



**NSIR/DPR-ISG-01**

**INTERIM STAFF GUIDANCE**

**EMERGENCY PLANNING FOR NUCLEAR POWER  
PLANTS**

## INTERIM STAFF GUIDANCE

### EMERGENCY PLANNING FOR NUCLEAR POWER PLANTS

#### I. PURPOSE

The purpose of this interim staff guidance (ISG) is to provide updated guidance information for addressing emergency planning (EP) requirements for nuclear power plants (NPPs). This guidance is based on changes to EP regulations in Title 10, "Energy," Part 50, "Domestic Licensing of Production and Utilization Facilities," of the *Code of Federal Regulations* (10 CFR Part 50), specifically 10 CFR 50.47, "Emergency Plans," and Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50, that were published in the *Federal Register* (FR) on November 23, 2011 (reference 76 FR 72560). The ISG should be used by licensees and applicants as guidance for implementing changes to onsite EP programs based on the revised EP requirements and by NRC staff for reviewing the adequacy of the revised onsite EP programs. The ISG also provides additional guidance on one topic not specifically addressed in the EP final rule (i.e., integrating offsite response organization (ORO) event response concepts with onsite EP programs). This guidance supplements and/or replaces previous guidance given in various documents and generic communications, including several NUREGs, bulletins, information notices (INs), and regulatory issue summaries (RISs), as indicated in the sections that discuss each of the guidance topics.

The NRC issues guidance to describe and make available to the public methods that the NRC staff considers acceptable for use in implementing specific parts of the agency's regulations. The guidance is not a substitute for regulations, and compliance with it is not required. Methods that differ from those set forth in guidance will be deemed acceptable if they provide the basis for the findings required for the issuance or continuance of a permit or license by the Commission.

This ISG contains and references information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing requirements were approved by the Office of Management and Budget, approval numbers 3150-0011 and 3150-0151. The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

#### II. BACKGROUND

Following the accident at Three Mile Island (TMI) Unit 2 in 1979, the U.S. Nuclear Regulatory Commission (NRC) revised its regulations to incorporate additional EP requirements. In 10 CFR 50.47(b), the agency established 16 planning standards. Of these planning standards, 15 were also incorporated into Federal Emergency Management Agency (FEMA) regulations under Title 44, "Emergency Management and Assistance," Part 350, "Review and Approval of State and Local Radiological Emergency Plans and Preparedness," specifically in 44 CFR 350.5, "Criteria for Review and Approval of State and Local Radiological Emergency Plans and Preparedness." For NRC licensees and applicants, additional requirements in Appendix E to 10 CFR Part 50 supplement the planning standards.

Following the events of September 11, 2001, the NRC staff reviewed the EP basis for nuclear power plants (NPPs) considering the impact of hostile action contingencies unanticipated at the time the basis was established. The staff concluded that the EP basis remains valid.

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Vulnerability studies revealed that the timing and magnitude of releases related to hostile action would be no more severe than in the other accident sequences considered in the EP basis. However, hostile action could present unique challenges to EP programs since they differ from the accident-initiated events for which licensees and OROs typically plan, train, and exercise.

Since 2001, the NRC staff has observed licensee performance during numerous security event-based EP drills and security force-on-force (FOF) exercises. The staff has also discussed security-based EP issues with various stakeholders, including licensees and Federal, State, and local government officials. The staff issued Bulletin 2005-02 (BL-05-02), "Emergency Preparedness and Response Actions for Security-Based Events," dated July 18, 2005 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML051740058) to obtain information from licensees on the type of EP program enhancements they had implemented to address potential hostile action and to provide examples of enhancements for licensees to consider in their response to security-based events. Licensees provided specific information pertaining to the following issues:

- how licensee emergency classification schemes address security-based events, including threat notifications;
- how promptly licensees notify the NRC of security-based events, and how this timing relates to NRC notification of other licensees that may be potentially affected by coordinated security-based events;
- how onsite protective action plans for licensee personnel consider possible attack scenarios, particularly when radiological exposure is not the primary threat to personnel safety;
- how alternative locations for onsite emergency response facilities support EP functions during a security-based event; and,
- how current EP drill and exercise programs prepare or evaluate responders for security-based events commensurate with established EP standards.

NPP licensees responded that they had implemented, or planned to implement, the types of enhancements outlined in BL-05-02 for security-based events. The Nuclear Energy Institute (NEI) issued a white paper titled "Enhancements to Emergency Preparedness Programs for Hostile Action" in May 2005 (revised November 18, 2005) (ADAMS Accession No. ML053290326). The NRC endorsed this guidance in RIS 2006-12, "Endorsement of Nuclear Energy Institute Guidance 'Enhancements to Emergency Preparedness Programs for Hostile Action,'" dated July 19, 2006 (ADAMS Accession No. ML061530290), as an acceptable implementation methodology for the EP program enhancements discussed in BL-05-02.

In SECY-06-0200, "Results of the Review of Emergency Preparedness Regulations and Guidance," dated September 20, 2006 (ADAMS Accession No. ML061910707), the NRC staff discussed the activities it had conducted to complete a comprehensive review of EP regulations and guidance and recommended pursuing rulemaking for EP program enhancements for

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several security event-related and non-security event-related topics. Additionally, the comprehensive review of the EP program identified several areas for potential EP program improvement and increased clarity based on the experience gained from EP program implementation since the TMI accident, recent technological advances, and lessons learned from actual events, drills, and exercises.

### III. OVERVIEW OF EMERGENCY PLANNING GUIDANCE DOCUMENTS

Other guidance documents offer assistance to NRC licensees, applicants, and offsite agencies in developing radiological emergency plans for NPP events and maintaining preparedness. Generic communications have addressed specific EP issues and lessons learned from actual events. The following sections discuss key EP guidance documents affected by the EP issues addressed in this ISG.

#### III.A NUREG-0654/FEMA-REP-1

Before publication of the final EP rule changes to 10 CFR Part 50 in 1980, the NRC and FEMA jointly developed NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (hereafter referred to as NUREG-0654) (ADAMS Accession No. ML040420012) to provide guidance to licensees, applicants, and State and local governments in developing plans that meet the 16 planning standards of 10 CFR 50.47(b). The guidance established specific evaluation criteria by which NRC and FEMA staff could assess whether the planning standards are met.

The NRC endorsed the evaluation criteria in NUREG-0654 in Regulatory Guide (RG) 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors," Revision 2, dated October 1981 (ADAMS Accession No. ML090440294). FEMA formally adopted criteria for the review and approval of State and local radiological emergency plans and preparedness in 1983 in 44 CFR 350.5. These criteria include the sections of 10 CFR 50.47 and NUREG-0654 that apply to State and local governments.

The NUREG document itself has not been revised since Revision 1 was published in November 1980. The following supplements and addenda have been issued since that time to address specific EP topics in more detail and to replace outdated citations:

- Supplement 1, "Criteria for Utility Offsite Planning and Preparedness" (ADAMS Accession No. ML083180169), was published in September 1988 as a final report to provide guidance for the development, review, and evaluation of utility offsite radiological emergency response planning and preparedness for those situations in which State and/or local governments decline to participate in emergency planning. The supplement was developed in response to the nonparticipation by offsite agencies in emergency planning for the Shoreham and Seabrook Station NPPs.
- Supplement 2, "Criteria for Emergency Planning in an Early Site Permit Application" (ADAMS Accession No. ML050130188), was added to provide guidance for the development, review, and approval of radiological EP information and plans submitted

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with an early site permit application under Subpart A of 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." The supplement was published as a draft report for comment in April 1996.

- Supplement 3, "Criteria for Protective Action Recommendations for Severe Accidents" (ADAMS Accession No. ML051120480), was added to provide guidance for the development of protective action recommendations (PARs) for the public during severe reactor accidents involving actual or projected core damage with the potential for loss of containment. The supplement was published as a draft report for interim use and comment in July 1996. The PAR guidance took the form of revised pages to Appendix 1, "Basis for Emergency Action Levels for Nuclear Power Facilities," of NUREG-0654, Revision 1. However, the use of the earlier PAR guidance in Appendix 1 of NUREG-0654, Revision 1, was allowed under specific conditions.

Supplement 3, "Guidance for Protective Action Strategies," dated November 2011 (ADAMS Accession No. ML113010596), updates the draft version of Supplement 3 issued in July 1996. The updated Supplement 3 provides a protective action logic development tool based on recent technical information and is intended for use by nuclear power reactor licensees to develop site-specific PAR procedures. OROs should use Supplement 3 to develop protective action strategy guidance for decision makers. The guidance in Supplement 3 provides an acceptable method to comply with 10 CFR Part 50, Appendix E, Section IV.3 regarding the use of evacuation time estimates (ETEs) in the formulation of PARs for the plume exposure emergency planning zone (EPZ), and provides guidance for the provisions of 10 CFR 50.47(b)(10) regarding the development of a range of PARs.

- One set of addenda (NUREG-0654/FEMA-REP-1, Rev. 1 Addenda, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," ADAMS Accession No. ML021050240) was published in a final report in March 2002 to update citations to revised or newer documents referenced in the main sections and appendices of NUREG-0654, Revision 1.

### III.B NUREG-0696

Studies of the TMI accident identified the need for extensive improvements in the overall response to accidents at NPPs, including enhanced facilities and systems to support the control room (CR) in mitigating the consequences of accidents and the licensee's capability to respond to abnormal plant conditions. NUREG-0696, "Functional Criteria for Emergency Response Facilities" (ADAMS Accession No. ML051390358), describes the facilities and systems that NPP licensees can use to improve emergency response to accidents, such as the technical support center (TSC), operational support center (OSC), and emergency operations facility (EOF). The document also provides guidance on the functional criteria for emergency response facilities (ERFs) and on the integrated support these facilities provide to the CR. Specific attributes are provided for each ERF in several categories, including function, location, staffing and training, size, structure, habitability, communications, instrumentation, data system

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equipment, power supplies, and records availability. The NRC has not revised the NUREG document itself since publication of the final report in February 1981.

#### **III.C NUREG-0737, Supplement 1**

The NRC developed NUREG-0737, "Clarification of TMI Action Plan Requirements," Supplement 1, "Requirements for Emergency Response Capability" (ADAMS Accession No. ML051390367), to provide additional clarification regarding emergency response capabilities, including functional statements and recommended requirements for various ERFs. The supplement represents a distillation and revision of the fundamental requirements for NPP emergency response capabilities from a wide range of guidance documents, including NUREG-0696. The NRC transmitted NUREG-0737, Supplement 1, to licensees of operating reactors, applicants for operating reactors, and holders of construction permits via Generic Letter 82-33, "Supplement 1 to NUREG-0737—Requirements for Emergency Response Capability," dated December 17, 1982 (<http://www.nrc.gov/reading-rm/doc-collections/gen-comm/gen-letters/1982/gl82033.html>), and published the supplement in January 1983.

#### **III.D NUREG-0800**

The NRC prepared NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (ADAMS Accession No. ML070810350), to establish guidance for the NRC staff in performing safety reviews of construction permit or operating license applications (including requests for amendments) under 10 CFR Part 50 and early site permit, design certification, combined license, standard design approval, or manufacturing license applications under 10 CFR Part 52 (including requests for amendments). NUREG-0800, Chapter 13.3, "Emergency Planning," addresses the NRC staff's review of an applicant's EP program. The review encompasses plans for various emergency response elements, including EPZs, emergency action levels (EALs), ETEs, and ERFs. If applicable, the reviewer also evaluates proposed EP inspections, tests, and analyses that the licensee will perform and the associated acceptance criteria. The agency issued Revision 3 of Chapter 13.3 in March 2007 (ADAMS Accession No. ML063410307).

#### **III.E RG 1.101**

In 1975, the NRC initially published RG 1.101, "Emergency Response Planning and Preparedness for Nuclear Power Reactors," to provide guidance to licensees and applicants on methods acceptable to the NRC staff for complying with the Commission's regulations for emergency response plans and preparedness at nuclear power reactors. The agency issued Revision 1 of RG 1.101 in March 1977 and withdrew it in October 1980 (45 FR 69610, October 21, 1980).

In November 1980, the NRC published Revision 1 of NUREG-0654 to provide specific evaluation criteria for determining compliance with the standards in 10 CFR 50.47(b) and for the FEMA review of the adequacy of offsite emergency plans and preparedness. Revision 2 of RG 1.101, issued October 1981, endorses Revision 1 of NUREG-0654.

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In January 1992, the Nuclear Management and Resources Council (NUMARC, now NEI) issued Revision 2 of NUMARC/NESP-007, "Methodology for the Development of Emergency Action Levels" (ADAMS Accession No. ML041120174), which contains guidance for developing EALs required by 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. Revision 3 of RG 1.101, issued August 1992 (ADAMS Accession No. ML003740302), endorses the use of Revision 2 of NUMARC/NESP-007 as an acceptable alternative to the EAL scheme in Appendix 1 of NUREG-0654 and reaffirms the endorsement of Revision 1 of NUREG-0654.

In January 2003, NEI submitted Revision 4 of NEI 99-01, "Methodology for the Development of Emergency Action Levels" (ADAMS Accession No. ML030230250), to provide guidance for the development of EALs in the shutdown and refueling modes of NPP operations. Revision 4 of NEI 99-01 also provides new guidance for developing EALs for permanently shutdown reactors and dry cask spent fuel storage facilities at NPPs. In addition, Revision 4 of NEI 99-01 also incorporates improvements to the EAL guidance found in Revision 2 of NUMARC/NESP-007. Revision 4 of RG 1.101, issued July 2003 (ADAMS Accession No. ML032020276), endorses the use of Revision 4 of NEI 99-01 as an acceptable alternative to the EAL schemes in Appendix 1 of NUREG-0654 and Revision 2 of NUMARC/NESP-007.

Revision 5 of RG 1.101, issued June 2005 (ADAMS Accession No. ML050730286) provides guidance to licensees and applicants at co-located facilities for complying with NRC regulations concerning the conduct of emergency response planning activities and interactions with offsite authorities in the years between offsite participation in full or partial participation exercises.

#### IV. ISSUES

##### IV.A Issues Addressed in This Interim Staff Guidance

The NRC staff recognized the need to update the onsite EP program guidance in support of the revised EP regulatory requirements. The staff identified changes that are needed in several existing onsite EP guidance documents because of the EP rule changes. Additional updates of guidance are also warranted to address EP program lessons learned, in particular, issues involving security event-related response.

To provide guidance at the same time the EP final rule was published, this document consolidated several guidance changes for onsite EP programs. Future updates of NUREG-0654 and other guidance documents as appropriate will include the information in this ISG. The NRC coordinated onsite EP program guidance changes with FEMA, which addressed offsite EP program guidance changes in other documents.

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The following issues and guidance are addressed in the designated sections of this ISG as listed below:

<b>ISSUE</b>	<b>SECTION</b>
On-Shift Staffing Analysis	IV.C
Emergency Response Organization Augmentation at Alternative Facility	IV.D
Licensee Coordination with Offsite Response Organizations	IV.E
Protective Actions for Onsite Personnel	IV.F
Challenging Drills and Exercises	IV.G
Emergency Declaration Timeliness	IV.H
EOF—Performance-Based Approach	IV.I
Backup Means for Alert and Notification Systems	IV.J
ORO Event Response Integration with Nuclear Power Plants	IV.K

#### **IV.B Additional EP Final Rule Issues Not Addressed in This Interim Staff Guidance**

This ISG does not provide guidance for three EP final rule issues (i.e., EALs for security events, amended emergency plan change process, and updating of ETEs); guidance for these issues is provided in the following documents:

- EALs for Security Events: BL-05-02, RIS 2006-12, NEI 99-01, “Methodology for the Development of Emergency Action Levels,” Revision 5, February 2008 (ADAMS Accession No. ML080450149), and NEI 07-01, “Methodology for the Development of Emergency Action Levels Advanced Passive Light Water Reactors,” Revision 0, July 2009 (ADAMS Accession No. ML092030210)
- Amended Emergency Plan Change Process: RG 1.219, “Guidance on Making Changes to Emergency Response Plans for Nuclear Power Reactors,” Revision 0, November 2011, (ADAMS Accession No. ML102510626)
- Updating of ETEs: NUREG/CR-7002, “Criteria for Development of Evacuation Time Estimate Studies,” Revision 0, November 2011, (ADAMS Accession No. ML113010515). This document describes a method that the NRC staff considers acceptable for the development of the ETE analysis required in 10 CFR Part 50, Appendix E, Section IV.

#### **IV.C On-Shift Staffing Analysis**

**Introduction:** The Commission amended 10 CFR Part 50, Appendix E, Section IV.A, “Organization,” to address concerns regarding the assignment of tasks or responsibilities to on-shift emergency response organization (ERO) personnel that would potentially overburden them and prevent the timely performance of their emergency plan functions. Licensees must have enough on-shift staff to perform specified tasks in various functional areas of emergency response. All shifts must have the capability to perform these emergency functions 24 hours a day, 7 days a week, to minimize the impact of radiological emergencies and to provide for the protection of public health and safety.

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Previous NRC regulations stated that on-shift staffing levels must be adequate but gave no clear definition of “adequate.” This provided some leeway in how licensees assigned emergency plan implementation duties to on-shift personnel. The supporting NRC guidance used for the approval of emergency plans attempted to define the measure of adequacy, but stakeholders found the guidance to be unclear. The final rule better ensures sufficient on-shift staff in the post-September 11, 2001, threat environment by limiting the assignment of responsibilities which on-shift ERO members would likely perform concurrently with their emergency plan functions. Section IV.A and new Section IV.A.9 of Appendix E state in part the following:

#### A. Organization

The organization for coping with radiological emergencies shall be described, including definition of authorities, responsibilities, and duties of individuals assigned to the licensee's emergency organization and the means for notification of such individuals in the event of an emergency. Specifically, the following shall be included:

9...for nuclear power reactor licensees, a detailed analysis demonstrating that on-shift personnel assigned emergency plan implementation functions are not assigned responsibilities that would prevent the timely performance of their assigned functions as specified in the emergency plan.

**Background and Discussion:** The specific requirement for establishing a shift emergency organization to respond to emergency events appears in 10 CFR 50.47(b)(2) which states, in part, the following:

On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times...

Additionally, 10 CFR Part 50, Appendix E, Section IV.A, requires licensees to describe the organization for coping with radiological emergencies, including individuals assigned to the licensee's ERO with a description of emergency assignments.

NUREG-0654, Section II.B, “Onsite Emergency Organization,” presents guidance for meeting these requirements. The guidance describes the onsite emergency organization, including the staffing requirements found in Table B-1, “Minimum Staffing Requirements for NRC Licensees for Nuclear Power Plant Emergencies.” This table specifies a minimum of 10 on-shift responders in four functional areas. It also specifies seven on-shift responders who perform response duties that may be performed by shift personnel who are assigned other functions. In other words, there are no dedicated responders to perform these functions. Finally, Table B-1 specifies two major functional areas, firefighting and site access control/personnel accountability, which must be staffed on a site-specific basis.

NUREG-0654, Section II.B, states that the emergency plan should unambiguously define on-shift responsibilities for emergency response. Specifically, Evaluation Criterion B.1 states

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that each licensee shall specify the onsite emergency organization of plant staff for all shifts and its relation to the responsibilities and duties of the normal staff complement. Therefore, each licensee has an emergency plan that specifies each emergency function and the emergency position assigned to perform it. The emergency plan should consider such contingencies as staffing of the fire brigade, back-shift staffing when overall staffing levels are lowest, and the potential demand for radiation protection and chemistry technicians during events involving radiological hazards.

In the aftermath of the September 11, 2001, terrorist attacks, the NRC reviewed the shift staffing issue in light of potential terrorist threats to ensure that sufficient onsite staff will be available for efficient emergency plan and security plan integration. For example, many licensees assigned emergency plan implementation duties to security force personnel who would now be needed for site defense during hostile action. The NRC issued Order EA-02-026, "Order for Interim Safeguards and Security Compensatory Measures," dated February 25, 2002 (ADAMS Accession No. ML020510635), to all license holders for commercial NPP reactors in the United States. The interim compensatory measures (ICMs) required licensees to conduct a review to ensure that additional duties are not assigned to responders in a way that would prevent effective implementation of the integrated plans (i.e., security and emergency plans) and to ensure that a sufficient number of personnel are available for emergency plan implementation.

Although the NRC issued orders in 2002 to correct the assignment of additional duties to security force personnel, it issued no corresponding order for on-shift ERO members. In the event of large-scale fires and/or explosions from hostile action, the fire brigade may be called out indefinitely. If one of the dedicated on-shift responders were also a fire brigade member, this could have resulted in other shift responders performing additional duties which could have interfered with the performance of their assigned emergency plan tasks. Thus, because of the previous lack of regulatory clarity, the potential remained for the assignment of multiple response duties to on-shift personnel, which could have inhibited effective emergency plan implementation.

The mitigative strategies and response procedure requirements for potential or actual aircraft attacks are located in 10 CFR 50.54(hh). Section 50.54(hh)(1) specifies the regulatory framework to facilitate consistent implementation of preparatory actions that licensees must take in the event of a potential aircraft threat to a nuclear power reactor facility. Because an aircraft attack is a significant threat and a rapidly evolving event, and because licensees may receive an aircraft threat notification only a short time before potential onsite impact, the NRC determined that it is not prudent for licensees to identify and accomplish ad hoc mitigative actions for such an event. This type of reactive response would significantly limit the effectiveness of onsite and offsite responses to protect public health and safety.

Section 50.54(hh)(1) requires licensees to cope with potential aircraft attacks by developing specific procedures that describe the pre-identified actions licensees intend to take upon notification of such an attack. These preparatory actions serve to maximize the response to a potential aircraft attack while demonstrating systematic onsite and offsite planning, coordination, communication, and testing. Guidance for implementing this requirement is found in RG 1.214, "Response Strategies for Potential Aircraft Threats," (issued September 2009, ADAMS

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Accession No. ML091750297, limited availability, classified as Official Use Only – Security Related Information).

NUREG-0654 states general guidance concerning the onsite emergency organization to allow licensees some flexibility in the number of on-shift staff required by emergency plans for response to emergency events. On occasion, this has resulted in the inadequate completion of Table B-1 emergency functions required during an emergency event. The NRC issued IN 91-77, "Shift Staffing at Nuclear Power Plants," dated November 26, 1991 (<http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/1991/in91077.html>), to alert licensees to problems that could arise from having insufficient staff for emergency response. The IN highlights the following two events:

- A fire at one plant in April 1991 resulted in the licensee's failure to notify some key emergency response personnel (communication function). The need to staff the fire brigade and still perform numerous response actions required by the event resulted in a heavy workload for the shift staff.
- A fire, loss of offsite power, and reactor trip at another plant in June 1991 resulted in difficulties in classifying the event, notifying required personnel, implementing emergency operating procedures, and staffing the fire brigade. Insufficient staff contributed to the licensee's failure to declare a timely Notification of Unusual Event.

The NRC staff also issued IN 95-48, "Results of Shift Staffing Study," dated October 10, 1995 (<http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/1995/in95048.html>), which cites several observations concerning shift staffing and also concludes that radiological support personnel could have a large workload during emergencies. IN 95-48 reported the results of an unpublished 1995 study and was written because, after issuance of IN 91-77, NRC event follow-up inspections indicated that challenges involving shift staffing and task allocation continued. Part of the shift staffing study involved collection of data on the adequacy of NPP staffing practices for performing response activities during two accident scenarios: (1) fire leading to reactor trip with complications, and (2) either control room fire leading to evacuation and remote shutdown or station blackout. Study findings of interest include the following:

- Licensees surveyed did not use a systematic process for establishing site-specific shift staffing levels.
- Licensees surveyed frequently assigned additional plant-specific tasks that were not specified by regulation to be performed by licensed and nonlicensed operators during an event.
- Five of the seven licensees surveyed used licensed personnel to staff the fire brigade.
- Procedures varied significantly concerning licensed and nonlicensed personnel staffing levels, and the number of nonlicensed operators used on the back-shift varied greatly.
- Radiation protection and chemistry technicians for all the licensees surveyed had a heavy workload during the scenarios.

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These findings demonstrated the need for a revised regulatory framework to explicitly limit on-shift ERO response duties to ensure that these emergency responders do not become overburdened during an emergency event.

NUREG-0396, EPA 520/1-78-016, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," issued December 1978 (ADAMS Accession No. ML051390356), provides a planning basis for offsite EP efforts considered necessary and prudent for large power reactor facilities. This document identifies the bounds of the parameters for which planning is recommended, based on knowledge of the potential consequences, timing, and release characteristics of a spectrum of accidents, including the core melt accident release categories of WASH-1400, "Reactor Safety Study—An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants" (NUREG-75/014), issued October 1975. NUREG-0654 points out that no single specific accident sequence should be isolated as the one for which to plan because each accident could have different consequences, both in nature and degree.

After the events of September 11, 2001, the NRC reviewed the EP planning basis and found that the design-basis threat (DBT) posed by hostile action does not lead to an event that is beyond the bounds of design-basis accidents (DBAs) defined in the current licensing basis. However, the NRC required licensees to develop, implement, and maintain procedures that describe the response to a potential aircraft threat in accordance with 10 CFR 50.54(hh)(1). On-shift staff must be able to cope with the DBAs and the DBT, and implement response actions for a potential aircraft threat, until the augmenting ERO staff is mobilized by activation of the emergency plan. NUREG-0654 guidance recommends that there be, in addition to on-shift personnel, 30-minute and 60-minute responders. The augmented ERO responders assume many managerial, engineering, and administrative duties from the on-shift personnel, allowing them to focus more fully on plant operations. Therefore, on-shift responders must be able to cope with expected DBAs, the DBT, and the response actions for a potential aircraft threat in accordance with 10 CFR 50.54(hh)(1) for the first 30 minutes of an emergency event. For those licensees that do not use 30-minute responders, on-shift staff must cope with these events until augmenting responders arrive.

The two INs previously discussed highlight the fact that licensees have experienced challenges in completing on-shift emergency response actions when responding to declared events involving a fire. Therefore, for the purposes of this staffing analysis, licensees should demonstrate that the on-shift staff can cope with a control room fire leading to evacuation and remote shutdown, as referenced in IN 95-48.

Station blackouts are beyond the plant's design basis and may not need to be addressed in the staffing analysis. The blackout coping analyses performed by licensees pursuant to 10 CFR 50.63 establish blackout coping times that exceed the required on-shift staff augmentation time. Also, since the control room fire scenario leading to evacuation and remote shutdown may adequately address the considerations involved with an Appendix R "safe shutdown" fire, licensees may not need to consider this scenario in the staffing analysis. Finally, the severe accident management guidelines (SAMGs) are implemented by licensee staff in the plant's TSC rather than the control room staff, who implement the plant abnormal and

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emergency operating procedures. As such, they also may not need to be addressed in the staffing analysis.

Concerning the DBA analysis, licensees should analyze at least one event that results in the declaration of a General Emergency and radiological doses to the public that exceed the Environmental Protection Agency (EPA) protective action guides (PAGs) beyond the site boundary and that would necessitate the promulgation of a PAR. This analysis should be done even if no DBA defined in the licensing basis results in this emergency classification and dose levels. The NRC is making this clarification to ensure that licensees consider all EP response actions contained in risk-significant planning standards 10 CFR 50.47(b)(4), (b)(5), (b)(9), and (b)(10) when performing the analysis.

The NRC is requiring each nuclear power reactor licensee to perform the detailed analysis specified in this guidance to determine if on-shift staff may have been assigned responsibilities that would prevent the timely performance of emergency response functions delineated in the licensee's emergency plan. The analysis performed under this guidance does not remove the licensee's responsibility under 10 CFR 50.54(q) for evaluating changes made to its emergency plan.

**Guidance:** *[The following guidance supplements existing guidance in NUREG-0654, Section II.B, Evaluation Criterion B.5 and Table B-1, regarding assignment of emergency response functions and tasks to licensee personnel. As such, a future update of NUREG-0654 will incorporate this guidance without replacing or superseding any existing guidance.]*

The following guidance on the scope of the on-shift staffing analysis is a minimum expectation and should not be considered as all-inclusive. Licensees should be aware of site-specific commitments and unique licensing attributes that would impact on-shift staffing considerations when performing the staffing analysis. Examples of other events that may warrant consideration include station blackout, Appendix R fire response, and SAMGs. Site-specific commitments may have been made for the performance of tasks by on-shift staff associated with these events prior to ERO augmentation that may impact EP response duties. Therefore, if licensees do not include these events in their staffing analysis, they should provide sufficient rationale as to why these events were not included.

As used in this ISG, a postulated DBA is an unanticipated occurrence that, while not expected to occur during the life of the NPP, is analyzed to ensure (1) the integrity of the reactor coolant pressure boundary; (2) the capability to shut down the reactor and maintain it in a safe shutdown condition; or (3) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures. Such accidents are often referred to in individual final safety analysis reports (FSARs) as "Condition IV events," or "limiting faults," and will generally include analyses of the radiological consequences of the postulated accident. Staffing analyses performed pursuant to 10 CFR Part 50, Appendix E, Section IV.A.9 should consider the postulated DBAs (Condition IV events) analyzed in the licensee's FSAR.

The staffing analysis is not expected to address lesser design basis events (e.g., anticipated operational occurrences, etc.) that may be documented in the FSAR, nor is it expected to address postulated accidents that are not already in the facility's design basis. The analysis

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assumptions; inputs; timing of events and plant protective responses; and specified manual operator actions and their timing, as documented in the FSAR analyses, should be used in the staffing analysis.

To ensure that the on-shift staff can carry out their assigned emergency response functions until the augmenting ERO arrives, each licensee should:

- Define the events that will be used in the staffing analysis. These events should include the following:
  - (1) Postulated DBAs (Condition IV events) presented in the FSAR, as updated, and which would result in an emergency declaration. At least one DBA should result in the declaration of a General Emergency and radiological doses to the public that exceed the EPA PAGs and necessitate licensee PARs;
  - (2) Station DBT;
  - (3) Response actions for an “aircraft probable threat” in accordance with 10 CFR 50.54(hh)(1) and as discussed in RG 1.214; and
  - (4) Control room fire leading to evacuation and remote shutdown, as referenced in IN 95-48.
- For each defined event, perform a detailed analysis, such as a job/task analysis (JTA) or time-motion study, to identify the emergency response actions that on-shift personnel must perform prior to the arrival of the augmenting ERO staff, as described in the licensee’s emergency plan.
- For the potential aircraft threat, perform a detailed analysis to determine if the current on-shift staff can adequately perform all emergency response actions required by the site-specific procedures for an “aircraft probable threat.” This analysis should include all emergency response actions taken prior to an aircraft impact in accordance with RG 1.214 for an aircraft threat that is greater than 5 minutes, but less than 30 minutes, from the site, and should consider the dispersal of the site fire brigade away from target areas for firefighting.
- Consider the major functional areas and tasks listed in NUREG-0654, Table B-1, when performing the detailed analysis (i.e., plant operations and assessment of operational aspects, emergency direction and control, notification/communication, radiological accident assessment and support of operational accident assessment, and others).
- Use the detailed analyses specified above to determine if the current minimum on-shift staff can adequately perform all required emergency response actions in a timely manner until augmenting ERO staff is required to arrive. Additional duties assigned to on-shift staff may be acceptable provided that those duties do not detract from the timely performance of their primary duties.
- All on-shift staff positions should be evaluated, even if they have no known collateral duties, to ensure that they can perform the tasks assigned to them.

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- Identify positions which have assigned duties that could affect the timely performance of an emergency response function/task. Licensees should promptly enter any such results into their corrective action program for resolution.
- On-shift staff must be capable of taking emergency actions to safely shut down the reactor, mitigate accident consequences, notify augmented ERO staff and OROs, determine PARs for site personnel and the public, perform firefighting, and provide medical assistance if needed. NUREG-0654, Table B-1, specifies key functional areas. On-shift staff must not be assigned responsibilities that could detract from the performance of their primary emergency plan functions.

The events used in the staffing analysis may not specify the performance of some major functions or tasks listed in NUREG-0654, Table B-1. Examples include the major task of “Repair and Corrective Actions” and the major functional area of “Rescue Operations and First-Aid.” In these cases, the licensee’s staffing analysis should specify the resources available to perform these functions and tasks, if needed. They may be assigned as a collateral duty to a designated on-shift responder.

With respect to the DBT analysis, licensees may assume that the hostile threat is neutralized with no adverse consequences to plant safety. However, licensees should ensure that sufficient staff is available to simultaneously implement both the emergency plan and the security plan in a DBT environment to include, as a minimum, the potential for restricted movement of site personnel.

NEI developed the document NEI 10-05, “Assessment of On-Shift Emergency Response Organization Staffing and Capabilities,” Revision 0, dated June 2011 (ADAMS Accession No. ML111751698), to establish a standard methodology for a licensee to perform the required staffing analysis. The NRC has reviewed NEI 10-05 and found it to be an acceptable methodology for this purpose.

Staffing analyses are required to be part of the emergency plan. The results should be documented and submitted to the NRC in accordance with 10 CFR 50.54(q)(5) for review. However, the NRC staff will not approve the staffing analyses. The NRC staff’s decision to not approve the staffing analyses is consistent with the existing NRC regulatory framework, and 10 CFR 50.54(q) is the process by which licensees are to incorporate the staffing analyses into their emergency plans. The NRC staff contends that 10 CFR 50.54(q) uses the characteristic “reduction in effectiveness” to exclude from the requirement to seek prior NRC approval those changes that would not reduce the effectiveness, and therefore maintain the NRC staff’s reasonable assurance determination, of the “original” emergency plan. Adding the staffing analysis to the licensee’s emergency plan per the new requirement of 10 CFR Part 50, Appendix E, Section IV.A.9 would not, by itself, reduce the effectiveness of the licensee’s emergency plan and as such would not require prior NRC approval.

When a licensee performs a change evaluation to their emergency plan to incorporate the staffing analysis, the licensee would identify that there was, in fact, no prior staffing analysis mentioned in the licensing basis and, therefore, the licensee would have satisfied the guidance

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in RG 1.219 of considering “the basis for the staff’s approval of the original plan.” As such, the licensee would be able to conclude that the inclusion of a staffing analysis, by itself, does not result in a reduction in effectiveness and the change can be made without prior NRC approval.

Since the licensee’s current on-shift staffing is part of the current emergency plan, there is a licensing basis for the current staffing level. Adding the staffing analysis to a licensee’s emergency plan does not change the licensing basis because the analysis is a process to determine the adequate on-shift staffing level. The results of the analysis will either validate the licensee’s current licensing basis and that the licensee meets, or exceeds, the requirement to have an adequate on-shift staffing level, or that the licensee must increase its on-shift staffing or reassign tasks to meet the requirement. Any reduction in effectiveness can only be associated with a change to the emergency plan that modifies current on-shift staffing levels or task assignments. The licensee would need to consider this licensing basis, per the guidance in RG 1.219, in performing a change evaluation if modifying current staffing levels or task assignments based upon the results of the staffing analysis.

#### **IV.D Emergency Response Organization Augmentation at Alternative Facility**

**Introduction:** The Commission amended 10 CFR Part 50, Appendix E, Section IV.E.8, to address concerns regarding ERO augmentation during hostile action. Licensees must have the capability to augment the on-shift staff within a short time after the declaration of an emergency. To accomplish this, licensees typically staff an onsite TSC which relieves the CR of emergency response duties and allows CR staff to focus on reactor plant safety. Augmented responders also staff an onsite OSC to provide an assembly area for damage repair teams. Finally, licensees establish an EOF, usually located within about 25 miles of the plant site, to function as the center for evaluation and coordination activities related to the emergency, and the focal point for providing information to Federal, State, Tribal, and local authorities involved in the response.

During hostile action, ERO members may not have access to the site, but these events still warrant timely ERO augmentation. The final rule requires licensees to identify alternative facilities as staging areas for augmentation staff, which will minimize delays in overall site response and allow for a swift, coordinated augmented response when the site is deemed accessible. Section IV.E.8 of Appendix E to 10 CFR Part 50 was amended, in part, by adding a new Section IV.E.8.d, which states the following:

For nuclear power reactor licensees, an alternative facility (or facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff and collectively having the following characteristics: the capability for communication with the emergency operations facility, control room, and plant security; the capability to perform offsite notifications; and the capability for engineering assessment activities, including damage control team planning and preparation; for use when onsite emergency facilities cannot be safely accessed during hostile action;

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**Background and Discussion:** The requirement for licensees to provide and maintain ERFs and equipment to support the emergency response appears in 10 CFR 50.47(b)(8), which states, "Adequate emergency facilities and equipment to support the emergency response are provided and maintained." Additionally, 10 CFR Part 50, Appendix E, Section IV.E.8.a., now requires licensees to provide "(i) A licensee onsite technical support center and an emergency operations facility from which effective direction can be given and effective control can be exercised during an emergency; (ii) For nuclear power reactor licensees, a licensee onsite operational support center;"

Following the events of September 11, 2001, the NRC issued Order EA-02-026 to all license holders for commercial NPP reactors in the United States. The ICMs require licensees to assess the adequacy of staffing plans at ERFs during a security-based event, assuming the unavailability of the TSC and OSC as the result of hostile action. The ICMs also require licensees with an onsite EOF to identify alternative facilities capable of supporting event response and providing communications with Federal and State/local officials and the public. Follow-up NRC inspections of ICM implementation revealed that some sites with an onsite EOF may not have made adequate arrangements for alternative facilities to accommodate augmenting staff.

**Guidance:** *[The following guidance supplements existing guidance in BL-05-02 regarding the use of alternative facilities when primary ERFs are unavailable because of hostile action. NUREG-0654, Section II.H, "Emergency Facilities and Equipment," addresses provisions for adequate ERFs and equipment in general. A future update of NUREG-0654 will incorporate the following guidance without replacing or superseding any existing guidance in Section II.H.]*

BL-05-02 states that the ERO is expected to be staged in a manner that supports rapid response to limit or mitigate site damage or the potential for an offsite radiological release. Drills and exercises have demonstrated the prudence of fully activating ERO members for off-normal-hour events to promptly staff alternative facilities so as to minimize delays in overall site response. Depending on the nature of the security threat, licensees should also consider deployment of onsite ERO personnel to an alternative facility during normal working hours.

Hostile action warrants the timely activation of the ERO. The ERO is expected to be staged in a manner that supports rapid response to mitigate site damage as soon as the site is deemed accessible. To accomplish this, licensees must identify an alternative facility (or collectively multiple facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to support response functions when ERFs are not accessible because of hostile action.

Licensees can use the EOF as the alternative facility for onsite ERO members if it is outside the owner-controlled area and within about 30 miles of the site. The facility should be far enough from the site so that it is geographically separated from any hostile action against the site, yet close enough that staged responders can travel quickly to the site when it is deemed accessible by appropriate authorities. Other buildings, such as training centers, local emergency operations centers, or other enclosed assembly areas, may also be adequate alternative facilities. Licensees should ensure that the facility selected meets all three recommended

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characteristics listed here. Licensees may use multiple facilities, but they should collectively possess these characteristics.

In cases where the EOF is located within the site vehicle checkpoint of the owner-controlled area, licensees should assume that the EOF is inaccessible during hostile action and identify an alternative facility for emergency response functions.

The requirements of 10 CFR 50.54(hh)(1) and guidance in RG 1.214, "Response Strategies for Potential Aircraft Threats," (September 2009, ADAMS Accession No. ML091750297, limited availability, classified as Official Use Only – Security Related Information), Sections C.7 and C.8, provide additional information concerning the use of alternative facilities outside the owner-controlled area.

Alternative facilities should have the following characteristics:

- (1) Capability to communicate with the EOF, CR, and security personnel.** The alternative facility will be a staging area for the augmented ERO, which would normally respond to its assigned ERF within a specified time period. However, if onsite ERFs, and potentially the EOF, are inaccessible because of hostile action, the CR would direct response actions until the alternative facility (potentially the EOF if it is a safe distance from the site) is staffed. Therefore, ERO staff in the alternative facility should be able to communicate with the CR, which will direct ERO movements based on accessibility of site facilities as determined in coordination with site security personnel and local law enforcement agency (LLEA) responders. The CR will also establish the priorities of repair teams in support of their rapid response to the site.

If the EOF is accessible, it may have assumed the command and control function from the CR, in which case the EOF will direct ERO movements when the site is deemed accessible. Therefore, ERO staff in the alternative facility should be able to communicate with the EOF. If the EOF is the designated alternative facility, then additional communication capability should be provided only if the alternative facility is located in a section of the building separate from the area used for the EOF.

The alternative facility should have the capability to communicate with site security personnel in order to receive timely reports of the site security situation. This information will be essential before dispatching ERO personnel to the site for emergency response.

- (2) Capability to perform offsite notifications of a plant emergency.** This capability will be necessary if the EOF is located within the owner-controlled area and is inaccessible during hostile action. In that case, there would be no backup facility to perform this function if the CR somehow lost the capability. Therefore, the alternative facility will be needed to perform these notifications within 15 minutes of a change in emergency classification level (ECL) or issuance of a PAR.

If the EOF is located outside the owner-controlled area and is also the designated alternative facility, it should already have ORO notification capability in the event that the TSC is inaccessible and the CR loses the capability to perform the notification function.

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For the case where the EOF is located outside the owner-controlled area and the alternative facility is not located in the EOF, the EOF would likely be available to perform the ORO notification function. However, there is no guarantee that the EOF would be available to perform this function during hostile action. Therefore, the alternative facility must be capable of performing offsite notifications. This is especially true if the EOF is not staffed until the Site Area Emergency level and thus would not be available at the Alert level, or if established EOF activation times are longer than the typical 60 minutes. In those cases, the alternative facility will most likely be available sooner than the EOF.

Although the final rule does not require the capability to perform event classification in the alternative facility, licensees should consider providing that capability. This is a primary consideration if the EOF is located within the owner-controlled area and would be inaccessible during hostile action. Then the alternative facility would be the backup to the CR if it somehow lost the capability for event classification.

- (3) **Capability for engineering assessment activities, including damage control team planning and preparation.** The ERO is expected to be staged in a manner that supports rapid response to mitigate site damage as soon as the site is deemed accessible. Therefore, alternative facilities should have the capability to begin planning mitigation actions in order to minimize the delay in overall site response. This facility should be able to access up-to-date plant technical documentation, such as general plant drawings, system information, and plant procedures, to enable engineers and maintenance supervisors to do adequate response planning. However, alternative facilities are not required to have the full documentation that is present at primary ERFs.

Licensees should consider equipping alternative facilities with phone systems and computer links to the site or other means to access plant data. However, licensees have flexibility in selecting the equipment or other means that would promote effective response planning from the alternative facilities on a site-specific basis.

#### **IV.E Licensee Coordination with Offsite Response Organizations**

**Introduction:** The Commission amended 10 CFR Part 50, Appendix E, Section IV, to ensure that licensees adequately plan for resource needs during hostile action events. To accomplish this, the Commission modified Section IV.A.7 as follows;

Identification of, and a description of the assistance expected from, appropriate State, local, and Federal agencies with responsibilities for coping with emergencies, including hostile action at the site. For the purposes of this Appendix, "hostile action" is defined as an act directed toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force.

Functionally, licensees are required to establish relations with OROs to coordinate emergency response efforts should they ever be needed. The scope of ORO support includes the

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implementation of State and local response plans to protect public health and safety in the event of a severe reactor accident and to provide fire, medical, and LLEA support to the NPP site. All NPPs have established such relations, and their response in integrated exercises is evaluated biennially.

However, demands on ORO resources have changed in the post-September 11, 2001, threat environment. In the unlikely event that hostile action takes place at an NPP, LLEA resources will have multiple duties in addition to supporting implementation of the emergency plan. For example, police officers designated to staff evacuation traffic control points may instead be responding to hostile action at the plant or firefighters designated to perform route alerting may instead be responding to major fires at the plant resulting from hostile action. This situation could detract from ORO emergency plan implementation if plans have not been revised to address this contingency. The staff made licensees aware of this issue through multiple channels (discussed below).

For an NPP to be licensed and maintain its license, NRC regulations require reasonable assurance that emergency plans can and will be implemented to protect public health and safety during a severe radiological emergency. However, previous regulations did not require specific emergency plan provisions to address the potential for hostile action to disrupt emergency plan implementation as the result of competing demands for the same resources.

The final rule requires nuclear power reactor licensees to ensure that adequate resources are identified to respond to the site during hostile action. Because "hostile action" is defined as "an act directed toward a nuclear power plant or its personnel," the NRC has excluded non-power reactors from the definition of "hostile action" at this time until a regulatory basis is developed to support inclusion of non-power reactors in that definition. However, non-power reactor licensees are still required to identify ORO resources that would respond to the facility in an emergency and the assistance licensees expect from them.

**Background and Discussion:** The staff promulgated RIS 2004-15, "Emergency Preparedness Issues: Post-9/11," dated October 18, 2004 (not publicly available), to inform licensees of issues related to hostile action. This generic communication highlights three issues and also provides several lessons learned from hostile action-related drills and exercises. The following issue regarding increased demand on LLEAs during response to terrorist activities at a nuclear power reactor is germane to this portion of the ISG:

A unique challenge during a potential terrorist threat is the increased demand on LLEAs, who are expected to implement portions of ORO emergency plans (such as traffic control points, route alerting, etc.), as well as respond to potential terrorist activities at the site. The OROs should prepare for this contingency. There are many potential approaches concerning this issue. Licensees should consider expanding the use of mutual assistance agreements with neighboring authorities to identify and plan for additional LLEA resources, the reassignment of ORO functions to other than LLEAs, and other site-specific solutions to this issue.

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In 2005, the Department of Homeland Security (DHS), with NRC and licensee support, initiated the Comprehensive Review Program. The Comprehensive Review is a cooperative Government and private sector analysis of the Nation's critical infrastructure that considers potential terrorist attacks, the consequences of such an attack, and the integrated prevention and response capabilities of the owner/operator, LLEA, and EROs. The results of the Comprehensive Review are used to enhance the overall security posture of the facilities examined. All NPPs were engaged in the Comprehensive Review process, which identified potential weaknesses in planning and response at some sites. A recurring issue identified at NPPs was a lack of recognition of the demands on LLEAs during hostile action and how the potential unavailability of LLEA personnel could impact emergency plan implementation.

The ICMs in NRC Order EA-02-026 require licensees to "develop plans, procedures and training regarding...coordination with offsite response organizations." RIS 2004-15 directly communicates to licensees the concern about LLEA resources. BL-05-02 initiated a drill and exercise program that would help identify LLEA resource issues, and the Comprehensive Reviews repeatedly identified LLEA/ORO resource issues. For these reasons, the NRC pursued rulemaking to address this issue. The guidance in this document identifies an acceptable means for licensees to address this issue.

**Guidance:** *[The following guidance addresses new requirements in Appendix E, Section IV.A.7 regarding the identification of offsite resources to support onsite emergency response activities during an event involving hostile action. NUREG-0654, Section II.C, "Emergency Response Support and Resources," addresses provisions for adequate emergency response support and resources in general. As such, this guidance will be incorporated into a future update of NUREG-0654 without replacing or superseding any existing guidance.]*

Licensees should complete the following actions to verify that adequate ORO resources have been identified to support onsite response activities during an emergency at the site, including hostile action:

- Review the onsite emergency plan to determine the type and extent of ORO resources needed to support onsite response activities during an emergency, including hostile action.
- Review arrangements with State, local, and Federal agencies to verify that the type of assistance to be provided by each agency is clearly identified and described to support onsite response activities. Local agencies should include LLEA, firefighting, and medical assistance
- Update existing arrangements as needed to clarify the type of assistance to be provided by an agency or to address any shortfalls for support of onsite response activities that have been identified.
- Arrange for additional ORO resources as needed to address any remaining shortfalls.

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Arrangements for ORO resources are typically documented in letters of agreement or memoranda of understanding. Licensees should verify that arrangements for ORO resources remain in effect as part of the annual update of the emergency plan and agreements in accordance with Evaluation Criterion P.4 of NUREG-0654, Section II.P, "Responsibility for the Planning Effort: Development, Periodic Review and Distribution of Emergency Plans."

#### **IV.F Protective Actions for Onsite Personnel**

**Introduction:** The Commission amended 10 CFR Part 50, Appendix E, Section IV, to address concerns regarding the protection of onsite personnel during hostile action. To accomplish this, new Section IV.I, "Onsite Protective Actions During Hostile Action," was added that requires development of a range of protective actions to protect onsite personnel during hostile action. This section states the following:

For nuclear power reactor licensees, a range of protective actions to protect onsite personnel during hostile action must be developed to ensure the continued ability of the licensee to safely shut down the reactor and perform the functions of the licensee's emergency plan.

**Background and Discussion:** Licensees are required to provide protection for emergency workers and the public in the plume exposure pathway EPZ, including such actions as warning of an emergency, providing for evacuation and accountability of individuals, and providing for protective clothing and/or radioprotective drugs. Many of these personnel are required by the onsite emergency plan, which is a condition of the NPP license that the licensee must follow and maintain. The emergency plan requires responders with specific assignments to be available on shift 24 hours a day to minimize the impact of radiological emergencies and to protect public health and safety.

Based on analyses performed after the terrorist attacks of September 11, 2001, the NRC staff was concerned that licensees may not have considered a range of protective actions appropriate for the current threat environment and were potentially subjecting employees to greater risk as a result. Some of those employees are emergency responders who are expected to implement emergency procedures and the emergency plan; a hostile action against the site could result in the loss of those responders and potentially affect safe reactor shutdown and emergency plan implementation. The staff acknowledged that different actions than are normally prescribed may be more appropriate during hostile action, particularly an aircraft attack. These may include actions such as evacuation of personnel from potential target buildings and accountability of personnel after the attack has concluded. Precise actions would depend on site-specific arrangements, such as the location of personnel in relation to potential targets of hostile action. BL-05-02 provides several measures for licensees to consider as part of a range of protective actions for site workers in Attachment 4, "Examples of Acceptable Changes to Onsite Protective Measures."

The final rule requires licensees to provide specific actions for the protection of onsite personnel in an emergency involving hostile action against the plant structures and/or staff. Such measures are prudent to protect personnel necessary to safely shut down the reactor and emergency responders necessary to implement the site emergency plan. By specifying these

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measures for emergency workers, other onsite workers will also be protected because the protective measures would be provided via plant page announcements or at the direction of site security personnel to the site as a whole and would not be directed to any particular group of workers.

**Guidance:** *[The following guidance supplements existing guidance in BL-05-02 regarding protective actions for onsite personnel during hostile action. NUREG-0654, Section II.J, "Protective Response," addresses, in general, the provisions for developing a range of protective actions for emergency workers and other onsite individuals. A future update of NUREG-0654 will incorporate the guidance without replacing or superseding any existing guidance.]*

Licenses should consider developing a procedure (or procedures) outlining station actions in response to security events. The procedure(s) should address different contingencies for onsite protective actions and clearly distinguish between actions taken for a credible threat versus an active hostile action. Site management should be continually aware of the site security status and avoid actions that would potentially place onsite personnel in a dangerous environment.

Licenses should develop a decisionmaking tool to aid the shift manager in rapidly determining the best protective action for onsite personnel during hostile action, such as site evacuation via normal exits, site evacuation via alternate means, or if little time is available, appropriate locations for sheltering and buildings to be evacuated. It may be appropriate to evacuate target buildings as quickly as possible. The time needed versus time available to take action for the onsite population during normal working hours, off-normal hours, weekends, outages, and adverse weather should be factored into the decisionmaking process.

The NEI white paper entitled "Enhancements to Emergency Preparedness Programs for Hostile Action" provides two examples of a tool acceptable to NRC staff for shift manager decisionmaking in Attachment 4, "Example Tools for the Development of Onsite Protective Actions." The site-specific considerations delineated in the NEI white paper could be incorporated into that tool. Other approaches may also be acceptable.

As appropriate, licenses should consider the following measures as part of a range of protective actions for site workers. Although these measures deserve primary consideration for an aircraft attack, some may be useful for a land or waterborne attack as well:

- **Evacuation of personnel from target buildings, including security personnel.**  
Licenses should develop public address announcements for each type of hostile action threat (land, waterborne, aircraft) and incorporate them into hostile action site procedures. These announcements should inform onsite personnel of the nature of the threat and the necessary personnel protective measures (e.g., evacuate site, evacuate target buildings to a different location, shelter-in-place) and give instructions to specific site teams or departments (fire brigade, licensed operators, etc.). This information will help ensure the survivability of emergency personnel needed to mitigate hostile action consequences, as well as the protection of other onsite personnel. The requirements of 10 CFR 50.54(hh)(1) and guidance in RG 1.214, Section C.4, provide additional information.

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- **Site evacuation by opening (while continuing to defend) security gates.** Licensees should use this measure in conjunction with the onsite protective measure decisionmaking tool discussed above. It will allow for a more timely site evacuation while not compromising site security.
- **Dispersal of licensed operators.** Licensees should identify personnel who are critical to mitigate hostile action consequences and suitable locations outside power blocks or protected areas to which those personnel can be repositioned to increase their survivability. The site security event procedure discussed above should include this information. Licensed operators are critical for emergency plan implementation and event command and control and should be protected accordingly. The requirements of 10 CFR 50.54(hh)(1) and guidance in RG 1.214, Section C.7, provide additional information.
- **Sheltering of personnel in structures away from potential site targets.** Site-specific arrangements, such as the location of workers in relation to potential targets, will dictate the appropriateness of sheltering versus evacuation. Sheltering inside potential target buildings may not provide the intended personnel protection. Procedures should be modified to ensure that plant page announcements convey the onsite protective measures deemed appropriate and do not place site personnel in a potentially dangerous situation.
- **Arrangements for accounting for personnel after the attack.** Licensees should revise site accountability procedures to consider the hostile action contingency. When the site is secure, all personnel who were in the protected area when the hostile action occurred should be accounted for as promptly as possible and not interfere with critical safe reactor shutdown activities or known medical emergencies.

#### **IV.G Challenging Drills and Exercises**

**Introduction:** The Commission amended 10 CFR Part 50, Appendix E, Section IV.F, "Training," to ensure that licensees develop and maintain key skills for emergency response. To accomplish this, the staff modified several parts of Appendix E, Section IV.F.2 and added Sections IV.F.2.i and j, to require that drill and exercise scenarios encompass a wide spectrum of events and conditions to avoid anticipatory responses resulting from participant preconditioning.

A basic principle of EP is that licensees conduct drills and exercises to develop and maintain key skills in order to protect public health and safety in the unlikely event of a radiological emergency. Licensees demonstrate their ability to implement emergency plans and critique response actions during evaluated biennial exercises. The NRC inspects licensee response in biennial exercises, and FEMA evaluates OROs. These programs have been in effect for many years, and the agencies have determined that there is reasonable assurance that protective actions can and will be implemented should they be necessary. However, the post-September 11, 2001, threat environment has changed the challenges that licensees may

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face and the staff believes that program enhancements are necessary to address this issue. Also, the staff had become aware of another issue that may have resulted from the maturity of licensee drill and exercise programs. Specifically, the scenarios used in drills and exercises had become predictable and were preconditioning responders to event sequences that did not represent credible accidents. These two issues formed the basis for the rulemaking, and this guidance is intended to facilitate licensee implementation of the final rule changes:

1. In the post-September 11, 2001, threat environment, the NRC staff recognized that, in the unlikely event of a nuclear plant emergency involving hostile action, licensee EROs would encounter challenges that differ significantly from those currently practiced in longstanding drill and exercise programs. For this reason, the staff believes that licensee drill and exercise programs must include hostile action scenarios to ensure that EROs are fully trained and prepared to respond to any emergency. However, previous regulations did not require specific scenario content. The final rule requires licensees to include hostile action in their drill and exercise programs.
2. EP regulations promulgated in 1980 initially required annual exercises, but this was changed to a biennial frequency in 1996. Each site has conducted numerous evaluated exercises and NRC and FEMA expectations for exercise demonstration are well understood. Exercise scenarios are designed to reliably deliver the expected demonstrations in a manner that facilitates performance and evaluation. This situation resulted in biennial exercise scenarios that were predictable and may have preconditioned responders toward anticipatory response in the escalation of emergency classification and the expectation that every emergency results in a radiological release. Further, the timing of biennial exercise scenarios did not resemble credible reactor accidents and most scenarios included improbable intermittent containment failure. These features may have resulted in negative training of the ERO because the drill and exercise scenarios used did not resemble credible accidents. In addition, the situation reduced the ability of drills and exercises to serve as ERO performance enhancement opportunities and as a means to identify weaknesses warranting corrective action. However, previous NRC regulations did not specify the content of drill and exercise scenarios or directly allow the staff to require specific scenario content. A regulatory change was necessary to require enhancement of scenario content.
3. The NRC recently promulgated requirements for response to aircraft threats and for the development of accident mitigation strategies in 10 CFR 50.54(hh)(1) and (2). Implementation of the measures developed to comply with this rule would essentially take place directly before or during a declared emergency. In order to ensure that licensees develop and maintain key skills in response to such emergencies and that all principal functional areas of response are addressed, guidance is provided on incorporating appropriate scenario content in drills, exercises, and other performance-enhancing experiences.

**Background and Discussion:** The NRC staff verifies the adequacy of emergency plan implementation through inspection of the EP program and inspection of the biennial exercise with FEMA staff. Also, NRC resident inspectors observe a sample of drills each year. The NRC staff reviews the adequacy of the licensee critique program to identify areas for improvement (i.e., weaknesses). Another facet of the inspection program involves reviews of the adequacy of licensee efforts to correct those weaknesses. Rigorous and diverse scenarios are fundamental

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if the licensee is to adequately challenge the ERO so as to identify and correct performance deficiencies and thereby enhance ERO performance during an actual emergency.

Regulations and emergency plans require periodic drills and exercises. Licensees have latitude in scenario content for these drills, but in reality, this latitude was somewhat limited. Licensee scenarios were often constrained by the need to provide enough time for OROs to adequately demonstrate their exercise objectives for each emergency classification level. Licensees often focused on ensuring an adequate demonstration of exercise objectives by the participants during a biennial exercise. To support this focus, the time dedicated to drills had to be used efficiently and effectively because EROs usually consist of three or four teams. Although a licensee may have conducted three or four drills each year, this allowed only one drill for each team. To maintain key skills for every team, drill scenarios had to contain most of the elements that would be expected in an inspected biennial exercise. The need for licensees to perform well in biennial exercises may have driven the development of drill scenarios that emulate biennial exercise scenarios. OROs may also have participated to varying degrees in drills and an off-year exercise. This situation resulted in elements of typical biennial exercise scenarios being reflected throughout the drill program and providing the same negative training as found in the biennial exercise.

While the 1980 EP regulations were successful in ensuring a high level of EP at every NPP site, the NRC believes that exercise scenarios should be enhanced because, as the scenarios were implemented previously, responders may have been preconditioned to accident sequences not likely to resemble the accidents they could realistically face. This was because of the unlikely timing of simulated accident events in the scenarios; the inevitability of large radiological releases; and, the failure to incorporate a wide spectrum of events, including hostile action.

In SRM-M060502, "Staff Requirements—Briefing on Status of Emergency Planning Activities, (Two Sessions) 9:30 A.M. and 1:00 P.M., Tuesday, May 2, 2006, Commissioners' Conference Room, One White Flint North, Rockville, Maryland (Open to Public Attendance)," dated June 29, 2006 (ADAMS Accession No. ML061810014), the Commission directed the staff as follows:

The staff should coordinate with DHS to develop emergency planning exercise scenarios which would help avoid anticipatory responses associated with preconditioning of participants by incorporating a wide spectrum of releases (ranging from little or no release to a large release) and events, including security-based events. These scenarios should emphasize the expected interfaces and coordination between key decision-makers based on realistic postulated events. The staff should share experiences of preconditioning or "negative training" with DHS.

The NRC staff has worked with FEMA to revise the exercise evaluation methodology to incorporate changes that reflect Commission direction. This effort is expected to be ongoing to ensure the benefits of improved exercise scenarios are maximized.

In SECY-02-0104, "Plan for the Comprehensive Review of Safeguards and Security Programs for NRC-Licensed Facilities and Activities," dated June 14, 2002 (not publicly available), the staff committed to reviewing several areas that could impact the EP basis as follows:

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vulnerability assessment; the DBT; staffing adequacy; public evacuation processes; the EP-operations-security interface; and, security-based exercise issues. The staff documented this review in SECY-03-0165, "Evaluation of Nuclear Power Reactor Emergency Preparedness Planning Basis Adequacy in the Post-9/11 Threat Environment," dated September 22, 2003 (not publicly available). To accomplish this review, the staff took several actions, including: (1) examining the technical and policy foundation of the EP basis to identify aspects that may be challenged by the post-September 11, 2001, threat environment; (2) observing an exercise based on a terrorist scenario and the EP portion of FOF exercises; (3) examining the impact of the DBT and vulnerability analyses; and, (4) reviewing the 16 EP planning standards of 10 CFR 50.47(b).

The staff concluded that the EP basis for NPPs remains valid, even considering the impact of hostile action contingencies unanticipated at the time the basis was established. Vulnerability studies revealed that the timing and magnitude of releases related to hostile action events are no more severe than the shortest timing or largest magnitude sequences considered in the EP basis. The EP basis accounts for the shortest timing and largest magnitude from a spectrum of accidents. However, hostile action could present unique challenges to EP programs since they differ from the accident-initiated events for which licensees and OROs typically plan and train. In particular, the staff found that hostile action should be included in drill and exercise scenarios.

The staff worked with the industry on a voluntary program to integrate hostile action scenarios into routine drills and exercises. The staff observed licensee performance during security-based EP drills and exercises and security FOF exercise evaluations. The staff also identified the need for additional information to determine how current EP drill and exercise programs prepare or evaluate responders for security-based events. To address this issue, the NRC issued BL-05-02. To provide more detailed guidance on the development of hostile action event drills and exercises, NEI prepared Revision 1 to NEI 06-04, "Conducting a Hostile Action-Based Emergency Response Drill," dated October 30, 2007 (ADAMS Accession No. ML073100460). The NRC issued RIS 2008-08, "Endorsement of Revision 1 to Nuclear Energy Institute Guidance Document NEI 06-04, 'Conducting a Hostile Action-Based Emergency Response Drill,'" dated March 19, 2008 (ADAMS Accession No. ML080110116), to endorse the guidance (with some clarifications) as one method acceptable to NRC staff for use during pilot drills.

NRC Order EA-02-026 provided ICMs that required licensees to take various actions to enhance EP in the post-September 11, 2001, environment, but they did not directly address the content of drill and exercise scenarios. SECY-03-0165 identified drill and exercise scenario content as a concern and started a process to change drill and exercise programs. BL-05-02 caused licensees to initiate a drill and exercise program that required the use of hostile action scenarios. NEI developed, and the NRC endorsed, guidance for conducting pilot drills using hostile action scenarios. However, the NEI-proposed program is voluntary and does not address Commission direction regarding the use of a wide spectrum of scenarios.

For these reasons, the staff pursued rulemaking to address this issue. Licensees are required to enhance their drill and exercise programs by incorporating a wide range of scenario elements, including hostile action. The guidance in this document identifies an acceptable means for licensees to comply with these requirements.

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**Guidance:** *[The following guidance incorporates a wide range of scenario elements into licensee drill and exercise programs. NUREG-0654, Section II.N, "Exercises and Drills," addresses provisions for conducting drills and exercises in general. This new guidance supplements the existing guidance and will be incorporated into a future update of NUREG-0654. The NRC staff coordinated changes to exercise scenario requirements with revisions to the FEMA "Radiological Emergency Preparedness [REP] Program Manual" (available from FEMA).]*

Evaluation criteria in NUREG-0654, Section II.N were revised to incorporate changes consistent with the final rule. In revised Evaluation Criterion N.1.a, the sentence referring to offsite radiological releases was deleted because radiological releases are no longer required in each exercise.

N.1.a. An exercise is an event that tests the integrated capability and a major portion of the basic elements existing within emergency preparedness plans and organizations. Exercises shall be conducted as set forth in NRC and FEMA rules and policy.

Applicability and Cross Reference to Plans: Licensee X State X Local X

Evaluation Criterion N.1.b was revised to recognize that scenarios may be based on non-accidental events, such as events due to hostile action, to remove criteria for the conduct of post-exercise critiques for onsite and offsite emergency response organizations, to remove criteria for conducting off-hours and unannounced exercises, and to replace out-of-date references to an annual exercise and five-year period. Scenario variations are required and were added to the evaluation criterion consistent with the final rule language.

N.1.b. An exercise shall demonstrate the key skills of response organizations to adequately respond to an incident scenario such that the major elements of the plans and preparedness organizations are tested within an eight-year exercise cycle. Each scenario variation shall be demonstrated at least once during the eight-year exercise cycle and shall include, but not be limited to, the following:

- a. Hostile action directed at the plant site involving the integration of offsite resources with onsite response;
- b. An initial classification of, or rapid escalation to, a Site Area Emergency or General Emergency;
- c. No radiological release or an unplanned minimal radiological release that requires the site to declare a Site Area Emergency, but does not require declaration of a General Emergency. For this scenario variation the following conditions shall apply:
  - i. The licensee is required to demonstrate the ability to respond to a no/minimal radiological release scenario only once within the eight-year exercise cycle. State, Tribal, and local response organizations have the option, and are encouraged, to participate jointly in this demonstration.

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- ii. When planning for a joint no/minimal radiological release exercise, affected State, Tribal, and local jurisdictions, the licensee, and FEMA will identify offsite capabilities that may still need to be evaluated and agree upon appropriate alternative evaluation methods to satisfy FEMA's biennial criteria requirements. Alternative evaluation methods that could be considered during the extent of play negotiations include expansion of the exercise scenario, out-of-sequence activities, plan reviews, staff assistance visits, or other means as described in FEMA guidance.
- iii. If the offsite organizations elect not to participate in the licensee's required minimal or no release exercise, they will still be obligated to fully participate in an integrated exercise at least every 2 years to meet the requirements as specified in 44 CFR 350.9.

Applicability and Cross Reference to Plans: Licensee X State X Local X

Under the provisions of 10 CFR Part 50, Appendix E, Section IV.F.2.j, the licensee shall maintain a record of exercises conducted during each eight-year exercise cycle that documents the content of scenarios used to provide for demonstration of the scenario elements identified in this section. All biennial exercises must include demonstration of response to at least the Site Area Emergency ECL.

Revised Evaluation Criterion N.1.b applies to licensee, State, and local organizations. Because FEMA no longer requires offsite organizations to participate in off-hours or unannounced exercises, the portion of Evaluation Criterion N.1.b regarding these types of exercises was relocated to new Evaluation Criterion N.1.c applicable to licensees only. The timeframe for conducting off-hours drills or exercises was also modified to align with Supplement 1 to NUREG-0654 as shown below:

N.1.c. Provisions must be made to start a drill or exercise between 6:00 p.m. and 4:00 a.m. at least once in every eight-year exercise cycle. Some drills or exercises should be unannounced.

Applicability and Cross Reference to Plans: Licensee X

Requirements for exercise evaluation and critiquing previously found in Evaluation Criteria N.1.b and N.4 have been consolidated in Evaluation Criterion N.4:

N.4. Biennial exercises shall be evaluated and critiqued as required. FEMA evaluators shall evaluate offsite emergency response organization performance in the biennial exercise in accordance with FEMA REP exercise methodology.

Applicability and Cross Reference to Plans: Licensee X State X Local X

Under the provisions of 10 CFR Part 50, Appendix E, Section IV.F.2.j, biennial exercise scenarios must provide the ERO with the opportunity to demonstrate proficiency in the key skills

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necessary to implement the principal functional areas of emergency response identified in Section IV.F.2.b of Appendix E. Key skills include specific response capabilities that may be assigned in a site-specific manner, such as:

- Timely classification of events;
- Timely notification of offsite authorities;
- Assessment of radiological releases onsite and offsite;
- Development of protective action recommendations;
- Dissemination of information to the public via media channels;
- Engineering assessment, repair plan development, and repair of critical equipment under emergency conditions;
- Mitigative action implementation;
- Protection of workers during emergency response, including medical care;
- Response to operational transients while implementing the emergency plan; and
- Coordination with offsite response organizations.

Successful demonstration provides a substantial basis for determining whether licensees can implement their emergency plans to protect public health and safety in the unlikely event of a serious radiological emergency. Where weaknesses in performance are observed, the critique of such performance and resolution of weaknesses using corrective action programs contribute to the strength of licensee EP capabilities through incorporation of lessons learned and training of the ERO. To satisfy these expectations, biennial exercise scenarios must provide for a satisfactory test (per 10 CFR Part 50, Appendix E, Section IV.F.2). Each biennial exercise scenario must provide the opportunity for the ERO to perform their key skills as applicable to their emergency response duties in the CR, TSC, OSC, EOF, and joint information center to implement the EP principal functional areas. Specific minimum expectations include demonstration of the following elements in every biennial exercise:

- Event classification.
- Timely notification of offsite authorities.
- PAR development (development of PARs involving public evacuation or sheltering is required only in exercises that include a General Emergency).
- Radiological assessment.
- Shift staff response to accident transients or other events that meet EAL criteria while implementing the emergency plan.
- ERO response and ERF activation following declared emergencies.
- Integration of licensee response with OROs to include briefings, coordination of worker protection, and, as appropriate to the scenario, coordination of public protective actions, radiological release monitoring, and offsite response to the site.
- Communications that support response between onsite and offsite ERFs.
- Dissemination of information to the public via media channels and press briefings.
- Development and implementation of radiological or physical protection (i.e., in response to hostile action) protective actions for onsite workers as appropriate to the scenario.
- Operational and engineering assessment of accident sequences.

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- Accident mitigation through the simulated repair of equipment. This must include mechanical, electrical, and/or instrumentation and control activities. The scenario should be designed to allow some repairs to be successful, but must provide the opportunity to demonstrate mitigation planning and repair execution. Radiological control activities must support some repair teams.

Under the provisions of 10 CFR Part 50, Appendix E, Section IV.F.2.i, scenarios used in biennial exercises must vary challenges and avoid participant preconditioning or anticipatory responses through the use of a wide spectrum of scenario elements. The ERO shall be provided the opportunity to develop and maintain key emergency response skills in response to the following scenario elements during the conduct of biennial exercises over the course of an exercise cycle:

- Response to hostile action, including interface with LLEAs. Hostile action scenarios should realistically include collateral damage that may occur (e.g., loss of offsite power and loss of use of certain onsite facilities and areas).
- Engineering assessment, repair plan development, and simulated repair of critical equipment damaged by hostile action after the active attack, but before the site is fully secured by LLEAs. Prioritization of repair team dispatch and protection in the aftermath of hostile action through coordination with site security and LLEAs to determine when the site is secure enough to allow limited movement of personnel.
- Response to one scenario with no radiological release or an unplanned minimal radiological release that does not require evacuation or sheltering of the public.
- Response to scenarios with radiological releases that require evacuation and/or sheltering of the public.
- Response to a scenario that begins with a Site Area Emergency or General Emergency, or escalates rapidly (within 30 minutes) to a Site Area Emergency or General Emergency.
- The successful simulated repair of simulated damaged equipment to prevent or mitigate core damage, reactor pressure boundary loss, and/or containment loss.
- Demonstration of the ability to mitigate an accident caused by hostile action or other initiators, through the simulated use of equipment, procedures, and strategies developed in compliance with 10 CFR 50.54(hh)(2).
- Where a licensee site hosts nuclear plants of differing technology or vintage, each differing unit must participate in at least one biennial exercise in each exercise cycle (exceptions may be made in consideration of operational status and where the number of technologies and vintages exceeds four).

All ERO teams (not necessarily each individual) shall be provided the opportunity to develop and maintain key emergency response skills within the scope of their duties during each exercise cycle. Additionally, the ERO (not necessarily each ERO team) shall be provided the opportunity to demonstrate key skills in response to the following scenario elements in drills or exercises during each exercise cycle. Drills are considered to be performance-enhancing experiences (exercises, drills, functional drills, tabletop drills, mini-drills, etc.) that reasonably simulate the interactions between appropriate ERFs and/or individuals that would be expected to occur during emergencies.

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- All functions in each ERF (e.g., all ERFs that are responsible for dose assessment perform those duties in response to a radiological release).
- Use of alternative facilities to stage the ERO for rapid activation during hostile action.
- Real-time staffing of facilities during off-hours (i.e., 6:00 p.m. to 4:00 a.m.).
- Providing medical care for injured, contaminated personnel (every two years).
- Response to essentially 100 percent of initiating conditions identified in the site emergency plan implementing procedure for classification of emergencies.
- Response to actual industry event sequences appropriate for the nuclear plant technology (e.g., BWR or PWR).
- All licensee ERO teams must be provided the opportunity to demonstrate key skills within the scope of their duties.
- Use of procedures developed in response to an aircraft threat and in compliance with 10 CFR 50.54(hh)(1).
- Use of the strategies associated with 10 CFR 50.54(hh)(2) to mitigate spent fuel pool damage scenarios (all strategies, such as makeup, spray, and leakage control, but not every variation of a given strategy).
- Use of the strategies associated with 10 CFR 50.54(hh)(2) to mitigate reactor accidents and maintain containment (10 strategies for boiling water reactors and 7 strategies for pressurized water reactors, but not every variation of a given strategy).

Scenarios must be kept confidential from participants.

Biennial exercise scenarios must be diverse and include a wide spectrum of radiological releases and events under the provisions of 10 CFR Part 50, Appendix E, Section IV.F.2.i. Scenarios will be considered sufficiently diverse when no more than one EAL is shared with the previous exercise or any practice drills/exercises conducted in preparation for the current exercise. Failure mechanisms used for reaching initiating conditions and the failed equipment itself should be varied to the extent practical. Where the design of plant systems makes variation difficult, circumstances and timing may be changed to effect the required variation (e.g., a fire or explosion causes the failure rather than a random mechanical fault). Drill scenarios should not be used for a biennial exercise within 2 years of use. However, should the licensee have difficulty developing realistic scenarios with wide variation, the reuse of more than one EAL may be acceptable. A description of difficulties, when the EALs were last used, and how scenario developers minimized similarities should be included when the scenario is transmitted for NRC review and verification. It may be appropriate to discuss this issue with NRC staff in advance of scenario transmittal.

The planning, scheduling, and logistical arrangements necessary to conduct a hostile action biennial exercise will challenge expectations for scenario confidentiality. For example, a drill or practice exercise involving a hostile action scenario may be conducted prior to the biennial exercise. In addition, prior reviews and approvals by various site personnel and OROs may be needed to involve offsite responders and other resources normally associated with hostile action response.

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Although some ERO members may infer that a hostile action scenario will be used in the biennial exercise, participants should not have knowledge of scenario details (i.e., specific events, timelines, or related information). Scenarios used for hostile action biennial exercises must be sufficiently different from those used in drills/exercises during the previous 2 years. Specifically, the elements and consequences of the hostile action must be varied (e.g., attack type or direction, number of attackers, attack timeline, damage, casualties, offsite consequences, etc.). Provided that the above requirements are met, it is acceptable for the same ERO members to participate in hostile action drills or practice exercises and the subsequent biennial exercise.

Following the conclusion of the hostile action-based (HAB) pilot drill program, NEI submitted a revised Appendix A, "Drill and Exercise Objectives," to NEI 06-04, Revision 2, in April 2010, which was further revised to address NRC staff comments in July 2011 (ADAMS Accession No. ML112091915). This appendix to the NEI guidance document provides a standard set of recommended objectives and associated performance attributes for use in conducting an HAB exercise. In the safety evaluation regarding Appendix A, issued September 2011 (ADAMS Accession No. ML112570074), and as indicated in a letter to NEI dated September 19, 2011 (ADAMS Accession No. ML112570092), the NRC endorsed the use of Appendix A to NEI 06-04, Revision 2, as an acceptable method for the conduct of HAB exercises.

Mitigative measures in hostile action scenarios should commence after the simulated active attack has ceased, but before LLEAs have swept the site for safe entry or declared the site secure. Securing the site may take days, and it is important that licensees train personnel to respond in the aftermath of hostile action through the prioritization of security resources. Under the provisions of 10 CFR Part 50, Appendix E, Sections IV.F.2.j and IV.I, licensees shall demonstrate planning for and prioritization of mitigative action teams and protection of team personnel. Mitigative actions may be successful in preventing or ameliorating core damage or containment failure.

Hostile action drills and exercises introduce the issue of appropriate handling of safeguards information. Drill and exercise scenarios should not and need not contain safeguards information. However, if the licensee finds it necessary to include safeguards information in some scenario elements, it must be handled in accordance with site procedures and NRC regulations. Nothing in this guidance should be construed as allowing the release of safeguards information to unauthorized personnel.

Although the rule does not specify a frequency for the conduct of the hostile action biennial exercise during the 8-year exercise cycle, it is the expectation of the NRC that the time period between hostile action exercises be given consideration during the scheduling of biennial exercises. As such, the NRC expectation is that licensees should not plan to conduct a hostile action exercise at the beginning of an exercise cycle and wait to conduct the next hostile action exercise at the end of the subsequent exercise cycle.

Although an important consideration for the development of 10 CFR 50.54(hh)(2) is the threat of hostile action, NEI 06-12, "B.5.b Phase 2 & 3 Submittal Guideline," Revision 2, December 2006 (ADAMS Accession No. ML070090060), notes that the deployable generic enhancement strategies could be beneficial in responding to a broad spectrum of damage states. This being

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the case, it is not necessary or desirable that the strategies only be used in hostile action scenarios. The guidance recommended that entry conditions beyond large fires and explosions should be considered and that implementing procedures should discuss how the strategies may be useful for mitigation of other beyond design basis conditions. These discussions may contribute to scenario development.

The type of performance-enhancing experience used for the maintenance of key skills associated with the mitigative strategies would be expected to vary with the strategy. Drills conducted for strategies that are implemented from the control room (e.g., 10 CFR 50.54(hh)(1) response actions, maximizing control rod drive makeup, isolation of reactor water cleanup) could be included in operator training. Drills conducted for strategies involving portable equipment (e.g., pumps, power supplies, batteries, control sets, pressurized gas, etc.) and seldom operated installed equipment (containment vent) should at least include a walkthrough of actions to the extent that verifies all necessary elements are available and that the staff is capable of implementation. Actual operation of equipment is not necessary, but in some cases would add to the efficacy of the drill and may coincide with surveillance activities.

The portion of a biennial exercise that involves demonstration of strategies associated with 10 CFR 50.54(hh)(2) may be conducted separately from the main exercise timeline and sequence of events. Thus, the initiating event(s) for entry into site-specific guidelines or procedures associated with 10 CFR 50.54(hh)(2) may differ from the initiating event(s) of the main exercise scenario and could involve an initiating event other than hostile action, such as a fire, flood, or explosion affecting large areas of the site, or station blackout. At a minimum, TSC and OSC staff would need to participate in this portion of the exercise. Participation of CR personnel, EOF staff, JIC staff, and offsite officials may be simulated consistent with the purpose of this portion of the exercise to maintain key ERO skills for familiarity with guidelines, procedures, and strategies associated with 10 CFR 50.54(hh)(2), including the (simulated) deployment and use of equipment associated with these strategies and intended to maintain or restore core cooling, containment, and/or spent fuel pool cooling. The portion of the exercise scenario addressing demonstration of 10 CFR 50.54(hh)(2)-related strategies should be included in the licensee's submittal of the biennial exercise scenario for NRC review.

The need for a remedial exercise under 10 CFR Part 50, Appendix E, Section IV.F.2.f will be determined on a case-by-case basis when any of the following conditions associated with a biennial exercise occurs:

- confidentiality is compromised to an extent that broadly affects ERO performance,
- the scenario does not provide the opportunity for demonstration of key skills,
- the scenario is not implemented in such a way that provides the opportunity for demonstration of key skills, or
- ERO performance does not provide the NRC with a basis to determine that key skills have been maintained.

The extent of participation in a remedial exercise will also be determined on a case-by-case basis since only portions of the response may need to be re-demonstrated.

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The NRC staff will review biennial exercise scenarios. Scenarios must be submitted 60 days prior to the exercise date. The NRC staff will provide comments to the licensee no later than 30 days before the exercise.

The new drill and exercise requirements in Section IV.F.2 of Appendix E are effective as of the effective date of the EP final rule, with the exception of the new 8-year exercise requirements in Section IV.F.2.j which take effect starting in the year of the initial hostile action exercise (for existing NPP sites) or the year of the initial full participation exercise (for new sites licensed under 10 CFR Part 52).

#### **IV.H Emergency Declaration Timeliness**

**Introduction:** The Commission amended 10 CFR Part 50, Appendix E, Section IV.C, "Activation of Emergency Organization," to address concerns regarding the timeliness of emergency declarations. Emergency declaration is the process by which a licensee determines whether an off-normal plant condition is an emergency and, if so, which of the four emergency classes (Notification of Unusual Event, Alert, Site Area Emergency, or General Emergency) to declare. Such declarations are fundamental to the licensee's EP program in that onsite and offsite emergency response activities are implemented in a staged, proportional manner, based on the level of the declared emergency. If an emergency declaration is delayed, the subsequent emergency response actions may not be timely. Emergency response personnel, facilities, and equipment may not be in position should it become necessary to implement measures to protect the public health and safety.

**Background and Discussion:** The emergency declaration process starts with information being available to plant operators to recognize an off-normal plant condition via indications on plant instrumentation, including alarms, or via reports from other plant personnel (e.g., reports of fire) or from persons outside of the plant (e.g., severe weather warnings). The plant operators assess the validity of these indications or reports by checking instruments, comparing indications on redundant instruments, or dispatching personnel to confirm reports. After validating the indication or report, the plant operators then compare the off-normal condition to the EAL thresholds in the emergency classification scheme. Not all off-normal conditions are immediately obvious, and not all indications are unambiguous. While some conditions can be classified upon recognition, others require further assessment.

The NRC staff published EPPOS No. 2, "Emergency Preparedness Position (EPPOS) on Timeliness of Classification of Emergency Conditions," Revision 0, dated August 1, 1995 (ADAMS Accession No. ML023040462), in response to the failure of some licensees to classify and declare an actual event and observations of a lack of urgency in performing emergency classifications. [Note that early NRC generic communications routinely used the phrase "emergency classification" to denote the outcome of the process to assess, classify, and declare an emergency condition. This document uses the phrase "emergency declaration" in place of "emergency classification" except when summarizing an earlier document.] A period of 15 minutes was determined to be a reasonable time for assessing and classifying an emergency. EPPOS-2 also stated that this 15-minute period should not be viewed as a grace period in which a licensee may attempt to restore plant conditions and avoid declaring an

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emergency. A delay in classification of up to 15 minutes was deemed to have minimal impact on the overall emergency response and the protection of public health and safety.

Under the provisions of the final rule, applicants and nuclear power reactor licensees are required to, first, have and maintain the capability to assess, classify, and declare an emergency condition within 15 minutes after the availability of indications to plant operators that an EAL has been exceeded and, second, promptly declare the emergency condition upon identification of the appropriate ECL. Any given emergency condition may result in the thresholds for two or more EALs being exceeded and licensees need to consider all applicable EALs and base the classification on the EAL resulting in the higher ECL. The applicant or nuclear power reactor licensee is expected to provide the resources necessary to accomplish the declaration without interfering with plant operation including, but not limited to, adequate qualified personnel on shift, an emergency classification scheme based on clearly defined and observable thresholds, and adequate supporting procedures, assessment tools, and evaluation aids.

Once the emergency plan is activated, responsibility for declaring the emergency may be transferred from the plant CR to a manager located in the TSC or EOF. Continuing assessment activities (e.g., dose projections, core damage evaluations) in these facilities may identify other conditions that have exceeded an EAL threshold and warrant escalating the emergency declaration. Regardless of the organizational structure, status of emergency plan activation, or the location where the declaration is performed, the Commission's intent is that the applicants or licensees demonstrate the capability to assess, classify, and declare an emergency condition within 15 minutes after information is first available to plant operators to recognize that an EAL has been exceeded and to make the declaration promptly upon identification of the appropriate ECL.

The NRC received comments during the public comment period on the EP proposed rule suggesting that a less restrictive timeliness criterion be established for the Notification of Unusual Event ECL than that for higher ECLs. Although the NRC recognizes that lower ECLs have lesser potential consequences on the public, an ECL, be it a Notification of Unusual Event or a higher ECL, cannot be known until the classification is completed and the declaration is made. This argues against the use of different timeliness criteria for the Notifications of Unusual Event ECL and higher ECLs because emergency events may not proceed step-wise through the four ECLs. Additionally, the actions to assess, classify, and declare an emergency, and the resources needed to accomplish these actions, do not differ by ECL.

**Guidance:** *[The following guidance is provided as additional information for demonstrating the capability to assess, classify, and declare emergency conditions within 15 minutes and to make declarations promptly. The final rule and associated guidance supersede EPPOS-2, which will be withdrawn. This guidance applies to nuclear power reactor licensees, or to applicants for such a license.]*

1. The NRC considers the 15-minute criterion to commence when plant instrumentation, plant alarms, computer displays, or incoming verbal reports that correspond to an EAL first become available to any plant operator.
  - As used here, "plant operator" means any member of the plant staff who, by

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virtue of training and experience, is qualified to assess the indications or reports for validity and to compare the same to the EALs in the licensee's emergency classification scheme.

- A "plant operator" may be, but need not be, a licensed operator or member of the ERO. "Plant operators" may be located in the CR or in another ERF in which emergency declarations are performed.
  - A "plant operator" does not encompass plant personnel such as chemists, radiation protection technicians, craft personnel, security personnel, and others whose positions require they report, rather than assess, abnormal conditions to the CR.
2. The 15-minute period encompasses all assessment, classification, and declaration actions associated with making an emergency declaration from the first availability of a plant indication or receipt of a report of an off-normal condition by plant operators up to and including the declaration of the emergency. If classifications and declarations are performed away from the CR, all delays incurred in transferring information from the CR (where the alarms, indications, and reports are first received) to the ERF (at which declarations are made) must be included within the 15-minute criterion.
  3. Validation or confirmation of plant indications, or reports to the plant operators, is to be accomplished within the 15-minute period as part of the assessment. Since this validation or confirmation is being performed to determine the veracity of an alarm, indication, or report, the 15-minute period starts with the availability of the alarm, indication, or report, and not the completion of the validation or confirmation, because the former is the time that the information was first available.
  4. A small number of EAL thresholds are related to the results of analyses (e.g., dose assessments, chemistry sampling, and/or inspections) that are necessary to ascertain whether a numerical EAL threshold has been exceeded, rather than confirming or verifying an alarm or a received report. In most of these cases, the basis of the EAL will identify the analysis necessary and its scope.
    - In these limited cases, the 15-minute declaration period starts with the availability of analysis results that show the threshold to be exceeded; this is the time that the information is first available.
    - The NRC expects licensees to establish the capability to initiate and complete these analyses with a reasonable sense of urgency. For example, if a particular skill set is necessary to assess one or more EAL thresholds, that expertise should be available on-shift.
  5. This 15-minute criterion ends as soon as the nuclear power reactor licensee determines that an EAL has been exceeded and upon identification of the appropriate ECL and when the licensee makes the emergency declaration. The final rule requires the

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licensee to promptly declare the emergency condition as soon as possible following the identification of the appropriate ECL. As used here, “promptly” means the next available opportunity unimpeded by activities not related to the emergency declaration, unless such activities are necessary for protecting health and safety. (See Paragraph 8 of this section.)

6. Consistent with the NRC’s position that emergency declarations are made promptly, the final rule states that the 15-minute criterion not be construed as a grace period in which a licensee may attempt to restore plant conditions to avoid declaring an EAL that has already been exceeded. This statement does not preclude licensees from acting to correct or mitigate an off-normal condition, but once an EAL has been recognized as being exceeded, the emergency declaration shall be made promptly without waiting for the 15-minute period to elapse. This is particularly the case when the EAL threshold is exceeded based on occurrence of a condition, rather than the duration of a condition.
7. For EAL thresholds that specify a duration of the off-normal condition, the NRC expects that the emergency declaration process run concurrently with the specified threshold duration. Once the off-normal condition has existed for the duration specified in the EAL, no further effort on this declaration is necessary—the EAL has been exceeded. Consider as an example, the EAL “fire which is not extinguished within 15 minutes of detection.” On receipt of a fire alarm, the plant fire brigade is dispatched to the scene to begin fire suppression efforts.
  - If the fire brigade reports that the fire can be extinguished before the specified duration, the emergency declaration is placed on hold while firefighting activities continue. If the fire brigade is successful in extinguishing the fire within the specified duration from detection, no emergency declaration is warranted based on that EAL.
  - If the fire is still burning after the specified duration has elapsed, the EAL is exceeded, no further assessment is necessary, and the emergency declaration would be made promptly. As used here, “promptly” means at the first available opportunity (e.g., if the Shift Manager is receiving an update from the fire brigade at the 15-minute mark, it is expected that the declaration will occur as the next action after the call ends).
  - If, for example, the fire brigade notifies the shift supervision 5 minutes after detection that the brigade itself cannot extinguish the fire such that the EAL will be met imminently and cannot be avoided, the NRC would not consider it a violation of the licensee’s emergency plan to declare the event before the EAL is met (e.g., the 15-minute duration has elapsed). While a prompt declaration would be beneficial to public health and safety and is encouraged, it is not required by regulation.
  - In all of the above, the fire duration is measured from the time the alarm, indication, or report was first received by the plant operators. Validation or

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confirmation establishes that the fire started as early as the time of the alarm, indication, or report.

8. The final rule establishes a “capability” criterion rather than an inflexible “performance” criterion (e.g., “...shall maintain the capability to assess, classify, and declare an emergency condition within 15 minutes...”). As such, the 15-minute timeliness criterion should not be construed as limiting response actions that may be necessary to protect health and safety provided that the delay in declaration shall not deny the State and local authorities the opportunity to implement measures necessary to protect the public health and safety. The use of a capability criterion allows licensees some degree of flexibility during an actual radiological emergency to address extenuating circumstances in which a delay in emergency declaration beyond 15 minutes may be necessary. Such delays could be found compliant with the final rule during an actual emergency if the situation meets all of the following conditions:
- The delay has no significant impact on the implementation of adequate measures to protect the public health and safety.
  - The delay was caused by a licensee actively performing another action immediately needed to protect the public health and safety such that a delay in declaration qualitatively represents the lesser risk.
  - The cause of the delay was not reasonably within the licensee’s ability to foresee and prevent.
  - The delay did not deny OROs the opportunity to implement actions to protect the public health and safety.

#### **IV.I Emergency Operations Facility—Performance-Based Approach**

**Introduction:** NPP licensees have submitted several requests to the NRC to combine EOFs for plants they operate within a State or in multiple States into a consolidated EOF that, in some instances, was located at a substantial distance from one or more of the plant sites and had no longer been considered a near-site facility. Other NPP licensees with reasonable technical bases for locating an EOF at a distance beyond existing guidelines have also submitted requests for exceptions to NRC guidance and, in situations in which the EOF was no longer considered to be near-site, exemptions to NRC regulations. However, previous regulatory standards did not address the capabilities and functional requirements for a consolidated EOF, such as capabilities for handling simultaneous events at two or more sites, or providing for the NRC and offsite officials to relocate to a facility nearer the site if they desire when an EOF is located at a substantial distance from a site. The NRC revised the regulations and associated guidance to reflect a performance-based approach for EOFs which provide functional requirements for these facilities, thus ensuring that the necessary capabilities are in place to protect public health and safety.

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**Background and Discussion:** Each NPP site must have an EOF where the licensee provides overall management of its resources in response to an emergency and coordinates emergency response activities with Federal, State, Tribal, and local agencies. The original EOF siting criteria called for the facility to be located near the reactor site and imposed a 20-mile upper limit (later modified by the Commission to 25 miles) for the distance between the site and the EOF. This upper limit was generally considered to be the maximum distance from the reactor site within which face-to-face communications between the licensee, offsite officials, and NRC staff could be facilitated, and which also permitted the timely briefing and debriefing of personnel going to and from the site. However, advances in computer and communication technology since the establishment of the original EOF siting criteria now allow EOF functions to be effectively performed regardless of the distance from the site. Computer-based systems allow plant parameter, meteorological data, and radiological information for multiple sites to be collected, analyzed, trended, and displayed in a remotely located facility. A variety of independent systems, such as microwave, telephone, Internet, intranet, and radio, can provide data and voice communications between the EOF and other onsite/offsite ERFs. This variety and use of multiple communication systems ensure a high degree of availability and reliability.

Nuclear utility consolidation has resulted in initiatives to standardize fleet emergency plans, use consolidated EOFs, and staff EOFs by designated corporate personnel. Standardized plans, implementing procedures, and accident assessment tools, such as a common dose projection model, allow emergency responders in a consolidated facility to effectively perform their functions for multiple sites, even if the EOF is not a near-site facility. Consolidated facilities eliminate the need to duplicate work space, displays, communication networks, and other capabilities for each site. Consolidated facilities can also be located at or near corporate offices where nuclear support personnel designated to fill EOF positions can respond more quickly.

According to previous NRC regulations and guidance, licensees had to submit requests for Commission approval of exceptions or exemptions to various EOF criteria, such as distance, habitability, size, and staffing requirements. Several of these criteria were not clearly defined (e.g., the term “near-site”) or have set values with no clearly specified basis (e.g., EOF working space for at least 35 persons). Neither previous regulations nor guidance documents addressed the capabilities and functional requirements for a consolidated EOF, such as capabilities for handling simultaneous events at two or more sites, or having provisions for the NRC and offsite officials to relocate to a facility nearer to the site if they desire when an EOF is located at a substantial distance from a site. Thus, licensees were uncertain about when to submit requests for exceptions or exemptions, which alternative approaches to existing EOF distance and other criteria may be acceptable, and, for consolidated facilities, any additional capabilities that need to be addressed. A regulatory mechanism (i.e., 10 CFR 50.54(q)) was already in place that allows licensees to change their emergency plans without prior Commission approval when certain conditions are met. This mechanism could have been more readily applied to consolidation of EOFs if the criteria had been clearer. In the absence of clear criteria, several licensees submitted requests to consolidate their EOFs. The staff evaluated and the Commission reviewed these requests on a case-by-case basis.

The NRC has removed references to the EOF as a “near-site” facility currently found in several regulations. Section IV.E.8.a of Appendix E to 10 CFR Part 50 requires licensees to have an onsite TSC and an EOF, and requires that all nuclear power reactor licensees provide an OSC.

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Section IV.E.8.b of Appendix E incorporates EOF distance criteria previously found in NRC guidance and specifies that an EOF must be located within 10 to 25 miles of each NPP site that the facility serves or, if the EOF is located less than 10 miles from the NPP site, then a backup facility must be provided within 10 to 25 miles of the site. A licensee will need prior Commission approval to locate an EOF beyond the 25-mile limit. For an EOF located beyond 25 miles, provisions must be made for locating NRC and offsite agency staff closer to each nuclear power reactor site so they can interact face-to-face with personnel going to and leaving the site for briefings and debriefings.

Section IV.E.8.c of Appendix E provides performance-based criteria applicable to EOFs. The functions that an EOF has to address include the capability to obtain and display plant data and radiological information for each unit or plant that the facility serves. A consolidated facility also needs to be capable of effectively responding to events at more than one site simultaneously. The ability to simultaneously display information for multiple plants will also enhance effective response to events occurring at more than one site. In some cases, an EOF could serve units or plants involving more than one type of reactor technology, such as pressurized water reactors and boiling water reactors, or more than one design of the same reactor type. The EOF staff needs to be capable of understanding plant conditions for each type of reactor and translating technical information into a useful form for offsite officials and media relations staff.

Two different licensees may co-locate an EOF to serve multiple plants, as defined in Appendix E to 10 CFR Part 50. A co-located EOF has some of the same characteristics as a consolidated facility in terms of equipment, displays, and other types of resources. The performance-based EOF criteria also apply to a co-located facility. However, each licensee will staff and operate the co-located facility according to a plant-specific emergency plan and set of implementing procedures.

**Guidance:** *[The following paragraphs present the changes applicable to existing guidance in several NRC guidance documents regarding the location of EOFs and performance-based functional criteria for EOFs.]*

NUREG-0654, Section II.C, which specifically refers to the licensee's near-site EOF, was modified as shown in the following (as strikethrough text):

Arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and local staff at the licensee's ~~near-site~~ Emergency Operations Facility have been made, and other organizations capable of augmenting the planned response have been identified.

The NUREG-0654 evaluation criteria relevant to EOFs include B.6, C.2.a, F.1.d, F.1.f, G.3.b, H.2, H.12, and I.5. With the exception of evaluation criterion H.2, all of these evaluation criteria refer to the EOF as being "near-site"; the references to "near-site" are being removed.

NUREG-0654, Appendix 1, contains a table for each of the four ECLs which provides the ECL description and purpose, licensee actions, and State and/or local offsite authority actions. The tables for the Notification of Unusual Event and Alert ECLs do not refer to a near-site EOF.

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However, Licensee Action 2 in the tables for both the Site Area Emergency and General Emergency ECLs refers to a near-site EOF; the reference to “near-site” is being removed.

NUREG-0654, Appendix 2, “Meteorological Criteria for Emergency Preparedness at Operating Nuclear Power Plants,” contains multiple references to a near-site EOF in the first paragraph of the section titled “Remote Interrogation.” This paragraph is being revised to remove the term “near-site.”

NUREG-0654, Appendix 5, “Glossary,” refers to an onsite TSC and near-site EOF and is being modified to remove the term “near-site.”

NUREG-0654, Supplement 1, Section II, “Planning Standards and Evaluation Criteria,” Planning Standard C, “Emergency Response Support and Resources,” specifically refers to the licensee’s near-site EOF and is being modified to remove the term “near-site.”

The NUREG-0654, Supplement 1, evaluation criteria relevant to EOFs include C.2.a, F.1.d, and H.12. All of these evaluation criteria refer to the EOF as being “near-site”; the references to near-site are being removed.

NUREG-0654, Supplement 3, Appendix 1, “Emergency Action Level Guidelines for Nuclear Power Plants,” contains a table providing a description and purpose of the General Emergency ECL, licensee actions, and State and/or local offsite authority actions. Licensee Action 2 in the table refers to a near-site EOF and was revised as shown by strikethrough text below. The word “support” is also missing in the reference to the “on-site operational center” and was added.

Augment resources by activating on-site Technical Support Center, on-site operational support center, and ~~near-site~~ Emergency Operations Facility (EOF)

NUREG-0696, Section 1, “Introduction,” is being updated to recognize that the OSC is specifically identified as one of the required ERFs in 10 CFR Part 50, Appendix E, Section IV.E.8.a.

The term “near-site” is being deleted from each of the following sections of NUREG-0696:

- Abstract, first paragraph
- Section 1, “Introduction”
- Section 1.3.3, “Emergency Operations Facility”
- Section 1.4, “Activation and Use,” Condition 3

NUREG-0696, Section 4, “Emergency Operations Facility,” provides criteria for EOF functions, location, structure, habitability, and instrumentation, along with other considerations for EOF capabilities. Subsection 4.1, “Functions,” specifically addresses the functions to be performed at an EOF. These functions apply to an EOF for a single site, as well as a facility used for multiple sites. Subsection 4.1 was appended to ensure adequate description of the functions applicable to any EOF, such as notification of offsite agencies and coordination of information

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provided to public information staff, and to provide additional functions described in Section IV.E.8.c of Appendix E, including the capability to obtain and display plant data and radiological information for each unit or plant that the facility serves. A co-located or consolidated facility must also be capable of effectively responding to events at more than one site simultaneously, since widespread events affecting multiple sites can and have occurred, such as the electrical blackout in several areas of the northeastern United States and portions of Canada in August 2003. The ability to simultaneously display information for multiple plants will also enhance effective response to events occurring at more than one site. In some cases, an EOF may serve units or plants involving more than one type of reactor technology, such as pressurized water reactors and boiling water reactors, or more than one design of the same reactor type. The EOF staff must be capable of understanding plant conditions for each type of reactor and translating technical information into a useful form for offsite officials and media relations staff. Subsection 4.1 was modified as follows (changes are denoted by strikethrough and underlined text):

#### 4.1 Functions

The emergency operations facility (EOF) is a licensee controlled and operated offsite support center. The EOF will have facilities and capabilities for:

- Management of overall licensee emergency response,
- Coordination of radiological and environmental assessment,
- Determination of recommended public protective actions, ~~and~~
- Notification of offsite agencies (when performed at EOF per licensee emergency plan),
- Coordination of event, plant, and response information provided to public information staff for dissemination to the media and public,
- Staffing and activation of the facility within time frames and at emergency classification levels defined in the licensee emergency plan,
- Coordination of emergency response activities with Federal, State, tribal, and local agencies~~;~~
- Locating NRC and offsite agency staff closer to a site if the EOF is greater than 25 miles from the site. Minimum provisions at this location should include the following items: conference area with whiteboards, separate areas suitable for briefing and debriefing response personnel, telephones, site ERO telephone contact lists, computers with internet access, access to a copier and office supplies, and radiation monitoring capability,
- Obtaining and displaying key plant data and radiological information for each unit or plant the EOF serves,
- Analyzing plant technical information and providing technical briefings on event conditions and prognosis to licensee staff and offsite agency responders for each type of unit or plant, and
- Effectively responding to and coordinating response efforts for events occurring simultaneously at more than one site for a co-located or consolidated EOF.

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Whenever possible, licensees and applicants are encouraged to establish their EOFs as close to sites as practical. Regardless of the EOF location, the NRC believes it is important for licensees or applicants to consult with offsite agencies that send representatives to the EOF prior to relocating or consolidating such facilities. This consultation is particularly important when a licensee or applicant intends to use an EOF located more than 25 miles from a site to ensure that response times to the facility would be acceptable to offsite responders, adequate communications with offsite responders at other locations would be available, and there would be no jurisdictional concerns with the EOF location (e.g., when the EOF is located in a different State than a nuclear power plant).

The first bulleted item of NUREG-0696, Subsection 4.2, "Location, Structure, and Habitability," also lists the EOF functions. This list was replaced with a reference to Subsection 4.1 as follows (changes are denoted by strikethrough and underlined text):

The location of the EOF, and whether a backup facility is required, should consider the following factors:

- Whether the location provides optimum functional and availability characteristics for carrying out the licensee functions specified for the EOF ~~(i.e., overall strategic direction of licensee onsite and support operations, determination of public protective actions to be recommended by the licensee to offsite officials, and coordination of the licensee with Federal, State, and local organizations) in Subsection 4.1.~~

NUREG-0696, Subsection 4.2, Table 2, "Relation of EOF Location to Habitability Criteria," provides EOF-related criteria (i.e., type of structure, protection factor, type of ventilation system, and backup EOF location) based on the distance of the EOF from the TSC and states that specific Commission approval is required for EOF locations beyond 20 miles from the TSC. As noted in the SRM to SECY-96-0170 (ADAMS Accession No. ML083580041), the Commission granted an additional 5 miles to the EOF distance, thereby allowing an EOF to be located between 10 and 25 miles from the TSC, based on the staff's recommendation in SECY-96-0170, "Assessment of Exceptions Granted for Locations and Staffing Times of Emergency Operation Facilities," dated August 5, 1996 (ADAMS Accession No. ML083580044). The criteria in Table 2 were modified to change the EOF distance requirement for Commission approval from 20 miles to 25 miles from the TSC based on Section IV.E.8.b of Appendix E. Provisions for locating NRC and offsite agency staff closer to the site also apply to an EOF located beyond 25 miles from the TSC. The habitability criteria in Table 2 were retained since the criteria apply only to a primary EOF located within 10 miles of the TSC and are still appropriate for ensuring that the primary EOF can support key functions, such as dose assessment, communications, and decisionmaking, in the event of a radiological release. The following markup shows the changes to NUREG-0696, Subsection 4.2, Table 2:

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Table 2. Relation of EOF Location to Habitability Criteria

Item Needed	EOF Criteria	
	Distance within 10 mi of the TSC	Distance at or beyond 10 mi of the TSC <sup>1</sup>
Structure	Well engineered for design life of plant <sup>2</sup>	Well engineered for design life of plant <sup>2</sup>
Protection factor <sup>3</sup>	≥ 5	None
Ventilation protection	Isolation with HEPA <sup>4</sup> filters (no charcoal)	None
Backup EOF <sup>5</sup>	Located within 10 to <del>20</del> 5 mi of the TSC	None

<sup>1</sup> Specific Commission approval is required for EOF locations beyond ~~20~~5 miles of the TSC. For ~~these cases an EOF located beyond 25 miles of the TSC~~, provisions must include arrangements to locate the NRC ~~and offsite agency~~ staff closer to the ~~reactor site(s)~~. The location and provisions of the close-in space for NRC and offsite agency staff should be described in the licensee's emergency plan.

<sup>2</sup> As an example of "well engineered," refer to the Uniform Building Code. In addition, it must be able to withstand adverse conditions of high winds (other than tornadoes) and floods. Winds and floods with a 100-yr recurrence frequency are acceptable for a design basis.

<sup>3</sup> Protection factor is defined in terms of the attenuation of 0.7 MeV gamma radiation. As a minimum, the protection factor only applies to those areas of the EOF in which dose assessments, communications, and decisionmaking take place.

<sup>4</sup> Ventilation system shall function in a manner comparable to the control room and TSC systems, but need not be seismic Category I qualified, redundant, instrumented, or automatically activated.

<sup>5</sup> Need not be a separate, dedicated facility, but, when activated, shall provide continuity of dose prediction and decisionmaking functions by arranging for portable backup equipment. No special provisions for protection factors or ventilation protection are needed.

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The paragraph in Subsection 4.2 immediately following Table 2 addresses conditions under which a licensee must submit a request for an exception to the EOF requirements (i.e., the inability to meet the EOF habitability criteria in Table 2 and minimum EOF size requirements in Subsection 4.4, "Size"). The first sentence of this paragraph was modified as shown below by strikethrough and underlined text to include functional requirements (i.e., the applicable functions discussed in Subsection 4.1) and to clarify that the inability to meet any of the three categories of requirements listed will necessitate a request for an exception:

Licensees who cannot meet the applicable requirements ~~of for functionality~~, size, ~~and or~~ habitability for the EOF must submit to NRC a request for an exception. This request must include justification for the exception and an alternate proposal. NRC will review requests for exceptions on a case-by-case basis.

The first paragraph of Subsection 4.3, "Staffing and Training," was modified to replace the reference to an EOF staffing response time of 1 hour with a reference to achieving full functional operation within timeframes defined in the licensee's emergency plan as follows (changes are denoted by strikethrough and underlined text):

The EOF shall be staffed to provide the overall management of licensee resources and the continuous evaluation and coordination of licensee activities during and after an accident. Upon EOF activation, designated personnel shall report directly to the EOF to achieve full functional operation ~~within 1 hour as~~ specified in the licensee's emergency plan.

The following underlined text was added to the second paragraph of Subsection 4.3 to address demonstration of the additional consolidated EOF functions described in Subsection 4.1:

In order to function effectively, the EOF staff personnel must be aware of their responsibilities during an accident. To maintain proficiency, the EOF staff shall participate in EOF activation drills, which shall be conducted periodically in accordance with the licensee's emergency plan. These drills shall include operation of all facilities that will be used to perform the EOF functions, including any support facilities located outside the EOF. Prior to the initial operation of a co-located or consolidated EOF and in at least one drill or exercise per exercise cycle thereafter, the EOF staff will demonstrate the ability to perform the additional co-located or consolidated EOF functions set forth in Subsection 4.1.

The demonstration of the additional consolidated EOF functions will allow NRC staff to verify the licensee's ability to meet the performance-based consolidated EOF criteria and to adequately cope with an emergency at any of the licensee's sites.

Subsection 4.4, "Size," was modified such that the size of the EOF is based on a work space large enough for licensee, Federal, State, and any local personnel who may report to the facility to perform their functions, rather than on space for a set number of personnel. The changes to Subsection 4.4 are as follows (as denoted by strikethrough and underlined text):

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The EOF building or building complex shall be large enough to provide the following:

- Working space for the personnel assigned to the EOF as specified in the licensee's emergency plan, including State and local agency personnel, at the maximum level of occupancy without crowding (minimum size of working space provided shall be approximately 75 sq ft/person);
- Space for EOF data system equipment needed to transmit data to other locations;
- Sufficient space to perform repair, maintenance, and service of equipment, displays, and instrumentation;
- Space for ready access to communications equipment by all EOF personnel who need communications capabilities to perform their functions;
- Space for ready access to functional displays of EOF data;
- Space for storage of plant records and historical data or space for means to readily acquire and display those records; and
- Separate office space to accommodate ~~at least five~~ NRC and other Federal personnel during periods that the EOF is activated for emergencies.

~~The EOF working space shall be sized for at least 35 persons, including 25 persons designated by the licensee, 9 persons from NRC, and 1 person from FEMA. This minimum size shall be increased if the maximum staffing levels specified in the licensee's emergency plan, including representatives from State and local agencies, exceed 25 persons.~~

NUREG-0737, Supplement 1, "Requirements for Emergency Response Capability," Section 8, "Emergency Response Facilities," Subsection 8.1, "Regulations," refers to a near-site EOF in several of the requirements listed under 10 CFR Part 50, Appendix E, Section IV.E, and was modified to remove the term "near-site." Conforming changes to NUREG-0737, Supplement 1, were also made to align the wording of Subsection 8.1 with the changes to Section IV.E.8 involving inclusion of the OSC as a required ERF, EOF distance criteria, EOF capabilities, and provisions for an alternative facility.

NUREG-0737, Subsection 8.4, "Emergency Operations Facility (EOF)," provides overall requirements regarding EOF functions, size, structural characteristics, communications capabilities, and types of data to be collected and displayed. This information is an abbreviated version of the EOF requirements found in NUREG-0696, Section 4 (discussed in the preceding section). The detailed performance-based EOF functional requirements incorporated in NUREG-0696 will not need to be duplicated in NUREG-0737, Supplement 1, because the information in Subsection 8.4 provides only an overview of facility requirements and will remain consistent with the corresponding information in NUREG-0696, Section 4. In addition, other guidance documents, such as NUREG-0654, only refer to NUREG-0696 regarding ERF functional criteria.

NUREG-0737, Supplement 1, Table 1, "Emergency Operations Facility," provides EOF distance and habitability criteria similar to those in NUREG-0696, Table 2, and was modified to reflect the new EOF distance criteria, indicating that the TSC is used as the reference point for determining

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EOF distances. The table was also renamed “Emergency Operations Facility Location Options” to match the title of the table shown in the table of contents of NUREG-0737 and to more clearly indicate its content. The additional information at the end of Table 1 regarding construction of a new EOF within 5 miles (of the site) that has already begun no longer applies and was deleted.

The source of information for NUREG-0737, Supplement 1, Table 1, is NRC Staff Requirements COMJA-80-37, dated January 21, 1981, in which the Commission approved (with comments) two options for EOFs. The Commission transmitted this information to licensees in Generic Letter 81-10, “Post-TMI Requirements for the Emergency Operations Facility,” Table III.A.1.2-2, “Emergency Operations Facility,” dated February 18, 1981 (<http://www.nrc.gov/reading-rm/doc-collections/gen-comm/gen-letters/1981/gl81010.html>). Some of the information in the Commission markup of the EOF options and incorporated in Generic Letter 81-10, Table III.A.1.2-2, was inadvertently omitted from NUREG-0737, Supplement 1, Table 1 (e.g., labeling of the two parts of Option 1 as “A” for the primary EOF and “B” for the backup EOF). The changes to the table include this omitted information as shown in the following markup:

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TABLE 1

#### EMERGENCY OPERATIONS FACILITY LOCATION OPTIONS

<u>Option 1</u> <u>Two Facilities</u>	<u>Option 2</u> <u>One Facility</u>
<u>A.</u> Close-in Primary: <u>Reduced</u> Habitability* <ul style="list-style-type: none"><li>◦ within 10 miles <u>of TSC</u></li><li>◦ protection factor <math>\geq 5</math></li><li>◦ ventilation isolation with HEPA (no charcoal)</li></ul>	<ul style="list-style-type: none"><li>◦ At or <u>B</u>beyond 10 miles <u>of TSC</u>.</li><li>◦ No special protection factor.</li><li>◦ If beyond <u>20</u>5 miles, specific approval required by the Commission, and <u>some</u> provisions for NRC site team <u>and offsite agency staff</u> closer to site. Location and provisions of close-in space for NRC and offsite agency staff should be described in licensee's emergency plan.</li><li>◦ Strongly recommended location be coordinated with offsite authorities.</li></ul>
<u>B.</u> Backup EOF <ul style="list-style-type: none"><li>◦ between 10-<u>20</u>5 miles <u>of TSC</u></li><li>◦ no separate, dedicated facility</li><li>◦ arrangements for portable backup equipment</li><li>◦ strongly recommended location be coordinated with offsite authorities</li><li>◦ continuity of dose projection and decisionmaking capability</li></ul>	

For both Options:

- located outside security boundary
- space for about 10 NRC employees
- none designated for severe phenomena, e.g., earthquakes

\* Habitability requirements are only for the part of the EOF in which dose assessments, communications, and decision making take place.

~~If a utility has begun construction of a new building for an EOF that is located with 5 miles, that facility is acceptable (with less than protection factor of 5 and ventilation isolation and HEPA) provided that a backup EOF similar to "B" in Option 1 is provided.~~

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NUREG-0800, Chapter 13, Section 13.3, Subsection II, "Acceptance Criteria," SRP Acceptance Criterion No. 25, references regulations and guidance that apply to the design of ERFs, such as 10 CFR 50.47(b)(8), NUREG-0696, and NUREG-0737, Supplement 1, which have already been discussed. The reference in NUREG-0800 to NUREG-0718, "Licensing Requirements for Pending Applications for Construction Permits and Manufacturing License," Revision 2, dated January 1, 1982, Appendix B, "Information Requirements for TMI-2 Action Plan Items in Categories 3, 4, and 5," states that applicants shall address the requirements for the EOF and other ERFs in accordance with the functional criteria in NUREG-0696 per Section III.A.1.2, "Upgrade Licensee Emergency Support Facilities." However, it does not refer to the EOF as a near-site facility or provide other specific criteria, and therefore no changes to this section are required.

#### **IV.J Backup Means for Alert and Notification Systems**

**Introduction:** An alert and notification system (ANS) provides the capability to promptly alert the populace within the plume exposure pathway EPZ of an NPP emergency event and to inform the public of protective actions that need to be taken. The predominant method used around U.S. NPPs for alerting the public is an ANS based on sirens to provide an acoustic warning signal. Some sites employ other means, such as tone alert radios and route alerting, as either primary or supplemental alerting methods. The public typically receives information about an event and offsite protective actions via emergency alert system (EAS) broadcasts or other means, such as mobile loudspeakers.

An ANS has two distinct functions. The alert function provides a warning signal to the population indicating the need to seek additional information regarding an event in progress. By itself, this function provides no information about the type of event or any protective actions that need to be taken. The notification function informs the public about the nature of the event and any protective actions. These functions may be performed by separate means, such as sirens for alerting and EAS broadcasts for notification, or by one method, such as tone alert radios and electronic hailers, that can provide both a warning signal and an instructional message. Although most ANS problems have involved degradation of the alerting capability, both functions are important for protecting public health and safety during an emergency. Therefore, this final rule addresses backup capabilities for both ANS functions.

**Background and Discussion:** NPP licensees are required by 10 CFR Part 50, Appendix E, Section IV.D.3, to demonstrate that the ANS capability exists. Alerting and notifying the public is a function assigned to the State and local governments and evaluated by FEMA. However, many jurisdictions have requested that the licensee fund the design and installation of the system and either fund or perform necessary maintenance and testing, and many licensees have assumed these responsibilities. In such cases, the licensee is acting on behalf of the State or local governments. The State provides the design of the proposed ANS and the proposed provisions for testing and maintenance of the ANS to FEMA for review. Once the system is installed and initial testing completed, a final ANS design report is prepared, generally by the licensee, and submitted by the State to FEMA for approval. The licensee may use the FEMA-approved final ANS design report as its demonstration of ANS capabilities under Section IV.D.3. Annually, the State certifies its emergency plans and reports ANS test

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performance data to FEMA. The State must submit changes to the approved ANS design and testing and maintenance procedures approved in the final ANS design report to FEMA for review pursuant to 44 CFR 350.14, "Amendments to State Plans." The NRC relies on FEMA to review and approve the ANS design and changes to it. The NRC oversight is generally limited to ensuring that the licensee continues to comply with the design, maintenance, and testing commitments that the licensee agreed to in the FEMA-approved final ANS design report. The NRC also considers siren reliability based on the ANS performance indicator (PI) results.

Additional background information concerning the need for backup ANS capabilities follows:

- The ANS is a component of one of four RSPSs as defined in the significance determination process of the NRC's Regulatory Oversight Program. Other RSPSs include classifying an emergency event, notifying emergency responders and offsite officials of a declared emergency, and performing dose assessment along with developing protective actions. The NRC considers the emergency response capabilities addressed in the RSPSs to be critical for protecting public health and safety. Offsite officials may be unable to implement protective actions if they cannot alert members of the public. Given the importance of the alerting and notification capabilities, it is appropriate to require a backup ANS method.
- Several events have occurred in which the alerting portion of the primary ANS was inoperable and would have been unable to provide prompt notification and information during an emergency. These outages were caused by a variety of factors. Multiple NRC INs document these circumstances, including IN 02-25, "Challenges to Licensees' Ability to Provide Prompt Public Notification and Information During an Emergency Preparedness Event," dated August 26, 2002 (ADAMS Accession No. ML022380474); IN 05-06, "Failure to Maintain Alert and Notification System Tone Alert Radio Capability," dated March 30, 2005 (ADAMS Accession No. ML050680335); and IN 06-28, "Siren System Failures Due to Erroneous Siren System Signal," dated December 22, 2006 (ADAMS Accession No. ML062790341). IN 96-19, "Failure of Tone Alert Radios to Activate When Receiving a Shortened Activation Signal," dated April 2, 1996 (ADAMS Accession No. ML031060187), addresses the inability to activate some tone alert radios because of a shorter tone activation signal permitted as part of EAS implementation. Without the ability to warn the population, the effectiveness of the notification element may be significantly reduced, which may also raise questions as to whether adequate measures can and will be taken to protect public health and safety. Having a backup means in place lessens the impact of the loss of the primary ANS.
- Other events have involved the widespread loss of the electrical grid providing power to siren-based systems, such as the electrical blackout in several areas of the northeastern United States and portions of Canada in August 2003. As discussed in RG 1.155, "Station Blackout," issued August 1988 (ADAMS Accession No. ML003740034), although the likelihood of failure of the onsite alternating current (AC) power system coincidental with the loss of offsite power is small, station blackout events may be substantial contributors to core damage events for some plants. A regulatory requirement for a backup method ensures that each primary ANS has appropriate backup measures in place.

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- House Report 107-740, dated October 10, 2002, directed FEMA to update its guidance on outdoor warning and mass notification systems, with a request that the new guidance require all warning systems to be operable in the absence of an AC power supply. The U.S. House of Representatives Committee on Appropriations also urged FEMA to consult with other relevant agencies and revise the national standard for outdoor warning and mass notification to reflect state-of-the-art technology. It was therefore appropriate that the NRC also considered changes to its regulations and guidance regarding warning systems. The U.S. Congress has recognized the importance of ensuring that warning systems are less subject to failure and of encouraging the use of newer alerting and notification technology. The Energy Policy Act of 2005 directed the Commission to require backup power for the emergency notification system, including siren systems, for NPPs located in areas of high population density.

Previous NRC regulations and guidance did not address requirements for backup power for sirens or other backup ANS alerting capabilities when a major portion of the primary means was unavailable. The regulations also did not require backup notification capabilities. The NRC determined that a requirement for backup ANS methods needed to be included in the regulations and adopted rule changes to address backup capabilities for both the alert and notification functions.

**Guidance:** [*The following paragraphs present the changes to existing guidance documents regarding design objectives and functional criteria for an ANS backup means. FEMA guidance regarding evaluation of ANS backup methods is provided in other documents, including NUREG-0654, Supplement 4, and an update to FEMA-REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants" (announced in 50 FR 43084 and available from FEMA).*]

NUREG-0654, Appendix 3, "Means for Providing Prompt Alerting and Notification of Response Organizations and the Population," Section B.2, was revised to address provisions for a backup to the primary ANS. The timeframe for route alerting was also clarified in Section B.2. Route alerting used as a supplement to the primary means to alert certain populations, such as people on rural farms or in recreational areas, who may not have received the initial notification within the plume exposure pathway EPZ and is part of ensuring 100-percent coverage should be completed within 45 minutes. Route alerting employed *during an actual emergency* as a backup method if the primary means of notification, such as sirens, is unavailable does not have a specific time limit, and therefore the 45-minute timeframe does not apply. However, the absence of a specific time requirement does not imply that any timeframe that the licensee and offsite officials may choose for implementing the backup means is acceptable. At a minimum, it is expected that the backup means will be capable of alerting and notifying populations at the highest risk of potential adverse health effects, such as those nearest the site and in downwind sectors, so that offsite protective action options will remain viable. Additional time may be necessary and would be acceptable for warning other populations at less risk.

The reference to ANS operability no later than July 1, 1981, was also deleted as this information is obsolete and inconsistent with the revised wording of 10 CFR Part 50, Appendix E, Section IV.D.3. NUREG-0654, Appendix 3, Section B.2, was revised as shown in the following:

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The minimum acceptable design objectives for coverage by the system are:

- a) Capability for providing both an alert signal and an informational or instructional message to the population on an area wide basis throughout the 10 mile EPZ, within 15 minutes.
- b) The initial notification system will assure direct coverage of essentially 100% of the population within 5 miles of the site.
- c) Notification methods will be established to assure essentially 100% coverage within 45 minutes of the population who may not have received the initial notification within the entire plume exposure EPZ. The basis for any special requirements exceptions (e.g., for large water areas with transient boats or remote hiking trails) must be documented.
- d) Utility operators shall identify and develop, in conjunction with State and local officials, both the administrative and physical means for a backup public alert and notification system capable of covering essentially 100% of the population within the entire plume exposure EPZ in the event the primary method is unavailable. The backup means of alert and notification shall be conducted within a reasonable time, with a recommended goal of 45 minutes.

The basis for any special requirements exceptions (e.g., for extended water areas with transient boats or remote hiking trails) must be documented. Assurance of continued notification capability may be verified on a statistical basis. The system plan must include a provision for corrective measures to provide reasonable assurance that coverage approaching the design objectives is maintained. The system shall be operable prior to initial operation greater than 5 percent of rated thermal power of the first reactor at a site. The lack of a specific design objective for a specified percent of the population between 5 and 10 miles which must receive the prompt signal within 15 minutes is to allow flexibility in system design. Designers should do scoping studies at different percent coverages to allow determination of whether an effective increase in capability per unit of cost can be achieved while still meeting the objective of item 2.a above.

Backup alerting plans will differ from facility to facility. The backup means may be designed so that it can be implemented using a phased approach in which the populations most at risk (e.g., within 2 miles) are alerted and notified first, followed by alerting and notification of people in less immediately affected areas (e.g., 2 to 5 miles, followed by downwind 5 to 10 miles, and finally the remaining population as directed by authorities). The backup method may have the additional capability of being employed only in the specific areas impacted when a portion of the primary ANS, such as a single siren or group of sirens within a community, fails and the extent of the affected area and population can be determined.

Backup power would minimize the impact of power outages and thus enhance overall alerting system reliability and availability, but it would not address other possible failure modes for siren-based systems. Siren activation computer failures, radio transmitter failures, and siren system hardware or software modifications that are incorrectly installed (see NRC IN 02-25) are

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some of the other possible failure modes. In other words, requiring or relying on backup power for sirens is not equivalent to having an independent backup means for public alerting and notification. NUREG-0654, Appendix 3, Section C.3.g, "General Considerations," was revised as shown below to clarify the need for backup power for sirens:

NRC's licensees are urged to cooperate with State and local governments in the use of cost effective combinations of systems, including those already in place, as a means of satisfying this objective.

The siren signal shall be a 3 to 5 minute steady signal as described in Paragraph IV E of CPG-1-17 and capable of repetition.

An independent backup means of public notification is required as stated in section B of this Appendix. Backup power for fixed sirens is not required unless mandated by other regulation or legislative act.

No specific changes are needed in NUREG-0800, Chapter 13.3, issued March 2007. Per Section IV, "Evaluation Findings," the NRC expects that demonstration of ANS operation and verification of adequate coverage for the first reactor at a new site, or for a new reactor at an existing site where upgrades are being made to a previously installed ANS, will be documented as a license condition for full-power operation.

NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73," Revision 2, issued October 2000 (<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r2/sr1022r2.pdf>), provides guidance on the reporting requirements of 10 CFR 50.72, "Immediate Notification Requirements for Operating Nuclear Power Reactors," and 10 CFR 50.73, "Licensee Event Report System." NUREG-1022, Section 3.2.13, "Loss of Emergency Preparedness Capabilities," addresses reporting requirements for events that would impair a licensee's ability to deal with an accident or emergency. This section covers the unavailability of the public prompt notification system, including sirens, as stated in the following excerpt:

#### Loss of Offsite Response Capability

A major loss of offsite response capability includes those events that would significantly impair the fulfillment of the licensee's approved emergency plan for other than a short time. Loss of offsite response capability may typically include the loss of plant access, emergency offsite response facilities<sup>15</sup>, or public prompt notification system, including sirens and other alerting systems.

If the alert systems, e.g., sirens, are owned and/or maintained by others, the licensee should take reasonable measures to remain informed and must notify the NRC if a large number of sirens fail. Although the loss of a single siren for a short time is not a major loss of offsite response capability, the loss of a large number of sirens, other alerting systems (e.g., tone alert radios), or more importantly, the lost capability to alert a large segment of the population for 1 hour would warrant an immediate notification.

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- <sup>15</sup> Performing maintenance on an offsite emergency response facility is not reportable if the facility can be returned to service promptly in the event of an accident.

NUREG-1022, Section 3.2.13 also provides examples of licensee interpretations of “major loss” of a public prompt alert and notification system, along with the following clarification regarding reportability:

However, licensees may use engineering judgment in determining reportability (i.e., a “major loss”) based upon such factors as the percent of the population not covered by emergency sirens and the existence of procedures or practices to compensate for the lost emergency sirens.

The staff considered adding clarification of reportability when the backup means does not have capabilities equivalent to the primary alert and notification system in terms of timeliness or coverage. However, the existing guidance is sufficiently broad regarding the use of engineering judgment in such situations that the staff decided a change to Section 3.2.13 is not necessary to support the final rule changes described previously.

One of the EP Cornerstone PIs in NEI 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 5, July 2007 ([http://www.nrc.gov/NRR/OVERSIGHT/nei\\_9902rev5.pdf](http://www.nrc.gov/NRR/OVERSIGHT/nei_9902rev5.pdf)), is the ANS reliability PI, which monitors the reliability of an offsite, siren-based ANS. It provides the percentage of the sirens that are capable of performing their safety function, as measured by periodic siren testing in the previous 12 months. For those sites that do not have sirens, the performance of the licensee’s ANS is evaluated through the NRC baseline inspection program (per NRC Inspection Procedure (IP) 71114.02, “Alert and Notification System Evaluation,” dated June 29, 2006, ADAMS Accession No. ML061660121). The licensee response band (green) threshold is set at a reliability level equal to or greater than 94 percent, the increased regulatory response band (white) threshold is set at less than 94 percent, and the required regulatory response band (yellow) threshold is set at less than 90 percent, which is the same as the FEMA threshold for acceptable ANS performance. There is no NRC unacceptable performance band for this PI.

No changes to the ANS reliability PI are warranted since it is properly focused on the reliability of the primary alerting method, which for most NPP sites involves using sirens. The intent of the regulatory changes described previously is not to diminish the importance of maintaining high levels of reliability and availability of the primary alerting system, since the backup method will not be required to have the same capabilities as the primary alerting system in terms of timeliness. This is also consistent with the intent of the ANS reliability PI not to create a disincentive for performing maintenance or upgrading siren systems to ensure that a siren-based ANS performs at peak levels of reliability.

#### **IV.K Offsite Response Organization Event Response Integration with Nuclear Power Plants**

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**Introduction:** Emergency response plans for NPPs must meet the requirement of 10 CFR 50.47(b)(6), which states, “Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public.” A similar requirement is also found in 10 CFR 50.54(gg)(1)(ii), which states, in part, “Procedures have been established for licensee communications with State and local response organizations....” Furthermore, 10 CFR 50.47(b)(3) requires that “Arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and local staff at the licensee’s Emergency Operations Facility have been made, and other organizations capable of augmenting the planned response have been identified.”

NUREG-0654, Section I.F, “Integrated Guidance and Criteria,” states, in part, the following:

[The NRC and FEMA have] a shared belief that an integrated approach to the development of response plans to radiological hazards is most likely to provide the best protection of the health and safety of the public. NRC and FEMA recognize that plans of licensees, State agencies, and local governments should not be developed in a vacuum or in isolation from one another. Should an accident occur, the public can be best protected when the response by all parties is fully integrated. Each party involved must have a clear understanding of what the overall level of preparedness must be and what role it will play in the event of a nuclear accident. This understanding can be achieved best if there is an integrated development and evaluation of plans.

Homeland Security Presidential Directive No. 5 (HSPD-5), “Management of Domestic Incidents,” ([http://www.dhs.gov/xabout/laws/gc\\_1214592333605.shtm](http://www.dhs.gov/xabout/laws/gc_1214592333605.shtm)), launched the creation of the National Incident Management System (NIMS), which provides a consistent, nationwide approach for Federal, State, local, and Tribal governments, the private sector, and nongovernmental organizations to work together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. The NIMS approach includes a core set of doctrines, concepts, principles, and organizational processes that enables effective, efficient, and collaborative incident management. The incident command system (ICS) structure is a component of NIMS. NIMS/ICS together provide a framework for a collaborative incident management approach between OROs and NPP licensees.

**Background and Discussion:** Emergency response requires a unified approach to emergency management and incident response activities. ORO personnel use NIMS/ICS when interacting with NRC licensees during emergency response activities. As private entities, NPP licensees are not bound by the NIMS requirements of HSPD-5; however, they should understand and be able to coordinate with OROs using incident command concepts to ensure effective response to emergency incidents at NPPs and to effectively support efforts to promptly mitigate an event.

The incident commander (IC) at the ICP manages ORO response activities in an integrated response environment involving licensee, law enforcement, firefighting, and medical response personnel. NPP licensees currently have procedures in place that address event response integration with OROs, but they may not address current incident command concepts as required under NIMS/ICS and incorporated into State and local emergency response plans. This integration should allow licensee personnel to effectively coordinate response activities

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with offsite responders. The challenge to NRC licensees is in integrating incident command concepts and principles, as outlined in the State and local emergency response plans, into their plans and procedures to ensure effective coordination with OROs.

Many State and local response organizations are adopting the use of NIMS/ICS as their standard for incident management in accordance with HSPD-5. NIMS/ICS provides a standardized terminology for communication among various incident responders and emergency operations centers, a centralized command speaking with one voice, scalability to allow agencies to adjust their capabilities based on the event, and multiagency coordination and integration of State and Federal resources. NIMS/ICS establishes a unified command structure and a near-site or onsite ICP with a designated IC responsible for directing overall ORO response activities with the NPP licensee.

HSPD-5 states the following as a matter of policy:

The Federal Government recognizes the role that the private and nongovernmental sectors play in preventing, preparing for, responding to, and recovering from terrorist attacks, major disasters, and other emergencies. The Secretary will coordinate with the private and nongovernmental sectors to ensure adequate planning, equipment, training, and exercise activities and to promote partnerships to address incident management capabilities.

NRC licensees are not required to institutionalize the use of NIMS/ICS to address incident management. However, as previously described, NRC regulations require that licensees have provisions to communicate promptly with emergency personnel and to use other resources effectively during an emergency. It was also noted that existing EP guidance was developed based on the use of an integrated onsite and offsite approach to responding to an emergency.

NPP licensees routinely conduct biennial exercises, and FEMA evaluates ORO response to postulated NPP emergencies based on the licensees' emergency response plans and procedures, as required under 10 CFR 50.47(b) and 44 CFR Part 350. Under changes to FEMA's exercise evaluation criteria, OROs will be evaluated on their ability to effectively implement a response to an NPP event in coordination with the licensee using NIMS/ICS concepts.

**Guidance:** *[Because ORO responders to an NPP event will conduct and coordinate their response efforts in accordance with NIMS/ICS concepts, licensee plans and procedures should establish the protocols and interfaces that will allow OROs to effectively support onsite activities, consistent with incident command concepts established in State and local emergency response plans. The guidance described below will be incorporated into a future update of NUREG-0654 without replacing or superseding any existing guidance.]*

A new evaluation criterion was added to NUREG-0654, Section II.C:

C.6. Each organization shall make provisions to enable onsite response support from OROs in a hostile action-based incident as needed.

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Applicability and Cross Reference to Plans: Licensee X State X Local X

NOTE: Evaluation criterion C.5 was added by Supplement 1 to NUREG-0654/FEMA-REP-1, Rev. 1.

NPP licensees should review and incorporate the following incident command-related items or capabilities within licensee plans and procedures as appropriate. The licensees should develop specific action-oriented checklists for use during event response operations, as applicable.

- Onsite PARs provided to offsite authorities should be reviewed for their potential impact on ORO response activities. For example, LLEA and medical services personnel may need to respond to the NPP site shortly after hostile action begins. An initial PAR of sheltering may be more appropriate in this situation to allow offsite responders clearer access to the site and to keep members of the public out of harm's way.
- Primary and backup communications methods and protocols should be identified for coordination of licensee response actions with the ICP before and after the activation of licensee ERFs. Provisions should be established for backup radio or other communications means between the ICP and ERFs if, for example, the IC needs to communicate with the emergency director at the TSC or EOF and the telephone system is inoperable.
- Multiple notification pathways from the licensee to OROs during hostile action should be reviewed to ensure that all organizations required to take immediate actions are included. The licensee notification pathways to initial warning points and to LLEAs serve different and distinct purposes and may not occur in parallel based on the progression of the hostile action. In addition, licensee notifications to LLEAs may include sensitive information. If LLEAs receive the initial notification or if the utility's initial response to hostile action at the NPP is direct interaction with LLEAs, this could result in inadvertent delays or bypassed notifications to emergency management agencies and State/local warning points, especially if the event is resolved before any assistance is requested beyond LLEAs. Licensees should also be aware that OROs may provide NPP personnel with "pre-event" information for certain situations and should coordinate with OROs to properly manage this type of information.
- A process should be established to coordinate the timely sharing and release of public information with the Federal Bureau of Investigation (FBI), LLEAs, and OROs during hostile action. Licensee plans and procedures should define roles and responsibilities (particularly between the FBI and other response organizations) for release of public information during hostile action. Guidelines may be needed to determine what should be withheld for security reasons and what information would be important for protecting the public. The licensee should prepare pre-scripted EAS messages for hostile action.
- The licensee should arrange for prompt dispatching of liaisons to the ICP to facilitate the transfer of plant information and coordination of response activities. As a minimum, liaisons should be knowledgeable of plant operations, radiation protection, and security

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aspects. For example, a licensee liaison may need to advise the IC on coordinating the entry of law enforcement personnel into protected, vital, and/or radiologically controlled areas of the NPP. The liaisons reporting to the ICP should also have a means to access appropriate plant procedures and drawings, either as hard copies or electronic copies that can be taken to the ICP during an emergency. The licensee emergency plan and/or emergency plan implementing procedures should describe the duties of the liaisons and the ERO position responsible for dispatching liaisons to the ICP. The ERO roster should indicate that sufficient liaison personnel are designated to support extended operation of the ICP.

- Personnel in ERO positions with ORO interface responsibilities should be familiar with incident command concepts, position titles, and terminology consistent with State and local emergency response plans and procedures. These ERO personnel should have a listing of ORO incident command terms and definitions to ensure that these terms are clearly understood during communications with ORO personnel.
- Licensees should review site security and emergency plans/procedures to ensure that prompt access to the NPP site is available for initial first responders. Licensees should ensure that ORO personnel expected to respond to the ICP are trained in site access arrangements to support onsite activities. Licensees should clearly identify responsibilities and processes for adjusting dose limits for emergency workers at the NPP site who would support critical activities. Processes should allow for just-in-time authorization to exceed dose limits.

#### V. FINAL RESOLUTION

The guidance in the ISG will be incorporated into a future update/revision to NUREG-0654 and other guidance documents pertaining to onsite EP programs.

#### VI. APPLICABILITY

The purpose of this section is to provide information on how applicants and licensees<sup>1</sup> may use this ISG and information regarding the NRC's plans for using this ISG. In addition, it describes how the NRC staff complies with the Backfit Rule (10 CFR 50.109) and any applicable finality provisions in 10 CFR Part 52.

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<sup>1</sup> In this section, "licensees" refers to licensees of nuclear power plants under 10 CFR Parts 50 and 52, and the term "applicants" refers to applicants for licenses for nuclear power plants under 10 CFR Parts 50 and 52 and all applicants for early site permits with complete and integrated emergency plans submitted under 10 CFR Part 52.

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#### Use by Applicants and Licensees

Applicants and licensees may voluntarily<sup>2</sup> use the guidance in this document to demonstrate compliance with the underlying NRC regulations. Methods or solutions that differ from those described in this ISG may be deemed acceptable if they provide sufficient basis and information for the NRC staff to verify that the proposed alternative demonstrates compliance with the appropriate NRC regulations.

Licensees may use the information in this ISG for actions which do not require NRC review and approval such as changes to an emergency plan under 10 CFR 50.54(q) that do not require prior NRC review and approval. Licensees may use the information in this ISG or applicable parts to resolve regulatory or inspection issues.

#### Use by NRC Staff

During regulatory discussions on plant specific operational issues, the staff may discuss with licensees various actions consistent with staff positions in this ISG, as one acceptable means of meeting the underlying NRC regulatory requirement. Such discussions would not ordinarily be considered backfitting. However, unless this ISG is part of the licensing basis for a facility, the staff may not represent to the licensee that the licensee's failure to comply with the positions in this ISG constitutes a violation.

If an existing licensee voluntarily seeks a license amendment or change and (1) the NRC staff's consideration of the request involves a regulatory issue directly relevant to this ISG and (2) the specific subject matter of this ISG is an essential consideration in the staff's determination of the acceptability of the licensee's request, then the staff may request that the licensee either follow the guidance in this ISG or provide an equivalent alternative process that demonstrates compliance with the underlying NRC regulatory requirements. This is not considered backfitting as defined in 10 CFR 50.109(a)(1) or a violation of any of the issue finality provisions in 10 CFR Part 52.

The NRC staff does not intend or approve any imposition or backfitting of the guidance in this ISG. The NRC staff does not expect any existing licensee to use or commit to using the guidance in this ISG, unless the licensee makes a change to its licensing basis. The NRC staff does not expect or plan to request licensees to voluntarily adopt this ISG to resolve a generic regulatory issue. The NRC staff does not expect or plan to initiate NRC regulatory action which would require the use of this ISG. Examples of such unplanned NRC regulatory actions include issuance of an order requiring the use of the ISG, requests for information under 10 CFR 50.54(f) as to whether a licensee intends to commit to use of this ISG, generic communication, or promulgation of a rule requiring the use of this ISG without further backfit consideration.

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<sup>2</sup> In this section, "voluntary" and "voluntarily" mean that the licensee is seeking the action of its own accord, without the force of a legally binding requirement or an NRC representation of further licensing or enforcement action.

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Additionally, an existing applicant may be required to adhere to new rules, orders, or guidance if 10 CFR 50.109(a)(3) applies.

If a licensee believes that the NRC is either using this ISG or requesting or requiring the licensee to implement the methods or processes in this ISG in a manner inconsistent with the discussion in this Applicability section, then the licensee may file a backfit appeal with the NRC in accordance with the guidance in NUREG-1409, "Backfitting Guidelines," dated July 1990 (ADAMS Accession No. ML032230247), and NRC Management Directive 8.4, "Management of Facility-specific Backfitting and Information Collection," dated October 28, 2004 (ADAMS Accession No. ML050110156).

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44 CFR 350.9, "Exercises."

44 CFR 350.14, "Amendments to State Plans."

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#### VIII. Abbreviations and Acronyms

AC	alternating current
ADAMS	Agencywide Documents Access and Management System
ANS	alert and notification system
CFR	<i>Code of Federal Regulations</i>
CR	control room
DBA	design-basis accident
DBT	design-basis threat
DG	draft (regulatory) guide
DHS	Department of Homeland Security
DPR	Division of Preparedness and Response
EAL	emergency action level
EAS	emergency alert system
ECL	emergency classification level
EOF	emergency operations facility
EP	emergency planning
EPA	Environmental Protection Agency
EPPOS	emergency preparedness position
EPZ	emergency planning zone
ERF	emergency response facility
ERO	emergency response organization
ETE	evacuation time estimate
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FOF	force-on-force
FR	<i>Federal Register</i>
FSAR	final safety analysis report
HAB	hostile action-based
HSEEP	Homeland Security Exercise Evaluation Program
HSPD	Homeland Security Presidential Directive
IC	incident commander
ICM	interim compensatory measure
ICP	incident command post
ICS	incident command system
IN	information notice
IP	inspection procedure
ISG	interim staff guidance
JTA	job task analysis
LLEA	local law enforcement agency
NEI	Nuclear Energy Institute

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NESP	National Environmental Studies Project
NIMS	National Incident Management System
NPP	nuclear power plant
NRC	(U.S.) Nuclear Regulatory Commission
NSIR	(Office of) Nuclear Security and Incident Response
NUMARC	Nuclear Management and Resources Council
ORO	offsite response organization
OSC	operational support center
PAG	protective action guide
PAR	protective action recommendation
PI	performance indicator
REP	radiological emergency preparedness
RG	regulatory guide
RIN	regulatory identification number
RIS	regulatory issue summary
RSPS	risk-significant planning standard
SAMG	severe accident management guideline
SRM	staff requirements memorandum
TMI	Three Mile Island
TSC	technical support center