BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Better Inspection Management Would Improve Oversight Of Operating Nuclear Plants

Investigations of the March 1979 Three Mile Island nuclear power plant accident concluded, among other things, that the Nuclear Regulatory Commission (NRC) needed to improve its program for inspecting operating nuclear power plants. GAO evaluated NRC's management of this program and found that:

--Although total inspection hours at plants have almost doubled, more time is required to check for compliance with an expanding body of requirements. Therefore, the sufficiency of inspection program resources is a continuing agency concern.

--NRC should use available information and analytical techniques to help focus its resources on high priority inspection areas.

--NRC could improve inspectors' effectiveness by providing them with additional training and clearer guidance and criteria.

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

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To the President of the Senate and the
Speaker of the House of Representatives

This report examines the Nuclear Regulatory Commission's program for inspecting operating nuclear power plants and suggests ways that the Commission could enhance its oversight of nuclear plants.

We conducted this review because of the increasing number of operating nuclear power plants and the program's importance to the regulatory system.

Copies of this report are being sent to the Director, Office of Management and Budget, and to the Chairman, Nuclear Regulatory Commission.

Charles A. Bowsher

Comptroller General
of the United States

COMPTROLLER GENERAL'S REPORT
TO THE CONGRESS

BETTER INSPECTION MANAGEMENT WOULD IMPROVE OVERSIGHT OF OPERATING NUCLEAR PLANTS

D I G E S T

The Nuclear Regulatory Commission (NRC) was created in 1975 to regulate the commercial nuclear power industry. At that time, there were 53 nuclear power plants in commercial operation. Now there are 81, and by the end of the decade there could be 100 or more.

Until 1978, NRC frequently sent inspectors to each operating plant from its five regional offices to confirm that the plants were operated safely and in compliance with regulations. Regional inspectors conducted a variety of specialized inspection procedures, each of which was designed to determine compliance with one or more of NRC's regulations or detailed requirements which implement regulations.

In 1978, NRC began to station one or more "resident" inspectors at each operating plant to observe daily activities. In conjunction, regional inspectors continued to perform the various specialized inspection procedures. Daily observations by residents, supplemented by region-based specialized inspectors, continues as NRC's basic inspection approach.

Investigations of the 1979 accident at the Three Mile Island nuclear plant by a presidential commission and a special inquiry group of the NRC commissioners concluded that NRC needed to improve its inspection program for operating plants by (1) devoting more resources to inspections, (2) using plant operating experience and risk-based analytical techniques to sharpen inspection procedures and priorities, (3) systematically assessing plant owners' operating performances, (4) supplementing routine inspections with periodic, in-depth team inspections, and (5) clarifying inspection procedures, regulations, and other regulatory requirements.

GAO reviewed NRC's management of its operating nuclear power plant inspection program, including its response to findings of Three

Mile Island investigations, because of the increasing number of operating plants and the program's importance to the regulatory system. A major part of GAO's methodology was the administration and analysis of confidential questionnaires to NRC's field-level inspection staff who implement the inspection program, and to officials of utilities operating nuclear plants. GAO discussed its methodology, including the administration and distribution of questionnaires, with NRC officials. In addition, GAO reviewed documentation on inspection program policies and procedures, and discussed the design and management of the program with headquarters and field-level program officials.

On the basis of the questionnaire responses, GAO found that, compared to the inspection program prior to the Three Mile Island accident, improvements have been made in ensuring that utilities safely operate their plants in compliance with NRC regulations. However, NRC inspectors stated that staffing constraints resulting from expanded inspection requirements did not allow them to make the detailed reviews of power plant operations they believed were necessary. About one-third of the inspectors added that NRC should provide them with additional training and with clearer inspection guidance and criteria to help improve their effectiveness.

In addition, GAO believes NRC should use available information and analytical techniques to identify high-priority inspection areas, to help ensure that NRC focuses its resources on priority inspection areas. This is particularly important given concern that has been expressed over staffing constraints.

MANY RESPONDENTS NOTE
INSPECTION PROGRAM IMPROVEMENT

About 65 percent of the NRC respondents who expressed an opinion, and 41 percent of the utility questionnaire respondents, said the inspection program has improved since the Three Mile Island accident. NRC's use of resident inspectors was singled out as the major improvement. Seven and 16 percent, respectively, said the inspection program is worse. (See p. 9.)

More than 80 percent of both groups stated that the inspection program ensured that

utilities comply with regulations. In addition, about 80 percent of the NRC respondents and 60 percent of the utility respondents said the inspection program ensured safe plant operations. (See p. 10.)

More than 60 percent of all NRC respondents also said that utilities are at least "greatly" responsive to their inspection findings and recommendations. About 30 percent said utilities are "moderately" responsive, while about 8 percent said utilities are "somewhat" responsive. (See p. 11.)

INSPECTION RESOURCES MAY NOT BE KEEPING PACE WITH AN EXPANDING WORKLOAD

Despite the increasing number of operating plants, GAO found that NRC's average annual inspection hours per plant increased from almost 1,000 hours in 1978 to over 2,000 hours in 1981 and 1982. In 1983, the per-plant average declined to 1,824 hours. However, the total number of NRC's specialized inspection procedures also increased from 43 before the Three Mile Island accident to the current total of 114 as regulatory requirements increased following the accident. More inspection time is required at each plant to check for compliance with more requirements. While some of these new procedures are not mandatory, the fact remains that the number of compliance checks have increased the inspection time required at each plant. Thus, higher average inspection hours per plant may not be indicative of sufficient time being spent on checking compliance with individual requirements. (See p. 11.)

A majority of NRC inspectors and managers responding to GAO's questionnaires said additional inspectors are needed. In addition, about 40 percent of the inspectors said they do not have enough inspection time to assure compliance with regulations. (See p. 13.)

The sufficiency of inspection resources has been a persistent issue since the Three Mile Island accident. NRC has made several program adjustments since then because of what it perceived to be too few inspectors. For example, until August 1981, NRC policy was to conduct

all inspection procedures at each plant within prescribed frequencies or in conjunction with certain plant events. However, since that time, NRC has granted field managers discretion to schedule 61 of the 114 inspection procedures on the basis of inspection needs and inspector availability because it found that it could not perform all of the required inspections on schedule.

NRC SHOULD USE AVAILABLE INFORMATION AND TECHNIQUES

Given NRC's inspection program staffing constraints, the effectiveness of NRC's discretionary approach to scheduling inspections depends on (1) it's ability to identify plant activities and related inspection procedures which should receive priority because of their importance to safety and (2) the abilities of field managers and inspectors to accurately assess the relative strengths and weaknesses in the operation of individual plants. GAO found, however, that NRC does not effectively use a variety of information sources and analytical techniques for these purposes.

For example, NRC's inspection office routinely collects utility reports of plant operating experiences and maintains records of all inspection results. In addition, other NRC offices use emerging risk-based analytical techniques to help assess safety issues from a risk perspective. NRC's field offices sometimes use these tools in plant-specific inspection planning. NRC does not, however, routinely use these tools to refine inspection procedures or identify industry-wide trends signaling a need to adjust inspection priorities. For example, NRC does not use risk-based analytical techniques to help target inspections on plant systems and activities presenting the highest risk to the public. This was recommended in one Three Mile Island accident investigation report. (See p. 16.)

NRC annually assesses the operating performance of each nuclear power plant in functional areas such as maintenance, fire protection, and training to identify relatively weak areas

needing future inspection emphasis. However, NRC has not correlated its 114 inspection procedures with the functional areas or provided managers with analyses of prior inspection results. Further, three of NRC's five regional offices do not prepare inspection plans on the basis of assessment results to guide subsequent inspection efforts. This may explain why GAO found that NRC's inspection emphasis at specific plants often did not follow the annual assessment results on those plants. (See p. 22.)

Finally, NRC does not routinely use evaluations prepared by utilities and the Institute of Nuclear Power Operations--a self-policing nuclear industry organization--in inspection program planning. These evaluations cannot take the place of NRC inspections; however, they are a source of information on utilities' operating performances which NRC can use in evaluating general inspection program priorities and planning inspections at individual plants. (See p. 27.)

INCREASING INSPECTORS' EFFECTIVENESS

Three Mile Island investigations found that NRC's inspection procedures were unclear, regulatory requirements were voluminous and complex, and communications between NRC field and headquarters officials needed improvement. Responses to GAO's questionnaires indicated that these were still problem areas, even though most inspectors responding to GAO's questionnaires said that the inspection program effectively ensures compliance with NRC regulations.

For example, about one-third of NRC's inspection procedures were identified as particularly difficult to understand and in need of revision. (See p. 35.) In addition, many NRC inspectors and utility officials said that NRC regulations and requirements are often confusing. They said this causes uncertainty about what is required for compliance and, therefore, makes it difficult to inspect for compliance. (See p. 38.)

Finally, inspectors generally gave high marks to the quality of training NRC has provided

them. More than one-third, however, said they need more training opportunities, and many said they have not received "mandatory" training. For example, over 60 percent of the inspectors responding to GAO's questionnaires who have been inspectors at least 30 months said they had not received "mandatory" training designed to familiarize them with nuclear industry standards. NRC inspectors and regional officials told GAO that inspectors do not always receive required training because of the heavy inspection workload. (See p. 42.)

RECOMMENDATIONS TO THE CHAIRMAN, NUCLEAR REGULATORY COMMISSION

To improve NRC's inspection program planning, GAO is recommending that the Chairman, NRC (1) integrate historical inspection data, plant operating experience, risk-based analyses, and results of industry self-evaluations into inspection program management, (2) develop inspection plans for each operating power plant, and (3) establish a policy on how utility self-evaluations are to be used in planning and conducting inspections. (See p. 32.)

To clarify the inspection program and enhance inspector training, GAO is also recommending that the Chairman, NRC (1) identify and revise inspection procedures, regulations, or other NRC requirements which are ambiguous or not sufficiently clear, (2) determine whether the inspector training program meets the needs of NRC's inspectors, and (3) identify mandatory training requirements, acceptable reasons for not providing required training on schedule, and maximum permissible time frames for rescheduling required training. The information GAO developed in this report should be helpful in this review. (See p. 45.)

AGENCY COMMENTS

NRC said the report makes useful points and that it agrees with many of GAO's recommendations. NRC added that actions are underway to improve the agency's programs that may not have been reflected in the questionnaire data GAO gathered in mid-1983. GAO recognizes NRC's improvement initiatives and believes

that they will satisfy the intent of GAO's related recommendations if completed. GAO revised the report to reflect NRC's comments. NRC's comments are shown in appendix I. (See p. 47.)

Contents

APPENDIX

ABBREVIATIONS

GAO	General Accounting Office
INPO	Institute of Nuclear Power Operations
NRC	Nuclear Regulatory Commission
TMI	Three Mile Island

CHAPTER 1

INTRODUCTION

Under the Atomic Energy Act of 1954, as amended, the Nuclear Regulatory Commission (NRC) and electric utilities that build and operate nuclear power plants each have responsibilities to make sure that plants are constructed properly and operated safely (42 U.S.C. 5841). NRC establishes regulations and criteria for the nuclear industry to follow, and licenses and inspects construction and operation. Utilities are responsible for designing, constructing, and operating their plants safely and in compliance with NRC regulations.

NRC was established in January 1975 from the former Atomic Energy Commission. At that time, 53 nuclear plants were operating and 188 others were in various stages of planning, construction, and licensing. As of January 1, 1985, 81 plants were in commercial operation and another 47 were under construction or in preoperational testing. About 30 of these 47 plants are at least 75 percent constructed and are scheduled to be operating before 1990. Thus, the industry NRC regulates is rapidly shifting toward operating plants.

NRC periodically inspects each operating plant to assure that the utility is operating its plant safely and in compliance with NRC regulations. NRC's Office of Inspection and Enforcement (inspection office) is responsible for developing inspection and enforcement policies and programs, and for conducting inspections and investigations of nuclear plant construction and operations. Historically, NRC's strategy for verifying utility compliance with regulatory requirements has been to audit selected utility operations. The audit concept involved sampling utility activities related to safety systems, evaluating the sample for compliance, and extrapolating the results of the evaluation to make a judgment about the entire activity. The audit for any given sample consists of

--reviewing applicable operating and performance procedures,

--observing the work activity, and

--reviewing operation and performance records for the activity.

The inspection and enforcement policies and programs are developed primarily at the headquarters level. Program administration, including performing inspections and investigations, is the responsibility of NRC's five regional offices. Inspections and investigations are conducted throughout the operating life of each power plant.

The inspection program is both preventive and reactive. Preventive inspections are routine, planned, periodic audits of

selected utility activities to assess safety of operations and compliance with regulations. Reactive inspections are investigations and responses to unexpected operational problems at plants or allegations that such conditions exist.

PERSPECTIVE ON NRC OPERATING REACTOR INSPECTION PROGRAM

Until the late 1970's, NRC's inspectors traveled to nuclear power plants from the agency's five regional offices to perform inspections. These inspectors specialized in areas such as fire protection, plant security, operator training, and quality assurance. About 25 percent of their time was actually spent at the power plants. The rest of their time was spent preparing for inspections, traveling, and documenting and evaluating inspection findings.

In June 1977, the NRC commissioners made several major changes in the inspection program. First, they decided to station one inspector full-time at each plant. NRC intended that these resident inspectors would be its "eyes and ears" at plants and would increase inspection time at plants. Each resident inspector was to be augmented by a regional inspector who would continue to periodically visit power plants to perform specialized inspections. Second, they called for inspectors to make more direct measurement and increased observations of utility operations. Third, the NRC commissioners established a "performance appraisal team." Under this concept, a team of inspectors would evaluate a number of selected plants each year in a comprehensive inspection taking about 9 weeks for preparation, on-site inspection, and documentation of results. NRC intended that the performance appraisal team would help it to

--develop a nationwide perspective on the relative strengths and weaknesses of utilities operating nuclear plants and

--evaluate the effectiveness of the integrated resident- and region-based inspection program.

NRC had begun staffing the resident inspection program and the performance appraisal team when the nation's worst commercial nuclear power plant accident occurred at Three Mile Island (TMI) on March 28, 1979.

Two major independent investigations of the TMI accident recommended, among other things, that NRC improve its methods of systematically evaluating the safety of operating nuclear

plants.[1] In general, the recommendations in both reports were designed to help NRC develop a capability to assess both plant performance and NRC's inspection program effectiveness.

In response to these reports, in 1980 NRC began the Systematic Assessment of Licensee Performance program. This initiative was designed to provide NRC with the capability of semi-annually assessing and comparing the performance of utilities operating nuclear plants and to allocate inspection resources. In addition, NRC proposed increasing resident inspector staffing to at least two inspectors per site. However, this did not occur because of other budget and regulatory priorities. NRC was able to increase its performance appraisal team inspections from 2 in 1979 to a total of 17 in 1980 and 1981, but reduced the number of inspections to a total of 7 in 1982 and 1983. The reduced effort was due, in part, to the substantial resources required to sustain the earlier level of effort.

In August 1981, NRC made another change to its inspection program. It permitted regional inspection program managers to tailor inspection plans for each plant. Until this time, NRC had tried to conduct each of its many different types of inspections--called inspection procedures--either at prescribed frequencies or in response to planned and unplanned plant events. NRC found, however, that it was no longer able to perform all inspection procedures as required because of insufficient inspection program resources.

This revision divided NRC's 114 inspection procedures into a "basic" (mandatory) and "supplemental" (discretionary) inspection program.[2] The basic program consisted of 41 procedures, including the resident inspector's tour and observation of the plant's operation each work day and follow-up on unanticipated plant events and items requiring corrective action by the utility. It also included selected specialized inspections in such areas as fire protection and housekeeping, personnel and training, maintenance, plant security, and meetings with utility management, the media, and local officials. Inspection program management selected these procedures on the basis of their collective judgment on the importance of the procedures at that time relative to the supplemental procedures. In December 1982, NRC

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[1] Report of the President's Commission on the Accident at Three Mile Island (Oct. 1979), and Three Mile Island: A Report to the Commissioners and to the Public, NRC Special Inquiry Group (Jan. 1980).

[2] A third program category, which NRC calls the "minimum" program, is essentially the "basic" program less a few designated annual inspections that need not be conducted under certain conditions. According to NRC (see app. I, p. 48), not distinguishing between the minimum and basic inspection programs does not significantly affect the matters discussed in this report.

added 12 emergency preparedness inspection procedures to the basic program. Each inspection procedure in the basic program must be conducted either (1) at its assigned frequency, (2) in conjunction with scheduled plant activities, such as refueling, or (3) in reaction to events, such as unscheduled reactor shutdown.

NRC's remaining 61 inspection procedures are included in the supplemental part of the inspection program. These procedures cover a variety of specialized inspections in some of the same areas covered by the basic program, such as fire protection and housekeeping, as well as other areas, such as radiation protection, procurement, and equipment calibration. Decisions on what supplemental inspections to perform, and their frequency, are to be made by inspectors, supervisors, and managers on the basis of inspector availability and their assessments of need.

Although NRC divided the inspection procedures into mandatory and discretionary parts, it granted resident and regional inspectors considerable latitude in deciding how much of the detailed inspection requirements in each procedure must be done to satisfy the intent of that procedure. Previously, all steps had to be done to complete the inspection procedure. Individual inspections can take from a few hours to several days to conduct at a plant site, in addition to preparation time, depending on the nature of the inspection procedure and the work the inspector(s) does to satisfy the intent of the procedure.

OBJECTIVES, SCOPE, AND METHODOLOGY

Because of the increasing number of operating nuclear power plants and the importance of NRC's inspection program to its regulatory system, we reviewed the program to assess whether it provides reasonable assurance that utilities are operating their plants safely and in accordance with regulations. In pursuit of this objective, we reviewed how NRC changed its inspection program in response to the findings, conclusions, and recommendations of the President's Commission on the Accident at Three Mile Island and the NRC commissioners' Special Inquiry Group Report on that accident. Although there were several other studies of that accident performed by NRC and other groups, these two are the only studies that addressed the effectiveness of the inspection program.

As noted earlier, NRC allows inspectors considerable flexibility to schedule and determine the scope of each inspection procedure. NRC also requires little documentation of the scope or results of individual inspections unless regulatory violations are detected. If no violations are detected, inspection reports document the type of inspection (inspection procedure), time charges, inspection date, and plant inspected. If one or more violations are detected, NRC requires sufficient documentation to prove the violation(s) and support any ensuing enforcement actions. There was limited documentary evidence available to us, therefore, to determine how effective NRC's inspection program is.

For this reason, a major part of our methodology was the administration and analysis of detailed questionnaires on the inspection program, which we sent to NRC inspection personnel and to utilities operating nuclear power plants. We discussed our methodology, including the adminstration and distribution of questionnaires, with NRC officials. The questionnaires used a 5-point rating scale to categorize the opinions and value judgments of respondents. To obtain complete and candid responses, we provided a pledge of confidentiality for the information that was provided; we also processed the data in a manner that eliminated the link between individuals' answers to particular questions. The questionnaire we distributed to NRC personnel was designed to obtain their assessments on

--the overall effectiveness of the program--whether it ensures that utilities operate their plants safely and in compliance with NRC regulations;

--the effectiveness of changes to the program in response to the findings, conclusions, and recommendations of groups investigating the TMI accident;

--the adequacy of inspection resources;

--the general clarity, completeness, and adequacy of the regulations, requirements implementing the regulations, and the guidance provided to inspectors;

--the appropriateness of NRC inspection policies and procedures, such as team inspections, and the flexibility granted to inspectors to implement inspection procedures;

--the use of various NRC and utility information sources on utility nuclear plant operations to manage the inspection program; and

--the training and experience of inspectors and their supervisors and managers.

The questionnaire we sent to utility officials was designed to obtain their assessments on

--NRC inspector activities and qualifications;

--NRC interaction with the nuclear industry's Institute of Nuclear Power Operations (INPO), which also has an inspection program that periodically evaluates each utility's nuclear plant operations;

--NRC's Systematic Assessment of Licensees' Performance program;

--NRC's interaction with individual utility organizations responsible for evaluating plant operations; and

--NRC's overall management of its inspection program.

In addition to our questionnaires, we discussed the design and management of the inspection program with officials of the Office of Inspection and Enforcement in Bethesda, Maryland; with managers, supervisors, and inspectors assigned to NRC's regional offices in Arlington, Texas; King of Prussia, Pennsylvania; and Walnut Creek, California; and with resident inspectors assigned to several plant sites. We also reviewed documentation on NRC inspection program policies, procedures, and studies.

We conducted our audit in accordance with generally accepted government auditing standards. Our audit work was performed from January 1983 through February 1984.

NRC questionnaires

We administered and analyzed three questionnaires to NRC inspection personnel--one each for resident inspectors, regional inspectors, and managers and supervisors. Though similar, each questionnaire was unique to the group whose views we sought. NRC's records do not always specifically identify whether a person is involved in NRC's inspection program for operating reactors or another inspection program. Therefore, we obtained a list from NRC of all active employees as of February 28, 1983, and eliminated those names we could identify by job title as not being involved in NRC's inspection program for operating reactors. We then met with inspection program officials in Bethesda, Maryland, and jointly identified 447 resident inspectors, regional inspectors, and regional managers and supervisors apparently involved in the inspection program for operating reactors.

In June 1983 we sent out 447 questionnaires. Seventy-seven respondents could not be included in our analysis because they were no longer associated with the inspection program. Of the remaining 370 questionnaires, 40 were not returned (residents-1, region-based-27, managers/supervisors-12). We also eliminated 20 questionnaires for reasons such as incomplete information. Consequently, our analysis is based on 310 questionnaire responses from 81 residents, 152 regional inspectors, and 77 supervisors and managers.

To obtain a better understanding of the questionnaire results, in October 1983 we met separately with selected residents and regional inspectors and discussed the results of their peer groups' questionnaires. Each of NRC's five regional offices were represented at these meetings. We also met with management representatives from NRC headquarters and three of the five NRC regional offices to discuss the results of all three questionnaires. NRC region IV in Arlington, Texas, and region V in Walnut Creek, California, were unable to send representatives to the meeting because of other commitments. However, during later visits to these regions, we discussed the questionnaire results with selected managers and supervisors.

Utility questionnaire

In July 1983 we sent 116 questionnaires to 40 utilities that operate nuclear power plants to obtain their assessments on NRC's inspection program. Questionnaires were sent to 40 utility corporate headquarters and to 76 individual plants located at 51 sites.

We received and analyzed 35 of the 40 (87 percent) utility headquarters, and 50 of the 76 (66 percent) power plant questionnaires. In 17 instances, respondents for multi-unit sites combined the information for all plants at that location into one questionnaire. Consequently, these 17 responses contained information from 38 power plants. In total, we gathered information and comments concerning 71 of the 76 (93 percent) operating power plants.

We also met with officials of three utilities--Baltimore Gas and Electric Company, Pennsylvania Power and Light Company, and Philadelphia Electric Company--to discuss the consolidated results of our utility questionnaire and enhance our understanding of their responses.

Plant visits

We visited 7 of the 51 sites with operating nuclear power plants. During our visits, we discussed the questionnaire results with utility plant management and the resident inspectors, and observed them performing inspections. We did not attempt to verify whether the inspections were conducted in accordance with NRC procedures. Our criteria for selecting these sites included the resident inspectors' availability and accessibility of the site to us. The plants we visited are listed below.

Plant	State
Haddam Neck	Connecticut
Millstone	Connecticut
Pilgrim	Massachusetts
Rancho Seco	California
Salem	New Jersey
San Onofre	California
Trojan	Oregon

Other

We also contacted representatives of two groups--Critical Mass and the Union of Concerned Scientists--who have had a long-standing and active interest in nuclear power regulation. However, as of mid-1983 neither group had performed any study or analysis concerning the NRC inspection program for operating reactors. Therefore, both groups declined to comment on the issues discussed in this report.

NRC Statistical Data Reporting System

We obtained and analyzed an NRC computerized inspection data base--the Statistical Data Reporting System--designed to capture, maintain, and report statistical data concerning inspections, investigations, and related activities. This system accumulates data on direct inspection-time charges, and number of inspections and violations by inspection procedure. This information can be arranged in various formats including type of inspection, site, NRC region, and type of inspector (resident, regional, or team).

Part of our analysis included verifying a sample of the records in the data base to determine the accuracy of the data and obtain an understanding of how inspections are reported. The information in the data base that we analyzed was accurate.

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Chapter 2 presents overall opinions of questionnaire respondents and a discussion of inspection coverage on operating reactors. Chapter 3 presents our findings, conclusions, and recommendations related to NRC's management of the inspection program from program design and implementation perspectives. Chapter 4 presents our findings, conclusions, and recommendations on the inspection program from the perspective of improving the effectiveness of inspectors in the field.

CHAPTER 2

HAS THE INSPECTION PROGRAM IMPROVED SINCE THE TMI ACCIDENT?

The majority of NRC respondents who expressed an opinion said that the inspection program has improved since the TMI accident and that it provides assurance to NRC that utilities operate their plants safely and in compliance with regulations. Most utility respondents said the program is effective, but they expressed mixed views on whether the program has improved. When improvement was indicated, NRC's emphasis on resident inspectors was singled out as the major reason. Generally, NRC respondents said utilities are responsive to inspectors' findings.

Since 1977, NRC has almost doubled average inspection time per plant. However, over the same time period the number of NRC inspection procedures has more than doubled. Thus, NRC has much more to inspect at each plant now than in 1977. NRC has relaxed inspection program requirements in several areas, largely because resources assigned to the program were insufficient to sustain the program requirements at the former levels. In effect, the inspection program has been shaped by the assigned resources. In this regard, while NRC inspectors said the program is generally effective, they also said that program staffing levels do not permit them to conduct inspections in the depth necessary for their professional satisfaction.

QUESTIONNAIRE RESPONDENTS SAID NRC'S INSPECTION PROGRAM HAS IMPROVED AND IS GENERALLY EFFECTIVE

We asked NRC resident and regional inspectors, NRC inspection program managers and supervisors, and utility officials whether the inspection program has improved since the TMI accident. About one-half of the resident and region-based inspectors said that they had no basis for commenting on this question because they were not serving in that capacity at the time of the accident. For those expressing an opinion, however, most NRC respondents, and 41 percent of the utility respondents, said the program has improved.

Has NRC's Inspection Program for Operating Reactors Improved Since TMI in Assuring Safe Power Plant Operations?

Response	Inspectors: Resident	Inspectors: Regional	Managers, supervisors	All NRC respondents	Utility officials
Better	75.6	56.2	67.1	64.7	41.0
Neither	12.2	32.9	31.4	27.7	43.4
Worse	12.2	11.0	1.4	7.6	15.7
Total[a]	100.0	100.0	100.0	100.0	100.0

[a]Percentages do not total 100 due to rounding.

NRC's emphasis on resident inspectors was the major reason why all classes of respondents said that the current inspection program is better now than before. For example, one utility plant superintendent stated that "the resident inspector program permits inspectors to become thoroughly familiar with a utility operation and observe day-to-day activities . . ." Another utility plant manager commented that on-site inspection provides an independent perspective that is healthy because plant personnel can become complacent about routine activities.

We also asked each of these groups whether NRC's inspection program ensures utilities' compliance with NRC regulations. As shown in the following table, a majority in each group said the program is effective from a compliance standpoint.

Is NRC's Inspection Program to Assure Your Power Plants's Compliance with NRC Regulations Effective or Ineffective?

Respondent	Response: Effective	Neither effective nor ineffective	Ineffective
	(percent)		
Resident inspectors	77.7	16.0	6.2
Regional inspectors	80.1	13.2	6.6
Managers/supervisors	85.5	13.2	1.3
All NRC respondents	80.8	14.0	5.2
Utilities	85.5	11.1	3.7
All respondents	81.8	13.3	4.9

We asked each group whether the inspection program ensures that nuclear power plants are safely operated. About 80 percent of each NRC group said that the program is effective from a safety standpoint, but fewer utility respondents--about 60 percent--said the program ensures safe operations of their power plant. Approximately 26 percent of the utilities stated that the inspection program was neither effective nor ineffective in this regard, and 14 percent rated NRC's efforts at their power plants as ineffective.

Utilities that rated NRC's inspection program as worse since TMI or ineffective in ensuring that power plants were operating safely took the position that plant safety is a utility's legal and moral responsibility. For example, one site manager said that:

> "The safe operation of a nuclear power plant is the sole domain of the utility holding the license. The NRC is only effective in the legal, administrative, and political arenas. In addition to the very obvious moral considerations of assuring the safe operation of a nuclear power plant, utility management will also be motivated by the spector of the staggering financial loss resulting from an accident."

The Chairman of the Board of another utility stated:

> "The primary responsibility for nuclear safe operation resides with the utility. The effectiveness of safe operation flows from the utility's management attitude toward nuclear safety and operational quality. The NRC can only perform a limited audit of the utility's results . . ."

Finally, we asked resident and regional inspectors how responsive utilities are to their inspection findings and recommendations. About 62 percent of the respondents said utilities are either "greatly" or "very greatly" responsive, about 30 percent said utilities are "moderately" responsive, and about 8 percent said utilities are "somewhat" responsive. None of the inspectors answered that utilities give "little or no" response. The responses we received to this question from inspection program managers and supervisors generally paralleled the inspectors' views.

Inspection coverage has increased

By January 1, 1977, the year before NRC began stationing inspectors at plant sites, there were 59 nuclear power plants licensed to operate. By 1983 the number of operating plants had increased to 76. During this same period, NRC doubled its average inspection hours as the size of its inspection staff increased. This is shown in the following table.

Historical Trends in NRC Inspection Hours

Year	Inspections per plant (average)	Inspection hours per plant (average)
1977	128	928
1978	129	990
1979	165	1,344
1980	152	1,763
1981	174	2,160
1982	184	2,057
1983	171	1,824

The table shows that this level of effort declined somewhat in 1982 and again in 1983. Nevertheless, the 1983 level of effort still represented almost twice the average inspection hours as before the TMI accident.

Although average inspection hours per plant have almost doubled since the TMI accident, the number of inspection procedures NRC uses to inspect for compliance has also more than doubled because regulatory requirements have increased. Before the TMI accident NRC used 43 inspection procedures to determine compliance with regulatory requirements. As these requirements have evolved and increased since the accident, however, the number of inspection procedures has increased to 114. While some of these new procedures are not mandatory, the fact remains that the number of compliance checks has increased the inspection time required at each plant. Thus, higher average inspection hours per plant than in pre-TMI accident days may not be indicative of sufficient time being spent on checking compliance with individual requirements. The preceding table also shows that NRC's inspection coverage now may have peaked and started to decline as new plants become operational.

Relationship of resident and regional inspectors

In addition to generally increasing the average inspection hours at operating nuclear plants, NRC's use of resident inspectors may have increased regional inspectors' effectiveness in detecting problems. For example, we asked regional inspectors how often they found something wrong when they performed an inspection as a result of either a resident's request or a routine, planned inspection. About 56 percent of the regional inspectors said that they find or confirm problems in over one-half of their inspections when the inspections are requested by resident inspectors. In contrast, about 41 percent said that they find problems in over one-half of their routine planned inspections.

ARE INSPECTION RESOURCES ADEQUATE?

Following the TMI accident, NRC decided to assign at least two resident inspectors at each plant site and to increase the appraisal team staffing from 7 inspectors in 1980 to 24 in 1981. In its 1981 Policy and Planning Guidance to the NRC staff, however, the Commission reduced the resident inspector staffing policy to at least one resident for each operating plant site, with additional inspectors to be assigned on the basis of the utility's performance, plant characteristics, and the availability of adequately trained inspectors.

NRC's 1981 decision to split its inspection procedures into basic and supplemental segments, and to grant regional inspectors, supervisors, and managers authority to determine the scope of their inspections, was also due to the premise that an insufficient number of inspectors were available to conduct all inspections at the previously specified frequencies at all plants. For example, in 1980 NRC reported to the Subcommittee on Environment, Energy, and Natural Resources, House Committee on Government Operations, that it had not been able to conduct 16 percent of the inspections required in fiscal year 1979 and in the first 8 months of fiscal year 1980.

In our questionnaires, we asked a number of questions related to the adequacy of both inspection program staffing levels and the time inspectors have to perform inspections to their professional satisfaction. The response to these questions, in total, indicates that NRC's inspectors and regional supervisors and managers do not believe that inspection resources are sufficient. For example:

--About 83 percent of the NRC respondents said that the current inspector staffing level is inadequate.

--The majority of NRC inspectors said that more resident inspectors are needed. To illustrate this view, about 54 percent of the regional inspectors and 73 percent of the resident inspectors said that two residents are needed at sites with a single plant. On the other hand, 53 percent of the supervisors and managers said that one resident is sufficient. At the time we administered our questionnaire, there were 23 single-unit sites, and 14 had one resident inspector. All other plant sites had at least two resident inspectors assigned.

--More than 60 percent of all NRC respondents would increase the number of regional inspectors.

--About 59 percent of all NRC respondents said that a single resident inspector working a 40-hour week either "must cut corners" or "cannot fulfill" NRC's inspection program requirements. The other 41 percent said that a resident

inspector either "normally can" or "must prioritize work" to fulfill these requirements.

--About 45 percent of the resident and 38 percent of the regional inspectors said that they do not have adequate inspection time to ensure compliance with NRC regulations. In addition, about 33 percent of the resident and 32 percent of the regional inspectors said that they do not have adequate time to ensure safe plant operations.

AGENCY COMMENTS AND OUR EVALUATION

In commenting on this report, NRC said that the report highlights several areas where improvements are needed. NRC stated, however, that the report may understate the significance of improvements made in the resident inspection program. We recognize improvements have been made and believe the report reflects them because it points out that NRC's use of resident inspectors was singled out by NRC and utility questionnaire respondents as the major improvement in the inspection program since the Three Mile Island accident. (See p. 10.) In addition, the report points out that resident inspectors have increased the total inspection time at plants, and may have increased the effectiveness of regional inspectors in detecting problems at plants. (See p. 12.)

The complete text of NRC's comments is contained in appendix I, beginning on page 47.

CHAPTER 3

IMPROVED INSPECTION PLANNING AND FEEDBACK WOULD ENHANCE PROGRAM EFFECTIVENESS

NRC's current approach to inspecting operating nuclear power plants puts much of the responsibility on regional program managers for deciding what plants and plant operational areas should be inspected. As stated on page 3, NRC now requires that 53 inspection procedures, collectively referred to as the "basic" inspection program, be conducted at all plants. It also requires these managers to select from among 61 supplemental inspection procedures in planning inspections. This approach is in marked contrast to NRC's earlier policy which required that all inspection procedures be conducted at each plant within prescribed frequencies or events. Properly executed, NRC's approach can concentrate inspections at specific plants in the most important areas--in contrast to giving the same inspection emphasis to each plant regardless of the relative operational strengths and weaknesses of individual plants.

Inherent in this approach is the need for adequate inspection planning and feedback. In this regard, NRC (1) collects information that can be used in managing and implementing the inspection program, (2) directs that its periodic assessments of each licensee's performance be a diagnostic tool for allocating inspection resources, and (3) intends that its periodic appraisal team inspections provide inspection program feedback. NRC has not, however, integrated these information sources and processes into an inspection program management system that ensures that, on a program-wide basis, areas most critical to safety are given priority and, on a plant-specific basis, that inspections are scheduled on the basis of the relative strengths and weaknesses at each plant. Specifically, NRC is not

- --routinely and systematically using available operating experience information and analytical techniques to manage and implement the inspection program,
- --using annual assessments of licensees' performances to develop site-specific inspection plans, or
- --integrating INPO and utility evaluation results into inspection planning.

Finally, NRC reduced its performance appraisal team inspections in deference to INPO evaluations, but NRC has no assurance that it receives all INPO reports.

NRC IS NOT ROUTINELY INCORPORATING OPERATING EXPERIENCE INTO INSPECTION PLANNING

In its report on the TMI accident, the President's Commission concluded that NRC's inspection program for operating plants lacked direction. It recommended that NRC systematically assess operating experience and use the results in specific safety improvement programs. The NRC Special Inquiry Group Report also recommended improved evaluation of operating experience, as well as application of risk-based analytical techniques, to improve and sharpen inspection procedures so that inspectors could focus inspections on anticipated problems at plants or within plant systems.

NRC has two data systems that collect information on operating experience. One is its inspection history data base, called the Statistical Data Reporting System. The second is a compilation of NRC-required utility reports of unplanned events, such as equipment malfunctions, which occur at operating plants.

In the 1980's, NRC has also increased its general use of the risk-based analytical techniques referred to in the Special Inquiry Group Report--called probabilistic risk assessment--as a tool for examining nuclear power plant systems and nuclear safety issues from a risk perspective.

Although these information sources on operating experience and risk-based analytical techniques are currently available, we found that NRC does not routinely

- --analyze its inspection history data base in managing its inspection program,
- --analyze event reports in managing its inspection program, or
- --use risk-based assessments as a tool for either program evaluation or identifying priority inspection areas.

NRC does not routinely analyze its inspection data base to manage its inspection program

NRC's Statistical Data Reporting System collects data on direct inspection time charges, the number of inspections, and the number of violations found for each of NRC's inspection procedures. A 1980 study[1] done for NRC by the Department of Energy's Sandia National Laboratories concluded, among other things, that analysis of NRC's inspection data base provided useful information

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[1]Allocation of NRC Inspection Efforts to Risk-Related Activities In Nuclear Power Plants, Sandia National Laboratories, April 1980.

to NRC managers. Sandia stated that NRC could use the inspection data base to identify inspection procedures that had been historically productive--that is, a relatively low number of inspection hours per violation--and those that had not. NRC could then increase or decrease staff investment in these procedures as warranted. According to the NRC inspection office Director of Reactor Programs, however, the study was overlooked in the aftermath of the TMI accident and its conclusions have not been adopted and put into effect. Although the information in the data reporting system could be organized to provide management oversight of inspection program trends at various plants and regions, NRC has not routinely done so.

We performed a limited analysis of these data so that we could discuss their usefulness with inspection program managers at both the headquarters and field levels. The following table shows that both the average hours per inspection and average inspection hours per violation have increased since 1977.

Historical Trends in NRC
Inspection Hours and Violations

Year	Average hours per Inspection	Average hours per Violation
1977	7.2	41.6
1978	7.7	47.6
1979	8.1	67.9
1980	11.6	77.2
1981	12.4	109.8
1982	11.2	122.9
1983	10.7	109.5

NRC headquarters program management officials said they were unaware of this information because the system is not designed to routinely provide them with any summary or analysis of the data. Although NRC has performed some analyses of the data, these have been by special one-time computer runs or by manual extraction and summary of data.

These officials said that the increase in inspection hours required to identify violations may have occurred because program emphasis has changed in recent years from looking for paperwork discrepancies to concentrating on safety-significant operational problems. These changes, however, could also have resulted from performing inspections in areas where problems have historically not been found, improved power plant performance, or a combination of these reasons. Regardless, such systematic analysis of inspections could enhance inspection resource use by alerting NRC to trends that need additional inquiry, and perhaps, adjustments to inspection program priorities.

Our trend analysis by region and plant showed that although NRC's average hours per inspection increased by almost 49 percent between 1977 and 1983, this increase was not consistent among NRC's five regions. The increase ranged from 16.4 percent in region II to 94.7 percent in region IV. The following table gives detailed inspection statistics for each region.

Average Hours per Inspection

	Region					
Year	I	II	III	IV	V	National
1977	7.5	6.1	8.1	6.8	7.5	7.2
1978	7.4	6.9	8.8	9.0	8.3	7.7
1979	10.9	6.7	6.4	10.8	7.7	8.1
1980	11.4	10.1	12.0	14.6	17.5	11.6
1981	14.7	8.8	14.2	17.1	13.6	12.4
1982	12.9	7.7	15.1	16.1	11.0	11.2
1983	13.4	7.1	13.7	13.9	12.2	10.7

In addition, the average number of direct inspection hours per violation increased almost 164 percent between 1977 and 1983. Again, this change was not consistent among NRC's five regions. For example, the following table shows that inspection hours per violation increased from about 88 percent in region IV to 241 percent in region III during this period.

Average Inspection Hours per Violation

	Region					
Year	I	II	III	IV	V	National
1977	44.9	36.6	37.6	52.7	58.8	41.6
1978	49.7	38.2	52.6	56.9	86.8	47.9
1979	89.6	45.7	66.5	98.9	91.6	67.9
1980	64.9	65.9	101.7	81.6	145.1	77.2
1981	128.5	70.9	143.6	115.8	226.6	109.8
1982	131.7	88.9	146.1	153.6	207.0	122.9
1983	141.2	77.6	128.2	99.0	158.0	109.6

Regional officials said that if this type of individual plant analysis was routinely available, it could be useful in managing and directing the inspection efforts at each power plant. For example, after reviewing plant-specific data that we summarized, a regional Division Director expressed surprise that the number of inspection hours per violation had been decreasing over the past 3 years at a plant that had historically been considered a good performer, but for which problems had recently been identified. The Director told us that if this information had been available to him earlier, the "deterioration" in the plant's performance and steps to correct the problems could have been identified earlier. To obtain this type of analysis for each plant of interest from the existing data system, however, he would have to manually consolidate and analyze the unsummarized reports the system currently generates--a time-consuming process.

NRC does not analyze licensee event reports to identify priority inspection areas

Each licensee event report contains information on the type of event, its probable cause and effect, and other related information. Through 1983, NRC received about 4,500 such reports annually. Effective January 1, 1984, however, NRC revised its licensee event reporting system. In commenting on our report, NRC said that under the revised system it expected to receive about 2,200 reports in 1984.

In a 1979 report, we concluded that NRC's reviews of these reports did not provide assurance that it was identifying safety-related problems.[2] Subsequently, both the President's Commission and the Special Inquiry Group found that an accident similar to that at TMI had almost happened twice before--at Beznau, Switzerland, in 1974, and at the Davis Besse plant in Ohio in 1977. Unlike TMI, however, in both earlier instances the reactors were operating at a low level of power--9 percent at the time of the Davis Besse event. The President's Commission pointed out that if the event had occurred when the reactor was at full power--as TMI was--"it is quite possible, perhaps probable, that core uncovery and possible fuel damage would have occurred." The President's Commission report stated:

> "Of crucial significance to [the inspection office's] system of inspection and enforcement are the Licensee Event Reports . . . in which utilities report and evaluate important incidents . . . . [the inspection office] makes little effort to systematically review the [reports], has no formal review mechanism for them, and hence, must rely on individuals to remember events and to identify generic concerns."

Following the TMI accident, NRC established the Office for Analysis and Evaluation of Operational Data with the objective of initiating a broad, coordinated program to assess operating experience. However, while this office analyzes selected event reports, analyses to date have been oriented towards identifying events in which the margin of safety established through licensing has deteriorated and recommending corrective actions. As such, this office's role has been focused on redefining licensing and related regulatory requirements. It has not been routinely used to identify trends or issues that might cause inspection program managers to modify inspection program priorities.

Although the operational data office's analyses of event reports are limited, each regional inspection office reviews event

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[2]Reporting of Unscheduled Events at Commercial Nuclear Facilities: Opportunities to Improve Nuclear Regulatory Commission Oversight (EMD-79-16, Jan. 26, 1979).

reports to determine whether the reported events are important and could occur at other plants. In addition, the regions we visited use licensee event reports in plant-specific inspection planning. Staff in these regions manually summarize and analyze these reports to identify plant-specific trends and as part of the annual assessment of each plant's performance. NRC's inspection headquarters office, however, does not analyze these reports on a program-wide basis for the purpose of refining general inspection program priorities.

In commenting on this report, NRC stated that the above discussion may mislead the report reader because it does not recognize the NRC staff's considerable effort to review and evaluate nuclear power plant operating experience and disseminate evaluation results to the nuclear industry. Some of this effort, NRC said, results in specific inspections and in revision to the inspection program. NRC said that its evaluations of licensee event reports can lead to either of two levels of communication to the nuclear industry. First, NRC may issue an information notice describing the safety issue identified from reviewing event reports. Utilities operating nuclear power plants are expected, NRC said, to review each notice and take any appropriate action.

Second, NRC could issue a bulletin if the issue identified has major safety significance. Bulletins specify actions utilities must take and, according to NRC, it subsequently inspects each affected utility for compliance. In this regard, NRC said it may prepare temporary inspection procedures for conducting these inspections.

Finally, NRC stated that nuclear power plant component problems reported by utilities or component manufacturers may lead to inspections to ensure that the problems have been corrected.

NRC's comments show that it uses nuclear industry event reports to identify safety issues and that it conducts inspections to ensure that the issues have been addressed properly. The comments describe ways that NRC reacts to safety issues identified from reviews of selected licensee event reports or other nuclear industry reports. Our point, however, is that NRC does not also routinely analyze the thousands of licensee event reports it receives over time to identify trends or patterns of events that might cause it to make more fundamental, longer term adjustments to its inspection program priorities.

NRC does not use risk-based assessments as a tool in identifying priority inspection areas

Probabilistic risk assessment is a method of systematically examining complex technical systems, such as nuclear power plants, to identify their associated public health, environmental, and economic risks. To assess risk, it is necessary to measure both the likelihood (probability) that an accident will occur and the

level of damage or loss (consequences) that will result. Probabilistic risk assessment addresses three basic questions:

--What could go wrong?

--How likely is it that this will happen?

--If it happens, what are the consequences?

NRC is increasing its use of probabilistic risk assessment techniques to examine a wide range of regulatory issues. For example, risk assessment techniques are used to help determine the importance of new safety issues that may be common to all or a number of nuclear power plants. In addition, NRC used risk assessment techniques in a comprehensive evaluation of how well 11 of the oldest nuclear plants conform to selected regulatory requirements adopted since the plants were built.

Probabilistic risk assessment of nuclear power plants is relatively new; significant use of risk assessment techniques in this area has occurred only during the past 10 years. Further, there are limitations on its use due to uncertainties in (1) the completeness of the analysis, (2) the sufficiency and reliability of data, (3) the assumptions used by analysts, and (4) the validity of the models used in risk assessments. On the other hand, nuclear industry and NRC proponents of risk assessment praise it as a good method for identifying potential contributors to plant accidents and determining their relative importance among a group of contributors.

Risk assessment could be used to focus inspection resources on those plant areas most critical to accident prevention. The value of risk assessment techniques for this purpose was demonstrated in 1978, for example, when Battelle Columbus Laboratories[3] reviewed NRC's inspection program to determine how insights gained through a major risk assessment-based study on reactor safety[4] might be applied to improve the program's efficiency. Battelle found that only 8 of 30 routine inspection procedures examined had a direct association with the 16 highest-risk plant systems identified by the study.

The report cautioned that its findings do not accurately reflect the extent to which NRC's inspection program is oriented to the control of risk. Nevertheless, it recommended that NRC review each inspection procedure and identify its intended function. Inspection procedures associated with the control of

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[3]Insights Into Improving the Efficacy of Nuclear Power Plant Inspection Procedures Based Upon Risk Analysis - Battelle Columbus Laboratories, June 1978.

[4]Reactor Safety Study, An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants, U.S. NRC, October 1975, WASH-1400 (NUREG-75014).

public risk should then be evaluated in terms of their effectiveness and their relationship to risk. Specifically, the report stated:

> "It is our general impression, . . . that an undertaking of this type would be beneficial and could lead to an approach to the allocation of inspection time that could be more efficient from the viewpoint of controlling public risk. It should not be inferred that based upon risk analysis, the inspection effort can be optimized in a rigorous sense. The relationship between the NRC inspection effort and the risk to the public from nuclear power plants is too complex. A critical evaluation of the various inspection activities from a risk perspective, should lead to a better understanding of the merits and limitations of the existing inspection program . . . . The allocation of the inspection efforts might then be established on a more quantitative basis . . . ."

One regional office we visited uses plant-specific risk assessment studies, where available, to manage its inspection activities for these plants. To date, however, NRC has not used probabilistic risk assessment to identify priority inspection areas, or to develop or modify its inspection procedures for operating nuclear power plants to ensure that the procedures address those plant areas that are the primary contributors to public risk. The inspection office's Director of Reactor Programs attributed this situation to a lack of personnel and risk assessment expertise.

In commenting on this report, NRC said that using risk assessment techniques to prioritize inspections is an agency goal. Therefore, it initiated research over 1 year ago to develop and field test approaches for using risk assessment techniques in the inspection program. Research to date, according to NRC, indicates that site-specific risk assessment studies, when available, may be useful in focusing inspection activities on more risk-related plant systems and components. NRC also said that it has begun a trial program for using risk assessment studies to prioritize inspections at one operating plant and one plant now in the preoperational testing phase.

NRC IS NOT EFFECTIVELY USING LICENSEE PERFORMANCE ASSESSMENTS TO PLAN INSPECTIONS

NRC established its Systematic Assessment of Licensee Performance Program in response to investigation reports on the TMI accident. The program was established to provide NRC with both a nationwide perspective on the relative operational strengths and weaknesses of individual nuclear power plants and a mechanism for allocating inspection resources.

The first systematic assessment in 1981 evaluated and ranked all operating nuclear power plant sites. An NRC headquarters group manually reviewed plant evaluations and inspection reports submitted by the NRC regions, and ranked each plant site as "above average," "average," or "below average." This report, published in August 1981, concluded that 9 sites were above average, 26 sites were average, and 15 sites were below average.

Following this effort, NRC reoriented the assessment program toward inspection planning, shifted program responsibility from headquarters to regional offices, and extended the interval between assessments from 6 to 12 months. NRC also eliminated the "average" designators in favor of assigning one of three numerical ratings to each basic assessment functional area (plant operations, radiological controls, maintenance, surveillance, fire protection, emergency preparedness, security and safeguards, refueling, and licensing activities)[5] for each plant. The three ratings were intended to signal both the appropriate relative level of utility management and inspection program attention to the functional area. With respect to the NRC inspection program, the three ratings indicated that either

--reduced inspection effort may be appropriate,

--normal inspection effort should be maintained, or

--increased inspection effort is needed.

NRC wanted its regional offices to use the revised assessment procedures as their principal tool for planning inspections and allocating inspection resources in conjunction with NRC's decision to break its inspection program down into basic and supplemental programs. As noted earlier, basic inspections are periodically required at all plants, while supplemental inspections are discretionary.

We evaluated regional offices' use of systematic assessment reports and found that they have not been effective for inspection planning because

--NRC has not grouped its 114 inspection procedures by each of the functional areas covered in the assessments and

--three of NRC's five regional offices have not used the assessments to prepare inspection plans for individual power plants.

Further, assessment report findings often did not appear to influence subsequent inspection efforts.

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[5]In March 1984, NRC added "quality programs and administrative controls affecting quality" to its assessment functional areas.

Inspection procedures are not grouped by assessment program functional areas

Each of NRC's 114 inspection procedures is tied to one or more specific regulatory requirements and provides instructions to inspectors for conducting the inspection. NRC has not, however, formally correlated its individual inspection procedures with its assessment functional areas. Instead, in preparing annual assessment reports NRC inspection personnel manually compute the total inspection hours for each inspection procedure and use their individual judgments to assign each of the procedures to one of the functional areas.

Some procedures can be directly associated with a functional area. For example, NRC's inspection procedure, called "Monthly Maintenance Observations," directly relates to the maintenance functional area. Others, however, cannot easily be tied to a specific assessment functional area. As a result, the allocation of inspection procedure hours to functional areas may not be done on a consistent basis from one assessment period to the next. If NRC systematically correlated inspection procedures with assessment functions and coded the correlations in the inspection data base discussed earlier, it would enhance the potential for these assessments to be an effective tool for inspection planning and management for at least three reasons.

First, NRC would have an accurate way to electronically, rather than manually, accumulate inspection data in a useful form for annual assessments. Second, correlating inspection procedures to assessment functional areas would highlight the specific procedures that need increased or decreased inspection emphasis on the basis of the assessment results in each functional area. Third, correlating inspection procedures with assessment functional areas in NRC's inspection data base would permit NRC managers to determine, at any point, whether the actual inspections conducted at plants are consistent with the most recent annual assessment results.

We discussed this concept with several NRC inspection program officials. They agreed with the concept, noting that much of the input into annual assessments is based on the inspections conducted and violations found in the previous year. Further, in commenting on this report, NRC said its own inspection office reviews had findings similar to those described above. As a result, NRC said that it changed the inspection program in November 1983 to align inspection procedures and assessment functional areas better, and made other changes to the assessment program for the same purpose. NRC added that work continues to make its inspection and annual assessment programs more complementary.

In a discussion with the inspection office's Director, Division of Inspection Programs held after NRC commented on our report, the Director stated that there is a definite need to align assessment categories with inspection procedures. He added that

the actions described in NRC's comments are preliminary; at least another year will be needed for NRC to correlate about 90 percent of the inspection procedures with assessment functional areas.

Some regional offices are not using assessments to prepare plant inspection plans

On the basis of our meetings with NRC inspectors, supervisors, and managers, it appears that all regional offices consider systematic assessment results in their general inspection planning. Only two regions, however, are developing inspection plans for each plant that use the annual assessments to identify, on a plant-specific basis, target areas for inspectors to evaluate.

The limited use of annual assessments to prepare plant-specific inspection plans appears to be related to a range of opinion among NRC inspection program managers on both the usefulness of the assessments and the propriety of tailoring inspection plans to individual plants. In our questionnaire, we asked managers whether NRC should rely on assessment reports to identify supplemental inspection procedures to be performed at plants. About 33 percent of the respondents said NRC should place "great" or "very great" reliance on the assessments, about 47 percent said NRC should place "moderate" or some reliance on them, and about 20 percent said NRC should place "little or no" reliance on the assessments. Managers' arguments against relying on the assessment were usually that it was not based on current information. For example, they said an area might be assigned a rating even though it may not have been inspected for a year or longer.

NRC questionnaire respondents also had mixed views on the current basic and supplemental inspection approach. About 57 percent of the respondents agreed, and 29 percent disagreed, that the inspection program should be modified to fit each power plant. In addition, about 62 percent agreed, and about 25 percent disagreed, that NRC should allocate its inspection resources on the basis of a plant's past performance. On the other hand, 48 percent of the NRC respondents agreed, and about 32 percent disagreed, that supplemental inspection procedures should be performed within specified frequencies at all plants.

In analyzing these responses, we noted that some inspectors agreed that inspection resources should be allocated on the basis of a power plant's past performance and stated that for each plant, supplemental inspection procedures should be performed at specified frequencies. Inspectors we met with reconciled these apparently conflicting responses. They said that planning supplemental inspection procedures on the basis of a plant's past performance is a good idea, but all procedures occasionally should be inspected at all plants. They said that the time period for performing all the supplemental inspection procedures might vary from plant to plant, depending upon each plant's past performance.

In our discussion with the inspection office's Director, Division of Inspection Programs, held after we obtained NRC's comments on this report, the Director stated that regional office efforts are underway to allocate inspection resources at plants using licensee assessment program findings. He added that this should allow regional management greater flexibility in determining the use of limited inspection resources.

Assessment report findings may not affect subsequent inspection efforts

To determine whether assessment results have affected subsequent NRC inspection efforts, we compared NRC's inspection time charges in two consecutive assessment periods for functional areas in which the results of the earlier assessment showed that either reduced or increased inspection emphasis may be warranted. We did this for the 10 operating plants in two NRC regions we visited. Functional areas with either of these ratings should have reduced or increased inspection effort in the period before the second assessment. For 29 (66 percent) of the 44 functional areas we compared, however, subsequent NRC inspection efforts did not change according to the assigned ratings. This is shown in the following table.

NRC Inspection Efforts in 44 Functional Areas

Plant	Increase or decrease in inspection effort warranted	Actual effort followed recommendation	
		Yes	No
A	3	1	2
B	6	3	3
C	2	1	1
D	3	1	2
E	5	-	5
F	6	1	5
G	8	4	4
H	3	2	1
I	5	1	4
J	3	1	2
	44	15	29

To illustrate this point, we found that one plant received favorable ratings in NRC's initial assessment in the areas of radiological controls, maintenance, and surveillance, and an unfavorable rating in the area of security and safeguards. Between the first and second assessments, however, NRC increased its inspection effort in the three areas with favorable ratings and, conversely, decreased its efforts in the area shown by the assessment to need increased inspection emphasis.

NRC regional office officials said inspection efforts following an assessment might not follow the assessment ratings if there was an unusual event at the plant during either assessment period requiring a special investigation. This would, they said, account for some, but not all, of the differences that we found.

A second reason why the inspection effort following an assessment might not follow the assessment results is that the allocation of the inspection effort to assessment functional areas may not be accurate. As discussed earlier, NRC has not correlated its individual inspection procedures to the appropriate assessment functional areas.

UTILITY AND INDUSTRY EVALUATIONS OFTEN ARE NOT INTEGRATED INTO INSPECTION PLANNING

Utilities are responsible for the safe operation of their nuclear power plants. To help ensure safe operations, utilities have established, on the basis of NRC requirements, plant quality assurance programs and site safety review groups. Furthermore, as an effort toward self-regulation in response to the TMI accident, utilities established INPO to promote safety and reliability in the operation of their nuclear power plants.

The quality assurance program is supposed to ensure that all work related to plant safety is conducted in a preplanned manner, is independently verified, confirms the acceptability of the work and manufactured items, and ensures that employees are properly trained and qualified. NRC approves the utility's quality assurance program and periodically evaluates it. Utility safety review groups are independent of the plant staff, but assigned on-site. They perform independent reviews of plant operational activities and the effectiveness of plant operating procedures.

From its inception, a principal INPO program has been its periodic (approximately every 15 months) evaluations of operations at each commercial nuclear power plant. INPO does not specifically evaluate a utility for compliance with NRC regulations; rather, its evaluations are based on performance objectives and criteria it developed. Like NRC, INPO evaluates organization and administration, operations, maintenance, technical support, training, radiological protection, chemistry, and emergency preparedness.

INPO provides formal evaluation reports of its findings and recommendations to each utility evaluated. The final reports include the utilities' responses to INPO's recommendations. INPO encourages utilities to provide copies of final reports to NRC, but this is not mandatory.

NRC inspectors generally review a sample of utility activities within the inspection area. Because NRC's coverage is limited, its policy is that inspection program staff should consider studies by others, such as these industry groups, in

planning both the specific inspections to be performed and the scope of the selected inspections.

The majority of NRC inspectors and managers responding to our questionnaires said that duplication exists between these industry efforts and NRC's operating reactor inspection program. For example, about 82 percent of the resident inspectors said that there was at least some duplication between their inspections and the quality assurance groups at the power plants to which they are assigned. Duplication between these programs and NRC's cannot be avoided entirely because they all involve reviews and evaluations of utility power plant operations. About 52 percent of the NRC respondents to our questionnaire who review INPO reports stated that they are accurate, 8 percent said that they are inaccurate, and the remaining 40 percent either had no basis for comment or did not have an opinion.

Despite their similarity to NRC inspections, many NRC inspection personnel who responded to our questionnaires stated that they do not review INPO and/or utility evaluations or, if they do review them, they do not specifically use them in inspection planning. (See table below.) As a result, NRC inspections may unnecessarily duplicate INPO and utility review groups' evaluations of some utility operations at the expense of not inspecting other areas that have not received substantial coverage by either INPO, utility groups, or NRC.

	Questionnaire Respondents Who Do Not Review Or Use Evaluations		
Respondents	INPO	Utility quality group	Utility safety group
	(percent)		
Resident inspector	26	20	18
Regional inspector	63	29	51
Managers/supervisors	25	a	a

[a]We did not ask managers whether they review evaluations by this group.

On the other hand, many NRC respondents who use these evaluations said that they use them to increase their inspections in areas where the evaluations found weaknesses. For example, over one-half of the responding managers who do review and use INPO evaluations said that they use them to increase NRC inspections in areas where INPO has found weaknesses. Likewise, about one-half of the inspectors who review evaluations by power plant quality groups use them for this purpose.

These responses raise questions about how NRC should incorporate the results of its evaluations into the inspection program. If, for example, INPO found a weakness in a utility's operations, and the utility identified actions it would take to correct the weakness, it would appear appropriate for NRC to monitor and evaluate the utility's corrective action. The more difficult question is whether NRC should automatically increase its own inspection coverage of the utility in the weak area or just monitor the utility's corrective actions. Considering NRC's finite inspection resources, increasing its effort in the area necessarily reduces either inspection coverage of that utility in another area or coverage at another plant.

NRC could make the most effective use of these evaluations and its own inspection resources by having NRC inspectors monitor and evaluate utilities' corrective actions on findings and recommendations by others rather than focusing NRC's limited inspection resources in these areas. However, this may not be the appropriate NRC action if INPO and/or a utility review group found a problem with significant safety or regulatory compliance implications. In such a case, NRC would have no choice but to conduct its own inspection of the matter.

In commenting on our report, NRC stated that in accordance with its August 1982 "Coordination Plan for NRC/INPO Appraisal and Evaluation Activities," NRC's role in pursuing correction of INPO evaluation findings will generally be limited to potentially significant safety problems for which it has no other reasonable alternative to meet its regulatory responsibilities. NRC also said its policy is not to use INPO evaluation results directly to plan inspections, with the above exception, in order to encourage self-improvement by utilities. Finally, NRC said that the interface between INPO and NRC inspection activities is undergoing further evaluation. We believe this NRC position is consistent with our position discussed above. As noted earlier, however, many NRC inspection program inspectors, supervisors, and managers told us that they use INPO and other utility evaluations to increase inspection effort in areas where INPO evaluations identify weaknesses--a practice that appears inconsistent with NRC's stated policy.

NRC also commented that because our questionnaire results showed that 80 percent of the resident inspectors review and use utility evaluations, it is not clear that NRC is not effectively using these evaluations in inspection planning. As discussed earlier, however, about one-half of the inspectors who review utility reports told us that they use the reports to identify areas for increased NRC inspections rather than monitoring of utility corrective actions.

REDUCED TEAM INSPECTIONS DIMINISH PROGRAM FEEDBACK

NRC's performance appraisal team inspections were intended to provide inspection program management with two types of feedback. First, they were to provide a nationwide perspective on the relative strengths and weaknesses of utilities operating nuclear power plants. Second, they were to provide NRC inspection management with a cross-check on the inspection program's effectiveness and the consistency of program implementation by regional offices. Further, with the August 1981 introduction of the basic and supplemental inspection program, these team inspections also became a valuable source of feedback to regional program managers on how well they were implementing the inspection program at specific power plants.

At about the same time that NRC started the basic and supplemental program, however, it also decided to cut back on performance appraisal team inspections to two or three per year. In contrast, in 1980 and 1981, NRC had performed a total of 17 appraisal team inspections. According to an NRC headquarters official, the decrease occurred initially because NRC was not able to attract and retain a sufficient number of team members and because the program was criticized within NRC due to the staff resources it required at the initial level of effort. A third reason for the decline was the similar INPO evaluations. In August 1982, NRC signed an agreement with INPO under which NRC would monitor INPO's evaluations of utility operations through direct observation and review of INPO reports.

NRC intends that its monitoring of INPO evaluations will provide an alternative capability to appraisal team inspections to maintain a nationwide perspective on the relative strengths and weaknesses of utilities operating nuclear power plants. This agreement, however, does not require INPO to furnish NRC copies of its reports. It requires that "INPO will exert best efforts to have the utilities release the final evaluation reports for distribution to other INPO members and to the NRC." NRC has made each resident inspector responsible for obtaining a copy of an INPO report from the utility, and NRC's Operating Reactor Program Branch is responsible for maintaining INPO reports. The Branch Chief, however, stated that the branch has neither a system for tracking INPO inspection reports nor a complete list of INPO reports. Thus, although NRC has cut back on its performance appraisal team inspections in recognition of INPO's evaluations, it does not have copies of all INPO evaluation reports.

NRC also intends that its occasional appraisal team inspections, in conjunction with periodic headquarters-level evaluations of selected regional office inspection program activities, should ensure consistency among regional offices. However, reducing appraisal team inspections will reduce their third major benefit--feedback to regional program managers on how well they are implementing the basic and supplemental inspection programs at individual plants. These managers will have this kind of feedback

only on the two or three plants per year covered by performance appraisal team inspections.

Team inspections appear beneficial to NRC managers in evaluating individual plant operations. For example, during a recent NRC appraisal team evaluation, many deficiencies were found in utility procurement operations. These deficiencies had not been noted in NRC's regular inspections. According to the plant's resident inspector, the procurement area had not been emphasized in recent years by his regional management. As a result of this appraisal team's evaluation, however, regional officials told us they planned to increase inspection of the utility's procurement practices.

Although the Special Inquiry Group concluded that NRC needed some type of team inspection of overall plant operations, this need may be greater today because of program changes since TMI--the establishment of the supplemental program and the requirement that regional program managers decide when to perform these inspections at individual power plants. As discussed earlier, however, regional program managers responding to our questionnaire had mixed opinions on the usefulness of NRC's assessment of power plants because they were not based on current information. Further, more than 90 percent of NRC inspectors, supervisors, and managers, and 52 percent of the utility officials responding to our questionnaire also stated that some type of NRC team inspections are needed.

NRC's region I has developed its own team inspection approach called Operational Assessment Teams. These teams consist of 7 to 10 regional inspectors who visit a power plant for up to 2 weeks. During this visit, the team members, while working in their own specialties--quality assurance, training, maintenance, etc.--focus their efforts on one plant system. It is regional management's opinion that this team concept generates greater member interaction and, therefore, better enables the identification of the root causes of problems.

CONCLUSIONS

NRC requires that basic inspections be conducted at all plants. Managers, supervisors, and inspectors at the regional level, however, decide what supplemental inspections should be done at individual plants. This approach permits and encourages regional officials to tailor inspections at each plant to their assessments of need. For example, program officials in a regional office can increase inspection coverage of plants they consider weak relative to other plants they inspect. Likewise, for any one plant this approach allows them to emphasize specific operational areas while deemphasizing others.

NRC's approach could permit more effective use of available inspection resources by ensuring that supplemental inspection

resources are used at plants and in aspects of utilities' plant operations that need inspection coverage the most. Inherent in this approach, however, is the need for sufficient planning and feedback to assure program managers that regional offices are emphasizing those plants and plant operational areas most in need of inspection coverage.

Elements essential to sound inspection planning currently exist, but NRC does not routinely use them nor has it integrated them into an overall inspection management system. Specifically:

--NRC compiles data on inspections at each plant. The current inspection data base, however, is not designed to provide program managers with analyses of inspection trends that could be useful in inspection planning, nor are the data formally correlated with the functional areas included in the licensee performance assessments.

--Although NRC compiles and analyzes licensee reports of plant events, it does not systematically analyze these data to identify trends or issues which might cause managers to modify the inspection program. NRC's analyses are limited to identifying and reacting to specific safety issues.

--NRC does not use risk-based analyses to develop or modify inspection procedures to ensure that inspections address the relatively high-risk areas.

--Three of NRC's five regional offices are not using systematic assessments of licensees' performances to prepare inspection plans for specific plants. Further, subsequent inspection emphasis may not follow assessment results.

--NRC does not effectively integrate INPO and utility evaluations of plant operations into its own inspection planning.

--NRC has decreased performance appraisal team inspections in recognition of INPO's similar evaluations, but it does not regularly obtain all INPO evaluation reports. Consequently, NRC is not able to consistently benefit from the knowledge gained from these industry investigations.

RECOMMENDATIONS TO THE CHAIRMAN, NUCLEAR REGULATORY COMMISSION

To improve NRC's operating nuclear reactor inspection program, we recommend that the Chairman, NRC

--use information available in the inspection data base to plan and monitor inspections at specific power plants. Analyses of the various types of inspections that are (and are not) being performed, as well as the frequency of violations detected, should be included in this process;

--systematically analyze licensee reports of plant events to identify trends or issues that need consideration in managing the overall inspection program;

--formally correlate the inspection procedures with the functional areas used in annual plant assessments;

--use risk-based analyses, as appropriate, to aid in evaluating overall inspection program and individual power plant priorities by identifying plant operations and inspection procedures that are most clearly related to control of public risk;

--use the reports and analyses discussed above to prepare written inspection plans for each plant; and

--establish and implement a policy on how NRC managers and inspectors are to monitor utilities' corrective action to evaluation findings, and recognize these evaluations in inspection plans.

Because NRC has reduced the number of its performance appraisal team inspections in recognition of INPO's similar evaluations, the Chairman, NRC should also

--compile and maintain a list of all INPO evaluation reports and those reports released by utilities to NRC and

--establish criteria for determining when the number of NRC performance appraisal team inspections should be increased or decreased in relation to NRC's success in obtaining INPO evaluation reports.

AGENCY COMMENTS AND OUR EVALUATION

In its general comments on this report, NRC said that it agrees with many of our comments and recommendations and that improvements are underway in several program areas. It also said that much of the information supporting the conclusions and recommendations in the report comes from data gathered in our mid-1983 questionnaire survey. NRC noted that while the survey results are valuable to it for future inspection program development, those results probably did not reflect the current improvement initiatives described in the specific comments that it appended to its general remarks. We revised the report to recognize NRC's improvement initiatives. We believe these initiatives, if completed, will satisfy the intent of our related recommendations.

NRC appended 17 specific comments to its general report comments, of which 13 address the matters discussed in this chapter. Two comments describe improvement initiatives related to two of our conclusions and recommendations. First, NRC said that it has taken two actions to correlate inspection procedures with the functional areas used in annual assessments of licensees. It

added that work will continue on this item. Second, NRC described its ongoing effort to use risk assessment techniques in determining inspection priorities. These NRC comments are presented in this chapter on pages 24 and 22, respectively. If carried through to fruition, these NRC actions should satisfy the intent of our related recommendations.

NRC's other detailed comments provided additional information on the matters discussed in this chapter for the purpose of factual accuracy and clarification. These comments are either included in the chapter or, as appropriate, we revised the report to reflect NRC's comments.

CHAPTER 4

FIELD INSPECTORS' EFFECTIVENESS MAY NEED IMPROVEMENT

The key to successful implementation of NRC's inspection program is well-trained, capable inspectors who understand NRC's regulatory requirements and their inspection procedures and who are knowledgeable of the utility operations at the plants they inspect. Utility officials told us that generally NRC's inspectors are capable and professional in conducting their inspections. Inspectors responding to our questionnaire, however, mentioned three problems that they believe limited their effectiveness:

--Inspection procedures used as guidance in inspecting for compliance with regulatory requirements are not written clearly or in sufficient detail.

--Regulations and other regulatory requirements are difficult to understand.

--Training opportunities have been inadequate.

INSPECTION GUIDANCE IS NOT CLEAR OR SUFFICIENTLY DETAILED

In 1979, the President's Commission Report noted that a majority of NRC's inspectors characterized NRC's inspection procedures as unclear and lacking in sufficient technical guidance. Each procedure provides inspectors with guidance on how to conduct the inspection. Inspectors have considerable latitude, however, to decide what has to be done to satisfy the intent of an inspection procedure.

We asked inspectors what inspection procedures they normally perform and whether the procedures need revision. Respondents to our questionnaire indicated, as they had to the President's Commission, that a substantial number of inspection procedures need revision. For example, for about one-third of the procedures normally used by regional inspectors, as few as 20 percent and as great as 56 percent of the respondents stated the procedures need clarifying. Some inspection procedures were rated as needing revision by as few as one percent of these regional inspectors; in contrast, as many as 56 percent of the regional inspectors rated other procedures they normally use as needing revision.

Since individual regional inspectors have different responsibilities and, therefore, use different inspection procedures, it is difficult to identify specific problems without a detailed review of each procedure--a step which was beyond the scope of our review. However, we believe the following comments from two nuclear engineers with over 3 years and 12 years experience, respectively, as NRC inspectors characterize the comments we received from inspection personnel.

"Almost across the board, inspection [procedures] should be revised for the purpose of providing more information to the inspector. They should provide descriptions (source, paragraph, intent) of what and where the specific requirements are for inspection areas. They should identify which items in inspection guidance and requirements are just good ideas, but have no enforceability. This would reduce the amount of time an inspector must spend researching the specific requirements for an area or site and allow more actual inspection effort."

"In my opinion, all [procedures] can be improved. For instance, in a single [procedure] you can generally find both 'too prescriptive' and 'easy to understand' and 'difficult to understand' in various degrees. In general, an experienced inspector in conjunction with region supervisors can work out an adequate inspection for a [procedure]. The concern is that consistency may be lost between inspectors and regions where a requirement is not clearly stated and the depth of inspection identified."

Because of the latitude inspectors have in satisfying the intent of an inspection procedure, we asked inspectors what percentage of their time is spent on utility activities such as examining equipment, observing operations, and examining records. We also asked NRC managers what percentage of the inspectors' time should be spent on these activities. Overall, the responses showed that the average times for what inspectors do and what their managers say they should do are similar.

When we analyzed the responses for resident inspectors and their managers by regions, however, we found significant differences among regions and between average responses from residents and their managers. For example, resident inspectors in region V stated that they spend about 21 percent of their time examining equipment while their managers stated that residents should spend about 42 percent of, or double the actual time spent on this activity. These differences are shown in the following tables.

How Resident Inspectors Say They Use Their Inspection Time

Activity	Percentage of time[a]					
	Region averages					National average
	1	2	3	4	5	
Examine equipment	34.2	28.8	29.8	38.0	21.3	31.0
Observe, interview, and/or assess utility personnel	41.0	40.2	41.7	38.0	57.5	41.6
Examine licensee records, logs, and procedures	24.8	31.0	28.5	24.0	21.3	27.4

[a]Percentages do not total 100 due to rounding.

How The Resident Inspectors' Managers Say They Should Use Their Inspection Time

Activity	Percentage of time[a]					
	Region averages					National average
	1	2	3	4	5	
Examine equipment	34.2	25.5	21.4	30.0	42.3	30.5
Observe, interview, and/or assess utility personnel	43.8	53.0	52.1	42.0	33.8	45.8
Examine licensee records, logs, and procedures	22.1	21.5	26.4	28.0	23.8	23.7

[a]Percentages do not total 100 due to rounding.

The differences in the average responses are surprising since all resident inspectors at operating plants have the same basic responsibilities. Even more surprising, however, is the wide range in individual responses. In the following table, for example, the time resident inspectors said that they spend observing, interviewing, or assessing utility personnel performing their activities ranged from 10 to 80 percent.

What Inspectors Do During an Inspection

Activity	Range of time spent on activity: Resident inspectors (percent)	Range of time spent on activity: Residents' managers (percent)
Examine equipment	10 to 70	10 to 60
Observe, interview and/or assess utility personnel as they perform their activities	10 to 80	5 to 50
Examine utility records, logs, and procedures	5 to 60	5 to 50

Responses from the different management levels varied also. For example, responses from section chiefs--the first level of management above inspectors--varied from 10 percent to 60 percent for the time resident inspectors should spend examining equipment, 20 percent to 70 percent for observing and assessing utility personnel, and 10 percent to 50 percent for examining licensee records.

We did not perform a similar analysis for all regional inspectors because they collectively conduct a variety of types of inspections. However, we did find a wide range of responses within specialty areas. For example, responses from radiation specialists showed a range of 0 percent to 30 percent for time spent examining equipment, 10 percent to 75 percent for observing and assessing utility personnel, and 15 percent to 85 percent for examining licensee records and procedures.

In 1979, the President's Commission Report concluded that inspectors spent too much time reviewing records and too little time independently testing or observing work. Although NRC has made several changes in its program to correct this, the responses to our questionnaires show that some inspectors and managers continue to emphasize records reviews. In addition, the wide range of responses among inspection personnel may support the concern expressed by a number of inspectors, discussed on page 36, that there is inconsistency among individual inspectors and among NRC's offices because inspection procedures are not clearly stated and the required depth of the inspection is not identified.

REGULATORY REQUIREMENTS ARE UNCLEAR

Regulation of the nuclear industry involves NRC's development of requirements, utilities' implemention of them, and NRC's inspection of the utilities to ensure compliance. NRC's Office of Nuclear Reactor Regulation (office of regulation) issues the requirements and the inspection office ensures that utilities are correctly implementing them.

The office of regulation's requirements represent the criteria used by inspection personnel to evaluate a nuclear power plant's operation. Consequently, these requirements should be clear, concise, and readily understandable both to utilities and inspectors. The President's Commission Report concluded that NRC regulations are so voluminous and complex that they require immense efforts by utilities and NRC to ensure compliance. Therefore, it added, the regulations can be a negative factor in ensuring safety.

Responses to our questionnaires show that NRC's regulatory requirements are often unclear or confusing to both NRC's inspection staff and utility personnel. As a result, utility personnel may not be certain what they must do to comply with an NRC requirement, and inspectors may not always have a clear understanding of what the utility was supposed to do.

Over one-third of the NRC respondents stated that more than 20 percent of the NRC operating plant regulations are difficult to understand. Our examination of individual responses showed that many of these statements were made by relatively experienced inspection personnel.

Inspectors' criticisms of the regulations ranged from "confusing" to too detailed. For example, a safeguards inspector responding to our questionnaire commented:

> "Some regulations are difficult to inspect because they are hard for [utilities] to implement. This is because the regulation is not clearly stated and often the published Regulatory Guides issued to assist [utilities] in complying are contradictory and nebulous. A good example of the above is: 10 CFR 73.71(c) - Reporting of Physical Security Events and [Regulatory] Guide 5.62."

About 79 percent of the safeguards inspectors who responded to our questionnaire said some regulations are difficult for them to understand.

Respondents' criticisms of NRC's requirements seemed to focus on their vagueness and, therefore, the difficulty in interpreting them. For example, one utility plant official stated:

> "The inspection program is designed around a set of laws and requirements which may not be perfect, but acceptable . . . . The real hard spot comes when the inspectors and regional administrators try to interpret the law and guidance given to them by the [Office of Regulation]. This interpretative process is most important to the inspection program . . . . Often the interpretations are a mixture of requirements and a significant amount of personal opinion added along the way."

Appendix R to 10 CFR 50 (Fire Protection) was singled out for special criticism by both NRC and utility officials. This requirement was issued in November 1980 and stipulated modifications to be made by operating plants in the area of fire protection. One NRC fire protection specialist responding to our questionnaire stated that "this [requirement] is so confusing that it is an embarrassment to the agency."

For example, on October 19, 1983, NRC provided utilities with its position on certain requirements of Appendix R because NRC and the utilities were interpreting the requirements differently. Specifically, NRC's letter stated:

> "During our evaluations . . . we determined that some [utilities] were interpreting certain requirements of Appendix R in a manner that was not consistent with the position that the staff was using . . . .
>
> Therefore, we are transmitting the enclosure to all [utilities] for information and use as appropriate. The NRC inspection teams that will be conducting the inspections for conformance to Appendix R at each plant will be using these positions as their criteria for conformance for these particular issues . . . ."

One of the requirements that was clarified in the letter was the need for fire detectors "in" a fire area. NRC staff interpreted the word "in" to mean "throughout" the potential fire area. We believe, however, that the NRC staff's interpretation of the word "in" further confuses the issue. While something is either "in" or not "in" a certain area, "throughout" raises questions on distance between the detectors and would appear to make this aspect of the regulation subject to interpretation.

CLARIFICATION OF REGULATORY REQUIREMENTS WAS A CONCERN OF INSPECTORS

When NRC inspectors need clarification of a regulation or other regulatory requirement, they often must go through inspection office channels to the office of regulation that developed the regulation or requirement. Reports on the TMI accident found that these requests often were not handled promptly. On the basis of the responses to our questionnaire, this condition appears to continue. Forty-one percent of the NRC respondents to our questions on communications rated communications as inadequate. Our discussions with inspection personnel disclosed that their greatest dissatisfaction with communications is what they believe is an inability to obtain timely and effective clarifications and interpretations of regulatory requirements from NRC's office of regulation. For example, one inspector commented:

> "Many technical specification or regulatory requirements are vague or unclear. Requests for positions for questions raised are usually answered in an unsatisfactory manner . . . . The position varies

according to who is assigned to handle the response, and if you get a written response, it is so vague as to be useless. Everyone in the regions feel that this area is out of control and almost useless."

According to one regional office division director, safety issues that inspectors identify are routinely submitted to the office of regulation for resolution, but it usually takes too long to receive a response. For example, following an operating event at the Salem plant, located in region I, NRC promptly began a coordinated investigation that included representatives from region I, inspection headquarters, and the office of regulation. Between February 25 and December 28, 1983, NRC issued three bulletins to utilities and a letter specifying actions utilities were to take to address the implications of the Salem event at their plants. In June 1983, after investigating the Salem accident, region I submitted recommendations for corrective action to the office of regulation.

In addition to issuing instructions to utilities for necessary corrective actions, that office also needed to provide the information to the inspection office so it could appropriately revise the inspection program. The inspection office's Director of Reactor Programs and his counterpart in region I told us that the office of regulation did not provide them with the information they needed until May 1984.

According to the inspection office's Director of Reactor Programs, the time required for a response from the office of regulation on a regulatory problem or safety issue varies according to the problem's complexity and the regulation office's workload. He added, however, that it usually takes more time than inspectors would like.

In commenting on our report, NRC pointed out that it has spent considerable effort in the past several years improving the process it uses to respond to inspectors' clarification requests. (See p. 52) This effort involves direct telephone conversations and, in some cases, formal clarification requests. In the latter cases, according to NRC, clarification request responses are provided by dates specified in the formal requests or by mutually agreeable completion dates consistent with workloads and priorities. Progress on formal clarification requests is tracked by means of a computerized tracking system. NRC noted that clarification requests are frequently assigned a lower priority than operating event evaluations and licensing reviews. Progress on formal clarification requests is tracked by means of a computerized tracking system.

The concerns of NRC inspectors about timely and effective clarification of regulatory requirements is based on

questionnaires completed by NRC inspectors and their supervisors and managers, and our subsequent detailed discussions with representatives of these groups. As such, the report reflects their concerns as of our October 1983 discussions with selected field inspection personnel. The NRC efforts described above may have alleviated these concerns.

TRAINING OPPORTUNITIES HAVE BEEN INADEQUATE

Although utilities rated NRC's inspectors as technically capable, less than half of the inspectors said that their training has been adequate. However, the inspectors generally rated the training courses they attend as helpful. In addition, some inspectors said that (1) they were not receiving the training deemed necessary by NRC and (2) a need may exist to add some courses to the inspectors' training curriculum. Finally, our analysis of questionnaire responses shows that inadequate training may be affecting some inspectors' ability to perform their assigned inspections.

Adequacy of NRC training

As shown below, nearly one-half of the inspectors responding to our questionnaire rated NRC training as adequate in providing them with the skills to perform their inspections; over one-third rated this training as inadequate.

How Do Inspectors Rate Their NRC Training?

Rating	Inspectors		
	Residents	Regional	Combined
Adequate	45.0	43.3	43.9
Neither adequate nor inadequate	30.0	17.3	21.7
Inadequate	25.0	39.4	34.4
Total	100.0	100.0	100.0

Although a majority of the managers and supervisors responding to our questionnaire rate NRC's training program as adequate for their inspectors, there was an 18-percent difference between the managers' rating of training for residents and regional inspectors. Specifically, about 78 percent of the managers rated training as adequate for the residents as compared to about 60 percent for the regional inspectors.

Our analysis of the responses of those inspectors who rated their inspection time as inadequate disclosed that a greater number rated their training as inadequate also. For example, of the resident inspectors who rated their training as inadequate,

one-third also rated their inspection time as inadequate and 18 percent rated their inspection time as adequate. This may indicate that inadequate training may be affecting inspectors' ability to perform their assigned inspections in a timely manner.

Inadequate training opportunities

About 37 percent of the inspectors responding to our questionnaire said that their training opportunities were inadequate, while about 40 percent said that opportunities have been adequate.

We also analyzed this question by the inspectors' positions and found that radiation protection inspectors (54.1 percent) and safeguards inspectors (47.6 percent) had a higher percentage of negative replies than other regional inspectors. Emergency preparedness inspectors (16.7 percent) had the fewest negative replies. Furthermore, the percentage of personnel who rated their training opportunities as inadequate varied among NRC's five regional offices. For example, about 60 percent of region II's residents who responded rated training opportunities as inadequate, compared to none of region IV's residents.

Inspectors we contacted said their managers often told them that they could not be spared for training because of the heavy inspection workload. However, one inspector from region IV told us that his desire to attend training--rather than the workload--was the critical factor in determining the training he received. According to this inspector, region IV annually develops a training plan for each of its inspectors, which is used to schedule training. According to all of the personnel we met with, region IV is apparently the only region using individual development plans. Furthermore, region IV had the lowest inadequate training response rate for its inspectors (15.4 percent for regional inspectors and 0 percent for residents).

NRC inspectors received about 5 days of training during fiscal year 1983. NRC managers generally agreed that often inspectors were not sent to training because of the inspectors' workloads. However, according to the managers, inspectors who needed training were receiving such training and the replies to our questionnaire were self-enrichment motivated.

Inspectors are not receiving required training

As part of our questionnaire, we provided inspectors with a list of NRC training courses and asked them whether they had attended each course. According to NRC's Inspection Manual, inspectors are to attend certain courses during the first 24 months of employment. We compared this list of required courses to our questionnaire responses for all 167 inspectors employed by NRC prior to 1981, or 30 months prior to our questionnaire mailing, and found that not all inspectors had attended all the required classes.

Listed below are four of the basic training courses NRC requires its inspectors to receive through seminars and self-study within the first 24 months of employment. The table shows the completion of these subjects reported by inspectors employed by NRC prior to 1981. The Inspection Manual subject covers the inspection procedures that inspectors use. The remaining three subjects cover the criteria against which they inspect.

Subject	Training received	Training not received
	----------(percent)----------	
NRC Inspection Manual	72.1	27.9
Code of Federal Regulations	88.9	11.1
Regulatory guides	58.7	41.3
Industry codes or standards	36.5	63.5

Inspectors said some courses should be added

NRC has established a training curriculum for each type of inspector (resident, radiation protection, etc.). As part of our questionnaires, we provided inspectors with a list of all NRC inspection-related courses and asked them whether the course is necessary to perform their assigned inspections. We compared the responses on various types of inspections to this question with NRC's training curriculum for these types of inspectors and found that inspectors believed some courses should be added to their training curriculum. For example, resident inspectors assigned to operating plants said that a general construction course should be added since they inspect construction activities related to plant modifications.

In commenting on this report, NRC said that it has taken several actions to ensure that inspectors receive necessary training. One action, it said, was hiring more instructors and scheduling additional courses. In addition, NRC said that regional offices must now maintain a journal for each new inspector that contains documentary evidence of training received. Completion of the journal and formal training courses, NRC said, constitutes minimum inspector qualification.

NRC's comments address controls that it has established to ensure that new employees receive the training essential for minimum qualification as inspectors. The controls may effectively ensure that new inspectors have satisfactorily completed all training that NRC considers necessary for them to begin conducting inspections. The controls that NRC described do not, however, address mandatory and elective training needs of those inspectors who have completed all minimum qualification requirements but may need additional periodic training to enhance their proficiency.

CONCLUSIONS

Lack of clarity and specificity in inspection guidance, regulations, and other regulatory requirements have been long-standing problems. One effect of inadequate inspection guidance is a wide variance in the way individual NRC inspectors said they divide their inspection time among examining utility records, observing utility operations, and examining equipment. This appears to show inconsistency in the way inspectors approach the same types of inspections. Inspectors' concerns about lack of clarity in regulations and other regulatory requirements were compounded by what they viewed, as of October 1983, as slow responses to requests for clarification.

A detailed review of NRC's inspection procedures, regulations, and related interoffice communications was beyond the scope of our review. Our work in these areas was limited to obtaining NRC and utility officials' opinions to determine whether areas of concern remained. As of October 1983, problems in these areas continued just as they were noted following the TMI accident. Therefore, NRC should promptly incorporate the suggestions it has received from the inspection staff and work to identify and revise those inspection procedures, regulations, and regulatory requirements which are not sufficiently clear and specific. Inspectors' concerns about obtaining timely and effective clarifications of regulatory requirements may have been alleviated by NRC's efforts in recent years to improve inter-office communications. Finally, inspectors are not receiving some of the training which they or NRC believe is necessary for them to fulfill their assigned inspection duties.

RECOMMENDATIONS TO THE CHAIRMAN, NUCLEAR REGULATORY COMMISSION

We recommend that the Chairman, NRC, take steps to clarify the inspection program and enhance inspection training. For the inspection program, the Chairman should

- --identify and revise, as may be appropriate, areas within the inspection procedures, regulations, or other NRC requirements which are ambiguous or not sufficiently clear in their use or intent.

To improve the inspection training program, the Chairman should

- --identify mandatory training courses, acceptable reasons for not attending on schedule, and maximum permissible time for rescheduling attendance at these courses.

- --determine whether the existing training program meets the needs of inspectors in assuring compliance with NRC regulations at operating nuclear power plants.

The information we developed in this report should be helpful in this review.

AGENCY COMMENTS AND OUR EVALUATION

NRC provided four comments on this report chapter correcting an apparent factual inaccuracy, clarifying one report statement, and providing information on two improvement initiatives. These comments are presented on pages 41 and 44, and we revised the discussion of inspectors not receiving required training to reflect the fourth comment. One comment addresses our conclusion that inspectors are not receiving all necessary training. NRC described steps it has taken to ensure that new inspectors receive all training required for minimum qualifications. While these steps appear to satisfy the intent of our recommendation, they do not cover NRC inspectors who have met all minimum training requirements.

APPENDIX I

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

JAN 28 1985

Mr. J. Dexter Peach
Director, Resources, Community, and
Economic Development Division
U.S. General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Peach:

We appreciate the opportunity to comment on the draft GAO report "Better Inspection Management Would Improve Oversight of Operating Nuclear Plants." The report makes several points which are useful to the Nuclear Regulatory Commission, and it highlights several areas in which we agree that further work by NRC may be desirable.

Much of the information supporting the conclusions and recommendations in the report comes from data gathered from a June 1983 survey. We have found GAO's compilation of the survey results (provided separately) and GAO's analysis of the survey results of particular value for future program development. With respect to several of the recommendations and conclusions in the report, actions to improve the NRC programs have already been initiated. The results of these actions were probably not reflected in the 1983 survey data and are included in the enclosed comments.

The GAO report states that the inspection program has improved since the TMI accident and attributes much of this to further implementation and development of the resident inspection program. Much of our effort in the last several years has been to develop and support the resident inspection program. A significant portion of the inspection activities at each operating site are now carried out by resident inspectors. These points are only briefly discussed in the draft report, while other aspects of the inspection program are addressed in more detail. While we agree with many of the draft report's comments and recommendations, the report may understate the significance of improvements made in the resident inspection program.

Specific comments on the draft report are enclosed.

Sincerely,

William J. Dircks
Executive Director for Operations

Enclosure:
Comments on GAO Recommendations

COMMENTS ON GAO REPORT

1. On page iv the statement is made "... NRC's regional offices annually assess the operating performance of each of their assigned plants in nine basic areas ..." Although the assessments are done in the regional offices and regions have a primary input, the SALP process involves input from other NRC offices and therefore is an agency assessment.

   [GAO COMMENT: Wording changed to reflect NRC position.]

2. On page 3 the report states "This revision divided NRC's 114 inspection procedures into a "basic" (mandatory) and "supplemental" (discretionary) inspection program." For clarification, the inspection program is divided into three categories; minimum, basic and supplemental. Essentially the "minimum" and "basic" inspection programs are mandatory programs, so not distinguishing between "minimum" and "basic" in the GAO report does not significantly impact the points made in the discussion.

   [GAO COMMENT: Wording changed to reflect NRC position.]

3. The report contains several statements that indicate results of utility reports on operating experience are not routinely used to refine the inspection procedures or to identify industry-wide trends to adjust inspection priorities (pgs iv, 16, 19-20 and 32).

   These statements may mislead the reader as the NRC staff devotes considerable effort to the review and evaluation of plant operating experience and regional inspection experience and systematically informs the nuclear industry and NRC offices, including the regional offices, of the results of these evaluations. Some of this effort results in specific inspections and in revision to the inspection program. This effort is described in the following paragraphs.

   In regard to nuclear power plant operating experience, 10 CFR 50.72 requires that licensees promptly report to the NRC Operations Center via the Emergency Notification System any operating event or condition indication of significant degradation in safety. If required, there is follow-up with the utility or the regional office to obtain sufficient information to evaluate the generic safety significance of the event.

   Licensees are also required (10 CFR 50.73) to submit written Licensee Event Reports describing and analyzing events that are significant to safety and any operation or condition prohibited by the plants' technical specifications. These reports are also reviewed for generic applicability to other plants. Also reviewed are construction deficiency reports [10 CFR 55(e)] and reports of safety grade component deficiencies submitted per 10 CFR 21. The results of inspections sometimes lead to the identification of a potentially generic issue. Also, AEOD is responsible for and does review selected event notifications and Licensee Event Reports for identification of generic trends relative to safety.

GAO Note: NRC's references to pages and paragraphs in the draft report have been changed to correspond to those in the final report.

As a result of the evaluation of these potential generic issues, IE issues two levels of generic communications to the nuclear industry, information notices and bulletins. Information notices pertain to a generic safety problem or issue but do not require specific action or response by the recipient. Licensees are expected to review each information notice for applicability to their facility and to take appropriate action. Licensee action on each information notice is not inspected by the regional office. However, the regional offices do inspect to ensure that each licensee does have a program to review each information notice.

Bulletins also provide information on generic issues that have a major safety significance. Bulletins also list specific actions that are to be taken by licensees and usually require a written response. Each affected utility is inspected to ensure that they have properly implemented the actions specified by the bulletin. In many cases, Temporary Inspection Procedures are prepared by IE and issued to the Regional Offices to provide more detailed guidance in the conduct of these inspections.

Also, NRR generic letters sometimes contain licensee requirements based upon the staffs' analysis of plant events. As with IE Bulletins, selected NRR generic letters form the basis for inspection program changes or the issuance of Temporary Inspection Procedures.

Some of the issues that are evaluated for generic applicability do not result in the issuance of an information notice or bulletin, but do result in specific inspection efforts. These largely fall into two areas. One is a component problem discovered at a nuclear plant that may stem from a design or manufacturing defect in that component. This can lead to an inspection of the component manufacturer and/or designer by the Vendor Program Branch. The other category is the followup to a 10 CFR 21 report submitted by a component manufacturer. Often, the individual utility customers are notified directly by the manufacturer and specific remedial actions are recommended. The regional offices often follow up with an inspection to ensure that the utility has received the manufacturer's notification and has taken appropriate action.

[GAO COMMENT: Report revised to incorporate NRC comment.]

4. The draft report indicates on page 19 that about 4500 licensee event reports are received annually.

This draft report does not discuss the fact that the NRC substantially revised the LER system in 1983, and the revised system (10 CFR 50.73) was effective January 1, 1984. As a result, the number of LERs submitted in 1984 will be reduced significantly over previous years, although the content and level of detail to be included in each report have been substantially increased. Overall, the number of LERs expected to be submitted for 1984 will be approximately 2200.

[GAO COMMENT: Wording changed to reflect NRC position.]

5. The draft report indicates on page 19 that the Regional Offices review each LER to ascertain if it should react (e.g., dispatch an inspection team, activate its emergency response center).

LERs are submitted within 30 days from discovery of a reportable situation. Thus LERs are not used to identify plant events requiring immediate response or activation of the emergency response center. The NRC uses the oral reports submitted per 10 CFR 50.72 for this purpose.

[GAO COMMENT: Wording changed to reflect NRC position.]

6. The draft report indicates on page 19 that AEOD's analysis of selected event reports is oriented towards the development of new regulatory requirements.

The focus or orientation of AEOD studies is to check on operating experience in light of present regulatory requirements. Thus, AEOD reviews operating experience in order to identify specific events and generic situations where the margin of safety established through licensing has been degraded and to recommend corrective actions that will restore the originally intended margin of safety. In this context, indicating that the focus of AEOD studies is to develop new regulatory requirements may be misleading.

[GAO COMMENT: Wording changed to reflect NRC position.]

7. On page 21, the report refers to a finding of a Battelle study that "only 8 of 30 routine inspection procedures examined had a direct association with the 16 highest-risk plant systems identified by the study." This reference alone may not fully reflect the findings of the Battelle study. Concerning the above finding, the Battelle report went on to state "This fraction does not accurately represent the extent to which the inspection program is oriented to the control of risk, however. First, the various modules do not involve the same levels of inspection; some are done more frequently or require more time than others. Secondly, some of the more general modules may not have direct association with risk mitigating systems but have high significance to risk. Training ...."

[GAO COMMENT: Report revised to incorporate NRC comment.]

8. On page 22, the statement is made that "To date, however, NRC has not used probabilistic risk assessment to identify priority inspection areas, or to develop or modify its inspection procedures..." The report does not recognize several NRC efforts in progress that are exploring the use of risk assessment techniques in inspection program development.

One of the Commission goals is to explore the use of Probability Risk Assessment (PRA) techniques as a means to prioritize the inspection program. Risk assessment techniques apply primarily to specific components and systems while inspection activities often apply to functional areas such as maintenance and operations. To resolve this issue, the Office of Nuclear Regulatory Research (RES), with input from IE, has initiated research to develop and field test approaches for applying PRA information into the inspection program. The research was initiated over one year ago.

Results of the research to date include development of a logic scheme for inspection program functional area prioritization. However, the approach identified is complex and requires further study to determine if it is

practical. The research did indicate that site specific PRAs, when available, may be useful in focusing inspection activities on more risk related systems and components. Trial programs for use of PRAs in inspection prioritization are in progress for one operating reactor facility and for one facility in the preoperational testing phase.

[GAO COMMENT: Report revised to incorporate NRC comment.]

9. On page 23, the GAO report characterizes SALP ratings in terms of increased, normal and decreased inspection effort. This characterization is incomplete in that category ratings are also meant to indicate the level of licensee attention needed for specific functional areas.

[GAO COMMENT: Wording changed to reflect NRC position.]

10. On page 23 and 27 the statement is made that "NRC has not grouped its 114 inspection procedures by each of the nine functional areas covered in the assessments."

The Office of Inspection and Enforcement (IE) has conducted two programmatic reviews that had similar findings. The results of these reviews were reported in IE reports "Program Assessment of Regional Implementation - SALP," dated July 8, 1983, and "Report of Results of MC 2515 Program Review," dated February 1983. One recommendation of both the IE Program Reviews was that the inspection procedures should be realigned to better reflect the evaluation areas used in the Systematic Assessment of Licensee Performance (SALP) program. Based on this recommendation, a change to the inspection program was issued in November 1983 to better align the inspection with the SALP functional areas. Also, changes have been made to the SALP program to better align the functional areas to the inspection program. As the GAO report points out, not all inspection procedures can be conveniently categorized into specific SALP functional areas. To address this issue and others related to the interface of the SALP process and inspection programs, staff work continues to make the two programs more complementary.

[GAO COMMENT: Report revised to incorporate NRC comment.]

11. On page 23, the statement is made that "there is no quality assurance functional area." A revised SALP program was issued to the Regions in March 1984. The revised program requires evaluation of the functional area "Quality Programs and Administrative Controls Affecting Quality."

[GAO COMMENT: Statement deleted.]

12. On page 30, the report states "NRC signed an agreement with INPO under which NRC would monitor INPO's evaluations of utility operations through direct observations and review of INPO reports by seven headquarters-level NRC inspectors". This statement might infer to some readers of the report that seven NRC staff members are assigned full time to monitor INPO. As stated elsewhere in the report, the seven individuals referred to are NRC's performance appraisal team inspectors and assessment of INPO activities is only a part of their responsibilities.

[GAO COMMENT: Statement deleted.]

13. On page 32, the report concludes that "NRC does not effectively integrate INPO and utility evaluations of plant operations into its own inspection planning."

With respect to INPO evaluations, a "Coordination Plan for NRC/INPO Appraisal and Evaluation Activities" has been in effect since August 1982. The plan provides guidance on the interface of the inspection program and INPO activities. Consistent with the Coordination Plan, it is not NRC policy to directly use INPO evaluation results in planning inspections, other than to coordinate timing of onsite activities. One purpose behind this policy is to encourage licensees, through their own initiative, to improve their programs. The Coordination Plan states that "NRC's role in pursuing correction of INPO evaluation findings will primarily involve only those potentially significant safety problems for which it has no other reasonable alternative in meeting its legislated responsibilities." The interface between INPO and NRC inspection activities is in the process of undergoing further evaluation. Commission Policy Statements and memorandums of understanding between NRC and INPO are being developed covering the areas of training and fitness for duty.

[GAO COMMENT: Report revised to incorporate NRC comment.]

With respect to utility evaluations, it is not clear that the survey results indicate that these evaluations are not being effectively used for inspection planning. The survey results indicated that 80 percent of the resident inspectors reviewed and used the evaluations. Region based inspectors reviewed and used the reports to a lesser extent. These responses appear to indicate that the reports are being used by many inspectors in their inspection preparation and planning.

[GAO COMMENT: Report revised to incorporate NRC comment.]

14. On page 40, the report concludes that inspector requests for clarification of regulatory requirements are not quickly answered. The report provides little discussion on NRC systems for dealing with inspector requests. Inspector requests for clarification of regulations or other regulatory requirements are directed initially to the regional office. Questions which cannot be resolved by the region are directed to NRR. Frequently requests are made because an inspector doesn't know the basis or philosophy behind a particular regulation. Many of these requests are handled by direct telephone conversations between the Project Manager, the appropriate technical reviewer, and the requesting region staff member. For some matters, a formal request and documented clarification is appropriate. NRR review and formal response to the region is conducted in accordance with Task Interface Agreements (TIAs) which identify responsible review groups, actions required, and scheduled completion dates.

TIAs regarding requests for clarification of regulatory requirements are handled on a routine basis and frequently are assigned a lower priority than matters of potentially higher safety significance, such as operating events evaluations and licensing reviews. As specified in the TIA, the NRR staff responds to the regional request by the date specified in the request, if one is provided, or negotiates a mutually agreeable completion date, consistent with the total staff workload and priorities. Status of

TIAs is monitored via a computerized tracking system. Status of incomplete TIAs is reviewed periodically with the regions and responsible review groups to assure completion of the TIA is consistent with regional needs.

Over the past several years considerable effort has been spent to improve the process (described above) for responding to regional requests. The results of these efforts may not be fully reflected in the GAO survey results.

[GAO COMMENT: Report revised to incorporate NRC comment.]

15. On page 41, the GAO draft report refers to the Salem scram breaker problem of February 25, 1983, and states that: "In June 1983... Region I submitted this issue to NRC headquarters. A response was not received, however, until May 1984." The GAO statement appears to be incorrect. In response to the Salem scram breaker problem, NRR, IE, and Region I promptly began a comprehensive coordinated effort to analyze this problem, assess generic significance and initiate agency action. A TIA governing division of responsibilities concerning this event was issued on March 3, 1983. This TIA involved responsibilities by Region 1, IE and NRR. Frequent correspondence and dialogue was initiated and maintained between Headquarters, affected licensees, and the regions subsequent to this event. Immediately after the event, IE issued IE Bulletin 83-01 (Failure of Reactor Trip Breakers to Open an Automatic Trip Signal), dated February 25, 1983. Subsequently, IE issued IE Bulletin 83-04 (Failure of Undervoltage Trip Function of Reactor Trip Breakers), dated March 11, 1983, and IE Bulletin 83-08 (Electrical Circuit Breakers with an Undervoltage Trip Feature in Use in Safety-Related Applications Other than Reactor Trip Systems), dated December 28, 1983. Generic actions by licensees were specified by NRR Generic Letter 83-28 (Required Actions Based on Generic Implications of Salem ATWS Events), dated July 8, 1983. Evaluation of licensee responses is still continuing.

[GAO COMMENT: Report revised to incorporate NRC comment.]

16. The tabulation on page 44 lists four courses stated to be required to be taken by inspectors within the first 24 months of employment. For clarification it should be noted that the tabulated "courses" are not formal courses to be attended but, rather, subjects to be covered in seminars and through self-study.

[GAO COMMENT: Wording changed to reflect NRC position.]

17. The report states on page 45 that "inspectors are not receiving all of the training which they or NRC believe is necessary for them to fulfill their assigned inspection duties." Several actions have been taken to alleviate these problems which may not have been reflected in inspector responses to the survey. One is that additional NRC instructors have been hired and additional courses scheduled. Another is that a revised inspector qualification and training instruction [IE Manual Chapter (MC) 1231] was issued on April 1, 1983. IE MC 1231 requires that a Regional Training and Qualification Journal be kept for each new inspector. Completion of the Journal and formal training courses (or equivalency examinations) constitute minimum inspector qualification. Also the Journals contain signature cards that are required to be completed. Signatures on these cards indicate certification of activities such as

APPENDIX I

inspection accompaniments, familiarization with regulations, study of technical specifications, study of regulatory guides, review of industry codes and standards, and completion of required training programs.

[GAO COMMENT: Report revised to incorporate NRC comment.]

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