OFFICE OF THE INSPECTOR GENERAL

US NUCLEAR

REGULATORY COMMISSION

NRC'S INFORMATION SYSTEMS

NEED MANAGEMENT ATTENTION

OIG/93A-29 March 18, 1994

AUDIT REPORT

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

March 18, 1994

OFFICE OF THE
INSPECTOR GENERAL

MEMORANDUM FOR: James M. Taylor
Executive Director for Operations

FROM: Thomas J. Barchi
Assistant Inspector General for Audits

SUBJECT: NRC'S INFORMATION SYSTEMS NEED MANAGEMENT ATTENTION

Attached is the Office of the Inspector General's (OIG) audit report on the results of our survey of users and senior and program managers regarding selected safety-related information systems. This report covers part two of our two-part audit of this area. OIG's report entitled, "Results of Nuclear Safety-Related Information Systems User Satisfaction Survey," dated August 30, 1993, provided the user responses to our questionnaire on information systems.

In his March 9, 1994 comments on our draft report, the Deputy Executive Director for Nuclear Materials Safety, Safeguards, and Operations Support stated he agrees with our report and provided information on actions to implement the recommendations.

Attachment:
As stated

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REPORT SYNOPSIS

The Nuclear Regulatory Commission maintains an estimated 200 to 300 automated information systems costing tens of millions of dollars. The agency does not know the exact number of systems that exist nor the total expenditure for the systems. In addition, many senior managers we interviewed told us they have had extensive problems using some systems and lacked confidence in the reliability of the data in those systems. Based on the user and manager opinions, we question whether some systems adequately support the mission-critical programs for which they were developed.

We found that all but one of the systems in our sample were being used to some extent by the managers and staff. However, the management controls over these systems need strengthening to make them more effective and efficient tools to assist the employees in carrying out their missions.

In his comments related to the "Report of the National Performance Review," the Chairman cited NRC's commitment to giving NRC employees the tools they need to do their jobs. Reliable, timely, accurate information is one of the agency's most valuable tools. Making needed improvements to these systems will enable them to be more useful to the employees they were intended to serve.

This report discusses the problems noted in our analyses of the results of an OIG satisfaction survey[1] of 186 system users and a separate OIG opinion survey of 99 managers.

[1]Results of Nuclear Safety-Related Information Systems User Satisfaction Survey, OIG/93A-10, August 30, 1993.

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INTRODUCTION

In fiscal year 1992, the Office of the Inspector General (OIG) began the implementation of its long-term strategy to determine the effectiveness of the Nuclear Regulatory Commission's (NRC) information resources management program. During the course of our initial audit work, concerns were raised regarding the usefulness of the agency's major automated information systems in supporting NRC's efforts to protect the public health and safety.

In addition, the Vice President's "Report of the National Performance Review" (NPR) noted a need to reinvent government in order to create a government that works better and costs less. The NPR report recommends that agencies, among other things, "cut back to basics" by abandoning the obsolete. The overall objective of our audit was to gain senior and program managers' assessment of selected NRC management information systems and to report potential problem areas needing management action. (See Appendix I for additional details on the objective, scope, and methodology).

In a two-phase effort, OIG obtained the views of system users and senior and program managers regarding selected safety-related information systems. OIG secured user opinions regarding system use and support services using a questionnaire-style survey instrument. The results of the user survey were issued in a report dated August 30, 1993. That report provided the user responses to the questionnaire but did not include OIG analysis of potential problem areas indicated by the responses.

During the planning phase of the user survey, one of the Deputy Executive Directors for Operations stressed the importance of including managers' opinions in our survey and requested that we provide them an opportunity to voice their opinions on agency systems. OIG interviewed a cross-section of NRC Headquarters and Regional managers responsible for the various programs these systems support (see Table 1.1 for the number of managers interviewed at each level). This report provides the results of those interviews and builds on the August 30, 1993 report by coupling the user responses with the manager opinions in selected subject areas.

TABLE 1.1

POSITION AND NUMBER OF MANAGERS INTERVIEWED

POSITION	NUMBER INTERVIEWED
OFFICE DIRECTOR	2
REGIONAL ADMINISTRATOR	4
DEPUTY OFFICE DIRECTOR	1
DEPUTY REGIONAL ADMINISTRATOR	3
ATTORNEY	1
ASSOCIATE OFFICE DIRECTOR	3
DIVISION DIRECTOR	24
DEPUTY DIVISION DIRECTOR	1
BRANCH CHIEFS	44
SECTION CHIEFS	16
TOTAL	99

BACKGROUND

The Office of Information Resources Management (IRM) is responsible for NRC's information resources management program. This program provides for a wide range of services including information systems development and maintenance. NRC has an estimated 200 to 300 automated information systems, a large number of which are maintained by IRM, but many others are developed and maintained by the user offices.

NRC manages its safety-related mission primarily through its five regional offices and the offices of Analysis & Evaluation of Operational Data (AEOD), Enforcement (OE), Nuclear Material Safety & Safeguards (NMSS), Nuclear Reactor Regulation (NRR), and Nuclear Regulatory Research (RES). NRC management, technical, and administrative staff in these offices depend

heavily on automated information systems to support numerous mission-critical programs. We, therefore, focused our survey efforts on the users and managers in these offices.

IRM identified a total of 16 systems as NRC safety-related information systems that it maintains. Table 1.2 lists these systems, their sponsor office, operational date, and the computer environment in which they reside.

From this list, OIG and the Federal Systems Integration and Management Center (FEDSIM), U.S. General Services Administration, judgmentally selected a sample of nine systems. OIG consulted with senior NRC managers on the nine systems included in our sample. The sample was selected to reflect a variety of user offices and mission applications. A description of each of the nine systems surveyed is included in Appendix II.

TABLE 1.2

SYSTEM	SPONSOR OFFICE	OPERATIONAL DATE	COMPUTER ENVIRON-MENT
Enforcement Action Tracking System (EATS)[1]	OE	FY 1992	SINET[2] - NIH Mainframe
Event/Unit Update System (SINET[3])[1]	AEOD	FY 1991	SINET[2] - NIH Mainframe
General License Data Base System (GLDB)[1]	NMSS	FY 1987	NRC 9370 Minicom-puter
Inspection Follow-up System (IFS)	NRR	FY 1991	SINET[2] - NIH Mainframe
Inspection Procedure Authority System (IPAS)	NRR	FY 1989	SINET[2] - NIH Mainframe
Inspection Report Tracking System (IRTS)	NRR	FY 1977	NIH Mainframe
Integrated Events System (IEVENTS)[1]	NRR	FY 1992	SINET[2] - NIH Mainframe

[1]System is one of the nine systems sampled.

[2]NRC's Shared Information Network.

[3]Although SINET is the current acronym for this system, it should not be confused with the "SINET" that refers to NRC's Shared Information Network on the National Institute of Health (NIH) Mainframe.

SYSTEM	SPONSOR OFFICE	OPERATIONAL DATE	COMPUTER ENVIRON-MENT
Licensing Tracking System (LTS)	NMSS	FY 1985	NRC 9370 Minicom-puter
Master Inspection Planning System (MIPS)[1]	NRR	FY 1989	SINET[2] - NIH Mainframe
Operator Licensing Tracking System (OLTS)[1]	NRR	FY 1983	NIH Mainframe
Part 21 System (P21)	NRR	FY 1991	SINET[2] - NIH Mainframe
Probabilistic Risk Assessment System (PRA)[1]	IRM	FY 1989	SINET[2] - NIH Mainframe
Safety Issues Management System (SIMS)[1]	NRR	FY 1986	NIH Mainframe
Services and Training Information System (STIS)	NMSS	FY 1986	NRC 9370 Minicom-puter
Systematic Assessment of Licensee Performance (SALP)[1]	NRR	FY 1988	SINET[2] - NIH Mainframe
Transportation Approval Package Information System (TAPIS)	NMSS	FY 1986	NIH Mainframe

FINDINGS

Information is one of NRC's most valuable resources and products. The safety-related information systems in our sample were developed and maintained for the purpose of providing management information in support of mission-critical programs. We found that all but one of the systems in our sample were being used to some extent by the managers. However, opinions received from users and managers raise questions about the adequacy of the support the systems provide to their operations. Also, the management controls over some aspects of these systems need strengthening to make them more effective and efficient tools to assist the employees in carrying out their missions.

The managers agreed on the need to have at their disposal vital, reliable, timely information that is easily accessible. However, many managers did not believe this need was being sufficiently met by the systems in our sample. Also, numerous managers expressed a lack of confidence in the reliability of the information the systems contain. In addition, some users cited problems with certain systems sampled during our user survey.

Based on the manager and user opinions and additional work performed by OIG, we found that:

-- Overall, managers expressed dissatisfaction with several systems;

-- Certain FIRMR requirements were not being met;

-- Accession lists were not being adequately maintained; and

-- The agency does not know the total number nor the total dollars spent on information systems.

Each of these areas is discussed in more detail in the following sections of this report.

MANAGERS EXPRESSED DISSATISFACTION WITH SYSTEMS

We interviewed 99 senior and program managers concerning the safety-related information systems in our sample. Our focus during the manager interviews was primarily on the nine systems. However we inquired about the managers'

use of the 16 systems and found that 15 of the 16 systems were used to some extent. The Probabilistic Risk Assessment (PRA) system was not used by any of the managers and staff surveyed during our audit. A later section of this report discusses the PRA system.

Managers viewed information contained in systems as generally needed; however, 66 of the 99 (66%) managers stated they were dissatisfied with some aspect of the sample systems they use. Overall, the managers described the systems as archaic, hard to access, not user friendly, and not good sources of management information. Also, for a number of reasons, many managers lacked confidence in the accuracy of the database of the systems they use and expressed reluctance to rely on the information in the database. One of the reasons for the lack of confidence was the systems' perceived susceptibility to input errors. Therefore, many managers do not use, or use, but are not satisfied with, the sample systems intended to provide management information in support of their operation. As a result, in some cases, managers have developed other systems to support their activities.

Furthermore, our user survey disclosed that users of the systems generally found the systems they use important. For example, a total of 73 of 97 respondents (75%) said that the system was either very important or important in relation to the work of their office.

A significant number of respondents to our user survey stated the General License Database System (GLDB), the Master Inspection Planning System (MIPS), and the Safety Issues Management System (SIMS) were difficult to use. Table 1.3 provides more information on this point.

TABLE 1.3

RESULTS	GLDB		MIPS		SIMS	
	NO. OF RESPONSES / TOTAL RESPONSES	%	NO. OF RESPONSES / TOTAL RESPONSES	%	NO. OF RESPONSES / TOTAL RESPONSES	%
System is probably or definitely not sufficiently tutorial to assist user during operations.	3 of 3	100	13 of 36	36	3 of 6	50
System is probably or definitely not user friendly.	3 of 3	100	15 of 36	42	2 of 6	33
Queries are probably or definitely not easy to perform.	3 of 3	100	12 of 36	33	3 of 6	50

During our interviews, a substantial number of the managers' expressed dissatisfaction with MIPS and the Inspection Follow-up System (IFS), even though IFS was not included in our sample of nine systems. Because MIPS and IFS are important safety-related information systems and many managers commented on these systems in particular, our report highlights managers' experiences using these systems. Our report also discusses how managers' dissatisfaction with existing systems led to the development of other systems.

Experiences using MIPS

Overall, MIPS surfaced as one of the more troublesome systems for the managers and was identified as a problem system during the user survey. MIPS is a tool to manage a safety prioritized inspection program at each operating commercial reactor. It is a centralized storage of planned and historical inspection data used by NRC management to coordinate NRC and NRC-sponsored activity at commercial reactor sites.

We found that 38 of the 58 (66%) managers that used MIPS were dissatisfied with the system. MIPS was generally characterized by the managers as cumbersome, not user-friendly, error prone, not a reliable source of management information, and hard to access. Also, respondents in the user survey identified MIPS as insufficiently tutorial, user un-friendly, and difficult to query.

In our opinion, MIPS is one of the agency's most critical mission-related information systems in that it is intended for planning and overseeing reactor inspections. During its development stage, the former Deputy Executive Director for Regional Operations described this system and its priority as follows:

> The system as envisioned will provide an inspection planning capability and centralized storage for historical as well as planned inspection data. Due to changes being made in the NRC inspection program, the recognized need for an inspection planning tool, and concerns regarding the accuracy of our historical inspection information data base, the development of a master inspection planning system should be conducted on a priority basis.

According to information provided by IRM, this system cost about $110,000 to develop and maintenance and enhancements over the life of the system (1989 to April 1993) total approximately $730,000.

Numerous regional managers explained that MIPS does not allow them the flexibility to plan inspections by individual inspector. Many of the managers used other systems or software to facilitate the management of inspection activities. These systems were mostly WordPerfect, LOTUS, and dBase files. Some other managers used manual systems to provide similar information.

Additionally, managers who used MIPS stated they did not believe the data was accurate, and that they are constantly correcting errors in the data. Managers indicated that the data generally does not fairly reflect the level of inspection effort devoted to a specific plant in a given period because, due to system quirks, it is easy for MIPS data to be incorrectly displayed in the MIPS reports.

Some managers who oversee a portion of NRC's Inspection program stated a substantial amount of resources is devoted to inputting to MIPS; several indicated the system provides no benefit to them. In fact, three managers suggested it would be easier to manage their inspection activities if the system did not exist. For example, several managers stated the time devoted to inputting to MIPS and trying to correct the errors with the inspection hours in MIPS is very time-consuming and detracts from managing the inspection program.

In his "Final Report on the Results of the Fiscal Year 93 Assessment of the Effectiveness and Implementation of the Operating Reactor Inspection Program", SECY 93-241, to the Commission, the Executive Director for Operations stated:

> The regions' ability to use MIPS as a tool for planning inspection activities varied. Most of the regions had difficulty in using MIPS, and regional personnel stated that the system did not permit on line scheduling and was not user friendly. The MIPS appeared to be particularly weak in its ability to accommodate frequent schedule changes necessary to support a dynamic inspection program. However, in some cases, these difficulties in using MIPS resulted from a lack of staff training and familiarity. As a result of close management involvement, one region achieved considerable success in implementing MIPS. In this region, inspection plans were complete and managers required the inspection staff to notify the appropriate section chief if inspection activities were expected to significantly exceed the pre-planned inspection effort. As a result, inspection plans were accomplished as planned.

The Executive Director's assessment is consistent with our findings in that, essentially, the managers we talked with in four regions experienced most of the problems with MIPS. Top managers in one region stated they have had success using MIPS as a tool to oversee their inspection activities. Officials

in this region believed their success resulted from a commitment by all managers to use the system; doing the quarterly plant performance reviews and making the resulting adjustments to MIPS; keeping central control of the inputs to MIPS in a single division; and setting aside time to learn the system.

Experiences using IFS

The Inspection Follow-up System (IFS) tracks findings and other significant information identified during inspections. It is also an important system that supports the agency's enforcement program. The managers who use IFS generally characterized it as needed, but not user friendly and difficult to access.

One of the primary concerns raised regarding IFS was an inability to input data into the system because of integration problems with other systems. For example, regional managers and staff told us of instances in which the IFS system rejected data they attempted to enter on materials licensees because the docket numbers had not been entered into IFS from the Licensing Tracking System (LTS). The LTS is a control system for materials licenses which tracks pertinent data for licensing the use of byproduct, source and special nuclear materials. A given materials licensee docket number must exist in LTS and be downloaded to IFS before inspection findings regarding that licensee can be entered into IFS. Only Headquarters can download materials docket numbers from LTS to IFS; whereas, regional staff enter inspection findings relative to those docket numbers into IFS. A few regional managers believed this contributed to the backlogs of data to be input into IFS. In our opinion, the inability to input this data into IFS impacts managers' ability to maintain accurate and current records on the status of follow up action regarding important safety-related inspection findings.

An IRM official stated that the problem with missing docket numbers may be due to many reasons, including IFS operator error and delays by Headquarters in downloading materials docket numbers from LTS to IFS.

Also, regional managers informed us of a problem with tracking the status of inspection findings that are entered into the Enforcement Action Tracking System (EATS). EATS is used by the Office of Enforcement (OE) and the regions to track escalated enforcement actions resulting primarily from

inspection findings. IFS tracks inspection findings; however, inspection findings that result in escalated enforcement actions are also entered into EATS. Some managers explained that the items that are escalated and placed in EATS are controlled by the Office of Enforcement and the regions are unable to update the status of the items in IFS once they are placed in EATS. Consequently, the items are carried as open in IFS even after they have been resolved.

In addition, some regional managers indicated they do not have sufficient input to decisions regarding systems prior to their development. For example, in a memorandum dated January 11, 1993, to the Director, Program Management, Policy Development and Analysis Staff, NRR, a Regional Administrator made the following statements regarding a decision on the IFS/EATS interface:

> The regions were not provided final user documentation in advance of implementation. This resulted in providing information to the staff on the implementation of the interface and how it will effect the region's use of IFS after the fact...
>
> In conclusion, the regions should always be directly involved in the final approval of all MIPS and IFS enhancements prior to implementation. In the past this has been done to some degree at the MIPS/IFS Counterpart Meetings. In the case of the IFS/EATS interface, final approval of the enhancement was made by NRR and did not provide regional involvement.

The IFS/EATS interface mentioned above was reportedly needed because these two systems contain related information but are not well integrated. We were told by IRM officials that a bridge was built to link IFS and EATS; however, this bridge was later severed because of resource limitations that made it difficult for Headquarters and Regional enforcement staff to maintain the data entry function.

Systems Developed by Managers

In addition to the experiences expressed about MIPS and IFS, both Headquarters and regional managers have developed and use systems in addition to or in lieu of the sample systems. Managers indicated that these systems were developed largely because of problems encountered with the

sample systems or the sample systems did not contain the precise information they needed. The manager interviews disclosed about 80 such systems, including eight manual systems. While the majority of the automated systems were developed by NRC staff members using "off-the-shelf" software such as WordPerfect, LOTUS and dBase, at least 29 others required contractor or laboratory assistance.

For example, we found that the Integrated Events System (IEVENTS) and three other systems -- the Event/Unit Update System, NRR's Events Tracking System, and AEOD's Events System, contained essentially the same information. IEVENTS contains preliminary notifications, morning reports, event notifications, and licensee event reports.

Two of the four systems, IEVENTS and the Event/Unit Update System, are maintained by IRM. According to IRM, the IEVENTS system was developed to replace the Event/Unit Update System in order to provide better search capabilities. However, some employees liked the report format of the first system. Both systems were left in the SINET shared data network. Both of these systems are on mainframes and some managers told us they have problems accessing these systems.

AEOD and NRR each maintain a PC-based system because of their need for event information. IRM designed IEVENTS to be a medium of exchange between these two systems. However, because of the ease of use and reliability of the AEOD and NRR systems, these systems now feed each other directly in addition to supplying information to the IEVENTS system. The AEOD system was developed by AEOD employees and the NRR system by a contractor.

FIRMR Requirements Not Fully Complied With

The Federal Information Resources Management Regulation (FIRMR), 41 CFR Chapter 201, contains the policies and procedures for the acquisition and management of Federal Information Processing (FIP) resources. The FIRMR mandates that a requirements analysis and an analysis of alternatives be performed prior to the acquisition of FIP resources. An automated information system is a FIP resource. Part 201-20 of the FIRMR states:

> Agencies shall establish and document requirements for FIP resources by conducting a requirements analysis commensurate with the size and complexity of the need....
>
> Using the results of the requirements analysis as the basis, agencies shall conduct an analysis of alternatives, commensurate with the size and complexity of the requirement, to identify the most advantageous alternative to the Government.

The Director of IRM stated there was no requirements analysis and probably no analysis of alternatives done for any of the nine systems in our sample. He added IRM did assess the systems' functional requirements, but did not do requirements analysis or analysis of alternatives to the extent required by the FIRMR because of a lack of adequate resources. Because FIRMR requirements were not followed, we believe that funds were expended to develop one system that is not used.

We found that none of the managers used the Probabilistic Risk Assessment System (PRA) developed by IRM even though some indicated they have PRA responsibility. Instead, the user offices developed their own PRA systems because the system maintained by IRM contained summary PRA data that is not detailed enough to be useful to them in doing their job. Furthermore, the only person listed on the accession list as a user of the PRA system did not use it. Moreover, we did not identify anyone who used this system either during the user survey or the manager interviews.

According to information provided by IRM, the PRA system cost $72,000 to develop and is a part of SINET which costs approximately $75,000 a month for timesharing. IRM could not determine what portion of the $75,000 monthly timesharing costs allocates to the PRA system.

We found that IRM did not do a requirements analysis nor an analysis of alternatives prior to developing the PRA system in 1989 as required by FIRMR.

IRM's lack of compliance with provisions of the FIRMR were noted in an earlier OIG report entitled, "Review of IRM's Management of its Contracts", dated March 8, 1993. That report related to IRM's not fully complying with FIRMR requirements in its contracting for FIP resources. This report pertains to the agency's compliance with FIRMR requirements prior to developing systems. The Director, IRM, pointed out that IRM recently began conducting requirements analysis. OIG has not performed a follow-up review

to evaluate IRM's implementation of this policy and it is our impression that other offices that develop systems are not fully aware of FIRMR requirements related to systems development.

We note that some regional managers believed they lacked sufficient involvement in the systems development process for the systems sampled. The performance of requirements analysis and analysis of alternatives should increase user and manager involvement and decrease the chance of the systems not meeting the needs of those for which they are developed.

ACCESSION LISTS NOT ADEQUATELY MAINTAINED

Accession lists are maintained as a means of controlling access to system databases, especially for systems containing sensitive information. According to IRM officials, names are placed on the accession list for systems only upon request.

Our user survey disclosed that 79 of 175 (45%) respondents whose names were taken from system accession lists never used the systems in question. Many respondents did not know how their names got on the accession lists and others did not know the given system existed.

At least four of the people in our user survey sample had left the agency, yet their names were still on the accession list for those systems. This raises questions about the adequacy of the accession lists, the procedures for removing names from the lists, and whether access to systems, particularly those containing sensitive information, is adequately secured. An IRM official told us that the user offices are responsible for requesting that names be put on and removed from the accession lists.

NUMBER AND COST OF SYSTEMS

The Paperwork Reduction Act requires agencies to systematically inventory major systems to avoid duplication with other systems maintained within that agency or by other Federal agencies.

IRM maintains about 100 automated information systems and estimates that another 100 to 200 systems are maintained by other offices within the agency. IRM maintains a computerized listing of the systems it maintains, which includes a general description of the system and other pertinent information.

For the most part, no such inventory exists for the other 100 or more systems maintained by other offices, nor is there definitive information on how many other systems are maintained by the these offices. We asked key officials in Headquarters and the regional offices whether they have such records for their systems. We found that only one office other than IRM prepared a partial listing of the systems maintained by that office. However, we were told that this list was incomplete and was not current.

IRM estimates a $4 million dollar annual expenditure for enhancements and the operation of the systems it maintains. However, IRM did not know the cost allocation by system and did not have complete records on development costs for these systems. IRM does not maintain records on the costs or number of systems controlled by other offices. As a result, the agency does not know the total costs for systems development and maintenance for these systems.

In OIG's audit report entitled, "Results of the Audit of U.S. NRC's Fiscal Year 1992 Financial Statements", dated June 29, 1993, OIG indicated that the agency does not maintain adequate records on systems' costs and could not determine with certainty the total expenditure for the systems it maintains. NRC officials estimated the asset acquisition value of NRC's information systems at about $33 million. The OIG report also stated that independent auditors were unable to form an opinion on the $31.3 million net book value[4] for property, plant, and equipment; of which $17.2 million related to ADP software systems. The Director, IRM, told us that the agency recently began to maintain better records on the costs of information systems as a result of the audit of the financial records.

We believe sound fiscal accountability requires the agency to keep thorough and accurate records on the number and cost of the systems maintained. Because our June 1993 report on NRC's FY 1992 financial statements addressed this same concern, we are not making any recommendations in this report. However, we plan to follow up on the agency's corrective actions taken in response to that report.

[4]Net book value equals acquisition value minus accumulated depreciation.

CONCLUSIONS

As requested, OIG canvassed agency managers and found a variety of opinions regarding the information systems they use. Although the interviews surfaced problems, the underlying causes appeared to be widely diversified. Therefore, we are not making specific recommendations to rectify individual problems. However, we believe it is important for the agency to further explore the concerns raised in order to appropriately address them.

Our work disclosed that:

-- Managers voiced dissatisfaction with systems due to user unfriendliness, access problems, and inaccurate data, and in some cases, developed other systems to support their activities.

-- FIRMR requirements were not fully met.

-- Procedures for maintaining accession lists need to be improved.

-- The agency does not know the exact number of systems that exist nor the total dollars expended on these systems.

RECOMMENDATIONS

In order for NRC to address concerns raised by its managers and ensure that the problems they identified with systems are rectified, we recommend that the EDO:

1. Develop and implement an action plan for evaluating and addressing problems voiced by the staff and managers using the systems.

In order for NRC to achieve its commitment to the NPR goals and strengthen its management controls over automated systems, we recommend that the EDO:

2. Ensure the elimination of systems that are not needed.

3. Evaluate the policies and procedures for maintaining accession lists and assure that these policies are effective and implemented.

4. Ensure that all NRC offices conduct requirements analysis and analysis of alternatives prior to developing information systems as required by the FIRMR.

AGENCY COMMENTS

On March 9, 1994, the Deputy Executive Director for Nuclear Materials Safety, Safeguards, and Operations Support (DEDO) responded to our draft report. He agreed with our findings and recommendations and provided information on actions to implement the recommendations. The DEDO's comments are shown in Appendix III.

OBJECTIVE, SCOPE, AND METHODOLOGY

This survey was initiated to obtain user and manager opinions regarding the use of Nuclear Regulatory Commission (NRC) safety-related information systems and the quality of support received in relation to those systems. Our objectives in performing this survey were to (1) provide the agency with pertinent information regarding system use and data reliability, and (2) identify areas that may warrant further review.

SURVEY PARTS

The survey consisted of two parts which were, for the most part, performed concurrently. One part was the conduct of a user-satisfaction survey using a questionnaire-styled survey instrument. The survey instrument was developed and tested with the assistance of the Federal Systems Integration and Management Center (FEDSIM), Office of Technical Assistance, Information Resources Management Service, U.S. General Services Administration. The survey was designed to elicit user opinions regarding a specified information system. The survey queried user opinions regarding system use, input processes, outputs, operating processes, and development and maintenance services.

At the request of one of the Deputy Executive Directors for Operations, the second part of the survey focused on interviewing a cross-section of Headquarters and Regional managers to obtain information on their experiences in using the systems and the usefulness of the systems in managing their programs. We interviewed over 100 managers and staff members to obtain information on NRC systems. This number included 99 managers representing five Headquarters and the five regional offices concerning system use, reliability of data, systems development and maintenance support, among other things. OIG judgmentally selected the managers interviewed to include an assortment of position levels, offices, and program responsibilities.

We also interviewed both Deputy Executive Directors for Operations, the Director, Office of Information Resources Management (IRM), and a number of other IRM officials and staff, General Services Administration personnel, and many other NRC Headquarters and regional employees.

SYSTEMS SAMPLED

From the listing of 16 safety-related information systems that IRM provided, OIG and FEDSIM judgmentally selected a sample of nine systems. This sample was selected to reflect a variety of user offices and mission applications.

The user survey covered only the nine systems. The manager interviews focused primarily on the nine systems; however, managers were asked which of the 16 systems they used, whether they input to the system and what would be the impact on their operation if the system did not exist.

SAMPLE SELECTION AND RESPONSES

OIG used the user accession lists to define the user sample universe. Only users from the five NRC regions, and the offices of Analysis and Evaluation of Operational Data, Enforcement, Nuclear Materials Safety and Safeguards, Nuclear Reactor Regulation, and Nuclear Regulatory Research were included in the sample universe. OIG judgmentally sampled those users for each of the nine sample systems, depending on the size and office stratification of each system's user universe. Table 1.4 lists the number of users on the accession list from the targeted offices, surveys mailed, and responses received for each system. The sample chosen for the nine systems consisted of 206 users. OIG received 186 responses, giving a 90% response rate.

TABLE 1.4

SYSTEM	NUMBER ON ACCESSION LIST	NUMBER OF SURVEYS MAILED	NUMBER OF RESPONSES RECEIVED
EATS	37	11	11
SINET	25	10	9
GLDB	5	3	3
IEVENTS	908	92	80
MIPS	606	59	56
OLTS	6	6	6
PRA	1	1	1
SIMS	38	12	10
SALP	42	12	10
TOTAL	1,668	206	186

Our review was conducted in accordance with generally accepted Government auditing standards. Audit work pertinent to the user survey and manager interviews began in March 1993 and was completed in July 1993.

SYSTEM DESCRIPTIONS

ENFORCEMENT ACTION TRACKING SYSTEM (EATS)

The EATS system tracks escalated enforcement actions. In 1989, the Office of Enforcement requested that EATS be converted from the personal computer environment to the mainframe environment where it currently resides. All NRC regions have access to this system.

EVENT/UNIT UPDATE SYSTEM (SINET)

The SINET system was developed as part of phase one of the Corporate Data Network. This system tracks event notifications and Licensee Event Reports (LERs) and was supposed to be replaced by the Integrated Events System (IEVENTS). According to IRM, this system is still active because some agency users prefer its report format to IEVENTS.

GENERAL LICENSE DATA BASE SYSTEM (GLDB)

The GLDB system was developed to manage information regarding the general licenses for nuclear byproduct materials. The system was developed for use by NMSS.

INTEGRATED EVENTS SYSTEM (IEVENTS)

The IEVENTS system was designed to incorporate Morning Reports (MRs) and Preliminary Notifications (PNs) into the corporate database (SINET). As mentioned above, IEVENTS was supposed to update and replace the Event/Unit Update System.

MASTER INSPECTION PLANNING SYSTEM (MIPS)

MIPS is a management tool used to design inspection plans for operating commercial reactors. MIPS automatically includes those inspection procedures that are part of the core, mandatory team, and safety issues

inspection programs and allows for additional inspection activities to be planned and scheduled by the regional offices based on an NRC assessment of each licensee's performance.

Operator Licensing Tracking System (OLTS)

OLTS was developed to aid the Operator Licensing Branch, NRR, in tracking the logging of applications and licenses and in preparing statistical reports. Among other things, this system maintains a record of all applications received for new and renewed operator licenses for all power and nonpower reactors.

Probabilistic Risk Assessment System (PRA)

The PRA system was designed by IRM to provide a central repository of summary level information on all probabilistic risk assessments conducted for NRC-monitored facilities.

Safety Issues Management System (SIMS)

SIMS was developed to provide an effective management information system to ensure the timely resolution of safety and/or other regulatory concerns affecting nuclear power plants.

Systematic Assessment of Licensee Performance (SALP)

The SALP system was designed to provide a central repository of summary level information on all SALP reviews conducted for NRC-monitored facilities.

INSPECTION FOLLOW-UP SYSTEM (IFS)

The IFS system is a subsystem of the Master Inspection Planning System (MIPS). It provides an inspection planning tool for follow-up of any identified issues, as well as a historical record of inspection findings, selected open items, and normal escalated enforcement information.

AGENCY COMMENTS ON DRAFT REPORT

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

March 9, 1994

MEMORANDUM FOR: Thomas J. Barchi
Assistant Inspector General for Audits
Office of the Inspector General

FROM: Hugh L. Thompson, Jr.
Deputy Executive Director for Nuclear Materials Safety, Safeguards, and Operations Support

SUBJECT: DRAFT REPORT - "NRC'S INFORMATION SYSTEMS NEED MANAGEMENT ATTENTION"

This responds to the February 1, 1994, memorandum transmitting the draft subject audit report. We agree with the content of the subject audit and have no comments or suggested changes to the report. With respect to your specific recommendations, we submit the following comments.

Recommendation 1

Develop and implement an action plan for evaluating and addressing problems voiced by the staff and managers using the systems.

Response

Agree. IRM has recognized several of the problems cited in the report and has plans underway to make improvements. One of the key strategies contained in IRM's recently developed Strategic Information Technology Plan is the need to improve the agency's applications systems management. We think improvement in this critical area will eliminate many of the problems identified in the draft IG audit report.

The strategy for applications management focuses primarily on improving the overall quality and integration of the agency's information and applications by changing the way that information systems are developed and managed. This strategy includes three major components: (1) strengthening systems life cycle management for all new systems, focusing on major development projects; (2) piloting business process reengineering as an integral part of the systems life cycle process to review and streamline the current processes before they are automated; and (3) implementing a data management program to improve the quality and accessibility of the agency's information with a focus on key applications areas. By completing these components, the agency

would improve the overall quality of its information systems.

The problems cited in the draft IG report (the systems are archaic, difficult to access, not user friendly, difficult to query, cumbersome, and insufficiently tutorial) are a direct result of the way the NRC developed its information systems over the years using a variety of technologies and approaches coupled with the technological aging of the nine application systems. Systems development project managers had few operational guidelines and the NRC had a limited number of development standards to encourage a consistent level of quality in developing, testing, and maintaining these systems. As a result, some of the NRC's information systems are technologically obsolete, not user friendly, and difficult to access.

Adopting systems life cycle management (LCM) will enable the NRC to improve the quality and consistency of its information systems by using LCM to structure the systems development process from initial requirements and programming through obsolescence and replacement. LCM encompasses all of the key components that make up a system: software, data, hardware, telecommunications, training, user support, and systems maintenance.

To round out this strategy and to make it technically feasible to improve the way the NRC develops and maintains its information systems, the NRC needs a plan that ensures against the technological obsolescence of its computing infrastructure. The recently developed and approved strategy for information technology infrastructure emphasizes significant investment in the hardware, software, and telecommunications technologies needed to create a robust and reliable automation environment capable of supporting the agency's current and future applications and communications needs.

Three key areas of the infrastructure bear on the findings of the audit report: workstation replacement, networking and connectivity, and local area network (LAN)-based development platforms.

The new workstation replacement strategy (entitled PC REFRESH) emphasizes an accelerated investment in office automation workstations to avoid the costs of operating and maintaining old equipment and to provide the capability needed to run current and future LAN-based applications. This strategy will update NRC's office automation workstations to meet the current industry standard for functionality, reliability, performance, and interoperability. The PC REFRESH contract was approved for use on January 10, 1994, and will continue for three years.

The second and third components of the infrastructure strategy

requires the use of LAN-based platforms for new applications to improve functionality and ease of use. To achieve the level of performance required, the AUTOS network must be upgraded to handle the data traffic and software required that will provide the functionality needed to support the NRC's information systems. In addition, we have contracted through the General Services Administration to review all mainframe systems resident at NIH and to "rightsize" or re-develop those systems onto PC/LAN-based platforms where appropriate. Systems required for future NRC work will be "rightsized" for running on in-house computers while systems no longer needed will be deleted from the current systems inventory. The first level of review of NIH systems will be completed in FY 1994. Those systems that are candidates for re-development will be scheduled to start in FY 1995, resources permitting.

The draft IG report also identified data errors, the lack of confidence in the systems because of the inability to input data to maintain accurate and current records, and other related data problems. Although there are several circumstances contributing to this particular problem, the IRM strategic plan identified as a challenge under Information and Applications Management the need to "manage shared data and documents as agency resources and ensure they are accessible, secure, and reliable."

To support improved integration and data management, IRM's strategic plan includes the implementation of a strong data administration program to ensure that data is managed as an agency resource by (1) establishing policies and standards for shared data, (2) defining roles and responsibilities for shared data, and (3) implementing a data quality assurance program. The plan states that the staff will apply these data management policies and standards to major functional areas, such as financial and contracts data. IRM had planned to begin work in this area during Fiscal Year (FY) 1994 but higher priority work caused us to postpone this initiative until FY-1995.

As previously cited, data related problems - unreliable data and data errors - can originate from several sources. Although data structures and data entry programs can be designed to prevent some errors, there are many that can be controlled only by the users who are responsible for the information. When actual computer code is discovered to be bad, it will be corrected. Data input edits, and other data safeguards are already being used. But, ultimately the user has the responsibility for the data accuracy and currency.

Considering the range of problems cited in the draft IG report and understanding that the resolutions are based primarily on major infrastructure upgrades and redesign of systems, the

process to improve the agency's information systems will take multiple years to complete. We have underway several projects that highlight the capabilities of current technology (hardware, software, and telecommunications) and are optimistic that over time this approach will eliminate or control most of the problems cited in the IG draft report. Until we have some hard experience using this approach, it is extremely difficult to pinpoint a future date at which time all of the applications systems required to process the NRC's work would be rid of the problems facing the nine systems studied in the report. To measure progress, IRM suggests that the problems documented in this audit report become the baseline as the above plans and initiatives are put into place. A followup audit conducted during Fiscal Year 1996 to measure progress would be beneficial.

Recommendation 2

Ensure the elimination of systems that are not needed.

Response

Agree. All offices within the NRC that develop and use computer systems, including IRM, will be required to determine the need for each system at least once each fiscal year. IRM routinely learns of system changes through the annual Information Technology planning call each Spring. The first such review for other NRC offices will be completed by the end of FY 1994.

IRM maintains an automated inventory of all systems developed by IRM. Other NRC offices are required to provide the same type of information about their systems to IRM in order to have a single inventory of systems for all of NRC that will enable the agency to account for costs for all software developed or modified during the fiscal year. Office systems information will be provided to IRM during FY 1994 and maintained current thereafter.

When an office/user identifies a discontinued system, IRM moves immediately to remove that system from operation and properly archive or discard all associated data files and documentation. IRM will continue this practice. Other NRC offices will be required to establish similar procedures.

IRM will review its policies and procedures regarding the handling of application systems no longer needed and will make the appropriate changes to ensure obsolete or unused systems are deleted from the system and archived accordingly. This review will be completed and changes made, where necessary, by July 1, 1994.

Recommendation 3

Evaluate the policies and procedures for maintaining accession lists and assure that these policies are effective and implemented.

Response

Agree. IRM will review its current policies and procedures to assure that they are effective and are being properly implemented.

Our current procedures rely on the user offices to keep the accession lists accurate and up to date. For example, requests for first time access, transfer of access, or deletion are accomplished through the submittal by individual user offices of an NRC Form 380, Computer Facility Access/Change Request. The form must be completed by the user and signed by the requestor's supervisor or a delegated individual.

Each user is given an opportunity once a month to verify access to systems at NIH. All costs associated with each access is reported by office, system, and user name. These reports are submitted to each Office Director/Regional Administrator for certification. If the month's cost is $100 or greater, the Office Director is requested to certify the costs and return a signed document to that effect. If costs are less than $100, this certification is not requested, however, each system is reviewed by the user office regardless of monthly cost figures. This process is also used to identify systems no longer in use (recommendation 2).

This review will be completed and changes made, where necessary, by July 1, 1994.

Recommendation 4

Ensure that all NRC offices conduct requirements analysis and analysis of alternatives prior to developing information systems as required by the FIRMR.

Response

Agree. In support of this recommendation, the strategic information technology plan contains a program management element that calls for improving the IT acquisition process.

According to the FIRMR, all FIP resource acquisitions require the preparation of certain documentation, including requirements and alternatives analyses. As defined in the FIRMR, the term

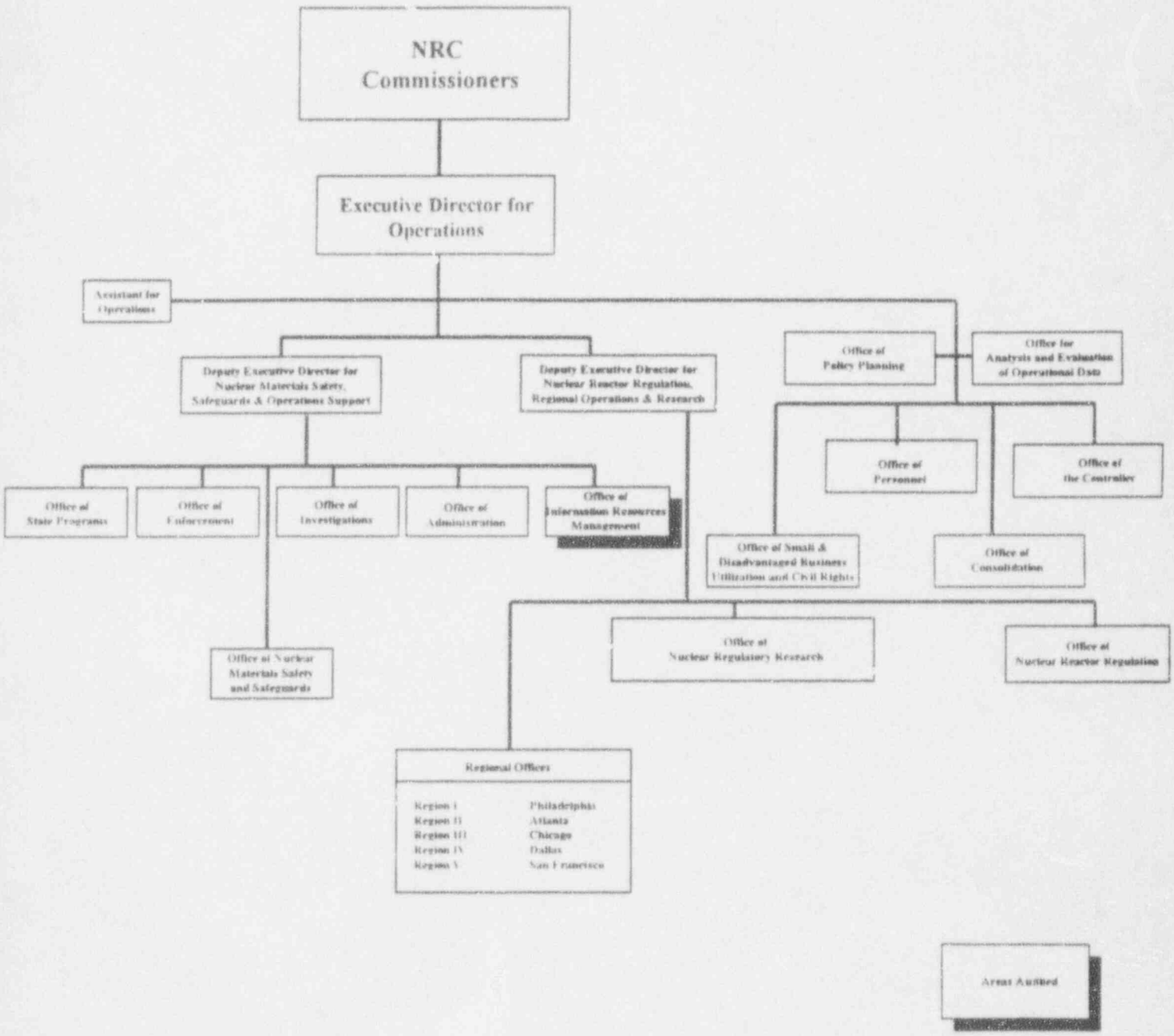
"acquisition" includes obtaining FIP resources (such as systems development) both from sources external to the agency and through in-house sources or development. IRM has recognized the need to strengthen management of FIP resource acquisitions to assure FIRMR requirements are being met while at the same time avoiding unnecessary bureaucracy. In 1992, IRM hired a FIP acquisition specialist to improve the conduct of FIP resource acquisitions. Over the past year, IRM has issued internal policy to all IRM project officers with instructions on preparing FIRMR documentation. IRM has also developed a comprehensive project manager training program that all IRM project managers must attend. In addition, all IRM and program office FIP resource acquisitions are reviewed for FIRMR compliance by IRM's FIP acquisition specialist before approval by the IRM Director. Upon implementation of IRM's reorganization, three additional staff positions were reassigned to the centralized management of FIP acquisitions.

With respect to FIP acquisitions (including system development) conducted by other offices, the Designated Senior Official (DSO) for Information Resources Management has appointed Senior IRM Officers (SIRMOs) in each of the major program offices who are responsible to ensure that individual office initiated FIP acquisitions are approved by IRM and carried out in accordance with the FIRMR. The SIRMOs have received formal training on the requirements of the FIRMR. By May 1994, the DSO will issue a memorandum to further clarify the roles and responsibilities of IRM and the program offices with respect to FIP resource acquisitions. A FIP acquisition directive that formally codifies the roles, responsibilities, and procedures will be issued later this year.

We also note that GSA has granted NRC a waiver from certain FIRMR requirements (including the FIRMR documentation referred to by the IG) as part of NRC's procurement reinvention laboratory. IRM plans to use this latitude to consolidate and streamline FIRMR documentation requirements. Instructions on the new requirements will be issued by May 1994.

Hugh L. Thompson, Jr.
Deputy Executive Director for
Nuclear Materials Safety,
Safeguards, and Operations
Support

U.S. NRC FUNCTIONAL ORGANIZATION CHART



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