



Incident Response Function Self-Assessment Report

March 29, 1999

EXECUTIVE SUMMARY

INTRODUCTION

The U.S. Nuclear Regulatory Commission's (NRC's) 1995 National Performance Review identified the Incident Response Program as one of several programs that were potential candidates for efficiency improvement (see SECY-95-154). More recently, the NRC's Strategic Assessment and Rebaselining initiative raised issues as to: (1) what measures the NRC should take to maintain a sufficient planning and response capability for the nuclear industry, State and local authorities, and the Federal Government in view of growing economic pressure and improving safety performance; and (2) whether the NRC's incident response capability for nuclear material and fuel cycle facility emergencies was consistent with the risk that was associated with the activities. These issues, coupled with increasing pressure to reduce resources across all program areas, led the Commission to request that a broad self-assessment (SA) be conducted of the NRC's incident response function. The SA included all significant response functions and response readiness activities. The overall goal and primary focus of the SA were to identify initiatives to improve the efficiency and effectiveness of these functions and activities. The SA was conducted by a team of NRC staff from the Incident Response Program office (i.e., the Office for Analysis and Evaluation of Operational Data [AEOD]), the Offices of Nuclear Reactor Regulation (NRR), Nuclear Material Safety and Safeguards (NMSS), State Programs (OSP), and Region III. A representative from an Agreement State also supported the SA. To the extent practical, the SA team utilized the methodology for program assessments developed by Arthur Andersen Consulting, under contract to the NRC. An NRC management oversight group (MOG), composed of Senior Executive Service managers and senior staff from AEOD, NRR, NMSS, OSP, and Region IV, provided guidance, direction, and oversight throughout the SA. The SA report, including recommended initiatives, was reviewed in draft by an external peer group composed of radiological emergency response program representatives from other Federal agencies, States, and a power plant licensee from December 1, 1998, through January 15, 1999. The submitted peer review comments were evaluated and were used to prepare the final SA report. The consensus decisions of the MOG provided the basis for the recommended initiatives and suggested initiatives in the final SA report.

FINDINGS AND RECOMMENDED INITIATIVES

Goals and Objectives

The SA team found that not all offices and staff have a clear understanding of "incident response." Consequently, the NRC staff occasionally believed that their time and effort was devoted to incident response even though it was actually involved in incident followup activities, such as incident investigation or licensee responder performance evaluation. The SA team recommended that a definition of "incident response" be

established, documented, and effectively communicated so that the staff would recognize and understand the difference between response and followup activities.

Incident Response Budget

None of the regions and only three HQ offices (i.e., Incident Response operations(IRO), NMSS, and OSP) are explicitly budgeted for the full resources needed for incident response readiness and response activities. The NRC's budget for responder training and exercises does not cover the significant full-time equivalent positions (FTEs) utilized by responders attending response training or participating in exercises. The resources expended in support of reactor readiness and response activities are about 50 percent more than those budgeted for these activities by the IRO. Some regional administrators indicated that resources budgeted for other programs are used to support required reactor response training and exercise activities, thereby challenging their ability to fully support these activities. The SA team recommended that the regional offices and those HQ offices that provide significant professional, technical, or administrative resources for incident response activities for reactors (i.e., incident response training, exercises, response to actual incidents) should have resources (FTEs) explicitly allocated, at the appropriate levels, to support these activities.

INCIDENT RESPONSE FUNCTIONS

The SA team conducted a broad-based review of response functions and activities for power reactors, fuel cycle facilities (FCFs, including gaseous diffusion plants) and nuclear material incidents. The SA team's findings and recommended initiatives in the area of response functions and activities are documented in Section 4.0 of the SA report and are summarized below.

Event Notification and Reporting

Experiences with reported FCF events, especially for gaseous diffusion plant (GDP) events, indicates that many reported events have low risk or low safety significance. The elevated number of FCF event reports imposes a workload on licensees' response personnel involving making reports and adds to the workload of the HQ operations officers (HOOs) and NRC response decision-makers. In addition, several recent FCF emergency notifications raised questions regarding emergency classification criteria. Similarly, a brief preliminary review of nuclear material event notifications showed that many of the events were low in both actual or perceived risk and safety significance. The SA team also found that notification and reporting requirements for material events may not be commensurate with the associated actual or perceived risk and safety significance. The team recommended that event notification requests for FCF licensees, gaseous diffusion plant certificate holders, and material licensees, and reporting and emergency classification requirements be revised so that they are, to the extent possible, consistent with the actual or perceived risk and safety significance and with nuclear power plant emergency classifications and definitions. It is recommended

that gaseous diffusion plant events of low safety significance be submitted as 30-day written reports.

Response Decision-Making

The current process for deciding the NRC's response level (i.e., response decision-making process) is complex and time-consuming. The process was found to have expanded over time in an effort to resolve problems involving insufficient expertise, training, and final decision-making authority of the emergency officer and the regional duty officer. A streamlined response decision-making concept and process was identified by the SA team. The streamlined approach would combine the safeguards analysis, the safety analysis, and the decision-making steps. A single decision-maker at HQ and in the region would be involved. Additionally, the team noted that a recent revision of the NMSS emergency officer provides guidance on the appropriate level of NRC's response on the basis of actual or perceived risk and safety significance of event conditions. With clear criteria and adequate implementation of the revised procedure, it should be easier for the decision-makers to make timely and appropriate response decisions and to reduce the number of staff members participating in the response decision-making conference call. The team recommended that the response decision-making and activation processes be streamlined, that training on the recently revised NMSS EO procedure be incorporated into RDO, ET, RA, and Commissioner assistant training and that key NRC response staff be trained on the NRC's roles and responsibilities under the Federal Radiological Emergency Response Plan (FRERP). The team also recommended that standardized responsibilities and authorities for the RDO be established.

There is a lack of clarity regarding the expected response role of NRC staff for nuclear material incidents which occur in Agreement States. Under the agreement, the Agreement State regulatory agency has regulatory responsibility for monitoring licensee response activities and for carrying out appropriate State response actions. NRC is the lead Federal agency under the FRERP. However, under the NRC's Agreement State oversight authority under the Atomic Energy Act, the NRC staff has questioned whether NRC may have, and should exercise, if necessary, a more substantive response role than only monitoring State response actions and offering assistance. The team recommended that the expected response role of the NRC staff for materials incidents that occur in an Agreement State be clearly defined and formally documented in connection with final decisions on the material response initiatives.

Concept of Operations

The staffing associated with the current practices for power reactor, FCF, and nuclear material incident response involves the expenditure of significant HQ and regional resources to maintain a high level of response. Relatively large site, regional, and HQ response teams (HQ and regional staffing for monitoring material incidents) are utilized. Team sizes have grown over time in response to the lessons learned from exercises

and events. NRC-wide, more than 600 individuals are on responder call lists to ensure sufficient response capability and reliability. The aggregate resources spent on response readiness activities reduce the time the staff can spend on other important programs. Feedback from the nuclear industry also indicates that the requests for information made by NRC responders during reactor exercises have distracted the focus and resources of the licensees' responders away from accident analysis and mitigation activities. An analysis of the minimum staffing levels needed to perform critical response activities for the current concept of operations indicates that the number of HQ and regional responders could be reduced while maintaining response performance. Fewer responders would significantly reduce the annual training and exercise costs compared to the current staffing practices. After these initial analyses, the Incident Response Operations (IRO) staff initiated a trial program to assess the effectiveness of smaller HOC teams, including a trial application in an NRC full-participation exercise. In the near term, the SA team recommended continuation of the trial program for power reactor facilities and FCFs to assess the acceptability of minimum response teams within the current concept of operations, while for materials incidents the team recommended minimum HQ and regional responder staffing be used for monitoring significant materials incidents. On the basis of the results of the trial program, an optimum minimum-responder team or staffing approach would be permanently implemented for all programs areas, as appropriate.

Alternative incident response approaches (i.e., concepts of operations) that would maintain or improve response performance with fewer staff resources were also evaluated by the SA team. The response options for reactor facility, FCF and materials incidents considered tradeoffs of regional versus HQ in the lead during standby and initial activation and alternative approaches to staffing the initial site team. For each option, the associated costs and advantages and disadvantages in response quality, timeliness, and reliability were assessed. The SA team determined that the NRC responder rosters, response training costs, and exercise costs could be significantly reduced if an "intra-NRC" initial site team, composed of a regional responder core and supplemented by HQ and other regional staff responders, was implemented. The team's assessment of the intra-NRC initial site team approach indicated generally effective response performance in most respects. Onsite arrival times for reactor incident response and selected performance and reliability issues for both reactor and FCF incident response were identified as requiring further evaluation. For reactor response, the team recommended that if the projected onsite arrival times were acceptable, a longer term evaluation be implemented to fully assess the quality of performance, reliability, and timeliness of the less costly alternative response concepts such as an intra-NRC initial site team. On the basis of the results of the followup evaluation, the alternative response concept and optimum minimum-team approach should be implemented permanently, as appropriate. For FCF response, the team recommended that the initial site team concept and composition be reevaluated and that guidance for dispatching an initial site team, including its function and composition, be developed. For FCF response, the team also recommended that an in-depth

evaluation and trial program of alternative initial site team options, especially the intra-NRC initial site team, be conducted.

In originally developing the response plan, including response modes, no attempt was made to consider how to most effectively address the characteristics of significant nuclear material incidents. As a result the NRC's incident response process and practices for material events are less formal and less structured than those for power reactor facilities. The NRC's response actions for most material events have generally been adjusted and tailored on a case-by-case basis to the specific circumstances of the event or emergency. Based on these observations the IRO staff, in coordination with the NMSS staff, recently began to revise the response procedures for materials incidents. The SA team recommended that the IRO staff continue its efforts to fully implement a new, separate concept-of-operations framework and response process tailored to the special needs of materials incident response. It was also recommended that the insights, ideas, and experience of Agreement State and EPA response personnel be utilized in fully developing and documenting the new materials concept of operations.

NRC executive team members were found to have similar technical and safety assessment backgrounds, and therefore, their advice and counsel for the executive team director tend toward technical assessment issues rather than public communications, State support, or Federal coordination issues. Individual executive team members are not assigned lead responsibility for monitoring NRC's performance or for making recommendations in specific lead Federal agency responsibility areas. Special expertise, such as in public or congressional affairs, to assess NRC performance as a Federal spokesperson is not represented within the composition of the executive team. These factors were viewed as contributing to the potential for uneven emphasis and attention by the executive team in overseeing NRC's effectiveness in all of its lead Federal agency responsibility areas. The SA team recommended evaluating alternative approaches to the roles and responsibilities, organization, and senior staff composition of the ET and recommended assigning specific responsibilities to ET members in a manner which appropriately reflects NRC's Lead Federal Agency status.

Other Response Initiatives

A significant fraction of the resources that are expended by the regional offices in response to actual events is associated with hurricane and tropical storm response activities. Hurricane response activities include activating and staffing the regional incident response centers and entering the monitoring phase of normal mode, dispatching satellite communications equipment at potentially affected plants, and sending regional inspection staff to relieve resident inspectors at the potentially affected facilities. The team found that power reactor facilities are designed for hurricane conditions and are generally required by plant procedures to shut down hours before the onset of hurricane force winds at the site and implement emergency plan

procedures in advance of a hurricane's arrival. Accordingly, experience shows that plants sustain hurricane force conditions with very limited reduction in plant safety margins. The team recommended that, except for the most severe hurricanes (e.g., Category 4 or 5), tropical storm and hurricane monitoring (i.e., continuous incident response center staffing) not be conducted whenever emergency onsite AC power systems are verified fully operable at the potentially affected facilities. Hurricane paths should be tracked sufficiently and solely to ensure that satellite communications are pre-positioned and the resident inspectors are relieved, as needed, at the potentially affected facilities.

A Commission policy statement on NRC's response to accidents occurring during the transportation of radioactive material references a memorandum of understanding between the NRC and the U.S. Department of Transportation. The memorandum of understanding identifies the NRC as the lead Federal agency for investigating the cause of the event and preparing a report. The policy states that the States have the primary responsibility for protecting health and safety of its citizens from public hazards and that recognition of the responsibilities for radiation hazards is reflected by the existence of an appropriately designated State agency chartered with the responsibility of responding to radiological emergencies. The team found that not all regional staff were fully cognizant of the policy and do not always seek and obtain State support in response to low-consequence transportation accidents. The team recommended that the staff continue to ensure appropriate NRC reliance on States in response to accidents occurring during the transportation of radioactive material in accordance with the established policy.

Agreement States have expressed concern about providing immediate Internet access via the NRC external website to limited preliminary information on events reported to the States by their licensees. Although an event may be reportable to the NRC within 24 hours, it may not involve an immediate threat to health and safety. This practice has resulted in a lack of sufficient time for Agreement States to collect and review additional information needed to evaluate the preliminary event information before public inquiries begin. The team recommended that IRO and the OSP work with the OCIO to implement a reasonable delay (e.g., 24 hours) in posting 24-hour nuclear material event reports on the NRC external website, and that State regulators be reminded that current OSP guidance allows States up to 24 hours after notification by their licensees in which to notify the NRC's HQ Operations Center of the occurrence of a "significant" nuclear material event.

INCIDENT RESPONSE READINESS ACTIVITIES

The SA team conducted a broad-based review of Incident Response Program readiness (preparation) activities for power reactor, FCF, and nuclear material incidents. The SA team's findings and its recommended initiatives in the area of response readiness activities are documented in Section 5.0 of the SA report and are summarized below.

Program Development and Response Coordination

The team found that close and coordinated interaction between the IRO and the major program offices, that is needed to achieve efficiency and effectiveness in development and implementation of the response program, does not always occur. Further, Management Directive 8.2 and NUREG-0325 are inconsistent with respect to organizational responsibility for development of the nuclear material Incident Response Program policy and guidance documents. The departure of the AEOD staff member who provided the incident response coordination activities between AEOD and NMSS significantly contributed to materials and FCF response program development weaknesses identified by the team. The team concluded that if NRC oversight of Department of Energy (DOE) facilities expands, sufficient and dedicated staffing in IRO, clarity in office roles and responsibilities, coupled with close interoffice coordination, will be needed to ensure efficient and effective development of the incident response procedures for the diverse spectrum of NMSS regulated activities. The team recommended that: (1) NUREG-0325 be revised to ensure that NMSS incident response program development roles and responsibilities are consistent with MD 8.2; (2) the nuclear material/ FCF response coordinator be reestablished in IRO; (3) the ongoing improvement of incident response coordination activities between NMSS and IRO receive continuing emphasis; and (4) any documents or tools that provide formal policy or procedural guidance on the incident response function be closely coordinated with, and concurred upon by IRO.

Incident Response Plan and Procedures

The team found that NRC's Incident Response Plan (NUREG-0728) was not developed to address the special characteristics of significant material incidents. The team recommended that NUREG-0728 be revised to address a new response concept of operations specifically tailored to nuclear material incidents and emergencies.

Incident Response Program Plan

The team found that there is no integrated NRC-wide program plan that documents and assigns organizational responsibilities for significant Incident development and implementation activities of the Response Program. Additionally, not all offices explicitly include all significant Incident Response Program support activities and resources in their annual operating plans and budgets. Occasionally, this has resulted in difficulty in obtaining organizational support for responder participation in training and exercises, and assistance in development of response tools or procedures. IRO, in cooperation with NMSS, recently developed a plan for coordinating NMSS incident response activities. The team recommended continued efforts to develop and maintain an integrated Incident Response Program plan and that planned office activities, accomplishments, and resources that support the program plan be documented annually in office operating plans.

Maintenance and Development of the Implementing Procedure

Recent procedure revisions have not always been fully evaluated by IRO and response teams regarding the interdependency of procedures. Additionally, routine procedure audits are no longer being conducted. The reduced level of quality assurance has resulted in the introduction of procedural conflicts that were not detected until the procedures were used. The team recommended that response procedure revisions be validated and verified by IRO, the regions, response teams, and response coordinators for consistency before they are implemented.

Following each exercise and any event involving an actual response, the IRO develops lessons learned based on responder debriefings. However, due to limited resources, lessons learned from exercises and events are not always resolved. The SA team recommended that IRO implement a process to systematically track the resolution status of significant lessons learned from exercises and actual events. The SA team also recommended that IRO assess the policy issues, costs, and means of routinely sharing with industry and State and local government, NRC exercise lessons of mutual interest.

NRC Responder Training and Exercises

The team identified several quality issues and cost issues associated with NRC responder response training and conduct of exercises. The initiatives recommended by the team to address the identified training and exercise issues include:

- Conduct an analysis to provide a firm basis for establishing NRC response training requirements for NRC response functions and activities. The assessment should employ recognized methods for determining the type and frequency of response courses and exercises needed to maintain adequate responder proficiency. This assessment should include a determination as to whether any NRC response personnel are required to enter a hazardous environment, and if so, ensure that they meet established OSHA requirements.
- Establish and implement a formal NRC responder training program on the basis of the analyzed training needs. This effort should: (1) identify the training and qualifications required to perform each response position; (2) develop and implement a training program and formally document training materials to meet the identified training needs; (3) evaluate the trainee and training process to ensure that the training provided is effective; (4) incorporate lessons learned; and (5) periodically review the training to verify that NRC response personnel meet established training requirements.
- Upgrade the response training program by: (1) establishing an NRC-wide policy that attendance at required annual responder training is mandatory; (2) scheduling training courses in advance for all NRC responders; (3) conducting

the fewest number of scheduled classes; and (4) conducting training to address immediate office needs, including FCF and nuclear material training for the HOOs and training on basic response concepts (reactor, FCF, and material emergencies) for all response managers, including the executive team. Management of responder training course requirements, schedules, and course attendance record-keeping should be the responsibility of the Office of Human Resources.

- Ensure that the multi-year exercise plans developed with other Federal and State (e.g., materials exercises) agencies periodically exercise all significant phases of emergencies that have the potential for serious health and safety consequences. Exercises should include materials, FCF, transportation and terrorist events, and should cover all phases of a response under the FRERP and FRP. Continue current efforts to increase the realism of NRC's response in exercises by simulating all major LFA responsibilities, including communications with Congress, the White House, the public (media), the States, and the heads of other Federal agencies. The use of drills, tabletop exercises, or other methods should be increased to provide team and integrated training as resources allow.

Federal Coordination

The team found that the level of Federal activity related to emergency response planning and coordination requiring NRC involvement has significantly increased. The IRO staff periodically attends briefings and HQ and regional coordinating meetings to stay informed and to keep the response staff of other Federal agencies informed. There is a concern that the staff resources and/or the approach may not be sufficient to ensure that the NRC's response program is sufficiently well coordinated with the changing Federal response. The SA team recommended that Federal coordination activities be rebaselined to ensure that sufficient resources are allocated to fulfill these expectations and commitments.

State Outreach

The team found that a relatively high turnover rate for State responders adversely affects the maintenance of the cadre of State responders who have experienced either NRC State Outreach activities or NRC incident response exercises for reactors. Accordingly, the existing approach to State Outreach and reactor exercises do not effectively sustain the desired level of knowledge of the NRC and Federal response among State responders. The team recommended that for FCF and materials incident responses the NRC seek to be more efficient in conducting State Outreach using approaches that reach all the States (i.e., including those States not within an EPZ for power reactors) and a larger number and type of (i.e., materials incident) State responders during outreach training and orientation sessions. Strategies suggested included combining State outreach training with Nuclear Material Events Database training or in association with annual conferences or meetings widely attended by State

responders, using NRC's video conferencing equipment or FEMA's Emergency Education Network nationwide broadcasting system. The SA team also recommended that States be provided with guidance that they can incorporate directly into their response procedures for using Federal assets in the event of an emergency.

Headquarters Operations Officers

The Incident Response Program budgets seven FTEs for the HOO function. However, the HOOs are actively involved in incident response activities or incident response readiness activities for only small percentage of the time they are on shift. Most of the time, they are involved in either non-emergency notifications or waiting for emergency notifications. Also, some Agreement States believe that the HOOs do not always understand reported material events as well as reactor events. The team recommended additional technical training for the HOOs to enhance their performance in understanding materials events and promptly implementing revised HOO procedures on information to be obtained by the HOOs for materials events. The team also recommended that the budget for HOO shift coverage include both an incident response component and a non-incident response component in recognition that only a small percentage of shift time is spent in response to actual incidents. Recognizing both components would establish a budget model in which to consider and evaluate the assignment of lower priority optional HOO tasks (e.g., events assessment) that would increase overall HOO utilization.

Information Technology Infrastructure

Maintaining reliability of the HOC IT infrastructure dominates the contract support costs of the incident response program. The SA team concluded that opportunities may exist for reducing the maintenance costs of OCIMS, ERDS, and other HOC information technology systems. The SA team recommended that efforts continue to identify new information technology approaches and systems to update the HOC IT infrastructure to improve its reliability and performance and lower its maintenance costs. Additionally, the team found that in responding to a recent event, portions of the HOC callout tree were not implemented in a timely manner. As a result, some HQ responders did not report to the HOC in a timely manner when the NRC entered the standby mode. It was recommended that the NRC's automated call-out systems be made operational and placed into service as soon as possible and that resources be provided to ensure their continued maintenance.

Incident Response Facilities

An SA team reassessment of the need for the four regional Incident Response Centers (IRCs) found that no substantive changes had occurred in the basis for the costs and benefits documented in a 1997 study, which had concluded that there would be little cost savings if three of the four regional IRCs were eliminated. The team recommended that the four regional IRCs be retained if the current concept of operations is retained. However, if a decision is made to reduce the regional incident

response role, such as by a change in the concept of operations, the need for the regional IRCs would be diminished and the 1997 IRC cost-benefit analysis should be reevaluated.

Redundant copies of emergency plans and emergency plan implementing procedures (EIPs) for all sites are maintained at the HOC, the regional offices, and the site resident inspector offices. Additionally, the overview material for each power reactor site that is contained in the plant information books (PIBs) and the electronic plant information books (EPIBs) on the NRC website contains simplified plant system diagrams and detailed plant system data that are not of verified accuracy. However, no formal mechanism was put in place to ensure maintenance of the PIBs. Incorrect drawings could result in erroneous assessment and the transmission of incorrect information to outside organizations. The SA team recommended that alternative approaches be evaluated to most effectively and efficiently maintain site-specific emergency plans, EIPs, ERPs, PIBs and EPIBs. The team also recommended that an assessment be conducted on whether and where these documents might be maintained at a single NRC location instead of multiple locations (e.g., HOC, regional IRCs, and RI offices) without impairing NRC incident response. The SA team also recommended evaluating whether emergency plans and EIPs could be maintained and accessed in a timely and reliable manner via ADAMS when it becomes operational.

AREAS OF SPECIAL INTEREST IDENTIFIED BY THE CHAIRMAN

The Chairman requested that a number of specific items be included in the SA. The assessments for these specific items were performed by the staff of the Incident Response Division (AEOD). The results of these assessments are documented in Appendix A of the SA report.

