

Integrated Regulatory Review Service Mission to the United States

MODULE 10: EMERGENCY PREPAREDNESS AND RESPONSE

Overview

Through its emergency preparedness (EP) regulations, guidance, and oversight process, the U.S. Nuclear Regulatory Commission (NRC) ensures that reasonable assurance exists that each reactor site or other applicable licensee (i.e., fuel facilities, research and test reactors) demonstrates reasonable assurance that adequate protective measures can and will be taken in a timely and effective manner in a radiological emergency.

Emergency Preparedness and Response

*The government shall make provision for emergency preparedness to enable a timely and effective response in a nuclear or radiological emergency.
(GS-R-1, Requirement 8)*

The overall objective of EP is to ensure that the nuclear power plant operator or other applicable licensee is capable of implementing adequate measures to protect public health and safety in a radiological emergency. The NRC shares responsibilities for emergency planning for nuclear power plants with the Federal Emergency Management Agency (FEMA), which is part of the U.S. Department of Homeland Security (DHS). The NRC is primarily responsible for facility planning, while FEMA has responsibility for offsite planning.

As a condition of their license, operators of these nuclear power plants must develop and maintain EP plans that meet comprehensive NRC EP requirements. Confidence in public protection is increased through the combined inspection of the requirements of EP and the evaluation of their implementation. To maintain oversight of the capability of nuclear power plant operators to protect the public, the NRC conducts thorough inspections. The NRC maintains four regional offices, which implement the agency's inspection program. In addition to these region-based inspectors, the NRC places "resident inspectors" at each of the operating nuclear plants to carry out the inspection program on a day-to-day basis.

The NRC assesses the licensees' capabilities to implement their emergency plans by requiring the performance of a full-scale exercise that includes the participation of government agencies at least once every 2 years. The NRC and FEMA determine the 2-year evaluated EP exercise requirements for nuclear power plant operators and State and local governments. In this manner, both onsite and offsite EP capabilities are adequately evaluated. These exercises are performed to maintain the skills of the emergency responders and to identify and correct weaknesses. NRC inspectors and FEMA evaluators evaluate the performance. Between these biennial exercises, the nuclear power plant operators conduct additional drills, which are evaluated by NRC inspectors.

In response to an event at an NRC-licensed facility or an event involving NRC-licensed material that could threaten public health and safety or the environment, the NRC activates its incident response program at its Headquarters Operations Center and one of its four Regional Incident Response Centers. The NRC's highest priority is to provide expert consultation, support, and

assistance to State and local public safety officials responding to the event. Once the NRC incident response organization is activated, teams of specialists are assembled at the Headquarters Operations Center and Regional Incident Response Center to obtain and evaluate event information and to assess the potential impact of the event on public health and safety and the environment.

The National Response Framework outlines the response of the Federal Government to a variety of events. The Nuclear/Radiological Incident Annex to the National Response Framework describes the NRC's responsibilities. The NRC is the coordinating agency for radiological events occurring at NRC-licensed facilities and for radioactive materials either licensed by the NRC or under the NRC's Agreement States Program. As coordinating agency, the NRC has technical leadership for the Federal Government's response to the event. If the severity of an event rises to the level of General Emergency, or is terrorist-related, DHS will take on the role of coordinating the overall Federal response to the event, while the NRC will retain a technical leadership role. Other Federal agencies that may respond to an event at an NRC licensed facility, or involving NRC-licensed material, include FEMA, the Department of Energy, the Environment Protection Agency (EPA), the Department of Agriculture, the Department of Health and Human Services, the National Oceanographic and Atmospheric Administration, and the Department of State.

System for Protective Actions To Reduce Existing or Unregulated Regulation Risks

The government shall establish an effective system for protective actions to reduce undue radiation risks associated with unregulated sources (of natural and artificial origin) and contamination from past activities or events, consistent with the principles of justification and optimization. (GS-R-1, Requirement 9)

The NRC strictly regulates radiation dose to occupational workers and the public under routine and non-routine operating conditions. Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20, "Standards for Protection against Radiation," establishes the dose limits for radiation workers, members of the public, and for a category known as planned special exposures. Planned special exposures allow a worker or workers to receive a dose up to 5 times the occupational limit for a unique situation such as a work action that may help mitigate an accident.

In the unlikely event of a nuclear power plant radiological emergency, it may be necessary for the public to take protective actions, which may include evacuation and sheltering in place. The protective action guidelines fall under the authority of the Environmental Protection Agency (EPA). In October 1991, EPA published the "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents" (EPA-400-92-001), which lists criteria for evacuation and/or shelter-in-place, depending on the projected doses and the duration of the release. The NRC published NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (issued November 1980), and its Supplement 3, Proposed Revision 1, "Guidance for Protective Action Recommendations for General Emergencies" (issued March 2010) to provide additional information on decisions for protective actions. In June 2005, the NRC issued Regulatory Issue Summary 2005-08, "Endorsement of Nuclear Energy Institute (NEI) Guidance 'Range of Protective Actions for Nuclear Power Plant Incidents.'" The NEI guidance details an acceptable range of early-phase protective actions that licensees may recommend to the local or State authority in the event of a nuclear power plant incident. The local or State authority has the ultimate authority to implement protective action decisions.

GS-R-2, “Preparedness and Response for a Nuclear or Radiological Emergency Safety Requirement”

The NRC responsibilities relating to radiological EP derive from its licensing functions under the Atomic Energy Act of 1974, as amended. Sections 161.b, 161.i, 161.o, and 182.b of the Act provide authority to promulgate regulations on emergency planning.

The regulation in 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” provides the framework for NRC activities regarding two classes of licensees: Class 104, medical therapy and research and development facilities, and Class 103, commercial and industrial facilities. In that this class is aimed at EP for commercial and industrial facilities (i.e., nuclear power reactors (Class 103 licensees)), then 10 CFR 50.47, “Emergency Plans,” and Appendix B, “Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants,” to 10 CFR Part 50 contain the standards and requirements, respectively, for EP at these facilities. These regulations are incorporated into the facility’s license by 10 CFR 50.54, “Condition of License.”

The International Atomic Energy Agency (IAEA) has two EP objectives: (1) the protection objective, intended to prevent the occurrence of deterministic effects in individuals by keeping doses below the relevant threshold and to ensure that all reasonable steps are taken to reduce the occurrence of stochastic effects in the population, and (2) the safety objective, designed to protect individuals, society, and the environment from harm by establishing and maintaining effective defenses against radiological hazards from sources. The NRC’s EP regulations are consistent with IAEA objectives.

Licensees for commercial nuclear power plants in the United States are required, as a condition of their license, to follow and maintain in effect emergency response plans that meet the NRC planning standards and requirements. In addition to the onsite emergency plan and procedures that implement the emergency plan, licensees are required to submit the emergency response plans of State and local governments that are within the 16-kilometer (10-mile) plume exposure pathway emergency planning zone (EPZ), as well as the plans of State governments within the 80-kilometer (50-mile) ingestion pathway EPZ.

The NRC evaluates the adequacy of the licensee’s emergency plan, and FEMA evaluates the adequacy of the State and local (offsite) emergency plans and reports their findings to the NRC. FEMA is the Federal agency that was assigned the lead responsibility for State and local emergency planning and response following the Three Mile Island accident in 1979. The NRC has the overall authority for nuclear power plant licensing.

Licensees are required to submit any changes to their onsite emergency plan and procedures to the NRC. The licensee may make changes to the onsite emergency plans without NRC approval only if the changes do not decrease the effectiveness of the plans, and the plan, as changed, continues to meet the NRC regulations in 10 CFR 50.47(b) and the requirements of Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities,” to 10 CFR Part 50. The State governments submit changes to the offsite plans to FEMA, which must review and approve significant changes in the plans.

Each licensee is required to demonstrate the capability of implementing its onsite emergency plan by conducting a full-participation EP exercise every 2 years. The full participation exercise includes the offsite radiological emergency response with participation by each offsite authority

having a role under the plans. Any weaknesses or deficiencies identified by the NRC in the exercise of the onsite emergency plan, as well as any deficiencies identified by FEMA in the exercise of the offsite emergency plans, must be corrected through appropriate remedial actions. In addition to the biennial exercise of the plume exposure pathway EPZ plans, a State is required to participate in an ingestion pathway exercise every 6 years with a nuclear power plant located within the State. None of the EP exercises require involvement by members of the public. NRC inspectors evaluate the licensee performance in the exercises, as well as inspecting the licensee EP program.

Assessment Summary

As part of the Complementary Self-Assessment, the NRC staff reviewed its programs against IAEA's goals and objectives and found its programs to be consistent.

The NRC's comprehensive emergency planning regulations provide for robust emergency planning around nuclear power plants.

Areas for Improvement

NRC will continue its close work with FEMA to ensure that guidance and standards for offsite response organizations are consistent with guidance and standards for licensees.