "cuff" systems. Because of this, official systems are not updated or maintained and the quality of the data is questionable.

Inadequate Documentation

Documentation for Multifamily systems is frequently inadequate, outdated, or even non-existent.

Inadequate Training

Many Field staff feel that they are inadequately trained for the systems they are required to use.

Inadequate System Support

There is inadequate technical support for Multifamily systems. Many Field Office staff are frustrated by the long time period (usually months, sometimes years) between problem identification and resolution.

Inadequate Teamwork Between Headquarters and the Field

There is the belief in the Field that Headquarters systems are designed for the use of Headquarters staff. Field staff are generally overlooked in this process.

Our Concerns About the New Multifamily System

The results of the survey make it clear that the problems that have been plaguing Multifamily systems from the beginning are still there. Given Multifamily's past track record in these matters, we believe that it will take more than a new development methodology to ensure the success of this latest effort. We will discuss reasons for this present situation and possible solutions in the next two chapters.

3.A Search for Causes

In this chapter, we will discuss what we believe to be the principle causes of the lack of successful Multifamily information systems.

3. Lack of Upper Management Support

Successful development of a new information system depends on the unswerving support of upper level management. However, what we have found in reviewing the history of Multifamily's efforts in this regard is that maintaining this support has not in fact been the case.

A recurring cycle of events seems to play itself out. First, either from external pressure or a realization that it is impossible to manage with the current systems, a project is started to fix the problems of Multifamily systems. There is enthusiastic support by the staff and current management. However, despite this initial support, the project is never really sufficiently staffed or funded. Then, because of this situation, at some point the work on the project stumbles. There is a reassessment of the project, with a consequent loss of direction and support.

This situation is aggravated by the frequent change of management within Housing and Multifamily. The new management feels that it must do its own new assessment of the situation. Consequently, priorities are changed and funds are redirected resulting in either partial completion or shelving of the project. Then, some time passes, the new management comes to realize the same problems are still there, and the whole process starts all over again.

Contributing to this situation is the exceedingly long time devoted to work on these projects. Thus, almost guaranteeing that there will be at least one change of upper management during the development process.

A lack of understanding by upper management of the full impact of some of their decisions can also have a major effect on maintaining adequate information systems. For instance, when upper management establishes new programs, there is little or no consideration given to the requirements for building automated systems to support those programs. This situation has resulted in either no system being put in place, or else having current, already inadequate systems being further stressed by attempting to load them up with additional, unplanned requirements.

3. Insufficient Qualified Systems Staff

In order to properly manage the development and maintenance of Multifamily information systems, it is necessary to have a sufficient number of qualified staff. However, the number of qualified systems staff in Multifamily has steadily declined over the last few years. For example, when the Information Systems Division was under the control of program management back in the 1980's, it had a staff of about 80 people. After the transfer to the Comptroller's Office, at one point this number declined to a low of seven.

The Department has decided to make up this shortfall with the use of contractor staff. However,

even this number has significantly declined. At one time there were 30 contractors assigned to Multifamily systems. There are now only two.

3. Inadequate Budget

Adequate funding for systems development and maintenance is another essential ingredient for success in this area. A major cause of systems failure is that Housing has built systems and consistently failed to support them.

This situation is particularly true of Multifamily systems. A consistent theme of previous reports and current interviews is that there has been insufficient funds to develop and operate Multifamily systems.

3. Lack of Cooperation Between Information Technology (IT) and Housing

Time and again in discussions with Multifamily staff, we heard the same lament: IT does not give adequate support to Multifamily systems. In the present arrangement, where there is a central IT organization supporting program systems, it is vital that these two organizations work in concert. However, there is evidence that the two entities often appear to be working at cross purposes, or at times, in a confrontational manner.

A particular point of contention brought up by Multifamily staff is their concern over the control of the contractors assigned to Multifamily projects. It was their unanimous feeling that control over those contractors should reside with the program office and not IT. Furthermore, it was also their opinion that this control by IT was a real cause of many of the problems in developing and maintaining their systems.

IT has also been criticized for not controlling their operations in the Field. Instances were cited where regional Multifamily program staff were soured on their own FO-MNS system, because regional Information Systems Division staff (ATAs, MSDs and MIDs) would not support it. Cited as further evidence of the lack of support, was the fact that from 1992 to 1993 there were only three people in Headquarters supporting all of the Field.

Staff of IT also are not reluctant to criticize Multifamily and their systems, calling MIPS and FO-MNS uncoordinated disasters. There is also criticism from IT that no one in Housing understands how to develop new systems. And, further, no one at Multifamily ever has been willing to claim ownership or sponsorship of their systems.

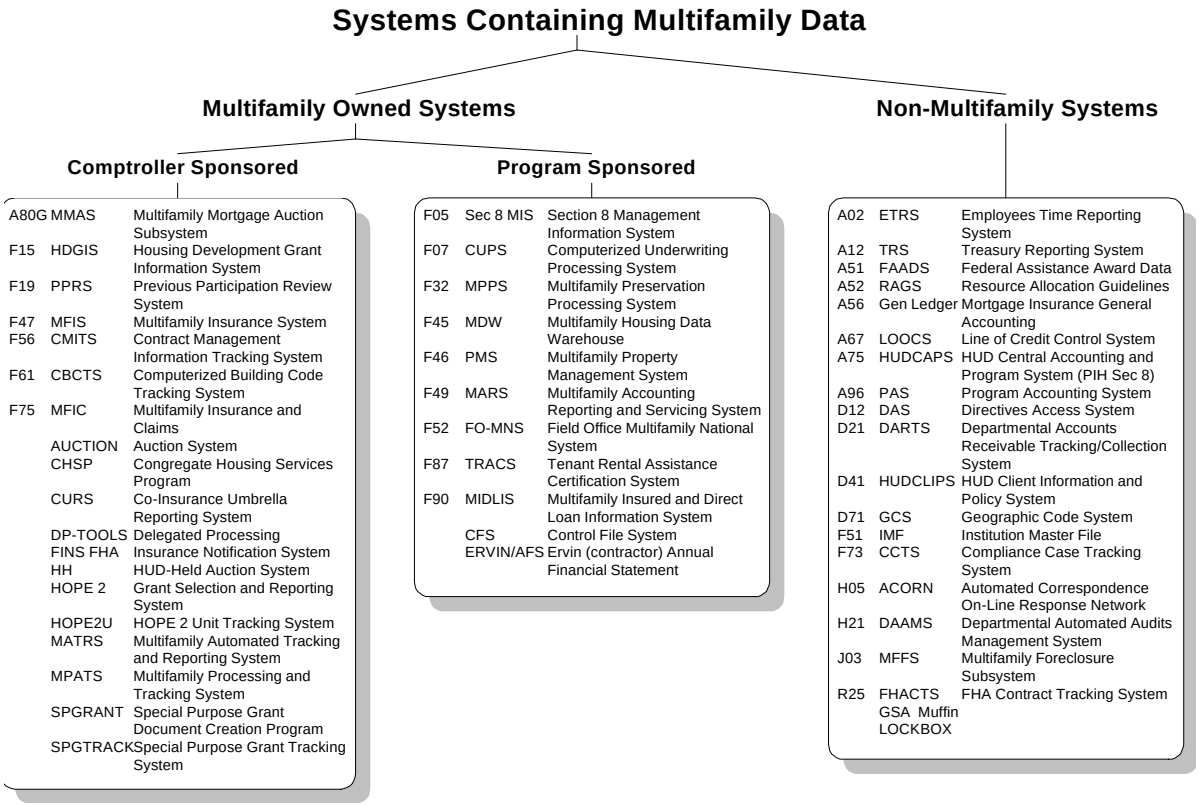
The finger pointing continues, with Multifamily staff claiming that IT staff lacks knowledge of the programs and does not want to learn, while, at the same time, IT staff counter-claiming that their staff knows more about Multifamily programs than they.

Organizational Problems

Several years ago the division responsible for Multifamily systems was moved to the Comptroller's Office. This move followed several successive unfavorable reports on FHA's financial statements, in which the poor state of its information systems was regularly cited as a material weakness. While this move might have seemed justified at the time, it ultimately had a

detrimental impact on Multifamily systems development. This was because the move put Multifamily systems personnel under the operational control of the Comptroller's Office.

The chart below shows the fragmentation of Multifamily data throughout various systems and organizations. As can be seen from the chart, several purely Multifamily systems are under the sponsorship of the Comptroller's Office.



It is vital for an organization to have responsibility for its own information systems. The current fragmentation of Multifamily systems can only foster a lack of responsibility and control over those systems.

As an indication of the lack of attention paid by Multifamily to this area in the past, until recently, there was no one individual within Multifamily to speak for or claim sponsorship for their information systems. This situation has only lately been rectified by the appointment of a Business Systems Manager.

Chapter 5

Recommended Solutions

Need for Change in Multifamily's Organizational Structure for Systems Development and Maintenance

Multifamily's recently completed Information Strategy Plan (ISP) called for all future Multifamily systems to adhere to several basic underlying principles. Among them were:

- Using standard interfaces
- Being able to enter and retrieve information
- Having systems that allow access by Field Office, Processing Center, and Headquarters Staff
- Building integrated systems
- Ensuring funding is provided

These are basic principles and rightly belong in a document such as the ISP. However, at the same time, their inclusion in the ISP leads to a larger question. Why had Multifamily not incorporated such basic principles into their current systems?

There are probably several answers to that question. Some were already discussed in the previous chapter. The first is the fragmentation of sponsorship of Multifamily systems throughout Housing and the Department. The second may lie in the fact that there was no one in charge of program systems at Multifamily. Without someone in charge of this vital area, responsibility and accountability for building interfaces, integrated systems, etc., cannot be established.

Need for a Single Person In Charge

It has been 5 years since Multifamily has had a person in charge of business systems. The lack of leadership in this important area has no doubt taken its toll. Multifamily reestablished the position of Business Systems Manager in February, 1995. We endorse Multifamily's action, and encourage its full support by the DAS for Multifamily Housing Programs.

Program Side Should Be in Control

Along with the establishment of the Business Systems Manager, it is equally important that this new position gain control over all Multifamily information systems. This move means transferring the Multifamily systems currently under the sponsorship of the Comptroller's Office over to the DAS for Multifamily Housing Programs.

Only those systems specifically intended for budgeting and accounting should be under the control of the Comptroller's Office.

Need for Better Systems Staffing

Multifamily must acquire experienced and knowledgeable staff to support the new Business Systems Manager. The Business Systems Manager must be given sufficient staff to carry out the ambitious aims of the ISP. Otherwise, it may very well go the way of the many preceding attempts at solving Multifamily's business systems problems.

Need for Professional Project Management

For many years, construction and defense industries have successfully applied the concept of the "Project Office" as a tool to manage risk on major projects. The project office is responsible for ensuring that every reasonable step is taken to ensure the success of the project. The focus is the project. The project office is not responsible for the project to deliver the product (an operational MF information system). Its principal objectives are to ensure open, fact-based dialog between customer and developer regarding the processes that maximize chances for success, and to provide objective and independent assessments of estimates and status.

The project office must be independent and objective. If the customer or developer can silence the project office, its effectiveness is compromised. Typically the project office reports at a level in the organization that insures access to key decision makers and the opportunity to escalate issues to the highest levels. The project office must have at least one senior individual with large-scale project management experience. The project office is collaborative. It identifies industry best practices, and champions their use within the organization. It is not an audit function, or an enforcement function. A project office for the Housing should include both a housing expert with large-scale project management experience, and an information systems expert. An accounting or insurance expert would be an asset.

A Multifamily project office might address some of the following issues:

- Define projects, players, roles, and responsibilities for developing and maintaining Multifamily information management systems;
- Implement a project management system which provides program managers with a quick look at project health at all times;
- Ensure the Multifamily data administrator has the authority to control and integrate data for Housing systems;
- Ensure proper internal controls are built into the information management systems;
- Ensure proper security controls are implemented in accordance with OMB Circular A-130;
- Implement the Change Control Board recommended in our Software Maintenance audit;
- Require that all information systems for Multifamily are placed under Configuration Management software control;
- Implement Help Desk and/or Defect Tracking software to support the Change Control Board, and build a historical database to assist in resolving production problems;
- Monitor quality assurance and testing activities;
- Approve the release of changes software into production;
- Define both Multifamily and IT responsibilities for operating each application;

- Implement a service level agreement with IT that recognizes their role as prime contractor to Housing;
- Measure the performance of IT (and their subcontractors) on each task they complete, i.e.:
  - Output measures describe the goods or services produced, either by discrete definition, e.g., function points for software, or by a proxy measure that represents the product;
  - Efficiency measures should be the total cost per unit of output;
  - Effectiveness measures should reflect processes controlled by management, to include:
    - quantity of output;
    - quality of outputs as defined by Housing (production problems and ABENDS are quality failures);
    - timeliness of outputs; and
    - customer satisfaction, based on scientific or statistical customer survey.
  - Productivity measures incorporate the amount of work done, the effort devoted to it, and the time that it takes, e.g., the number of function points of software delivered each month per developer; and
  - Throughput measures are designed to allow an organization to measure the total volume of work associated with all IT applications development and support activities completed for the Housing over a specific period of time.

The project office must also utilize industry best practices for its own processes. The Software Program Managers Network (SPMN) was formed within the Department of Defense to bring about substantial improvements in productivity, quality, timeliness, and user satisfaction by implementing best practices as a foundation for management. There is a clear understanding that project management is a core competency for large-scale software development. Good construction tools alone do not guarantee or even imply success. Any software manager may become a member of the SPMN. A series of videotapes and handbooks are being developed to provide best practices information to all network members. These tools are not about official policy or guidance, but provide tools that may be useful in managing software development. In addition to the SPMN, the Project Management Institute provides training and certification that project management professionals are knowledgeable in the core practices of project management.

• A Different Funding Mechanism

A lack of adequate funding has been one of the major causes for many Multifamily systems projects never being successfully completed.

No More Committee Approach to Funding Decisions

The current approach to allocating funding to various systems projects, where a committee of program managers competes for scarce resources, is inefficient and not productive in the long run. A better method must be found.

The committee approach to making systems funding decisions should be abandoned. The planning and allocation of funds to the various systems projects should be made by professional systems

managers. These decisions would then be reviewed and approved by the upper level program managers.

Within Multifamily, the Business Systems Manager would be the person to make these decisions. However, for this method to work in practical terms, there must be a Business Systems Manager to make systems project decisions for all of Housing. In this way, priorities can be set and funds allocated which would maximize information resources across the whole office.

Danger of Short Term Funding

All too often we have heard in our discussions with program staff that systems projects fail either because insufficient funds are initially allocated for the project, or that those funds are redirected or not sustained.

A mechanism must be found to unlink the annual budget process from the funding of multi-year projects.

Need for Total Life Cycle Project Funding

System projects follow several distinct steps in their life cycle development. Unfortunately, these steps do not neatly fit into the annual budgeting process. All too often, funds have dried out in the middle of a project effectively killing it.

Once a project has been approved, funds should be allocated for the full project development life cycle period. Controls can be put in place to determine if the project is on course. *Go, No Go* decision points can be placed in the project plans for this purpose. In this manner, the project leader can concentrate on successfully completing the project, instead on looking over his shoulder wondering if funds will no longer be available at the next budget go-around.

Need for a Rapid Application Development Approach

Current Approach Too Time Consuming

Multifamily is using the Department's standard systems development methodology to plan for its new systems. This standard methodology, the Information Engineering Methodology (IEM) from James Martin, is quite thorough, but also can be quite time consuming.

Given the poor state of Multifamily's current systems, and the pressing need to come up with a usable substitute, we recommend that Multifamily look to one of the newly emerging so-called Rapid Application Development (RAD) methods for all of its systems development projects.

• Need to Change Relationship With IT

As discussed in the previous chapter, there is considerable disagreement between Multifamily and IT about the best method to control their systems development projects. Perhaps before the appointment of a Business Systems Manager, there was some validity to the criticism that there was no one to act as sponsor for Multifamily systems. However, this should no longer be the case.

Multifamily should now take a more active role over its systems development projects. This means that IT will have to take a more subordinate, supporting role then before.

Should Have Control Over Contractors

Along with responsibility over their own projects must come control over any contracts supporting those projects. As the current arrangement stands, IT has responsibility for the contract, meaning that ultimately the contract personnel must answer to IT and not Multifamily. This situation adds unnecessary layers of bureaucracy, and inevitably confusion in the minds of contractor personnel as to who is actually in charge. This is an inefficient arrangement and should be changed.

• Need for a Different Relationship With the Field

The responses from Field staff and managers to the recent survey conducted in preparation for the ISP make it clear that there is inadequate support being given to the Field for Multifamily systems. Complaints of inaccessible data, inadequate training, inadequate systems support, and inadequate teamwork between Headquarters and the Field, among others, are a real indication that this unsatisfactory situation must be quickly addressed and rectified.

There is a feeling among the Field staff that systems are inadequately designed, and then dumped on them without any support. More often than not, this results in Field development of home grown "cuff" systems.

q Must Be Able to Work Closer With Field

Multifamily must establish an organizational relationship between the Business Systems Manager and the Field Office Multifamily staff. The Business Systems Manager must exercise some form of control over the development of local systems. This is necessary to insure that local systems meet standards, are not duplicative of national systems, and are compatible with national systems.

Must Work With IT to Better Support Systems in Field

The DAS for Multifamily Housing Programs must work with the head of IT and the Field service organizations in order to ensure that Multifamily systems are receiving sufficient support. It is obvious from the comments received from the Field that this is not currently happening.