
BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Management Weaknesses Affect Nuclear Regulatory Commission Efforts To Address Safety Issues Common To Nuclear Power Plants

Investigations of the March 1979 Three Mile Island nuclear plant accident showed that the Nuclear Regulatory Commission (NRC) had not made adequate progress in addressing safety issues common to nuclear plants that had been identified before that accident. GAO evaluated NRC's progress in managing these safety issues and determined that NRC has increased the rate at which it develops regulatory solutions for these issues. This more vigorous pace, however, has been overshadowed by the identification of new issues from the Three Mile Island accident and other sources. As a result, a larger backlog of unresolved issues exists now than before the accident.

NRC has improved its methods for identifying safety issues and determining their importance to safety. NRC does not, however, have sufficient management controls in place to ensure resolution of issues and implementation of appropriate changes to affected nuclear plants and to NRC's regulatory procedures in a timely manner. GAO makes several recommendations pertaining to the need for improved management controls.

GAO also presents a matter for consideration by the Congress which would result in improved public disclosure by NRC of its progress in addressing the most important of these safety issues.



GAO/RCED-84-149
SEPTEMBER 19, 1984

030094

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

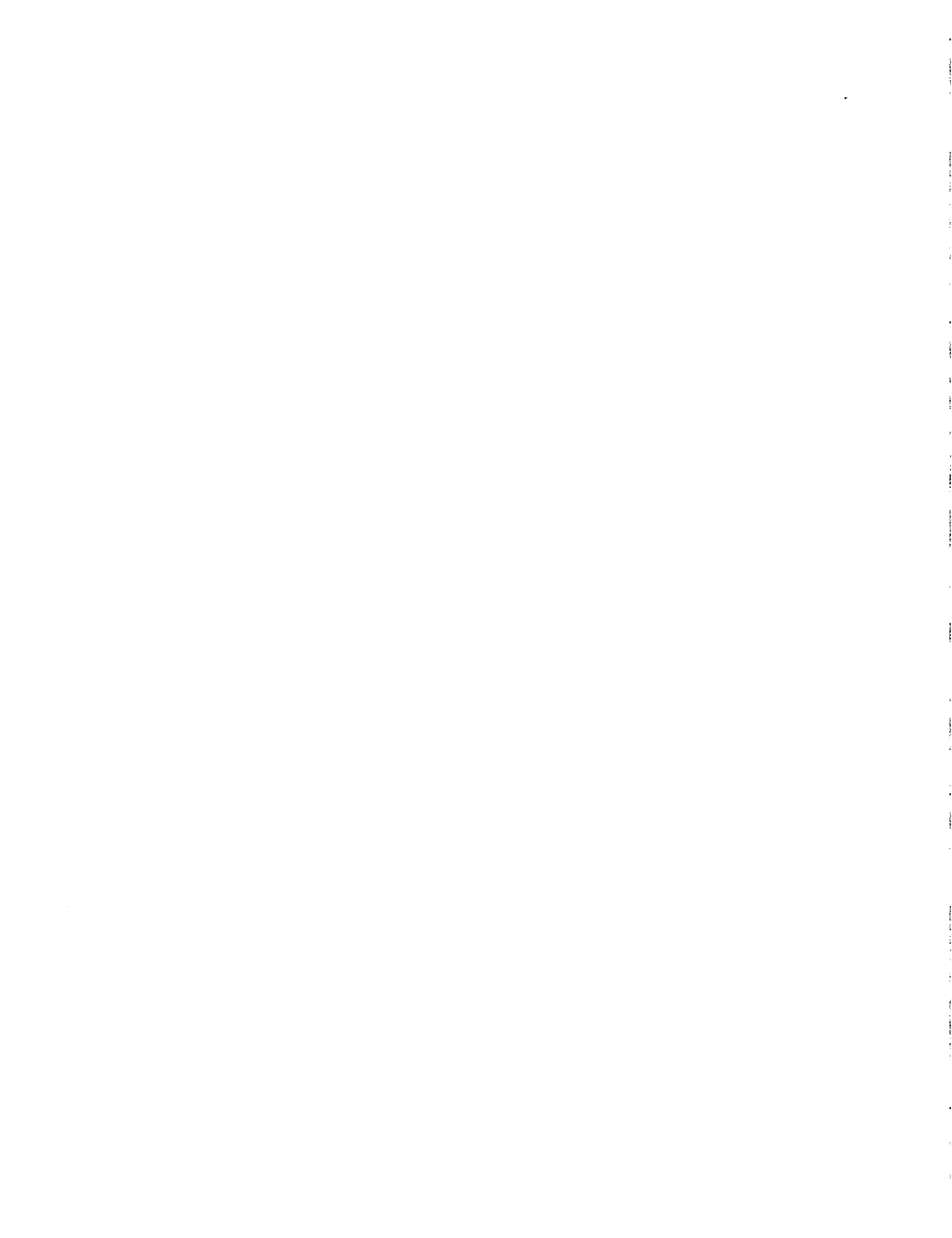
This report examines the Nuclear Regulatory Commission's efforts to address safety issues common to nuclear power plants and identifies actions the agency should take to improve its management of these issues. The report also suggests that the Congress could enhance its oversight of nuclear regulation by improving the Commission's reporting, as required by the Energy Reorganization Act of 1974, as amended, of progress in addressing important safety issues.

We conducted this review to determine if the Commission has corrected earlier management weaknesses highlighted in investigation reports of the March 1979 accident at the Three Mile Island power plant.

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



D I G E S T

The Nuclear Regulatory Commission (NRC) regulates nuclear power plants to ensure the protection of public health and safety and the environment. In carrying out its responsibilities, NRC frequently identifies potential deficiencies in the licensing, operation, or safety of these plants. For example, the loss of all alternating current electric power to the plant is referred to as a station blackout. A station blackout could jeopardize cooling of the reactor core, resulting in severe damage to the plant. When potential deficiencies such as station blackout apply to all plants or specific groups of plants, NRC terms them "generic issues" and addresses them on an overall, rather than plant-specific, basis.

Investigation reports of the March 1979 Three Mile Island nuclear plant accident criticized NRC for, among other things, ineffective handling of generic issues. The NRC Commissioners' Special Inquiry Group stated ". . . actual progress in this area has been limited. This remains an area requiring substantially more attention and progress than it has received to date." Further, the President's Commission on the Accident at Three Mile Island reported that ". . . labeling of a problem as generic may provide a convenient way of postponing decision on a difficult question."

As a result of such criticism, NRC developed new procedures and systems to address generic issues through four sequential steps:

- identification, the collection and analysis of information to identify generic issues;
- prioritization, the ranking of issues based on their importance to safety;
- resolution, the development of solutions to generic issues; and
- implementation, the actual changes made to nuclear power plants or to NRC regulations

and procedures resulting from a generic issue solution.

GAO evaluated NRC's systems and procedures for each of the above four steps, and its overall progress in addressing generic issues since the Three Mile Island accident. In addition, GAO examined NRC's practices for reporting to the Congress, as required by law, its progress on certain generic issues called Unresolved Safety Issues.

GAO found that NRC has made overall progress in addressing generic issues, however, more new issues are being identified than are being resolved. While NRC has improved its identification and priority ranking procedures, it has not developed effective management procedures for resolving outstanding issues and implementing necessary changes. Further, NRC's reporting of generic issues status to the Congress needs to be extended to additional generic issues to increase congressional and public awareness of NRC progress.

NRC'S OVERALL PROGRESS IN ADDRESSING
GENERIC ISSUES HAS INCREASED AS HAS
THE NUMBER OF GENERIC ISSUES

Before the accident at Three Mile Island, NRC resolved about 20 of the 142 generic issues identified in its 1978 Task Action Plan. Following the accident, NRC identified in its Three Mile Island Action Plan many new generic issues and increased its resolution efforts. In 1980 NRC resolved 97 generic issues, most of which were identified from the accident. Since then NRC has resolved about 30 generic issues per year, and overall it has resolved 208 of the 482 total issues identified through July 1984.

NRC continues to identify new generic issues at a rate of about 11 each year. If NRC continued at the current rate of identification and resolution, it would take NRC about 10 years to work off the remaining 186 generic issues. However, NRC currently plans to resolve only 12 issues per year over the next three fiscal years (1984-86).

Because NRC has concentrated on generic issues identified from the Three Mile Island accident, at least 60 issues identified before the

accident, including some of the highest priority, remain unresolved 5 years after the accident. In addition, about 45 issues classified as needing resolution within several years are deferred until NRC assigns resources to them. Some have been deferred for as long as 5 years.

NRC HAS IMPROVED ITS IDENTIFICATION AND RANKING PROCEDURES

NRC's new approach to identifying potential generic issues addresses deficiencies noted in Three Mile Island-related investigations. These deficiencies largely centered on the lack of a systematic analysis of nuclear plant operating experience to identify potential generic issues. (See p. 7.)

NRC has also implemented a new system to rank safety-related generic issues to ensure that in the future (1) the most important safety issues are worked on first and (2) resources are allocated according to issue priority.

Various NRC and outside experts stated that the system provides a rational and disciplined approach for determining the importance of individual issues. As of November 1983, NRC has ranked 123 issues under this system. Of these 68 have substantial potential (high or medium priority) for improving safety. (See p. 14.)

NRC NEEDS ADDITIONAL INFORMATION TO MANAGE GENERIC ISSUE RESOLUTION

NRC incorporates some generic issues into larger research programs where they lose their individual identities. As a result, NRC cannot determine which issues are being worked on, what resources are being applied to their resolution, and when they will be resolved. (See p. 25.)

In addition, when asked by GAO to be specific about what changes to power plants or NRC procedures were required as a result of the resolution of generic issues, NRC could only make incomplete determinations by a laborious process of separately reconstructing the disposition of each resolved issue. Because NRC does not maintain summary information on individual generic issues, it could not

readily separate those issues requiring changes to plants from those requiring changes to NRC procedures. In other cases, NRC could not determine whether or not any changes were required. (See p. 27.) The table below shows NRC's breakdown of issues according to their resolution.

Outcome of Resolved
Generic Issues

(As of Nov. 1983)

Required no changes	41
Required changes to power plants or to NRC regulations	105
Need for change unknown	<u>62</u>
Total	<u>208</u>

NRC NEEDS BETTER MANAGEMENT CONTROLS
TO ENSURE IMPLEMENTATION OF GENERIC
ISSUE SOLUTIONS

When the solution to a generic issue will require utilities to make changes to affected plants, NRC sends the resolved issue to its Division of Licensing for implementation. This division implements the issue solution by reviewing and approving specific proposed changes for each affected plant. NRC does not, however, have adequate controls in place to ensure the effective implementation of changes on a multiplant basis. Specifically, GAO found that:

- Generic issues lose their identity when sent to the Division of Licensing. The division often changes the titles and control numbers of these issues, may break individual issues down into smaller implementation actions, or may combine several issues into a single action for implementation. As a result, the division cannot match implementation actions with corresponding generic issues. (See p. 30.)
- NRC implements generic (multiplant) issue solutions on a first-come-first-served basis without regard to their relative importance to safety. NRC does, however, place emphasis on negotiating plant-specific solutions that consider the issue's safety importance. This action helps to alleviate the problem at the individual plant level, but

does not correct the overall problem. (See p. 32.)

--NRC does not normally maintain information by issue showing when, or if, all affected plants have completed the necessary changes. (See p. 31.)

REPORTING OF GENERIC ISSUES SHOULD INCLUDE HIGH-PRIORITY SAFETY ISSUES

The Energy Reorganization Act of 1974, as amended, requires NRC to report to the Congress on "unresolved safety issues," a term undefined by the act or by its legislative history. As of November 1983, NRC had designated and was reporting on 27 of the 142 Task Action Plan issues as Unresolved Safety Issues. NRC considers these issues its most important ones and has given them more management attention than other generic issues. However, NRC does not report at least 29 other high-priority safety issues to the Congress. Based on NRC's priority ranking system, 11 of these 29 issues may be as important to safety as the Unresolved Safety Issues which NRC reports to the Congress.

Extending report coverage of generic safety issues could enhance congressional and public awareness of NRC's progress in addressing and resolving significant generic issues. Expanded report coverage could also stimulate better NRC management of the generic issues program. (See p. 34.)

CONCLUSIONS

In the 5 years since the Three Mile Island accident, NRC has accelerated the resolution rate for generic issues. However, many more issues have also been identified, leaving a larger backlog of unresolved issues now than before the accident.

Although NRC has improved its identification and ranking system, it has yet to develop an effective program to manage the resolution and implementation of generic issues. In addition, NRC's handling of generic issues is fragmented. Only the 27 Unresolved Safety Issues reported to the Congress receive the focused management attention needed for an effective program.

RECOMMENDATIONS

GAO is making several recommendations to the Chairman, NRC, for the purpose of establishing improved management control of the agency's generic issue program. These recommendations appear on pages 18, 29, and 33. In summary, GAO recommends development and implementation of a management system that would (1) individually track generic issues through completion of all work, including implementing changes at affected plants, (2) provide information on resource needs, expenditures, and milestones, (3) retain summary information on the disposition of resolved issues, and (4) ensure that the most important safety-related plant modifications resulting from the resolution of generic issues receive priority attention.

GAO also recommends that the Chairman, NRC, assess ways to eliminate the backlog of unresolved generic issues in a timely manner. The Chairman should determine whether adequate resources are available within the agency for this purpose, and if not, he should consult with NRC's oversight committees to work out a mutually agreeable timetable and the necessary resources. (See p. 29.)

MATTERS FOR CONSIDERATION BY THE CONGRESS

To enhance congressional and public awareness of NRC's progress on nuclear power plant generic issues, the Congress may wish to amend the Energy Reorganization Act of 1974 to

- expand current reporting requirements to include all safety-related generic issues assigned a high-priority ranking and
- require summary information in NRC's annual report on the total number of generic issues identified, resolved, implemented, and completed at all affected plants.

This report includes suggested legislative language on pages 37-39.

AGENCY COMMENTS

NRC agreed that the report highlights several areas that may require further work and stated that it is examining the current

system to determine what improvements can be made to its overall management of generic issues. (See app. I.)



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ABBREVIATIONS

GAO	General Accounting Office
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation

CHAPTER 1

INTRODUCTION

The Nuclear Regulatory Commission (NRC) is responsible, under the Atomic Energy Act of 1954, as amended, for licensing and regulating nuclear facilities and materials and conducting related research. NRC responsibilities include protecting public health and safety, protecting the environment, safeguarding materials and plants, and ensuring conformity with antitrust laws. In 1967 the NRC's predecessor, the Atomic Energy Commission, became aware of potentially significant issues affecting a number of nuclear power plants through its Advisory Committee on Reactor Safeguards. Commenting on a specific power plant construction application, the Committee noted four issues it believed ". . . are of significance for all large water-cooled power reactors and warrant careful attention." Issues of this type, that relate to a class or type of nuclear power plant, as opposed to an individual plant, evolved into generic issues.

Generic issues are possible deficiencies in the design, construction, or operation of several or a class of nuclear power plants such that the protection of the public or the environment from radiation may be inadequate. For example, the loss of all alternating current electric power (from both off-site and on-site sources) is referred to as a station blackout. A station blackout could jeopardize cooling of the reactor core which depends on the availability of systems which do not require alternating current power supplies and on the ability to restore alternating current in a timely manner. The concern is that the occurrence of a station blackout may be a relatively high probability event that could result in severe damage to the plant.

Most issues have been identified from NRC evaluations of nuclear plant operating data, safety-related research, risk assessment analyses, nuclear power plant licensing reviews, and public concerns. In some cases, these issues require interim repairs at plants to allow time for further study and resolution. In most cases, however, NRC's initial assessment indicates that no immediate action is necessary while a longer term review is undertaken.

GENERIC ISSUE CATEGORIES

The first generic issues were identified in the late 1960s and totaled 482 as of November 1983. In December 1983, NRC's Commissioners published a report, Prioritization of Generic Safety Issues (NUREG-0933), which lists these 482 issues and ranks many of them according to their importance to safety. The 482 issues are derived from three sources: (1) Task Action Plan items--142, (2) Three Mile Island Action Plan items--255, and (3) new generic issues--85. As of July 1984, NRC had not added any generic issues to its list of 482 issues.

Task Action Plan

On October 8, 1976, the NRC Commissioners directed the Office of Nuclear Reactor Regulation (NRR) to develop a program plan for the resolution of generic issues. As part of this program, NRR developed the Task Action Plan in January 1978. The Task Action Plan contains a total of 142 generic issues.

Unresolved Safety Issues

Concern about the number of unresolved generic safety issues led the Congress in 1977 to amend the Energy Reorganization Act of 1974 (42 U.S.C. 5801) to require NRC to develop and implement a plan for addressing unresolved safety issues relating to nuclear power plants. The Congress directed NRC to submit the plan to the Congress by January 1, 1978, and to include progress reports thereafter in the Commission's annual report. As a result of this legislative requirement, NRC designated 27 of the Task Action Plan generic issues as Unresolved Safety Issues. NRC considers this subgroup of Task Action Plan issues as the highest priority generic issues.

Three Mile Island Action Plan

The March 28, 1979, accident at Three Mile Island resulted in a number of accident investigations that recommended numerous actions to reduce the chances of future accidents. In response to these recommendations, NRC developed and published the Three Mile Island Action Plan to provide a comprehensive and integrated plan for correcting or improving the regulation and operation of nuclear facilities based on experience from the accident. The Action Plan listed 255 additional generic issues.

New generic issues

The third category of generic issues is called "new generic issues." Contrary to what the name implies, some of these issues can be traced back as far as the mid-1970s, but were not included among the Task Action or Three Mile Island Action Plan issues. Other new generic issues have recently been identified. While both the Three Mile Island and Task Action Plans represent a review of generic issues at a given time, the new generic issue category represents an ongoing list which continues to grow. For example, NRC added at least 18 new generic issues to its list in 1983. In total, NRC has identified 85 new generic issues as of November 1983. NRC will update NUREG-0933, its list of known generic issues, semi-annually.

NEED FOR CHANGES TO NRC MANAGEMENT OF THE GENERIC ISSUE PROCESS

The President's Commission on the Accident at Three Mile Island and the Nuclear Regulatory Commission's Special Inquiry

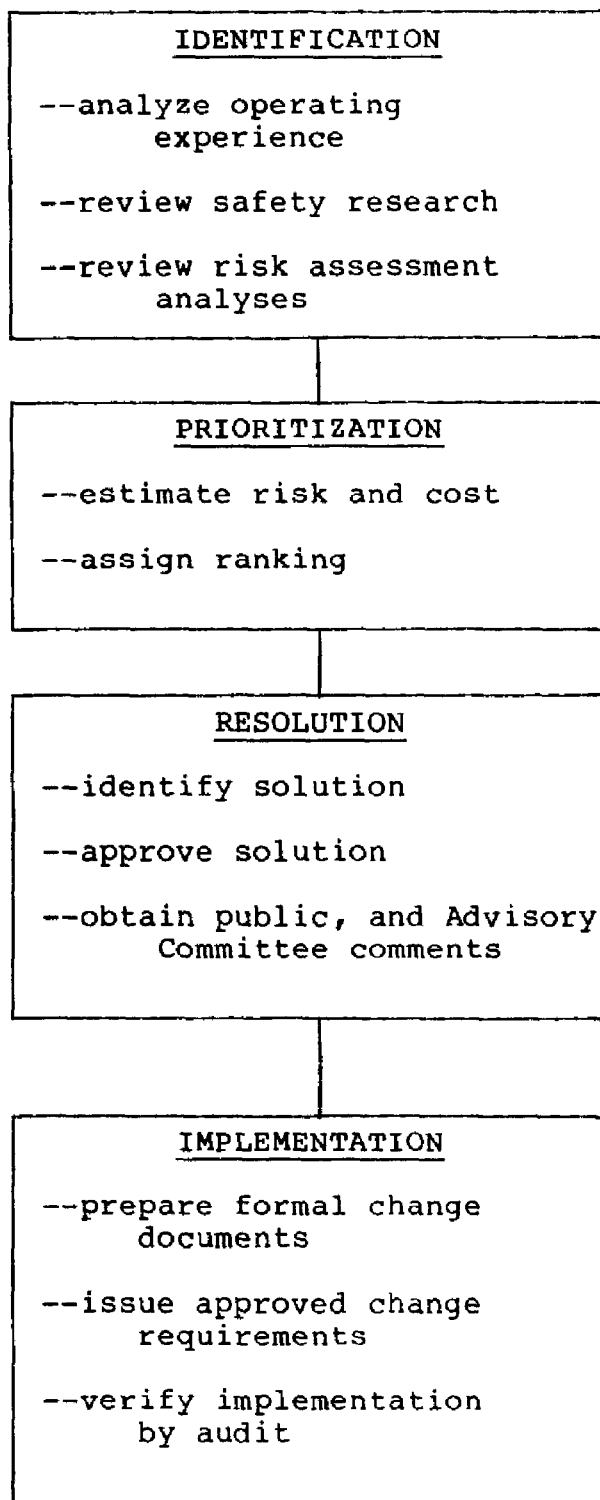
Group, also formed to investigate the 1979 accident, identified NRC management problems as the one consistent theme found throughout their investigations. Specific problems found with NRC's management of generic issues were: no assurance that all important issues were identified, no provision for systematically evaluating operating experience, little coordination of incoming information to identify potential problems, no requirement that relevant issues be resolved prior to plant licensing, and an overall lack of policy direction and guidance by NRC.

As a result, one Three Mile Island Action Plan generic issue specified that NRC would develop a plan for the resolution of all generic issues to include the following five elements:

- identification of possible safety issues through evaluation of nuclear plant operating experience, results of safety-related research, results of risk assessment analyses, licensing reviews by the NRC staff and the Advisory Committee on Reactor Safeguards, and public concerns;
- determination of those issues that are deemed to have substantial potential for adverse impacts on safety;
- development of a timely program for evaluating the significance of each issue and determining any appropriate resolution;
- development of recommended changes to the regulations, licensing review methods, and/or power plant inspection procedures to implement any necessary criteria resulting from the evaluation of the problem, including criteria for modification of standard designs; and
- development of a management program to ensure the effective and reasonable implementation of the above program and effective interaction with the industry and the public.

NRC incorporated the essential features of these five elements into its own four-step process for addressing generic issues that is depicted in Figure 1.

Figure 1
Generic Issue Process



OBJECTIVES, SCOPE, AND METHODOLOGY

We performed this assignment to determine if NRC (1) has corrected weaknesses in its management of generic issues identified by Three Mile Island accident investigations and (2) has made reasonable progress in resolving outstanding generic issues. Our objective was to evaluate the effectiveness of NRC's procedures for identifying, establishing priorities, resolving, implementing, and reporting on generic issues. To accomplish this objective, we

- discussed the generic issue program with officials in NRC's Offices of Nuclear Reactor Regulation (NRR), Nuclear Regulatory Research (Research), Inspection and Enforcement, and Analysis and Evaluation of Operational Data, the Committee to Review Generic Requirements, and the Advisory Committee on Reactor Safeguards;
- met with the Department of Energy's Battelle Pacific Northwest Laboratories to discuss NRC's priority ranking system which they helped develop;
- spoke with the Union of Concerned Scientists, a public interest group which commented on the priority ranking system; and
- analyzed documents relating to the generic issue program, specific generic issues, the Three Mile Island Accident, and our prior reports concerning NRC.

To determine how well the overall program was working to make nuclear plant operations safer, we examined all 482 issues to determine their status. Specifically we examined NRC's:

- identification process through discussions with officials who monitor power plant operational data, developed the list of generic issues, and reviewed examinations of the Three Mile Island investigations as they pertain to 482 generic issues identified through November 1983 (see ch. 2);
- prioritization system by analyzing guidelines for ranking safety issues, and discussing with officials of the Department of Energy's Battelle Pacific Northwest Laboratories how the guidelines were applied to the priority rankings established for 123 of the 482 issues (see ch. 3);
- resolution efforts by reviewing current and past resolution progress on generic issues, of which 208 have been resolved, and examining the NRC's generic issue management control system (see ch. 4); and

--implementation efforts by reviewing current and past progress in implementing necessary changes, of which 105 require changes to NRC procedures or to power plants, and discussing with NRC officials how actual plant changes are made (see ch. 5).

We did not visit utilities operating nuclear power plants to determine if resolved generic issues requiring plant changes have actually been made since we are studying that in a related review still underway. In that effort we examine utilities' progress in making plant changes required by the Three Mile Island Action Plan.

Finally, we also examined the extent to which NRC, pursuant to Section 210 of the Energy Reorganization Act, is keeping the Congress informed of its progress in addressing generic issues by reviewing current reporting requirements and the actual reports submitted. (See ch. 6.)

Our review was performed in accordance with generally accepted government audit standards between June 1983 and January 1984.

CHAPTER 2

NRC HAS A SYSTEMATIC PROGRAM TO IDENTIFY GENERIC ISSUES

In March 1983 NRR issued a directive outlining procedures for identifying and processing generic issues intended to correct the deficiencies identified in the various Three Mile Island investigations. Almost all of the 482 issues had been identified prior to this directive, so NRC intends to use these procedures to identify new generic issues. The new system corrects earlier deficiencies through a more systematic and integrated evaluation of plant operating experience, safety-related research, and risk assessment data in conjunction with peer review and screening of potential issues. While experience with the new system is limited, it should enable NRC to identify and evaluate potential generic issues that pose important questions about nuclear industry regulation and operation.

NRC HAS DEVELOPED A SYSTEMATIC GENERIC ISSUE IDENTIFICATION PROCESS

Prior to the Three Mile Island accident, NRC had not established procedures to ensure the systematic analysis and evaluation of nuclear plant operating information for its safety significance. For example, in a report issued just before the accident, we concluded that NRC's reviews of utilities' nuclear power plant incidence reports did not provide assurance that all identifiable safety-related problems were promptly found.¹ Subsequently, NRC's Special Inquiry Group report on the accident concluded that, "[to] the extent that operating experience was reviewed, reviews were conducted on a random, uncoordinated basis with no assurance that major safety-related problems were identified"

As a result, the Three Mile Island Action Plan prescribed specific requirements to improve the identification process for generic issues. NRR Office Letter No. 40, Management of Proposed Generic Issues (Mar. 1983), specifies the procedures that will be followed for systematically identifying and processing generic issues.

NRC organizations involved in identifying generic issues include:

¹Reporting Unscheduled Events at Commercial Nuclear Facilities: Opportunities to Improve Nuclear Regulatory Commission Oversight (GAO/EMD-79-16, Jan. 26, 1979).

- NRR, which monitors operating nuclear power plants during their lifetimes in addition to its licensing responsibilities during plant construction and operation;
- the Advisory Committee on Reactor Safeguards, which advises NRC on the safety aspects of proposed and existing nuclear facilities and the adequacy of proposed reactor safety standards;
- the Office for Analysis and Evaluation of Operational Data, which analyzes operational data associated with all NRC-licensed activities and feeds the results back to the appropriate organization to improve safety;
- the Office of Inspection and Enforcement, which reviews power plant manufacturers' deficiency reports and reviews operating events called into NRC's continuously manned operations center; and
- the regional offices, which inspect nuclear facilities to determine whether facilities are constructed and operated in compliance with license provisions and Commission regulations.

These groups, along with NRC's Research Office, identify potential generic issues through evaluation of operating experience, results of safety-related research, risk assessment analyses, licensing reviews, and public concerns.

The Office for Analysis and Evaluation of Operational Data, for example, reviews licensee operating reports which describe nuclear plant events ranging from trivial to those of major safety significance. The reports are generated in response to NRC reporting requirements contained in the technical specifications for a given plant. Violations of these specifications form the basis for many operating reports, while others may simply reflect an event having potential public interest. The Office screens between 3,000 and 4,000 licensee event reports annually to identify trends in safety events which may require NRC action. One type of NRC action could be the identification of new generic issues for subsequent resolution and eventual implementation of changes to NRC procedures or to affected plants.

After identifying potential generic issues from licensee event reports or other sources, NRC performs additional in-depth work to assess each issue's significance. Most issues originating in the Office for Analysis and Evaluation of Operational Data, the Office of Inspection and Enforcement, and NRC's regional offices are submitted to the Assistant Director for Safety Assessment in NRR. According to officials within the Assistant Director's office, information submitted is reviewed for potential significance and compiled for biweekly meetings

with the Office for Analysis and Evaluation of Operational Data, NRR, and Inspection and Enforcement. These meetings keep the various groups apprised, allow broader perspective on issues, and serve as a screening device for all proposed issues. The Assistant Director for Safety Assessment and other knowledgeable offices further analyze issues and submit proposed generic issues along with recommendations for action to the Division of Safety Technology within NRR. The Safety Program Evaluation Branch within the Division of Safety Technology evaluates each issue's significance and then takes one of the following actions:

- Proposed issues that relate to radiological safety or the impact of current regulatory requirements remain with the Division of Safety Technology for prioritization. These issues become part of the division's generic issue program.
- Proposed issues that only require clarification or interpretation of current regulatory requirements by means of information notices, or by bulletins where specific actions are required, are sent to the Office of Inspection and Enforcement.
- Proposed issues that do not relate to either radiological or environmental safety are sent to the appropriate NRR division or NRR's Planning and Program Analysis staff for disposition.
- Proposed issues that appear to have some significance but should require no more than 30 days or one staff-month to resolve are sent to the appropriate NRR division for resolution.
- Proposed issues that relate to environmental protection are sent to NRR's Division of Engineering.

CONCLUSION

While NRC's experience with its new generic issue identification system is limited, the procedures could correct the problems with earlier identification processes. The new system should improve NRC's identification of potential generic issues that concern the safety, safeguards, and environmental aspects of nuclear power plants. This system combines an evaluation of power plant operating data from the plants with safety-related research and risk assessment data to identify potential generic issues. Peer review and screening of the concerns raised should help ensure quality identification and delineation of the issues.

CHAPTER 3

NRC USES A RATIONAL AND DISCIPLINED

APPROACH TO PRIORITIZE GENERIC ISSUES

NRC recognized from the outset that all generic issues could not be resolved concurrently. Since 1977 NRC has tried a series of ranking systems to identify priority issues. All of these systems have been plagued by substantial uncertainty in the assigned priority of each issue. Further, no coordinated effort existed to ensure addressing the highest priority issues.

Recent attempts have been directed toward quantifying the relative importance of these issues and reducing the level of subjective input influencing the evaluations. The current method, implemented in 1983, relies on probabilistic risk assessment¹ techniques to determine the level of risk associated with a given safety issue. This system identified a larger number of generic issues with important safety consequences than was previously thought to exist. Conversely, some issues once thought relatively important are now considered less important. While not entirely free of the problems of previous ranking systems, the new system's rational and disciplined approach for determining issue importance represents a significant improvement.

PAST ISSUE RANKING SYSTEMS

Prior to 1976, NRC management provided little guidance to its staff on which generic issues were to be resolved first, according to the Assistant Director of the NRR's Division of Safety Technology. Since NRC recognized it could not address all issues concurrently, the NRC staff selected issues to work on based on their own judgments of an issue's significance. As a result, the most important issues did not necessarily receive the greatest attention. As the number of generic issues increased, NRC recognized the need to develop a system to prioritize safety issues.

From 1977 until after the Three Mile Island accident, NRC developed and used three different ranking systems:

--In 1977 NRC staff combined several lists of issues and classified the issues into four categories of importance from "significant" to "of little or no importance" based on professional judgment.

¹Probabilistic risk assessment is a method of systematically examining complex technical systems, such as nuclear power plants, to identify and measure their public health, environmental, and economic risks.

--In 1978 a risk assessment group in the Office of Nuclear Regulatory Research examined the issues and placed them in four categories using a more quantitative basis for risk assessment. These categories ranged from "potential high risk items" to "items not directly related to risk."

--In early 1979 NRC introduced a relatively more comprehensive and quantitative system. Each issue was assigned points based on an assessment of safety and environmental significance and whether the issue would require modifications to existing plants versus changes to plants not yet completed. While NRC recognized that the point system was still quite subjective, it believed the system was nevertheless a major improvement over previous systems.

Unresolved Safety Issues

In addition to these ranking attempts, NRC reviewed the Task Action Plan generic issues in 1978 to identify those that had potentially significant public safety implications. These were the issues NRC designated as Unresolved Safety Issues for the purpose of reporting them to the Congress. NRC defined an Unresolved Safety Issue as:

". . . a matter affecting a number of nuclear power plants that poses important questions concerning the adequacy of existing safety requirements for which a final resolution has not yet been developed and that involves conditions not likely to be acceptable over the lifetime of the plants affected."²

As a result of this review, the Commissioners designated 27 issues as Unresolved Safety Issues, gave these issues priority funding, and reported on them in NRC's annual report to the Congress.

NRC recognized the need for a new ranking system

In the aftermath of the Three Mile Island accident, many new issues were raised. In addition, increased attention to operating experience continued to identify additional safety issues. NRC found the ranking system it introduced in 1979 was too elementary and subjective to use on this large number of new issues.

²NRC issues an operating license for 40 years from the issue date on a plant construction permit. This translates into an operating life of approximately 30-35 years, depending on the time needed to complete plant construction. At present, no nuclear power plant has been in commercial operation for more than 23 years.

Further, as discussed in chapter 2, the Three Mile Island Action Plan required NRC to develop a plan for early resolution of safety issues, including evaluating the significance of each issue. NRR's Division of Safety Technology assumed responsibility for providing a more rational, quantitative basis for establishing the priority of safety-related generic issues.

CURRENT RANKING SYSTEM

In 1983 NRR developed and implemented an integrated priority ranking system for safety-related generic issues based on risk and cost estimates. This system is designed to assist in the timely and efficient allocation of NRC resources to those safety issues with a high potential for reducing risk and to remove from further consideration issues with little or no safety significance. NRC, however, recognizes that several limitations exist with this system, including the large degree of uncertainty associated with the quantitative techniques, the lack of consideration for land and water contamination, and the double counting of risk on related issues.

Development of the ranking methodology

Several NRC studies, such as the Light Water Reactor Safety Study (1975), the Risk Assessment Review Group Report (1978), the Three Mile Island Special Inquiry Group Report (1980), and the President's Commission Report on the Accident at Three Mile Island (1979), proposed the use of available analytical tools and operational experience to support rational, quantitative, and specific probabilistic analyses of generic issues. NRC officials agreed, and as a result, the Division of Safety Technology embarked on a program to develop a generic issue ranking system based on current risk assessment techniques.

One of NRC's first steps in developing a new ranking system was the selection of criteria by which to evaluate the issues. Since NRC's stated generic issue program goal is the reduction of risks in nuclear power plants, NRC decided that the priority for a given issue generally will be based on an evaluation of the expected risk reduction. Anticipated improvements in terms of man-rem³ and core melt probability⁴ were used to determine the risk reduction. Further, because both industry and NRC resources are limited, NRC decided to consider the costs of resolving issues and implementing any required changes. Thus, the underlying principle employed was to establish priorities in

³Man-rem is a radiation dose measurement that can be used to estimate genetic effects as well as other health consequences.

⁴Core melt is the melting of fuel in the central part of a nuclear reactor that could generate and release large amounts of radiation to the environment.

a manner which would expend available resources to produce the greatest safety benefits.

Establishing the priority of individual safety-related generic issues became a five-step process:

- Obtain information on the issue, determine which plants are affected, and estimate the risk.
- Obtain or postulate the expected resolution of the issue.
- Estimate the effect of the resolution on the estimated risk and calculate the expected reduction in public and worker risk.
- Calculate the engineering, labor, and downtime costs associated with the resolution.
- Apply these calculations to the predetermined criteria for issue importance.

Under this new ranking system, NRC defines the importance of generic issues in four ways:

- HIGH priority means that strong efforts to achieve an earliest practical resolution are appropriate. This is because (1) an important safety deficiency is involved (though generally the deficiency is not severe enough to require prompt plant shutdown), (2) a substantial safety improvement is likely to be attainable at a low enough cost to make the improvement very worthwhile, or (3) the uncertainty of the safety assessment is unusually large, and a conservative assessment of risk would indicate an important safety deficiency. Issues in this category are candidates for possible designation as Unresolved Safety Issues.
- MEDIUM priority means that no safety deficiency demanding high-priority attention is involved, but the potential for improving safety or reducing the uncertainty in safety analysis techniques may be substantial and worthwhile, though less so than for items assigned a HIGH priority. Efforts at resolution should be planned, perhaps over several years, but on a basis which does not interfere with pursuit of HIGH-priority generic issues or other high-priority nuclear regulation work.
- LOW priority means that no safety deficiencies demanding at least MEDIUM-priority attention are involved, and there is little or no prospect of substantial and worthwhile safety improvements. Generally, a LOW priority

indicates that it is not clear from currently available information whether the issue merits pursuit. Development of additional information could determine whether to pursue the issue as MEDIUM priority or to DROP the issue.

--The DROP category covers proposed issues that are without merit or whose significance is clearly negligible. Although recommended for elimination from further pursuit, such issues are still carried as generic issues.

NRC units whose area of responsibility or specialized knowledge was substantially involved, reviewed each issue assigned a priority under the new system. NRC considered comments from other NRC offices, the Advisory Committee on Reactor Safeguards, the industry, and the public in further reassessments of priorities before the December 1983 publication of NUREG-0933, which listed 482 issues.

Results of the new ranking system

As of November 1983, NRC had ranked 123 of the 482 generic issues under the new ranking system as follows: 29 high priority, 39 medium priority, 19 low priority, and 36 issues that should be dropped. Of the 29 high-priority issues, 22 were safety concerns not designated a top priority under previous prioritization systems. The 1977 Task Action Plan prioritization scheme, for example, designated "Diesel Reliability" as a medium priority. Under the current ranking system, this issue is a high priority with expected public risk reduction of 65,000 man-rems.

Of the 359 issues not ranked under the new system, 222 are at or near resolution and require no ranking, while 45 are issues yet to be prioritized. The remaining issues have either been incorporated into other issues or are not related to safety.

The 27 issues designated as Unresolved Safety Issues were not intended to be subjected to this ranking system because they are the highest priority, as set by the Commissioners in 1978. However, NRC rankings of 8 Unresolved Safety Issues showed that most of these 8 issues were less important to safety than at least 11 of the generic issues prioritized under the new system. Furthermore, three of the eight Unresolved Safety Issues did not meet the new prioritization system's minimum criteria for a high-priority issue while five others met the criteria. In fact, Division of Safety Technology officials have acknowledged that there is little difference in importance to safety between some Unresolved Safety Issues and some high-priority generic issues. However, none of the high-priority generic issues have been designated as Unresolved Safety Issues nor have any of the latter issues been downgraded. In commenting on our draft report, NRC stated that it has identified a potential new

Unresolved Safety Issue. However, the Commission has not yet designated this issue as an Unresolved Safety Issue. (This issue is discussed in more detail in ch. 6.)

Under the new ranking system at least 75 of the 123 ranked safety issues have substantial and worthwhile potential for safety improvements (high- or medium-priority designations). Further, by NRC's standards, at least 34 of the 123 are high-priority issues warranting strong efforts to achieve the earliest practical resolution.

Problems with the new ranking system

Despite advances in the current system, NRC recognizes that several problems remain. These include (1) uncertainties in risk analyses, (2) the system's inability to consider risks such as land and water contamination, (3) the system's current inability to address interdependencies among related issues, and (4) unnecessary delays in the peer review process.

Uncertainties in risk analysis

Our May 28, 1983, report entitled Response to Specific Questions on the Indian Point Probabilistic Safety Study (GAO/RCED-83-138) reported that, although probabilistic risk assessment has been praised as a good method for the systematic examination of risk, its use is limited because assessment results are uncertain and difficult to compare. Specifically cited as contributors to uncertainty were the completeness of the analysis, the amount and accuracy of data, assumptions made by study analysts, and the validity of the models used.

For several years, NRC has had considerable research underway directed at reducing the limitations of risk assessment. Although not directed at improving the priority ranking system, this research would, if applied, reduce the uncertainties. However, since these research results are not yet available, NRC has not decided if this research will provide a basis for improving the ranking system.

NRC's application of risk assessment techniques to prioritization of generic issues compounds the uncertainties in the final results. For example, NRC simplifies the prioritization process by using risk estimates from a representative plant to estimate the risk at all similar plants. According to the Acting Director of NRR's Division of Risk Analysis, this practice raises an important question about how applicable one analysis is to all plants. Differences among specific plants and classes of plants can substantially affect both the core melt probability and the relative importance of potential accident sequences. As a result, the use of representative plants may not reflect an issue's true importance.

The amount of time allotted to analyzing each issue adds to the level of uncertainty. The analyst must obtain and review information on the safety issue, determine the expected resolution, and estimate risk reductions and costs for the anticipated resolution. NRC requires that this analysis be completed within 2 to 3 weeks. NRC officials state that this is generally enough time to develop adequate information for prioritizing these issues. While this time period may be prudent, in relation to the other demands on NRC staff resources, it nevertheless adds to the overall level of uncertainty in the final rankings because the analysis is not as complete and detailed as it could be.

Finally, the analyst's ability to predict an issue's expected solution accurately can also affect the uncertainty. If an analyst is unable to predict the expected solution accurately, then the risk reduction associated with solving an issue is much less certain.

Some risks are not considered

The prioritization guidelines primarily focus on health effects and core melt probabilities to measure risks. They do not routinely consider other risks such as land and water supply contamination. However, if the health effects are not considered as an adequate measure of a specific issue's risk, then other off-site risks such as land and water contamination can be considered. Further, generic issues primarily concerned with NRC's licensing process or environmental protection do not involve significant safety elements and cannot be considered within the ranking scheme. As a result, NRC does not normally consider potentially relevant factors such as environmental contamination that could affect an issue's overall importance.

Issue interdependencies are not considered

The new ranking system assumes issues are independent. However, resolving an issue and implementing the solution can reduce the relative importance of other related issues since the risk related to that other issue has been at least partially reduced. As a result, the resolution of one issue may render related issues less important. Simply put, risks are double and triple counted. For example, one section of the Three Mile Island Action Plan deals with nuclear power plant operating personnel. That section contains 16 generic issues that overlap to some extent. Resolving one of these issues often reduces the importance of other similar issues by reducing their safety significance. While NRC recognizes that these overlaps exist, the ranking system does not take them into account. In fact, an NRC contractor working on the system proposed that once the initial rankings of all generic issues are completed, additional work should be performed to identify these interdependencies.

Peer review of rankings are delayed

One important aspect of the prioritization process is peer review. Systematic peer review of each prioritization analysis helps to ensure the completeness, accuracy, and sound judgement of the analysis.

We found that peer reviews have been unnecessarily drawn out. While the Division of Safety Technology states that peer review of a prioritization analysis should take less than an hour, in some cases it has taken as long as six months to complete peer reviews. Delays have occurred because some NRC branches considered the reviews low priority. In other cases, the transmitted documents were simply lost or misplaced. In any event, drawn out peer review of issues can delay completion of the ranking step and the start of the issue resolution step.

Comments on the new ranking system

NRR has received many comments on its new prioritization system, including those problems identified in the previous section. While many reviewers recognized and discussed these problems, most concluded that the new system is the best available.

NRR's use of probabilistic risk assessment to prioritize generic issues is supported by various NRC groups such as the Advisory Committee on Reactor Safeguards, Office of Policy Evaluation, Executive Director for Operations, the Office for Analysis and Evaluation of Operational Data, and the Committee to Review Generic Requirements. The Executive Director for Operations and the Office of Policy Evaluation recommended that the Commission approve the new prioritization system. Also, the Electric Power Research Institute (a research arm of the electric utility industry) and South Carolina Electric and Gas Company, Rochester Gas and Electric Corporation, Alabama Power, and Georgia Power (utilities operating nuclear power plants) all cited the assessment of the relative safety importance of issues and their prioritization as one of the more appropriate uses of probabilistic risk assessment. All of these groups recognized the limitations of the ranking system but believe in the system's usefulness.

The Union of Concerned Scientists also recognizes NRC's need to prioritize these issues, but believes that the uncertainties in probabilistic risk assessment make it unlikely that the new priority ranking system yields meaningful results. The Union does not believe that the current system has been shown to be better than earlier subjective approaches. NRC advisory and review groups believe, however, that even with its limitations, the current ranking system is the best available and should continue to be used. The Advisory Committee also reviewed the priority assigned to each issue and, in the majority of instances, agreed with the NRR rankings.

CONCLUSIONS

NRC's current system provides an analytical basis for allocating resources based on estimates of risk reductions associated with the resolution of specific generic issues. This system can also serve to mitigate differing views on an issue's priority. NRC, aware of system limitations primarily due to the uncertainties of quantitative analysis, to the overlapping of some issues which result in multiple counting of risk, and to delays in peer reviews, continues work to improve its risk assessment techniques. The application of improved risk assessment techniques to the prioritization system should improve the system's reliability and accuracy.

To date, 131 issues--including 8 Unresolved Safety Issues--have been ranked under this system. Over half of these issues merit further attention, and 34 of them are high-priority issues warranting strong efforts toward early resolution. However, only those designated as Unresolved Safety Issues receive the priority funding and management attention placed on this special group of Task Action Plan generic issues. This leaves 29 other issues which have met NRC's criteria for the highest priority issues, but have not been designated as Unresolved Safety Issues.

RECOMMENDATIONS

We recommend that the Chairman, Nuclear Regulatory Commission:

- revise the current priority ranking system to increase its reliability as improvements are made in the probabilistic risk assessment methodology,
- review all high-priority generic issues to determine if they warrant designation as Unresolved Safety Issues,
- analyze overlapping generic issues to define issue priority better, and
- establish time frames to prevent delays in peer reviews of the ranking efforts.

Agency Comments and Our Evaluation

NRC stated that it has completed review of all issues to determine if they warrant the Unresolved Safety Issue designation as part of the priority ranking system peer review process and has proposed one new issue to the Commission.

NRC's peer review process is an important step in prioritizing issues. In fact, the ranking system has already shown

that many of the high-priority issues are as important to safety as the Unresolved Safety Issues. As such, we believe all high-priority issues--currently there are 29--should be reviewed by the NRC Commission since only the Commission can designate Unresolved Safety Issues. We do not believe that a staff-level peer review adequately fulfills this responsibility.

CHAPTER 4

NRC NEEDS TO IMPROVE ITS EFFORTS

TO RESOLVE GENERIC ISSUES

NRC considers a generic issue "resolved" when it identifies and approves a solution to the issue. However, this does not mean that the deficiency has been corrected. Neither NRC nor utilities need to make required changes for an issue to be considered resolved. Throughout this report we will be using the NRC definition of a resolved issue (i.e., one for which a solution has been identified and approved, but not carried out).

The amount of attention devoted by NRC to the resolution of generic issues has varied. Prior to the Three Mile Island accident, NRC made minimal efforts to resolve these issues. In the year following the accident, NRC's increased efforts resolved 97 issues, most of which were identified from that accident. NRC has not maintained this pace, however, leaving most issues identified in the mid-1970s unresolved. Furthermore, as a result of the slower pace of resolution and the increased number of issues identified, 186 issues remain unresolved in 1983, more than the 125 issues unresolved at the time of the accident.

The lack of information needed to manage the resolution process effectively may be contributing to NRC's pace in resolving generic issues. While NRC has attempted to develop a tracking system to provide this information, the system does not include some necessary management information. For example, NRC could not identify all generic issues actually being worked on, nor could it identify specific resource expenditures for all individual issues. Further, although NRC can determine which resolved generic issues resulted in new requirements, it cannot determine whether those new requirements resulted in changes to NRC procedures or in changes at affected nuclear power plants. NRC needs this information to assist in tracking issues through implementation of new requirements and to provide feedback on how effectively NRC's system identifies and prioritizes generic issues.

NRC has resolved many generic issues since the Three Mile Island accident, however, it needs to manage the resolution process more effectively to reduce the backlog of unresolved issues quickly.

GENERIC ISSUE RESOLUTION PROCESS

Although NRC has identified 482 generic issues, 88 have either been absorbed into other related issues or dropped as unimportant. As a result, only 394 issues required resolution.

NRC considers a generic issue resolved when "a solution to the problem has been identified and has gone through all the necessary approval steps." Resolution of a generic issue can take from several months to 10 or more years.

The first step in the resolution process is the development of a plan to delineate the work to be done, assign major responsibilities, and project resource needs and milestone dates. These plans vary in detail in accordance with issue priority and the depth of information on a given issue. An example of a comprehensive generic issue's work plan, "Hydrogen Control Measures and Effects of Hydrogen Burns on Safety Equipment," lists the lead organization, manager, supervisor, and reviewers of the issue; provides a description of the problem, the general approach to resolution, and the technical content of the major tasks; establishes schedules and resource needs; and discusses the basis for NRC to permit continued operation of affected plants while the issue is being resolved.

The second step involves development of a technical solution. NRR and the Office of Nuclear Regulatory Research are responsible for resolving almost all generic issues using their technical staffs and/or contractors to carry out the necessary work to resolve an issue. According to an engineer in NRR's Safety Program Evaluation Branch, the scope of effort varies from issue to issue. Typically, however, the information used to resolve an issue comes from experiments, tests, ongoing programs, and probabilistic risk assessment.

In the final step to resolution, various NRC groups review and approve the proposed solution. Once the Director of NRR has agreed to a proposed resolution, NRC's Committee to Review Generic Requirements reviews it and sends it on to the Advisory Committee on Reactor Safeguards and the Executive Director for Operations. When a change to the Standard Review Plan (NRC's guide for reviewing nuclear power plant license applications), is anticipated, NRC also publishes the proposed change in the Federal Register for public comment. NRR then incorporates all comments received and resubmits the modified resolution. According to the Chief of the Safety Program Evaluation Branch, the approval process takes about 11 months to complete. After this step--but before any changes have been made at nuclear power plants or in NRC staff procedures--NRC considers a generic issue resolved. Actual plant changes can take several additional years to complete, depending on such factors as the complexity of the changes needed or the plant's operating and maintenance schedule.

PAST EFFORTS TO RESOLVE GENERIC ISSUES
HAVE IMPROVED, BUT ADDITIONAL WORK
STILL NEEDS TO BE DONE

Although NRC has made significant progress since the Three Mile Island accident, a larger backlog of unresolved generic issues existed in 1983 (186) than at the time of the accident (125), and the most important issues have not necessarily received priority attention.

The number of both resolved and unresolved
generic issues has increased

Prior to the Three Mile Island accident in March 1979 NRC made minimal efforts to resolve generic issues. Although NRC developed and implemented new resolution procedures 2 years before the accident, only 10 of the 135 generic issues identified at that time had been resolved. The findings of NRC's Special Inquiry Group on the Three Mile Island Accident stated ". . . actual progress in this area has been limited. This remains an area requiring substantially more attention and progress than it has received to date."

In the wake of the accident, NRC identified 255 additional generic issues based on Three Mile Island experiences, studies, and investigations. The investigations generally agreed that (1) the accident demonstrated that safety improvements were needed and (2) the causes of the accident included failures and errors in both the equipment and in the organizations that built, operated, and regulated the plant. The President's Commission on the accident concluded that past efforts to resolve generic issues needed substantial improvement. The Commission reported that "the evidence indicates that labeling of a problem as generic may provide a convenient way of postponing a decision on a difficult question."

In response to the criticisms contained in the reports, and because of the Three Mile Island accident itself, NRC resolved 97 generic issues in 1980 as opposed to 9 in the previous year. Since this initial increased effort, however, the pace at which NRC is resolving generic issues has receded. In 1981, 1982, and the first 11 months of 1983, NRC resolved 33, 36, and 23 generic issues, respectively. NRC plans to resolve 36 issues during fiscal years 1984-86.

Although resolution efforts have increased since the Three Mile Island accident, the current backlog of 186 unresolved generic issues exceeds the approximately 125-issue backlog which existed prior to the accident. This includes at least 33 issues of the highest priority, about 24 of medium priority, and about 50 issues whose importance to safety has not been evaluated as yet. During 1983, NRC worked on 73 of the 186 unresolved issues. Work on the remaining issues is deferred until

resources become available. In fiscal year 1984, NRC plans to start work on 10 additional issues.

At the current resolution rate of approximately 30 issues per year, NRC will need more than 6 years to eliminate the backlog even if no new issues are identified. However, NRC identified an average of about 11 new issues a year (excluding the Three Mile Island issues) over the past 5 years. At NRC's current rate of resolution, therefore, elimination of the generic issue backlog will take about 10 years. This may be optimistic, however, since NRC plans to resolve only 36 issues in total over the next three years. Thus, while efforts to resolve generic issues have increased since Three Mile Island, the number of generic issues needing resolution has also expanded, leaving NRC with a larger backlog. This backlog includes many issues of high and medium priority, some of which have been awaiting resources for 5 or more years.

NRC does not always resolve the most important issues first

The majority of NRC's resolution effort has been directed toward the issues identified in the Three Mile Island Action Plan. Of the 208 issues resolved to date, 160 (77 percent) have been Three Mile Island related. While the Three Mile Island issues have been given most of NRC's attention, the majority of the Task Action Plan issues have remained unresolved for more than 5 years. The following table depicts the progress made in resolving generic issues by category:

Resolved Generic Issues as of November 1983

<u>Category</u>	<u>Total</u>	<u>Resolved</u>	<u>Percent Resolved</u>
Three Mile Island Action Plan	234	160	68
Task Action Plan (includes Unresolved Safety Issues)	103	42	41
New Generic Issues	<u>57</u>	<u>6</u>	<u>11</u>
Total	<u>394</u>	<u>208</u>	<u>53</u>

Although NRC continues to resolve generic issues, it does not always resolve the most important issues first. In commenting on the Three Mile Island accident, the Action Plan authors informed the NRC staff that, "when determining the schedules for developing and implementing changes in requirements, the primary concern was the perceived immediacy of the need for corrective action," rather than the importance of the issues. In the aftermath of the Three Mile Island accident NRC staff members were also unable to analyze and incorporate other issues requiring resolution into their overall efforts to resolve important generic issues. Instead, NRC staff concentrated on Three

Mile Island issues because of the perceived immediacy of those issues. NRC recognized this problem in October 1980, 18 months after the accident, when the Director of the Office of Program Evaluation sent a memo to the Commissioners stating

"at the present time staff work on generic issues is primarily directed to USIs [Unresolved Safety Issues] and Three Mile Island Action Plan items. Any work on designating the remaining issues appears to be on an ad hoc basis. We lack a clear idea of how the priorities of all the generic issues . . . rank together as an integrated package"

In addition to examining NRC's resolution efforts by over-all category, we reviewed NRC's adherence to the separate priority schemes contained in the Task Action and Three Mile Island Action Plans. In both cases, while the largest percentage of resolved issues fell into the respective highest priority categories, many lower priority issues were resolved while higher priority issues remained unresolved as the following table shows.

Relative Priorities
of the Resolved Issues^a

	<u>Total</u>	<u>Resolved</u>	<u>Percent</u>
Three Mile Island Action Plan			
Priority 1 (highest)	91	88	97
Priority 2	67	22	33
Priority 3	49	21	43
Not Prioritized (lowest)	<u>48</u>	<u>29</u>	60
Total	<u>255</u>	<u>160</u>	
Task Action Plan			
Unresolved Safety Issues (highest)	27	14	52
Priority A	22	7	32
Priority B	73	14	19
Priority C	17	6	35
Priority D (lowest)	<u>3</u>	<u>1</u>	33
Total	<u>142</u>	<u>42</u>	

^aThe 88 issues which NRC decided either to drop or absorb into other issues are included in this table because those decisions came after the issues were prioritized. This table excludes 85 generic issues identified in recent years, many of which have not yet been prioritized and only 6 of which have been resolved.

NRC IS UNABLE TO TRACK SOME
ISSUES THROUGH THE RESOLUTION PROCESS

NRC's management information system to track generic issues through the technical resolution phase does not provide all needed information. For example, some issues lose their identity when included in larger research programs. As a result, NRC cannot determine the amount of resources expended on these issues or whether those resources are commensurate with the issues' priorities. Further, some of the information in the management information system is incorrect or misleading.

Finally, NRC's system does not provide fundamental information on the issues, for example, whether an issue's resolution required changes to plants or NRC procedures. As a result, it is difficult to track generic issues from the resolution to the implementation phase, and NRC lacks valuable information which could be used to evaluate the effectiveness of its identification and priority ranking processes.

Management information system
lacks needed data

NRR's fiscal year 1982 Operating Plan required the Division of Safety Technology to develop a system that permits tracking of identified safety-related generic issues and any resulting new requirements through prioritization, resolution, and implementation. The Generic Issue Management Control System provides a management overview of these issues through resolution. The control system provides useful information such as work scope, contractor, status, and milestones. However, it does not provide the information necessary to determine the level and direction of effort for all generic issues.

The control system cannot, for example, show the level of research funding or effort expended on a given generic issue because NRC organizes its \$170 million annual research budget around large programs not generic issues. NRC allocates a majority of these funds to programs such as Light Water Reactor Pipe Cracks, Severe Accident Plan, and Small Break Loss of Coolant Accidents and Transients programs. The Office of Nuclear Regulatory Research's resolution of a given generic issue results from the overall efforts within the programs. No match exists between specific generic issues and discrete parts of these research programs. For example, the Severe Accident Research Program, which NRC funded for about \$56.3 million in fiscal 1983, includes at least five generic issues. However, the amount of funding targeted for these issues cannot be determined. As a result, the research office cannot show the level of effort exerted on specific generic issues.

Determining the relationship between the research office's emphases and its order of priorities for generic issues proved

equally difficult. We attempted to obtain a list of the research office's ongoing generic issues. Instead, the office was only able to provide us with a list of nearly resolved high- and medium-priority generic issues related to its research programs with no indication of whether the issues are being worked on as part of the research. As a result, we could not determine whether ongoing research was aimed at resolving the highest priority generic issues. According to NRC officials, however, the direction of the research office's efforts depends more on the importance of the research programs than the individual priorities of generic issues.

Similarly, NRR combined all generic issues related to human factors (such as operator, training, or maintenance errors) with other human factor activities and incorporated both into the Human Factors Program Plan. As with the research office, the individual generic issues have lost specific identity in terms of level and direction of effort.

Conversely, NRC manages and works on Unresolved Safety Issues individually. Each of these special issues has been allocated resources on a priority basis and is under active resolution. In addition, NRR develops annual progress reports on the status of Unresolved Safety Issues. By far, these 27 issues are considered by NRC as the most important generic issues to be addressed. The management information and attention focused on them is far superior to that focused on the remaining generic issues.

Management information can be inaccurate and misleading

NRC's management information system can provide inaccurate and misleading information because of the loss of issue identity discussed above and the system's design. For example, the Office of Nuclear Regulatory Research said that it is resolving generic issues A-29 (Nuclear Powerplant Design for the Reduction of Vulnerability to Industrial Sabotage) and B-64 (Decommissioning of Reactors). The September 1983 management information system report, however, shows the former issue as inactive and the latter as active, but without resource requirements or expenditures.

The information system also shows resolution progress or milestone slippages. However, this information can be inaccurate due to the system's design. The fiscal year 1983 fourth quarter report lists eight issues where the original-to-current completion dates have slipped from 2 to 16 months. However, the report does not hold the original dates constant, resulting in understatement of the time frames for resolving these generic issues. For example, the original date for the Director of NRR's review of generic issue C-8 (Main Steam Line Linkage Control) was listed in the third quarter report as October 1985, but as November 1986 in the fourth quarter report.

Overall summary information on the outcome of the resolution process is not available

The technical solution of a generic issue may or may not result in new requirements for current or future licensees. Fundamental to the resolution process should be the ability to attest to what happened to the issues after development and approval of solutions. However, NRC does not maintain any summary information showing the disposition of resolved issues. As a result, it is difficult to track issues with approved solutions to implementation of the solutions, and NRC loses valuable feedback on the program.

We contacted NRR's Director and the Directors of its Divisions of Safety Technology and Licensing to learn the outcomes of resolved issues. However, they do not maintain summary information on the resolved issues. At our request, the Director of NRR had his staff develop this information. His staff, however, could determine the resolution disposition for only 146 of the 208 issues and could not differentiate between issues requiring changes to power plants or to regulations, as shown in the following table.

Outcomes of Resolved
Generic Issues

(As of Nov. 1983)

Required changes to power plants or to NRC regulations	105
Required no changes	41
Need for change unknown	<u>62</u>
Total	<u>208</u>

Analyzing the disposition of resolved generic issues has several management benefits. Specifically, the number and types of changes required of future and current licensees gives a measure of the overall importance of resolving generic issues in relation to other NRC regulatory activities. In addition, as discussed in chapter 2, NRC uses a variety of methods and sources to identify new issues. Analyzing the outcome of resolved issues could provide valuable feedback on which methods and techniques are most effective in identifying generic issues. Finally, NRC has used several prioritization techniques. Under its current priority system high-priority issues involve important safety deficiencies, substantial improvement potential at low costs, or large uncertainties. Conversely, low-priority issues are defined as having little or no prospect for safety improvement. Logically, the higher priority issues should result in new requirements for current and future licensees more frequently than lower priority issues. If this does

not follow, or if past priority systems correlate better, NRC would be in a position to reassess its current system for determining generic issue priorities.

CONCLUSIONS

NRC's resolution efforts have been unable to offset the identification of new issues and allow for reduction of the current backlog. We estimate that at the current resolution rate of about 30 issues each year, NRC will take at least 10 years to eliminate the backlog. This is equal to approximately one-third of the operating life of a nuclear power plant and does not include the time necessary to implement any needed plant changes. This period would be even longer under NRC's plan to resolve only 12 generic issues in each of the next three fiscal years.

NRC's resolution efforts do not adequately address the concern expressed by the President's Commission on Three Mile Island and the Special Inquiry Group that generic issues required more attention and progress than they had received prior to the Three Mile Island accident. However, increasing the resolution rate to 50 issues per year, for example, would enable NRC to reduce the backlog in 5 years. NRC could also begin working on issues relatively soon after they are identified, rather than deferring work on the issues for several years as is now often the case.

While it was appropriate that the Three Mile Island issues received some priority attention, the majority of Task Action Plan issues, most of which are over 5 years old, and new generic issues remain unresolved. This includes nearly one-half of the Unresolved Safety Issues, designated the most important issues by NRC, and most of the high-priority issues in these groups.

In addition, while NRC has recently attempted to develop a management information system for tracking generic issues, the system does not provide the information necessary to assess resolution efforts. NRC's management of Unresolved Safety Issues demonstrates that generic issues can be individually managed during resolution. At a minimum, NRC's management information system should include resource needs, expenditures, identification dates, issue priority, prioritization dates, constant original milestone dates, and actual milestone dates for all generic issues. Further, it should distinguish those issues currently receiving resources from those which are not. The active issues should be summarized into a table with the information mentioned above, and any inactive issues which were originally scheduled to be active by the reporting date should also be listed.

Finally, NRC does not track the disposition of resolved generic issues. As a result, it lacks valuable information useful for evaluating the overall significance of the program and of specific stages like identification and priority ranking of new issues.

RECOMMENDATIONS

At NRC's current level of effort, it will take about 10 years to eliminate the backlog of unresolved generic issues. NRC's plans to resolve fewer issues over the next three fiscal years will further extend the time needed to eliminate the backlog. This may be too long considering (1) the sense of urgency expressed by Three Mile Island accident review groups and (2) the age and relatively high priority of many of these issues. Therefore, we recommend that the Chairman, Nuclear Regulatory Commission, assess ways to eliminate the backlog of unresolved generic issues sooner. The Chairman should determine whether adequate resources are available within the agency for this purpose. If adequate resources are not available, the Chairman should consult with NRC's congressional oversight committees to work out a mutually agreeable timetable and the necessary resources.

In addition, we recommend that the Chairman, Nuclear Regulatory Commission, change the generic issue management information system to

- maintain issue identity through resolution to ensure that these efforts correlate with issue priority;
- include information such as resource needs, expenditures, identification dates, issue priority, prioritization dates, constant original milestones dates, and actual milestone dates; and
- maintain summary information on the resolution outcome of the resolved issues, continually update this information as new issues are resolved, and use this information to evaluate the generic issue identification and prioritization processes.

CHAPTER 5

NRC NEEDS TO IMPROVE ITS EFFORTS TO IMPLEMENT GENERIC ISSUE SOLUTIONS

The Special Inquiry Group reviewing the Three Mile Island accident concluded that management problems affected NRC's handling of generic issues. Similarly, we found that management problems still affect the implementation of generic issues. Specifically: (1) generic issues are not generally followed into implementation because NRC does not maintain records matching generic issues to the implementation mechanism called a multiplant action, (2) NRC does not track generic issues requiring plant modifications or their corresponding multiplant actions to determine if all the plants have made the required modifications, and (3) multiplant actions are implemented on a first-come-first-served basis rather than on a priority system. NRC considers "implementation completed" on a multiplant action when the utility agrees to make needed changes. However, this is misleading since no actual changes in the plants have been made. As a result, the program that attempts to identify and resolve problems affecting numerous nuclear power plants breaks down at the point where improvements are to be made.

NRC CANNOT TRACK GENERIC ISSUES FROM RESOLUTION TO IMPLEMENTATION

Resolved generic issues requiring changes are implemented in one of two ways. Those only affecting future licensees, called frontfits, result in modifications to NRC's guide for reviewing nuclear power plant license applications. Those requiring changes to operating power plants, called backfits, are sent to the Division of Licensing for implementation and transformation into multiplant actions. We attempted to analyze the 105 resolved issues that resulted in either frontfits or backfits but found that NRC did not maintain the necessary implementation information.

Frontfits

Many generic issues which generate new requirements do not require direct action on the part of licensees operating nuclear power plants. Rather, they require that NRC modify the Standard Review Plan, NRC's most definitive basis available for specifying NRC's design criteria and guidelines for operating nuclear power plants at an "acceptable level of safety." NRC could not provide us with a list of resolved issues requiring these changes, although one Division of Safety Technology official stated that the majority of generic issues requiring implementation are frontfits requiring changes to the Standard Review Plan. Since NRC could not determine what changes to the Standard Review Plan were required, they also could not determine whether the changes to the plan had been made.

Backfits

The Division of Licensing transforms generic issues requiring backfits into multiplant actions. As part of this transformation the generic issues control numbers change. For example, generic issue I.A.2.1 became action number F-03. Additionally, in some instances, one generic issue became numerous multiplant actions. For example, generic issue II.K.3 became actions F-36 through F-62. Finally, in some cases, the titles of the generic issues do not match the titles of corresponding actions. For example, generic issue II.D.1, titled "Testing Requirements," became action F-14, titled "Relief Valve and Safety Valve Training." As a result, it is almost impossible for anyone not closely involved with a specific issue to keep track of it through this transformation.

Given these control number and name changes, we expected to find that either the Division of Safety Technology or the Division of Licensing maintained a log correlating generic issues to multiplant actions. Except for two groups of generic issues, they did not. Licensing did maintain the issue identity for the 27 Unresolved Safety Issues and for some, but not all, resolved Three Mile Island Action Plan issues.

In December 1983 we requested from the Director of NRR a list of generic issues requiring implementation and their corresponding multiplant actions. In January 1984 we received a partial list correlating 40 generic issues to 54 actions. We examined these issues and found only seven of them had been resolved. Of the remaining 33 issues, 12 had been absorbed into other issues while 21 were unresolved. We contacted a Division of Safety Technology official to determine if an unresolved issue could be implemented. He stated that the solutions had to be identified and approved before implementation could take place, therefore, none of the 33 issues on NRC's list could be implemented.

NRC DOES NOT KNOW IF GENERIC ISSUE CHANGES HAVE BEEN MADE

The Division of Licensing considers "implementation completed" on a multiplant action when NRC and the utility agree upon and approve needed actions. No actual safety improvements need to be made by power plant owners for NRC to consider an action implemented. In addition, NRC does not track either multiplant actions or generic issues to their final end. According to NRC's Chief of NRR's Operating Reactors Program Branch, the Office of Inspection and Enforcement verifies by audit that plants make required changes, on a per plant basis, but does not track these on an issue or multiplant action basis. Finally, Licensing does not have a system to prioritize implementation actions, but rather implements needed actions on a first-come-first-served basis. As a result, the current implementation

process is both incomplete and not linked to the issues' importance to safety.

Implementation misnomer

Once NRC approves a utility's implementation plan, including both proposed changes and their timetables, Licensing no longer monitors the actions. Of the 76 multiplant actions we determined to be based on generic issues, 21 were considered completed as of November 1983. However, NRC cannot determine whether a generic issue requiring implementation has actually been fixed at all affected plants.

The Office of Inspection and Enforcement inspects plants to verify that multiplant action changes have actually been made. In most cases, Inspection and Enforcement verifies performance on a plant-specific rather than on an issue basis. For example, Inspection and Enforcement would inspect the Duane Arnold plant's progress toward meeting its 49 licensing actions, rather than verify that all 71 operating nuclear plants had carried out multiplant action MPA B-63 for developing "Interim Procedures for Short Term Blackout." For Three Mile Island Action Plan issues contained in NUREG-0737, however, Inspection and Enforcement does maintain data by both plant and issue. With that exception, no one within NRC verifies that all plants have made the necessary changes so that an issue or multiplant action can be retired.

NRC PLANS SOME IMPROVEMENTS IN THE IMPLEMENTATION PROCESS

Currently, multiplant actions are implemented in the order received rather than in order of importance. According to a Licensing official, for the first time in the generic issues process, even Unresolved Safety Issues--which NRC considers the most important generic issues--do not receive priority attention. Licensing is attempting to correct this problem by working with the Division of Safety Technology to develop a method of prioritizing multiplant actions using probabilistic risk assessment techniques. The objective is to ensure implementation of the most safety-significant actions first. While we agree that this effort is needed, it is too early to comment on NRC's approach.

In the past several years, NRC has also placed emphasis on negotiating plant-specific implementation schedules which consider the issues' safety importance. Although such actions can help alleviate this problem at the plant level, they do not correct the overall problem.

CONCLUSIONS

To license a utility to operate a nuclear power plant, NRC must determine that the plant has been properly designed and constructed, and can be operated safely. By definition, generic issues are matters relating to safety or environmental aspects of nuclear power plant design, construction, or operation that are applicable to all or a subset of all plant types, and the more safety-significant issues are "not likely to be acceptable over the lifetime of the plants affected." Resolution of generic issues and implementation of any necessary changes should make the plants even safer.

However, management problems cause the generic issue program to break down at the point where improvements are to be made--the implementation phase. Specifically, NRC: (1) cannot match resolved generic issues requiring changes to the implementation mechanism, (2) cannot determine if required plant modifications have been made at all plants, and (3) does not have procedures to assure that the more important safety-related changes receive priority implementation. Further, use of the term "implementation completed" for safety-related changes when no actual changes have been made at plants is misleading. These problems undermine the generic issue program, need corrective actions, and, if corrected, could lead to improvements in over-all power plant safety.

RECOMMENDATIONS

We recommend that the Chairman, Nuclear Regulatory Commission,

- identify those resolved issues requiring changes to the Standard Review Plan and monitor and maintain summary information on their progress;
- identify those resolved issues requiring changes to operating plants, correlate these issues with multiplant actions and track them until all of the plants have made the required modifications; and
- develop a multiplant action priority system to ensure that NRC give priority attention to those actions most important to safety.

CHAPTER 6

REPORTING OF GENERIC ISSUES TO THE CONGRESS SHOULD INCLUDE ALL IMPORTANT SAFETY ISSUES

The Congress has twice become involved with the generic issue program. In 1977 it amended the Energy Reorganization Act of 1974 to require NRC to identify and correct "unresolved safety issues," and to report progress on these issues in its annual reports to the Congress. The amendment did not, however, require NRC to report on issues that might be identified in future years. NRC's Commissioners have designated, and annually reported on, 27 of the 133 issues included in the January 1978 Task Action Plan as Unresolved Safety Issues.

In NRC's fiscal year 1980 authorization act, the Congress also required NRC to make a one-time report on the status of the 133 Task Action Plan generic issues and NRC's plans for resolving these issues. In response, NRC submitted a brief status report on these issues but did not specify plans for resolving them.

Congressional involvement in the generic issue program has had a positive impact on the handling of selected generic issues. The problems discussed in earlier chapters affecting the overall generic issue program do not, for the most part, affect the 27 Unresolved Safety Issues which NRC reports to the Congress in response to the Energy Reorganization Act amendment. NRC has resolved 14 of these issues, individually manages the resolution of the rest of them, and knows which multiplant actions correspond to resolved issues requiring changes at nuclear power plants.

ENERGY REORGANIZATION ACT AMENDMENT

In 1977 the Congress amended the Energy Reorganization Act of 1974 to provide for a program to resolve safety issues. The House Committee on Interior and Insular Affairs noted that this program should enhance the credibility of the licensing process. The committee concluded that, since the failure to resolve such issues might have resulted in inadequate safety margins, the Commission needed to take steps to ensure the issues were analyzed and, where necessary, corrective actions taken. As a result, Section 210 was added to the act as follows:

"The Commission shall develop a plan providing for the specification and analysis of unresolved safety issues relating to nuclear reactors and shall take such action as may be necessary to

implement corrective measures with respect to such issues. Such plan shall be submitted to the Congress on or before January 1, 1978 and progress reports shall be included in the annual report of the Commission thereafter." (Under-scoring supplied.)

The Joint Explanatory Statement of the House-Senate Conference Committee provided the following additional information regarding its deliberations on this portion of the bill:

"The House amendment required development of a plan to resolve generic safety issues. The conferees agreed to a requirement that a plan be submitted to the Congress on or before January 1, 1978. The conferees also expressed the intent that this plan should identify and describe those safety issues, relating to nuclear power reactors, which are unresolved on the date of enactment. It should set forth: (1) Commission actions taken directly or indirectly to develop and implement corrective measures; (2) future actions planned concerning such measures; and (3) timetables and cost estimates of such actions. The Commission should indicate the priority it has assigned to each issue, and the basis on which priorities have been assigned."

As a result of this requirement, NRC sent the Congress a report (NUREG-0410) in January 1978 describing NRC's generic issue program and identifying 133 generic issues initially compiled in the Task Action Plan. NRC reported to the Congress that this program's scope went beyond the amended act's requirements to include non-safety along with 84 safety-related issues. Therefore, for purposes of the annual updates to the Congress, NRC limited progress reports to issues designated by the Commissioners as Unresolved Safety Issues. As noted in chapter 2, NRC defined Unresolved Safety Issues as generic issues posing important safety questions involving conditions unlikely to be acceptable over the lifetime of affected plants. NRC's first progress report contained 22 Unresolved Safety Issues, to which 5 issues were subsequently added to make the total of 27.

The Congress' decision to require NRC to designate, correct, and report progress on Unresolved Safety Issues clearly has had a positive effect on NRC's management of the 27 designated issues. NRC has resolved 14 of them and is currently working on the other 13 issues. Further, NRC keeps track of the resources allocated for their resolution, is aware of the resolution disposition, maintains records correlating these issues to implementation multiplant actions, and knows the issues' implementation status.

The development of NRC's new priority ranking system makes clear, however, that other generic issues potentially as important to power plant safety as the Unresolved Safety Issues may merit this designation. For example, as discussed in chapter 3, NRC has ranked 123 safety-related issues not designated as Unresolved Safety Issues using its new system. Twenty-nine of these issues--none of which have been resolved--were designated high-priority issues, and subsequent analysis showed that at least 11 of these issues may be as important to safety as the Unresolved Safety Issues reported to the Congress.

In addition, 39 of the 123 recently ranked issues met NRC's medium-priority criterion of substantial potential for improving safety or reducing uncertainty. Finally, 45 generic issues have yet to be prioritized under the new ranking system. NRC could find that many of these issues meet its ranking system criteria for high- or medium-priority issues.

PUBLIC LAW 96-295

In 1980 the Congress enacted Public Law 96-295 authorizing NRC's fiscal year 1980 appropriation. Section 110 of this act required NRC to develop and submit to the Congress a comprehensive plan for safety evaluations of all operating plants. One part of this comprehensive plan addressed generic issues. That part required (1) a list of the original 133 Task Action Plan generic safety issues listed in NUREG-0410 for which technical solutions had been developed, (2) a determination of which technical solutions should be incorporated into the Commission's rules and regulations, and (3) a schedule for developing a technical solution to those generic safety issues listed in NUREG-0410 which had not been technically resolved. The accounting and schedule requirements touch upon the management information problems discussed in the previous chapters of this report.

In response to the reporting requirement, NRC submitted a status report on its generic issue efforts with its safety program evaluation plan. This four-page report did not contain any specific information on the generic issues contained in NUREG-0410. The report stated that NRC would (1) review and evaluate the generic issues identified in NUREG-0410, generic issues identified in the Three Mile Island Action Plan, and new generic issues and (2) develop plans and schedules for those issues determined to require resolution within the next several years. We contacted NRC's Offices of Congressional Affairs, Nuclear Reactor Regulation, and Administration, but they were unable to tell us whether this information was ever provided to the Congress. In any case, the requested information was not available during our review nor was there similar information on most other generic issues identified subsequent to the 1978 publication of NUREG-0410.

CONCLUSIONS

The Congress has twice required NRC to report progress on generic issues. However, NRC has reported very little information to the Congress on the generic issue program. The picture presented to the Congress shows 27 important safety issues progressing toward technical resolution and agreement with affected utilities on specific actions to be taken at their nuclear power plants.

The 27 issues reported to the Congress receive more management attention and, as a result, make more progress toward resolution than other generic issues. On the other hand, of the 29 other high-priority safety issues not reported to the Congress, at least 11 may be as important as those on which NRC reports. However, these issues do not receive the same focused management attention and are not progressing as rapidly toward resolution as those reported to the Congress. In addition, as of November 1983, there were 45 unprioritized issues, including some which may be high priority and merit reporting to the Congress.

In addition, NRC's characterization of issues as "resolved" and "implemented" can be misleading. As discussed in chapters 4 and 5, neither resolved nor implemented, as NRC uses those terms, means that necessary changes have been made at plants or to NRC's regulations or procedures. Resolved means the technical solution to an issue has been approved. Implemented means that the power plant owners have agreed to make necessary changes. Since it can take years for the changes to be made at all plants affected by a generic issue, NRC also needs to report when the changes have actually been put into place.

Expanding and improving NRC's reporting would keep the Congress and the public more accurately informed about the status of generic issues. This added attention could also lead to a better managed program.

MATTERS FOR CONSIDERATION BY THE CONGRESS

To enhance congressional and public awareness of NRC's progress on nuclear power plant generic issues, the Congress may wish to amend the Energy Reorganization Act of 1974 to

- expand current reporting requirements to include all safety-related generic issues assigned a high-priority ranking and
- require NRC's annual report to summarize the total number of generic issues identified, resolved, implemented, and fixed.

Specifically, the Congress may wish to repeal section 210 of the Energy Reorganization Act, and amend section 307 by adding a subsection (d) as follows:

(d)(1) The Commission shall, as soon as practicable after the end of each fiscal year, make a report to the President for submission to the Congress, on the status of all issues (including, but not limited to, safety, environmental, licensing, and regulatory issues) identified by the Commission, either prior to the fiscal year or during the fiscal year, which are common to many or all utilization facilities required to be licensed under section 103 or section 104(b) of the Atomic Energy Act and are in operation at the end of the fiscal year or have applied during the fiscal year for licenses under sections 103 or 104(b).

(2) The report referred to in subsection (d)(1) shall include:

(i) a list of high-priority generic safety issues, and the number of all other issues, for which the Commission has developed solutions but not yet taken any action and for each high-priority generic safety issue, identification of the action proposed to resolve the problem and the Commission's timetable for implementing that action;

(ii) a list of high-priority generic safety issues, and the number of all other issues, for which the Commission has begun implementing the proposed solution and for each high-priority generic safety issue, the action taken by the end of the fiscal year, future actions planned and any changes with respect to actions the Commission previously identified under section (d)(2)(i);

(iii) a list of high-priority generic safety issues, and the number of all other issues, for which, during the fiscal year, the Commission finds that all proposed actions have been taken by the Commission and by licensees, where appropriate, and for which the Commission determines that the problem which gave rise to the issue no longer exists;

(iv) a list of high-priority generic safety issues, and the number of all other issues, for which the Commission plans to take no action and for each such high-priority generic safety issue, an explanation why the Commission has determined that no action is necessary; and

(v) a list of high-priority generic safety issues, and the number of all other issues, which have been identified, but for which the Commission has not by the end of the fiscal year developed any solution.

(3) For purposes of this section, "high-priority generic safety issue" shall mean those issues hereinbefore or hereinafter determined by the Commission to be high-priority generic safety issues in application of NUREG 0933, December 1983, and those issues labeled Unresolved Safety Issues by the Commission as of the date of enactment of this section.



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

JUL 09 1984

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, Management Weaknesses Affect Nuclear Regulatory Commission Efforts to Address Safety Issues Common to Nuclear Power Plants (Code 301633). The report makes several points which are useful to the Nuclear Regulatory Commission and highlights several areas in which we agree that further work by NRC may be desirable. Specific comments on the factual information in the report are enclosed.

Sincerely,

A handwritten signature in cursive script, appearing to read "William J. Dircks".

William J. Dircks
Executive Director for Operations

Enclosure:
Specific Comments on Draft GAO Report,
"Management Weaknesses Affect Nuclear
Regulatory Commission Efforts to
Address Safety Issues Common to
Nuclear Power Plants" (Code 301633)

ENCLOSURE

SPECIFIC COMMENTS ON DRAFT GAO REPORT,
"MANAGEMENT WEAKNESSES AFFECT NUCLEAR REGULATORY COMMISSION
EFFORTS TO ADDRESS SAFETY ISSUES COMMON TO NUCLEAR POWER
PLANTS" (CODE 301633)

1. p. ii

The report states that "it (NRC) has not developed effective management procedures to assure timely resolution of outstanding issues ..."
We are examining the current system to determine what improvements can be made in the overall NRC management of generic issues.

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

2. p. iv

The GAO report states that "The generic issue solutions are implemented on a first-come-first serve basis without regard to their relative importance to safety." This statement is too general. During the past several years increased emphasis has been placed on the project managers negotiating plant-specific schedules for implementation. Safety importance is considered in these negotiated schedules.

[GAO COMMENT: Wording changed on p. iv and in Chapter 5, where this is discussed in detail.]

3. Chapter 1, Figure 1, p. 4

"... obtain public, and Advisory Committee comments" is part of RESOLUTION and not IMPLEMENTATION.

[GAO COMMENT: Figure 1 corrected.]

4. Chapter 2, p. 8

The "NRC organizations involved in identifying generic issues" should be expanded to include (1) Regional Offices, and (2) the Office of Nuclear Regulatory Research. Generic issues originate from these offices through special memoranda and Research Information Letters.

[GAO COMMENT: Wording changed to include the above.]

5. Chapter 2, p. 8

The first indented paragraph should be revised as shown below to fully reflect the role of the Office of Inspection and Enforcement and the Regional Offices in identifying generic issues.

The Office of Inspection and Enforcement, which reviews vendor deficiency reports required by NRC regulations, and reviews operating events on a real-time basis as they are called into the NRC operations center. This center is manned by qualified professionals seven days a week, 24 hours per day.

The Regional Offices, which inspect nuclear facilities to determine whether facilities are constructed and operated safely and in compliance with license provisions and Commission regulations.

[GAO COMMENT: Wording changed to reflect the above.]

6. Chapter 2, p. 9

The second indented paragraph implies that bulletins, circulars, and information notices are issued only to clarify or interpret current regulatory requirements. This is not the case. The vast majority of information notices are issued to inform industry of potential generic safety problems that have occurred at nuclear power plants in operation or under construction. IE Bulletins are issued to require specific actions and responses consistent with regulatory requirements by

nuclear power plant licensees and CP holders for issues that are deemed to have considerable safety significance. Circulars are no longer issued.

[GAO COMMENT: Wording changed to reflect the above.]

7. Chapter 2, p. 9

The review for potential significance of the information submitted to the Assistant Director for Safety Assessment is better described as follows:

A preliminary review for potential safety significance requiring shorter term action is performed and then the information is routed to the other cognizant branches within NRR for a more in-depth review. Once an issue is determined to have potential safety significance, the cognizant organizational unit making the determination submits the proposed generic issue along with recommendations for action to the Division of Safety Technology within NRR.

[GAO COMMENT: Wording changed to reflect the above.]

8. Chapter 3, p. 14

The report states that "After the publication of NUREG-0933 comments from other offices, ... were considered" Comments on the prioritization of the issues were solicited from other NRC offices, the ACRS, the industry, and the public prior to, and not after, publication of NUREG-0933 in December 1983. Comments from other offices and the ACRS were also obtained before submission of the report to the Commission in June 1983.

[GAO COMMENT: Wording changed to reflect the above.]

9. Chapter 3, p. 14

The "Results of the new ranking system" as stated by GAO are not consistent with those reported in Table III of the December 1983 issue of NUREG-0933, a copy of which is enclosed.

[GAO COMMENT: NCR's Table III of NUREG-0933 (see p. 47) includes generic issues that have been ranked but are not currently being worked on. The discussion in Chapter 3 (see pp. 14-15) on the results of the new ranking system, on the other hand, includes the issues listed in Table III and seven other ranked issues which either have been resolved or are being worked on.]

10. Chapter 3, p. 14

The report states that "none of the high priority generic issues have been designated as Unresolved Safety Issues" Since publication of NUREG-0933 in December 1983, one of the HIGH priority issues (New Generic Issue 23, Reactor Coolant Pump Seal Failures) has been identified as a potential USI which, if approved, will be reported to Congress. The peer review process includes a review of HIGH priority issues to determine if they should be USIs.

[GAO COMMENT: Wording changed to reflect the above.]

11. Chapter 3, p. 16

The report states that "They do not consider other risks such as land and water supply contamination." Where applicable, special risks associated with land and water supply contamination are addressed under "Other Considerations" in the prioritization process. If calculated public dose is not an adequate surrogate, special offsite effects are considered separately as stated on p. 9 of NUREG-0933.

The report also states that "potentially relevant factors ... are not considered." The purpose of the section on "Other Considerations" is to consider all other relevant and significant factors that can be identified. A partial list of the likely factors is provided in the Introduction to NUREG-0933.

[GAO COMMENT: Wording changed to reflect the above.]

12. Chapter 3, p. 18

The second recommendation to review all issues for identification of new USIs has been completed. This is a continuing process that is a part of peer review procedure. As a result, one issue, new Generic Issue 23 is being proposed as a USI (See Comment 5 above).

[GAO COMMENT: See GAO response on pages 18-19 of report.]

13. Chapter 4, p. 20

The report states that "the NRC is unable to determine which resolved generic issues result in new requirements ... and which did not."

[GAO COMMENT: Wording changed to clarify the above.]

and

Chapter 5, p. 30

The report also states that "NRC could not provide us with a list of resolved issues requiring these (SRP) changes."

While formal lists showing the types of requirements that resulted from resolution of issues have not been developed, the information is available to do so. In fact, an informal list of resolved issues and the resulting requirements, if any, was provided to the GAO.

[GAO COMMENT: In the course of our audit we asked NRC officials to provide us separate lists of resolved generic issues which required changes to (1) NRC's Standard Review Plan and (2) applicable nuclear power plants. After 6 weeks, NRC officials were not able to provide us with the former list. NRC officials did provide us with a partial list showing that 40 resolved generic issues led to changes at nuclear plants. We found, however, that 33 of these 40 issues were not correctly listed.]

TABLE III
 SUMMARY OF THE PRIORITIZATION OF ALL NEW GENERIC ISSUES,
 TASK ACTION PLAN ITEMS, AND TMI ACTION PLAN ITEMS

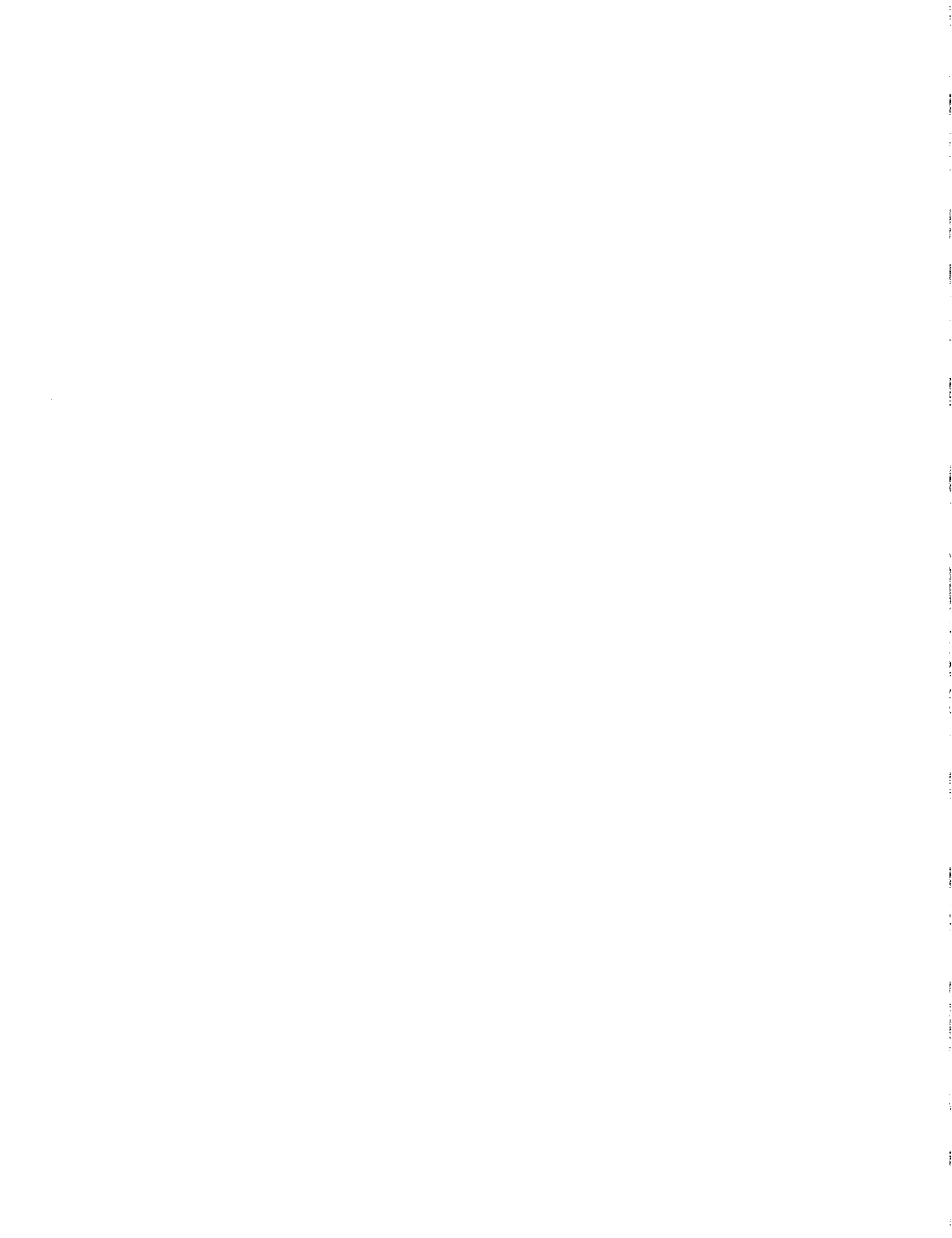
Action Item/Issue Group	Covered in Other Issues	RESOLVED STAGES			USI	HIGH	MEDIUM	LOW	DROP	NOTE 4	NOTE 5	TOTAL	
		NOTE 1	NOTE 2	NOTE 3									
1. <u>TMI Action Plan Items (255)</u>													
(a) <u>Safety</u>													
(i) Generic Safety	63	14	6	4	48	0	17	20	11	7	2	-	194
(b) <u>Non-Safety</u>													
(i) Licensing	-	0	1	5	49	-	-	-	-	0	0	6	61
2. <u>Task Action Plan Items (142)</u>													
(a) <u>Safety</u>													
(i) Generic Safety	-	17	0	2	20	27	5	10	3	8	1	-	93
(ii) Regulatory Impact	-	0	0	0	1	-	-	-	-	0	7	1	9
(b) <u>Non-Safety</u>													
(i) Licensing	-	0	0	0	1	-	-	-	-	7	6	11	25
(ii) Environmental	-	1	0	0	6	-	-	-	-	0	0	2	15
3. <u>New Generic Issues (85)</u>													
(a) <u>Safety</u>													
(i) Generic Safety	-	20	4	6	6	0	4	5	3	8	29	0	85
TOTAL:	63	52	11	17	131	27	26	35	19	36	45	20	482

Legend

NOTES: 1 - Possible Resolution Identified for Evaluation
 2 - Resolution Available
 3 - Resolution Resulted in either the establishment of New Requirements or No New Requirements
 4 - Issues to be Prioritized in the Future
 5 - Issue that is not a Generic Safety Issue but should be Assigned Resources for Completion

HIGH - High Safety Priority
 MEDIUM - Medium Safety Priority
 LOW - Low Safety Priority
 DROP - Issue Dropped as a Generic Issue
 USI - Unresolved Safety Issue
 I - TMI Action Plan Item with Implementation of Resolution Mandated by NUREG-0737

11/30/83
 (301633)



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