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# Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants

NUREG-0654/FEMA-REP-1, Rev.1., Supplement 4: Criteria for National  
Preparedness Initiative Integration, Exercise Enhancement, and Backup Alert and  
Notification Systems

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## ABSTRACT

As part of the domestic licensing of commercial nuclear power plants (NPPs), the Federal Emergency Management Agency (FEMA) and the Nuclear Regulatory Commission (NRC) evaluate emergency preparedness activities at these facilities. Preparedness activities for a radiological incident at a nuclear power plant (NPP) are an essential part of planning and preparing for communities that could be affected by an incident at the facility. FEMA's role is to review and provide findings to the NRC on planning and preparedness activities of state, tribal, and local governments, licensee emergency response organizations, if applicable, and other supporting organizations (collectively referred to as Offsite Response Organizations or OROs). FEMA performs this activity before the NRC issues a license to operate an NPP, as well as provides ongoing certifications that planning and preparedness efforts are effective and consistent with relevant regulatory guidelines. The NRC evaluates applicants for NPP site permits, construction permits, and operating licenses. As a part of that evaluation, the NRC reviews the licensees' emergency plans and preparedness efforts.

NPP licensees and OROs must show that they have plans in place that provide a reasonable assurance that adequate protective measures will be taken to protect public health and safety in the event of an incident at an NPP. FEMA evaluates the adequacy of the offsite plans and capabilities through the 16 Planning Standards that are contained in FEMA regulations at 44 CFR § 350.5 and NRC regulations at 10 CFR Part 50.

The NRC and FEMA have also developed a number of Evaluation Criteria that the agencies use to determine compliance with each of the 16 Planning Standards. Those Evaluation Criteria are contained in NUREG-0654/FEMA-REP-1, which is incorporated by reference into FEMA's regulations at 44 CFR Part 350. As such, the criteria established in NUREG-0654/FEMA-REP-1 are binding upon those responsible for offsite emergency preparedness planning in the areas surrounding the NPP. NUREG-0654/FEMA-REP-1 describes methods acceptable to NRC staff for demonstrating compliance with NRC emergency preparedness regulations at 10 CFR Part 50. Except when an applicant or licensee proposes an acceptable alternative method or methods for complying with NRC's emergency preparedness regulations, the methods described in NUREG-0654/FEMA-REP-1 will be used in the evaluation of compliance with these regulations. It is FEMA's position regarding offsite emergency preparedness that, unless an alternative approach is proposed and accepted for meeting the intent of the Planning Standards of NUREG-0654/FEMA-REP-1, the associated Evaluation Criteria must be met.

Supplement 4 to NUREG-0654/FEMA-REP-1, Rev. 1 provides additional guidance for the development, review, and evaluation of offsite radiological emergency response planning and preparedness surrounding the Nation's commercial NPPs. This guidance addresses four emerging issues: (1) aligning the offsite REP Program with national preparedness initiatives under Homeland Security Presidential Directive (HSPD)-5 and Presidential Policy Directive (PPD)-8; (2) preparing for and responding to hostile action-based (HAB) incidents at NPPs; (3) enhancing scenario realism and reducing negative training and pre-conditioned responses of exercise participants; and (4) ensuring backup means are in place for alert and notification systems.

Although licensees and applicants may consult this document for informational purposes, this supplement provides guidance to OROs with respect to preparing offsite plans and conducting exercises in a manner that will be found acceptable to FEMA and the NRC. Requirements and guidance for licensees and applicants on the issues addressed in this supplement are contained in NRC regulations in 10 CFR Part 50 and NRC NSIR/DPR ISG 01, Interim Staff Guidance, Emergency Planning for Nuclear Power Plants, respectively. This document revises and adds Evaluation Criteria and revises Appendix 3 to NUREG-0654/FEMA-REP-1, Rev. 1.

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# A. INTRODUCTION

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## 1. PURPOSE AND USE OF DOCUMENT

The Federal Emergency Management Agency (FEMA) and the Nuclear Regulatory Commission (NRC) jointly issue this Supplement 4 to NUREG-0654/FEMA-REP-1, Rev. 1 to provide additional guidance for the development, review, and evaluation of offsite radiological emergency response planning and preparedness surrounding the Nation's commercial nuclear power plants (NPPs). This guidance addresses four emerging issues: (1) aligning the offsite Radiological Emergency Preparedness (REP) Program with national preparedness initiatives under Homeland Security Presidential Directive (HSPD)-5 and Presidential Policy Directive (PPD)-8<sup>1</sup>; (2) preparing for and responding to hostile action-based (HAB) incidents at NPPs; (3) enhancing scenario realism and reducing negative training and pre-conditioned responses of exercise participants; and (4) ensuring backup means are in place for alert and notification systems.

This supplement is organized as follows:

- A. Introduction**
- B. Integration of National Preparedness Initiatives into Offsite Response Organization (ORO) Response Plans and Activities** – addresses the integration of National Incident Management System (NIMS)/Incident Command System and National Exercise Program/Homeland Security Exercise Evaluation Program (HSEEP) concepts into offsite emergency response plans and activities.
- C. Coordination between OROs and Licensees during a Hostile Action-Based Incident** – addresses unique challenges posed during HAB incidents regarding the capability of OROs to respond to the NPP site while maintaining offsite response capabilities.
- D. Challenging Drills and Exercises** – contains guidance for developing exercise scenarios that incorporate a broader spectrum of options regarding releases and initiating events to increase realism and to minimize participant preconditioning. This guidance addresses:
  - Predictability of Emergency Classification Levels (ECLs)
  - Varying Radiological Release Options
  - Varying Radiological Release Conditions
  - Broader Spectrum of Initiating Events
- E. Backup Means for Alert and Notification Systems** – addresses requirements for backup capabilities for both alert and notification functions.
- F. Summary of Revisions**

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<sup>1</sup> On March 30, 2011, Presidential Policy Directive 8 on National Preparedness was signed. This directive replaces Homeland Security Presidential Directive (HSPD)-8 (National Preparedness), issued December 17, 2003, and HSPD-8 Annex I (National Planning), issued December 4, 2007, which are hereby rescinded, except for paragraph 44 of HSPD-8 Annex I. Individual plans developed under HSPD-8 and Annex I remain in effect until rescinded or otherwise replaced

## 2. AUTHORITIES

The authorities under which FEMA and the NRC jointly issue Supplement 4 are as follows:

- The NRC's regulations in Title 10, Chapter I, Part 50 of the Code of Federal Regulations
- FEMA's regulations in Title 44, Chapter I, Part 350 of the Code of Federal Regulations
- Homeland Security Presidential Directive 5 "Management of Domestic Incidents"
- Homeland Security Presidential Directive 8 "National Preparedness"
- Post-Katrina Emergency Management Reform Act, Public Law 109-295 (PKEMRA)
- FEMA REP Authorities:
  - Reorganization Plan No. 3 of 1978
  - Section 201 of the Disaster Relief Act of 1974, 42 USC 5131, as amended by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 100-707, 102 Stat. 4689 (1988). This Act constitutes much of FEMA's role in promoting, funding, coordinating, and providing technical assistance for disaster preparedness.
  - Presidential Directive of December 7, 1979
  - Executive Order 12148, "Federal Emergency Management"
  - Homeland Security Act of 2002, Pub. L. 107-296, 116 Stat. 2135 (2002)
- NRC Authorities:
  - Atomic Energy Act of 1954, as amended
  - Energy Reorganization Act of 1974
  - Energy Policy Act of 2005
  - NRC Authorization Acts of 1980 (PL 96-295) and 1982-1983 (PL 97-415)

This document is consistent with the provisions of the NRC-FEMA Memorandum of Understanding dated June 17, 1993 (58 FR 47996), wherein the parties agreed to cooperate in radiological emergency preparedness matters and that FEMA would review available offsite plans and provide its findings and determinations to the NRC for its use in making licensing determinations.

## 3. SCOPE

Although licensees and applicants may consult this document for informational purposes, this supplement provides guidance to OROs with respect to preparing offsite plans and conducting exercises in a manner that will be found acceptable to FEMA and the NRC. Requirements and Guidance for licensees and applicants on the issues addressed in this supplement are contained in NRC regulations in 10 CFR Part 50 and NRC NSIR/DPR-ISG-01, Interim Staff Guidance, Emergency Planning for Nuclear Power Plants, respectively. This document revises and adds Evaluation Criteria and revises Appendix 3 of NUREG-0654/FEMA-REP-1, Rev. 1.

## **B. INTEGRATION OF NATIONAL PREPAREDNESS INITIATIVES INTO ORO RESPONSE PLANS AND ACTIVITIES**

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The recent national preparedness initiatives HSPD-5: *Management of Domestic Incidents*, PPD-8: *National Preparedness*, and PKEMRA establish a unified and coordinated approach to all-hazards preparedness and response based on NIMS, the National Response Framework (NRF), and the National Exercise Program. Building upon the Incident Command System, NIMS provides a consistent framework for incident management at all jurisdictional levels regardless of the cause, size, or complexity of the incident. Using the template established by NIMS, the NRF provides the structure and mechanisms to coordinate and integrate incident management activities and emergency support functions (ESFs) across Federal, state, tribal, and local government entities and the private sector. The National Exercise Program was developed to test collective preparedness, interoperability, and collaboration across all levels of government and the private sector; it incorporates HSEEP as the policy and guidance for exercise program management, design, development, conduct, evaluation, and improvement planning.

ORO plans and procedures reflect any relevant impacts of Federal capabilities depicted in the NRF. Specifically, elements in the incident-specific annexes, such as the Nuclear Radiological Incident Annex, the Terrorism Annex, or the Catastrophic Incident Annex, should be considered when developing or updating plans and procedures. Additionally, valuable information pertaining to synchronization of public messages is contained in the ESF Annex #15.

### **1. NIMS/INCIDENT COMMAND SYSTEM**

HSPD-5 requires Federal departments and agencies to make the adoption of NIMS by OROs a condition for Federal preparedness assistance through grants, contracts, and other activities. HSPD-5 does not apply to private sector entities, such as many NPP licensees. Licensees are encouraged, but not required, to adopt NIMS. However, offsite response concepts (based on ORO plans/procedures) are coordinated with licensee plans/procedures to ensure effective response and communications between the licensee and OROs. NRC regulations in 10 CFR § 50.47 (b)(3) & (b)(6) require licensees to ensure that their programs are integrated appropriately with those of the OROs.

Although HSPD-5 does not require the adoption of NIMS for OROs that do not seek Federal preparedness assistance, the integration of NIMS/Incident Command System into ORO emergency plans/procedures for NPPs will provide greater consistency across response jurisdictions and facilitate integration of response elements during an incident that affects a nuclear facility (e.g., HAB incident or catastrophic natural disaster). During such incidents, the OROs would establish incident command to facilitate the coordination and subsequent response operations between multi-jurisdictional organizations both onsite and offsite.

### **2. NATIONAL EXERCISE PROGRAM AND HSEEP**

Through PPD-8, the President directed the establishment of the National Exercise Program to integrate national-level exercise activities. Through the methods and tools that form the HSEEP, exercise scheduling, design, development, conduct, and evaluation is aligned and standardized.

Key features of the HSEEP methodology include:

- Scheduling through the use of an annual Training and Exercise Plan Workshop and Multi-year Training and Exercise Plan;

- Planning and implementation in accordance with the guidelines set forth in HSEEP policy;
- A properly formatted After-Action Report/Improvement Plan; and
- Tracking and implementation of corrective actions identified in the After-Action Report/Improvement Plan.

In concert with the National Exercise Program, the REP Program is integrating the HSEEP methodology including guidance for exercise program management, design, development, conduct, evaluation, and improvement planning. HSEEP does not supersede existing NUREG-0654 requirements for the REP Program. Integrating HSEEP into REP facilitates program efficiencies by:

- Ensuring REP compliance with elements of HSPD-5, PPD-8, and PKEMRA;
- Standardizing exercise design, conduct, evaluation, and improvement planning requirements among all FEMA Regions and evaluation team members;
- Reducing scheduling conflicts by bringing the REP Program into the National Exercise Schedule;
- Reducing exercise fatigue by combining multiple requirements into fewer total exercises; and
- Providing a suite of standardized tools for scheduling, planning, information sharing, and evaluation/corrective action.

Such integration will not, however, establish any additional exercise requirements for the REP Program or replace existing REP Evaluation Criteria with new capabilities.

The table below indicates the relevant NUREG-0654/FEMA-REP-1 Planning Standards and Evaluation Criteria that should be reviewed when implementing the changes related to “Integration of National Preparedness Initiatives into ORO Response Plans and Activities.” These Planning Standards and Evaluation Criteria continue to remain in effect.

Relevant Sections of NUREG-0654/FEMA-REP-1		
Planning Standard	Evaluation Criteria	
A. Assignment of Responsibility (Organizational Control)	A.1.a A.1.b A.1.d	A.2.a
C. Emergency Response Support and Resources	C.1.a C.1.b	
N. Exercises and Drills	N.1.a	

#### **EVALUATION CRITERION CHANGE:**

Evaluation Criterion N.1.a is revised to reflect the incorporation of HSEEP in state and local exercise plans as shown by underlined text in the following:

***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. ~~The emergency preparedness exercise shall simulate an emergency that results in offsite radiological releases which would require response by offsite authorities.~~ 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*

NOTE: As will be discussed later in the section on Challenging Drills and Exercises, Evaluation Criterion N.1.a is also being revised to remove the second sentence.



## C. PLANNING AND PREPAREDNESS FOR HOSTILE ACTION-BASED INCIDENTS

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As originally drafted, NUREG-0654/FEMA-REP-1 addressed accidents at fixed commercial NPPs that might have an impact on public health and safety. Following the events of September 11, 2001, FEMA and NRC staff reviewed planning and preparedness standards and criteria for NPPs considering the impact of HAB contingencies unanticipated at the time the Planning Standards and Evaluation Criteria were established. As defined by the NRC, a hostile action is “an act toward an NPP 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.”<sup>2</sup>

Vulnerability studies revealed that the timing and magnitude of releases related to HAB incidents are no more severe than the other accident sequences considered in the emergency preparedness basis. However, HAB incidents could present unique challenges to emergency preparedness programs because they differ from the accident initiated incidents for which licensees and OROs typically plan, train, and exercise.

**Coordination between Licensee and OROs:** Functionally, licensees establish relationships with OROs to coordinate emergency response efforts in case they are needed. The scope of ORO support includes the implementation of ORO radiological response plans to protect public health and safety in the event of a severe reactor accident and to provide fire, medical, and local law enforcement support to the NPP site. Such relations have been established at all NPPs and their coordinated response in REP exercises is inspected by the NRC and evaluated by FEMA biennially.

An HAB incident involving an NPP, however, could place multiple simultaneous demands on OROs that need to be considered in radiological plans/procedures. OROs and licensees work together to ensure that emergency plans/procedures are coordinated/communicated and updated as needed to provide prompt access to the NPP site for in-bound first responders. Licensee agreements with OROs (e.g., memoranda of understanding or letters of agreement) are updated to reference the arrangements for access to the NPP site, including during HAB incidents.

In addition, ORO plans/procedures include provisions to ensure that inbound response resources do not become an impediment to evacuation and vice versa. This could include altering evacuation efforts. ORO plans/procedures also include provisions for removal of impediments to in-bound responders.

**Alternate Resources:** An HAB incident could take ORO resources away from normally assigned radiological response roles and responsibilities in the emergency plan and detract from ORO emergency response capability if plans/procedures are not revised to address this contingency. For example, OROs may not have sufficient personnel to support onsite law enforcement and offsite alert and notification at the same time.

Licensees and OROs work together to identify solutions that will ensure timely implementation of emergency response plans/procedures in the event that ORO resource demands are unusually high. For example, an ORO may enter into mutual aid agreements with neighboring jurisdictions and private sector entities, including both for-profit and not-for-profit organizations (sometimes called non-governmental organizations), to identify alternate personnel to supplement local resources.

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<sup>2</sup> NRC Bulletin 2005-02, Emergency Preparedness and Response Actions for Security-Based Events, Attachment 2B.

**Rosters:** Plans/procedures address timely activation of qualified alternate personnel through callout rosters or other methods normally used by the ORO. OROs activate alternate personnel when the emergency action level and incident classification indicate that there is an HAB incident that would take the ORO resources away from normally assigned roles and responsibilities in the radiological emergency response plan.

**Training:** The revised ORO plans/procedures address the training for primary and alternate personnel necessary to ensure adequate response when alternate personnel must be mobilized. Radiological training that would be necessary for some functions could be delivered through an online course or in the classroom at a frequency determined in ORO plans/procedures. ORO plans/procedures also include provisions for just-in-time training updates as the incident progresses. FEMA encourages participation in drills and exercises to reinforce and to validate planning.

The table below indicates the relevant NUREG-0654/FEMA-REP-1 Planning Standards and Evaluation Criteria that should be reviewed when implementing the changes related to “Coordination between OROs and Licensees.” These Planning Standards and Evaluation Criteria remain in effect.

Relevant Sections of NUREG-0654/FEMA-REP-1		
Planning Standard	Evaluation Criteria	
A. Assignment of Responsibility (Organizational Control)	A.1.a A.1.b A.1.c A.1.d A.1.e	A.2.a A.3 A.4
B. Onsite Emergency Organization	B.6	
C. Emergency Response Support and Resources	C.4	
F. Emergency Communications	F.1.e	
J. Protective Response	J.10.j	
O. Radiological Emergency Response Training	O.1	

#### **NEW EVALUATION CRITERION:**

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

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

## D. CHALLENGING DRILLS AND EXERCISES

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Exercises are a critical component of FEMA's reasonable assurance determinations that OROs' REP plans/procedures are adequate to protect public health and safety in the vicinity of operating or proposed commercial nuclear power plants. REP exercise scenarios need to be enhanced to help avoid anticipatory responses by exercise participants due to preconditioning and to emphasize the expected interfaces and coordination between key decision-makers based on realistic postulated events. Traditionally, REP exercise scenarios have been designed to reliably deliver the expected demonstrations in a manner that facilitates performance and evaluation. This situation has resulted in a pattern of predictable biennial exercises that may precondition responders toward certain expectations about how the exercise scenario will unfold. Some of the predictable features of biennial exercise scenarios include:

- There will always be a large radiological release, often resulting in the need for public dose-based protective actions beyond 5 miles;
- The initial plant conditions for the exercise will often suggest the scenario outcome;
- The licensee will not be allowed to mitigate the accident before a release occurs;
- The release will occur after a General Emergency is declared;
- Initial protective action recommendations will be developed based on plant conditions rather than on an assessment of radiological conditions;
- The release will be directed toward the major population centers without regard for existing meteorological conditions and terminated before the exercise ends;
- The exercise will escalate in a sequential manner through the emergency classes; and
- There will be enough time between emergency classes to facilitate the evaluation of required demonstrations.

Further, typical scenarios in biennial exercises use simulated accidents such as loss of coolant and steam generator tube rupture accidents, which do not address HAB incidents or site-specific "all-hazards" incidents. Therefore, FEMA and the NRC have added new scenario variables, including varied release conditions, non-sequential escalation of emergency classification levels, and incorporating HAB incidents.

FEMA and the NRC currently allow exercise planners to vary the cause and magnitude of the radioactive release so long as they meet two key criteria:

- Plume-phase scenarios must result in actual or potential conditions that trigger protective action decisions for the public at varying distances in the EPZ (e.g., evacuation, shelter-in-place, and use of potassium iodide). If the scenario calls for no or minimal release, OROs use alternative methods (e.g., controller injects, out-of-sequence activities, or other venues) to demonstrate the capability to make and implement protective action decisions.
- At least one exercise every 8 years<sup>3</sup> must include a post-plume phase ingestion pathway and relocation/reentry/return exercise.

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<sup>3</sup> 44 CFR Part 350.9(c)(4) requires that states within the 50 mile EPZ of a site exercise the ingestion exposure pathway at least once every 5 years. This was modified to 6 years in 10 CFR Part 50, Appendix E, Section IV.F.2.d and GM PR-1, "Policy on 0654/FEMA-REP-1 and 44 CFR 350 Requirements" (October 4, 1985). The cycle was modified to 8 years in this Supplement.

Periodic exercises demonstrate response to a wide spectrum of incidents including, but not limited to, those with and without core damage, with and without a radiological release, that involve hostile action against the site, and that allow realistic simulated actions to mitigate consequences of the incident.

The introduction of the scenario variations below is intended to enhance the variability of exercise events and minimize any negative training practices. The initiating event of an exercise scenario is varied to go beyond the traditional equipment malfunctions and operation actions and bring more of an all-hazards perspective.

#### **Required scenario variations (OROs and licensee):**

- (1) **Hostile action directed at the plant site involving the integration of offsite resources with onsite response.** Hostile actions against an NPP are initiating events that present unique challenges to the licensee and OROs. An HAB incident may overwhelm local and state response agencies, and may also involve response from agencies not normally involved in a REP exercise. This scenario is used in at least one exercise in the 8-year cycle. Extent of play discussions should consider varying attack scenarios (i.e., insider threat or ground, waterborne, airborne, or a combination of attacks) every exercise cycle, as applicable to the NPP site. The HAB scenario variable can coincide with either a release or “no release” scenario variable, but the scenarios must not include a “no release option” for consecutive HAB exercises at a particular site.
- (2) **An initial classification of or rapid escalation to a Site Area Emergency or General Emergency.** There are four ECLs that provide a basis for determining the level of response actions to a potential or actual emergency at an NPP. The ECLs are: Notice of Unusual Event, Alert, Site Area Emergency, and General Emergency. The approach to exercise design routinely begins at Notice of Unusual Event or Alert and progress gradually through each level, culminating at General Emergency. Because players are preconditioned to expect this sequential and gradual escalation in emergency classification level over a compressed time period, they may anticipate and make decisions based on the exercise scenario and elapsed scenario time, rather than focusing on the unfolding scenario emergency conditions. In a real event, NPP conditions may rapidly deteriorate, resulting in an initial declaration of a Site Area Emergency, or skipping an emergency classification level altogether.

Skipping or rapidly escalating ECLs can make scenarios more realistic and challenging. At least one exercise scenario per exercise cycle, at a frequency of at least once every 8 years, shall involve an initial classification at a Site Area Emergency, or rapid escalation from a Notification of Unusual Event or an Alert to a Site Area Emergency. This is intended to establish a minimum demonstration frequency only. OROs and licensees should discuss rapid escalation or skipping of emergency classification levels as part of each exercise extent of play negotiations, based on specific site needs and plan requirements. This scenario will vary depending on the jurisdictions’ plans/procedures.

#### **Required scenario variations (licensee only):**

- (3) **No radiological release or an unplanned minimal radiological release that requires the site to declare a Site Area Emergency, but does not require the declaration of a General Emergency.** The scenario for a simulated NPP incident is developed jointly by participating state, tribal, and local government representatives and the licensee and submitted to the FEMA Regional Office for review. The scenario includes meteorological and radiological data such as

characteristics of the release, projected dose, exposure rates, and concentration in the environment. The radiological data should be supported by and compatible with plant conditions and the associated potential for releases or simulated releases. Because of the potential for exercise scenarios to be essentially repeated at many sites without significant variation in magnitude of release, decision-makers could face essentially the same set of conditions leading to either: (1) mechanical decisions based on the previous exercises, rather than thoughtful risk analysis; or (2) some decisions that are not being tested.

Not having every exercise result in a radiological release will help avoid anticipatory responses. Licensees are required to use this variable in at least one exercise per 8-year exercise cycle. OROs are encouraged, but not required, to participate in this exercise with the licensee. If OROs elect to participate in a joint exercise with no or minimal release, part of the planning for the exercise will include identifying Demonstration Criteria that will not be evaluated during the exercise and determining appropriate alternative demonstration and evaluation venues so that the OROs can meet their biennial evaluation requirements.

- (4) **Off-hours and unannounced exercises.** Provisions must be made to start an 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.

#### **Optional Scenario Variations:**

- (5) **Varied radiological release effects and meteorological conditions.** The scenario for a simulated NPP incident is developed jointly by participating state, tribal, and local government representatives and the licensee and submitted to the FEMA and NRC Regional Offices for review. The scenario includes meteorological and radiological data such as characteristics of the release, projected dose, exposure rates, and concentration in the environment. The radiological data should be supported by and compatible with plant conditions and the associated potential for releases or simulated releases. Because of the potential for exercise scenarios to be essentially repeated at many sites without significant variation in magnitude of release, decision-makers could face essentially the same set of conditions leading to either: (1) mechanical decisions based on the previous exercises, rather than thoughtful risk analysis; or (2) some decisions that are not being tested. Varying release effects and meteorological conditions from scenario to scenario is one option for enhancing realism in exercise play. The variations should be consistent with plant design, site location, and geography. These elements are not to be considered requirements, but rather areas for consideration as part of scenario development discussions.
- (6) **A broader spectrum of initiating/concurrent events.** Preexisting guidelines do not specify the initiating events for radiological emergency preparedness exercises, but initiating events have traditionally been based upon a series of equipment failures and accidents at the NPP. Exercise scenarios should now incorporate expanded causative events that go beyond equipment malfunctions or operator actions to include an all-hazards approach that takes into account site-specific hazards, based on applicability to the site, and provided that they do not become the primary focus of the exercise or detract from the demonstration of REP capabilities. All-hazard incidents may include:
  - **Natural disaster** historically applicable to the area (e.g., hurricane, tornado, earthquake, flooding);

- **Site-specific all-hazards incidents** (e.g., accident involving near-site facility, train derailment on or adjacent to site owner controlled area); and
- **Seasonal factors** impacting the PARs and decision process (e.g., transient populations, weather conditions, agricultural seasons).

The table below indicates the relevant NUREG-0654/FEMA-REP-1 Planning Standards and Evaluation Criteria that should be reviewed when implementing the changes related to “Challenging Drills and Exercises.” The Planning Standard and Evaluation Criteria continue to remain in effect; however, Evaluation Criteria N.1.a, N.1.b, and N.4 are revised as outlined below. In addition, two new Evaluation Criteria, N.1.c and N.1.d, are added.

Relevant Sections of NUREG-0654/FEMA-REP-1	
Planning Standard	Evaluation Criteria
N. Exercises and Drills	N.1 N.3 N.4

#### **EVALUATION CRITERION CHANGE:**

Evaluation Criterion N.1.a as written in the original NUREG 0654/FEMA-REP-1 is revised as shown by strikethrough and underlined text as follows:

**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. ~~The emergency preparedness exercise shall simulate an emergency that results in offsite radiological releases which would require response by offsite authorities.~~ 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*

NOTE: As discussed previously, Evaluation Criterion N.1.a was also revised to reflect the incorporation of HSEEP in state and local exercise plans.

#### **EVALUATION CRITERION CHANGE:**

Evaluation Criterion N.1.b is revised as shown by strikethrough and underlined text in the following:

**N.1.b.** *~~An exercise shall include mobilization of State and local personnel and resources adequate to verify the capability to respond to an accident incident scenario requiring response demonstrate the key skills of response organizations to adequately respond to an incident scenario. The organization shall provide for a critique of the annual exercise by Federal and State observers/evaluators. The scenarios should shall vary from year to year such that all the major elements of the plans and preparedness organizations are exercised within an five-year period eight-year exercise cycle. Each organization should make provisions to start an exercise between 6:00 p.m. and midnight, and another between midnight and 6:00 a.m. once every six years. Exercises should be conducted under various weather conditions. Some exercises should be unannounced. 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 at least 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.
  - 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 required minimal or no-release exercise, they will still be obligated to meet the exercise requirements as specified in 44 CFR § 350.9.

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

#### **NEW EVALUATION CRITERION:**

FEMA no longer requires OROs to participate in off-hours and unannounced exercises. In order to retain the requirement for licensees, it has been deleted from Evaluation Criterion N.1.b and moved to a new Evaluation Criterion N.1.c:

- 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 State    Local



### **NEW EVALUATION CRITERION:**

In order to elaborate on ORO requirements for ingestion pathway exercises, a new Evaluation Criterion N.1.d has been added:

***N.1.d. An exercise shall include mobilization and implementation of State and local (as appropriate) personnel and resources adequate to verify the capability and response to a large radiological release requiring ingestion pathway protective actions beyond the 10 mile EPZ at least once every 8 years. Organizations shall specify who is responsible for the decision-making process. OROs shall reference or include the organization's procedures for making PADs and implementing protective actions based upon PAGs that are consistent with EPA recommendations, and the process for ensuring coordination of PADs with all applicable jurisdictions.***

Applicability and Cross Reference to Plans: Licensee ☐ State ☒ Local ☒

### **EVALUATION CRITERION CHANGE:**

The NRC does not require the use of the post-accident sampling system. Evaluation Criterion N.2.e (2), is revised as shown by strikethrough and underlined text in the following:

***N.2.e(2) Health Physics Drills (2). Analysis of inplant liquid samples including the use of the post-accident sampling system with actual elevated radiation levels shall be included in Health Physics drills by licensees annually.***

### **EVALUATION CRITERION CHANGE:**

Requirements for exercise evaluation and critique have been consolidated in Evaluation Criterion N.4, which is revised as shown by strikethrough and underlined text in the following:

***N.4 ~~Official observers from Federal, State or local governments will observe, evaluate, and critique the required exercises. A critique shall be scheduled at the conclusion of the exercise to evaluate the ability of organizations to respond as called for in the plan. The critique shall be conducted as soon as practicable after the exercise, and a formal evaluation should result from the critique. 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 ☒ State ☒ Local ☒



## **E. BACKUP MEANS FOR ALERT AND NOTIFICATION SYSTEMS**

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This supplement revises NUREG-0654/FEMA-REP-1, Appendix 3, Section B.2, by adding a requirement to provide a backup capability to the primary alert and notification systems (ANS).

### **1. BACKGROUND**

An ANS provides the capability to promptly alert the population within the plume exposure pathway EPZ of an NPP incident and to notify the public of protective actions that need to be taken. The alert function provides a warning signal to the population indicating the need to seek additional information regarding an event in progress. By itself, the alert function provides no information about the type of incident or any protective actions that need to be taken. The notification function informs the public about the nature of the incident 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 the alert and notify functions are important for protecting public health and safety.

NPP licensees are required to demonstrate that the ANS capability exists. Alerting and notifying the public is a function assigned to the state and local governments and is 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.

Several incidents have occurred in which the alerting portion of the primary ANS was inoperable. As a result, the licensee and OROs would have been unable to alert and notify the public and provide prompt information had there been an emergency. Without the ability to alert the population, the effectiveness of the notification element may be significantly reduced and may raise questions as to whether adequate measures can and will be taken to protect public health and safety. Having a backup means for alert and notification in place would lessen the impact of the loss of the primary ANS.

Backup means of alert and notification 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.

Topography, population density, existing ORO resources, and timing will be considered in judging the acceptability of backup means of alert and notification. Although circumstances may not allow this for all situations, FEMA and the NRC recommend that OROs and licensees attempt to establish backup means that will reach those in the plume exposure EPZ within a reasonable time of receiving notice of failure of the primary alert and notification system, with a recommended goal of 45 minutes.

Specific changes to existing guidance documents regarding design objectives and functional criteria for an ANS backup means are provided in the following paragraphs. Additional guidance regarding evaluation of ANS methods can be found in other FEMA documents, including FEMA-REP-10, “Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants.”

## 2. SUMMARY OF CHANGES

As shown in the excerpt below, this supplement revises NUREG-0654/ FEMA-REP-1, Rev. 1 to require licensees to have a backup capability for the primary ANS. The revisions also clarify that the backup capability does not have to meet the same time requirements as the primary ANS or its supplemental route alerting.

NUREG-0654/FEMA-REP-1, Appendix 3, Section B.2, is revised as shown by strikethrough and underlined text in the following:

*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) *Special arrangements Notification methods will be ~~made~~ 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 large 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 ~~no later than July 1, 1984~~ prior to initial operation of 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.*

Although the changes above to NUREG-0654/FEMA-REP-1, Appendix 3, Section C, provide for backup ANS means separate from the primary ANS, they do not address backup power. The only current requirement for providing backup power to sirens appears in a provision of the Energy Policy Act of 2005; this provision is based on the size of the permanent population within a 50 mile radius of a power plant and currently applies to one site (i.e., Indian Point).

NUREG-0654/FEMA-REP-1, Appendix 3, Section C.3.g, is revised as shown by adding the underlined text in the following:

***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.***

The table below indicates the relevant NUREG-0654/FEMA-REP-1 Planning Standards and Evaluation Criteria that should be reviewed when implementing the changes related to “Backup Means for Alert and Notification Systems.” No changes to these Evaluation Criteria are necessary since they do not address specific ANS design objectives other than the requirement to establish the administrative and physical means and the time required for notifying and providing prompt instructions to the public within the plume exposure pathway EPZ.

Relevant Sections of NUREG-0654/FEMA-REP-1	
Planning Standard	Evaluation Criteria
E. Notification Methods and Procedures	E.5 E.6
F. Emergency Communications	F.1.e

## F. SUMMARY OF REVISIONS

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### **EVALUATION CRITERION:**

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

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

### **EVALUATION CRITERION:**

- 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. *An exercise shall demonstrate the key skills of response organizations to adequately respond to an incident scenario. Scenarios shall vary such that the major elements of the plans and preparedness organizations are exercised 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 at least 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.*
  - 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 required minimal or no-release exercise, they will still be obligated to meet the exercise requirements as specified in 44 CFR § 350.9.*

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

### **EVALUATION CRITERION:**

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 State    Local*

### **EVALUATION CRITERION:**

N.1.d. *An exercise shall include mobilization and implementation of State and local (as appropriate) personnel and resources adequate to verify the capability and response to a large radiological release requiring ingestion pathway protective actions beyond the 10 mile EPZ at least once every 8 years. Organizations shall specify who is responsible for the decision-making process. OROs shall reference or include the organization's procedures for making PADs and implementing protective actions based upon PAGs that are consistent with EPA recommendations, and the process for ensuring coordination of PADs with all applicable jurisdictions.*

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

### **EVALUATION CRITERION:**

N.2.e(2) *Health Physics Drills (2). Analysis of inplant liquid samples with actual elevated radiation levels shall be included in Health Physics drills by licensees annually.*

### **EVALUATION CRITERION:**

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*

### **APPENDIX 3, SECTION B.2**

*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 large 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.*

### **APPENDIX 3, SECTION C.3.G**

*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.*