

*A White Paper
Addressing
Compliance with
NRC Proposed
Rule making*

Emergency Preparedness at Nuclear Power Plants



*Ensuring Readiness and Compliance
with New NRC Regulation
of Emergency Preparedness Programs*

Prepared by
**Oak Ridge Associated
Universities**

ORAU emergency management experts provide mission-focused operational experience.

Executive Summary



The commercial nuclear power industry is approaching a period of extensive increase in regulation and oversight of emergency preparedness programs by the Nuclear Regulatory Commission (NRC). The proposed enhancements will affect current licensees as well as applicants for new licenses, construction permits, and early site permits. Offsite Response Organizations (ORO) will also be affected.

This white paper describes potential impacts of these proposed regulations, provides solutions to ensure compliance, and identifies systematic approaches and technological tools that save both time and costs.

A review of the proposed enhancements reveals the potential for considerable change to a nuclear power plant's emergency preparedness program. Oak Ridge Associated Universities' (ORAU) emergency management experts provide mission-focused operational experience in real-world environments and demonstrated expertise to support federal and state agencies with planning, research, and readiness activities, which strengthen emergency preparedness and response capabilities.

ORAU is a university consortium leveraging the scientific strength of 98 major research institutions to advance science and education. We leverage the collective capabilities of our university consortium by partnering with national laboratories, government agencies, and private industry to:

- **Enhance** our nation's preparedness to respond to emergencies related to terrorist incidents, natural disasters, and health threats
- **Strengthen** America's scientific research and education enterprises to enhance global competitiveness
- **Build** public trust and confidence in the management of worker health and environmental clean-up initiatives

ORAU staff is highly experienced in the emergency preparedness arena and has a thorough understanding of the potential impacts of the NRC proposed emergency enhancements on emergency preparedness programs. Ensuring that solutions are comprehensively and effectively designed and developed to address the issues and impacts is a primary goal.

ORAU works hand-in-hand with clients to assess existing emergency plans, procedures, and processes as well as update and/or develop needed documentation to ensure a comprehensive emergency preparedness program.

Executive Summary continued

For example, one of the proposed NRC rules addresses the need for more challenging drills and exercises. ORAU ensures that drills and exercises include a spectrum of realistic scenarios and exercise objectives that challenge responders to higher levels of performance. ORAU exercise designers develop objectives with appropriate response criteria that can be effectively measured for all key response positions.



The nuclear power plant industry, along with federal, state, and local government agencies, need emergency planning and operational support to enhance and integrate their efforts to respond to plant emergencies, natural disasters, acts of terrorism, and man-made hazards.

Introduction

As managers know all too well, the best laid plans can be seriously disrupted by an audit or evaluation that identifies inadequate processes, outdated procedures, or non-compliance with rules and regulations.



The commercial nuclear power industry is approaching a period of extensive increase in regulation and oversight of emergency preparedness programs by the NRC. This white paper describes potential impacts of these proposed regulations, provides solutions to ensure compliance, and identifies systematic approaches and technological tools that save both time and costs.

Background

Due to an increased focus on both the development and construction of new commercial nuclear reactors and the aftermath of 9/11, the NRC has proposed to amend certain emergency preparedness (EP) requirements in its regulations (10 CFR Parts 50 and 52) that govern domestic licensing of production and utilization facilities. Both the NRC and the Federal Emergency Management Agency (FEMA) have proposed enhancements to current EP regulations that will result in sweeping changes to the current regulatory environment.

THIS WHITE PAPER
has been developed
based on the status of
the NRC proposed rule
changes to emergency
preparedness programs
as of October 2009.

PROPOSED NRC
changes will most likely
require additional training
and education for
emergency management
personnel, responders,
employees, and the
general public.

Challenges and Potential Impacts

A review of the proposed enhancements reveals the potential for major adjustment to a nuclear power plant's EP program. The changes will also need to be tested to ensure that they not only meet the needs of the organization but are also effective in complying with NRC requirements.



Deadlines for implementation of the changes will create added pressure on already stretched EP staff. With the adoption of the proposed EP regulations, EP programs may need to implement far-reaching changes to several of their program components, for example:

- Plans
- Procedures
- Personnel Assignments
- Training
- Drills
- Exercises
- Facilities and Equipment
- Consequence Assessment
- Protective Actions
- Accident/Threat Analysis
- Offsite Coordination
- Documentation/Recordkeeping

The extensive proposed changes impacting exercises include the requirement for NRC review and approval of licensee exercise scenarios. In addition to hostile action events, exercise scenarios need to incorporate a wide spectrum of radiological releases and events. All exercises will require complete documentation of scenarios and EP elements.

The costs associated with these modifications may range from relatively minor (i.e., for straightforward updates to programs, procedures, and plans) to potentially significant (i.e., for the design and development of challenging exercise scenarios and new emergency management processes and procedures). These changes will most likely require additional training and education for emergency management personnel, responders, employees, and the general public.

In addition to the proposed changes that affect operations and emergency management onsite, greater coordination and cooperation will be required with OROs that are called to respond, especially during a hostile action event. It will be more important than ever to build and maintain the trust and communications to ensure a smooth and efficient response during a complex emergency.

**OAK RIDGE ASSOCIATED
UNIVERSITIES (ORAU)**

*has assisted many
federal agencies in
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Oak Ridge Associated Universities Experience and Capabilities



ORAU has assisted several federal agencies [e.g., the Department of Energy National Nuclear Security Administration (DOE/NNSA), the Department of Homeland Security (DHS), FEMA, and the Bureau of Reclamation (BOR)] in addressing emergency management and EP issues and challenges. ORAU experts provide mission-focused operational experience in real-world environments and demonstrated expertise with planning, research, and readiness activities.

ORAU's extensive exercise experience includes the design, development, conduct, and evaluation of drills, tabletops, and full participation exercises for several federal agencies. Topics include all facets of EP (e.g., radiation release, hostile actions, natural and man-made disasters, weapons of mass destruction, and crisis and risk communication). In support of our country's national security and EP readiness initiatives, ORAU staff have designed, developed, implemented, and evaluated exercise venues in several national level EP exercises, such as Top Officials Exercises (TOPOFF) and Diablo Bravo.

ORAU has a broad range of proven experience and capabilities in emergency management to develop and implement a wide variety of tailored solutions to effectively and efficiently meet the challenges faced by the commercial nuclear power industry. The following table outlines the NRC proposed rules and how ORAU can provide emergency management and EP solutions, tools, and resources.

U.S. NRC Proposed Enhancements to Emergency Preparedness Regulations

Security Related Issues	Proposed Rule	ORAU Emergency Management Capabilities
1	<p>On-Shift Multiple Responsibilities Requires licensees to ensure that on-shift staff are not assigned additional responsibilities that could detract from the performance of their primary emergency plan functions.</p>	<ul style="list-style-type: none"> • Accident Spectrum Analysis • Job Task Analysis • ERO Functional Responsibility • Job Descriptions • Job Aids/Checklists • On-Shift Staffing Process • Emergency Plans and Implementing Procedures
2	<p>Emergency Action Levels (EALs) for Hostile Action Events Requires EALs based on hostile action events be incorporated into the licensee's EAL scheme.</p>	<ul style="list-style-type: none"> • Current EALs Assessment • EALs for Hostile Action Events • Implementation Recommendations
3	<p>Emergency Response Organization (ERO) Augmentation and Alternative Facilities Requires licensees to identify and equip an alternative facility (or multiple facilities) to support response functions when Emergency Response Facilities (ERFs) are not accessible because of a hostile action.</p>	<ul style="list-style-type: none"> • Accessibility Assessment of Alternative Facilities • Continuity of Operations Plans • Processes and Procedures • Emergency Plans • Duty Roster Staffing Processes • Communications Plans and Procedures • Event Classification Job Aids • Offsite Notification Job Aids • Training
4	<p>Licensee Coordination With Offsite Response Organizations (OROs) During Hostile Action Events Requires licensee to verify that OROs have plans and procedures for emergency plan implementation support during all contingencies, including hostile action events.</p>	<ul style="list-style-type: none"> • EP Assessment Tools • Exercise evaluation criteria of ORO response capabilities • Emergency Plans and Procedures • Protective Action Recommendation Job Aids • Memorandum of Understanding/Memorandum of Agreement (MOU/MOA) • Training Requirements – General Employee and Responder • Training/Drill Modules • Notifications and Communications Processes and Job Aids • Emergency Public Information Plans, Procedures, Training
5	<p>Protection for Onsite Personnel 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.</p>	<ul style="list-style-type: none"> • Initial Event Assessment (Consequence Assessment) • Protective Active Recommendation Job Aids • Notifications/Communications Processes and Job Aids • Training/Drills
6	<p>Challenging Drills and Exercises Requires licensees to enhance their drill and exercise programs by incorporating a wide range of scenario elements, including hostile action events.</p>	<ul style="list-style-type: none"> • Exercise Builder®– Computer-Based Design Tool • Exercise Design, Development, Implementation, and Evaluation • Homeland Security Exercise and Evaluation Program (HSEEP) Methodology • Hostile Action Based (HAB) Scenarios • Identification of Strengths, Deficiencies, and Weaknesses • Corrective Action Plans • Documentation Procedures • Recordkeeping Systems

U.S. NRC Proposed Enhancements to Emergency Preparedness Regulations continued

Non-Security Related Issues	Proposed Rule	ORAU Emergency Management Capabilities
1	Backup Means for Alert and Notification Systems (ANS) Requires licensees to have backup ANS methods for both alert and notification functions.	<ul style="list-style-type: none"> • Communications Testing Processes • Assessments of Current Facilities and Equipment • Recommendations Based on Established Criteria
2	Emergency Declaration Timeliness Requires applicants and licensees to establish and maintain the capability to assess, classify, and declare an emergency condition promptly within 15 minutes after indications are available to plant operators that an EAL has been exceeded.	<ul style="list-style-type: none"> • Emergency Plans and Procedures • Training • Drills • Job Aids/Checklists
3	Emergency Operations Facility – Performance-Based Approach <ul style="list-style-type: none"> • Requires licensees and applicants to have an onsite Technical Support Center (TSC) and an Emergency Operations Facility (EOF) • Requires that all nuclear power plant licensees and applicants under 10 CFR Parts 50 and 52 provide an Operations Support Center (OSC) • Requires licenses and applicants to comply with performance-based criteria applicable to EOFs 	<ul style="list-style-type: none"> • Assessments of EOF, TSC, and OSC • Recommendations for EOF, TSC, and OSC Compliance Based on Established Performance-Based Criteria
4	Evacuation Time Estimate (ETE) Updating <ul style="list-style-type: none"> • Requires periodic review of ETEs • Requires update due to increase or decrease in affected population area of at least 10% 	<ul style="list-style-type: none"> • Process Design and Development • Scheduling Tools • Report Formats • Recordkeeping Systems
5	Amended Emergency Plan Change Process <ul style="list-style-type: none"> • Requires licensee to identify changes to emergency plans that require prior NRC approval • Requires submission of changes using NRC-specified process 	<ul style="list-style-type: none"> • Change Process Design and Development • Computerized Tracking System • Decision-Making Job Aids • Training • Emergency Plans • Reporting Systems • Recordkeeping Systems

ORAU CONSISTENTLY
uses a systematic approach to ensuring that solutions are comprehensively and effectively designed and developed to address the issues and impacts.

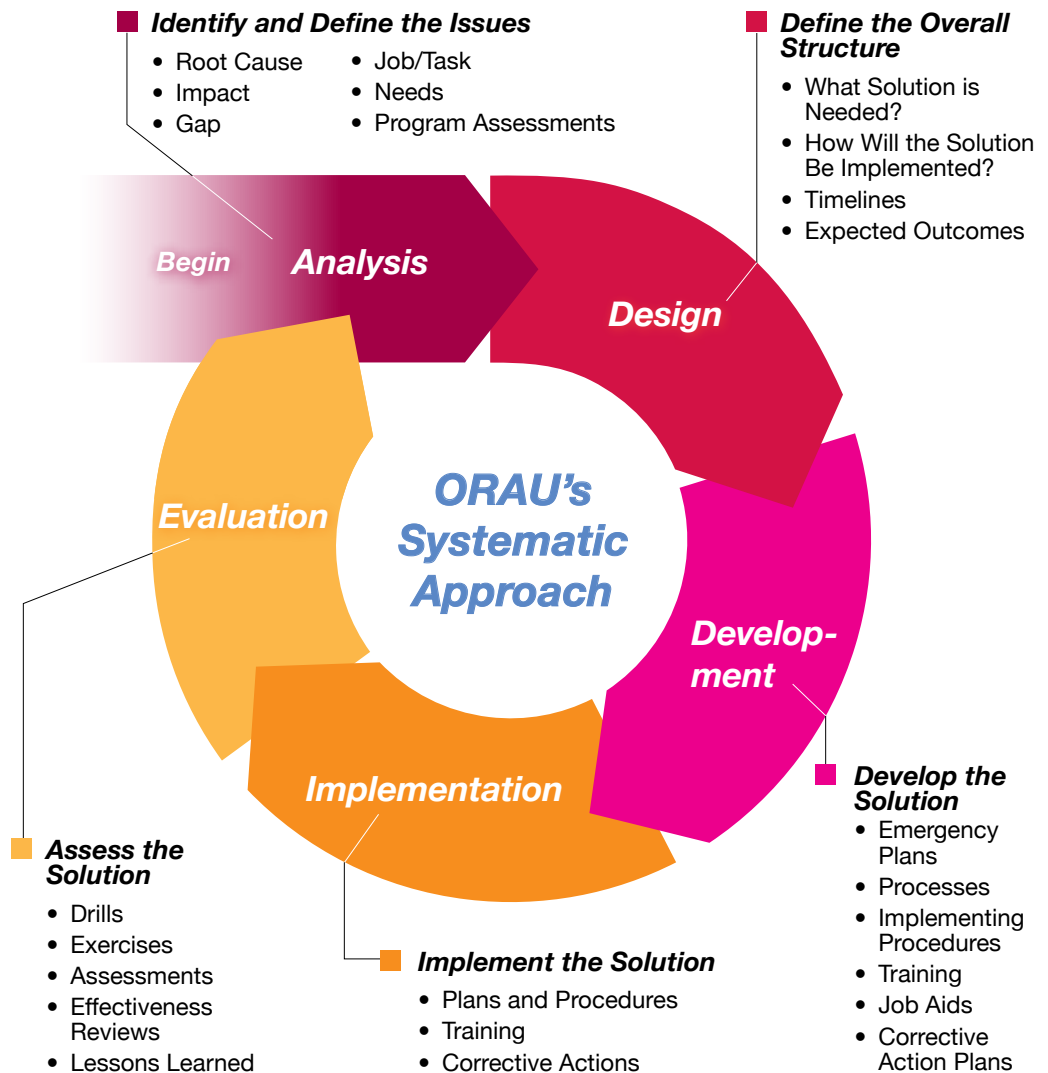
ORAU Approaches to Meeting the Challenge



Considering the potential impacts on both cost and time, it is important to formulate a plan that uses the most systematic and cost effective approaches available to develop effective solutions to comply with NRC requirements.

ORAU consistently uses a systematic approach to ensuring that solutions are comprehensively and effectively designed and developed to address the issues and impacts. The principles and practices of a systematic approach used by ORAU are illustrated below.

ORAU's Systematic Approach to Problem Solving



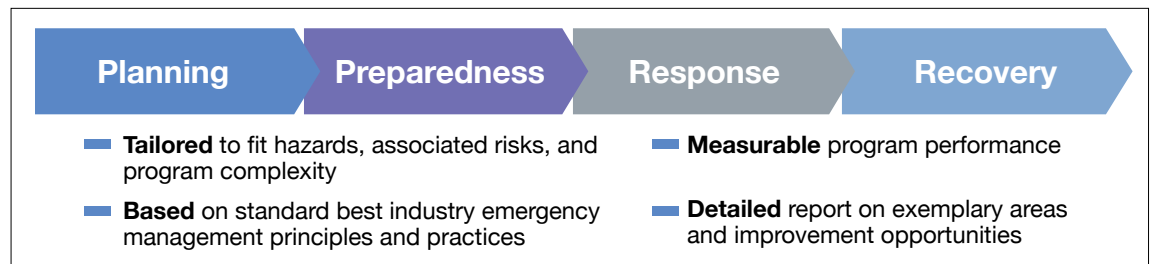
ORAU Approaches to Meeting the Challenge continued

ORAU Specific Capabilities

ORAU designs and develops effective national preparedness solutions and tools. ORAU also provides timely, innovative, and successful technology and highly targeted solutions for managing exercises and corrective actions,

Assessment Guides

ORAU works hand-in-hand with clients to assess existing emergency plans, procedures, and processes as well as to update and/or develop needed documentation to ensure a comprehensive emergency preparedness program. ORAU has developed assessment guides to thoroughly assess standard emergency management program elements



Phased Development and Implementation

The complexity of a comprehensive EP program requires that the solutions take into account the relationships among the various components and the fact that adjustments made in one area may have consequences in another area.

For example, ensuring that on-shift ERO response duties are limited so as not to overburden the responders during an emergency event may result in having to increase the number of on-shift personnel, or requiring more cross-training of employees, or both. These actions may in turn result in additional labor and training costs.

Systematic Exercise Design and Development

ORAU ensures that drills and exercises include a spectrum of realistic scenarios and exercise objectives that challenge responders to higher levels of performance. ORAU exercise designers develop objectives with appropriate response criteria that can be effectively measured for all key response positions.

ORAU supports client emergency management programs with direct operational and technical assistance. Where needed, ORAU provides training using HSEEP methodology related to development, conduct, management, evaluation, and reporting requirements for exercises. ORAU integrates federal, state, and local emergency preparedness exercise objectives resulting in an effective national and local emergency response.

DEVELOPING A PLAN that both considers the impacts and implications of any actions taken and identifies appropriate mechanisms and strategies to address these issues will result in cost efficiencies and minimize the impact on operations and personnel.

ORAU Emergency Management Technological Tools



Exercise Builder[®]

Working with a team of subject matter experts, ORAU created **Exercise Builder**— a unique computer-based tool for personnel who are responsible for developing drills and exercises. This tool has built-in exercise components such as exercise scenarios, objectives, and evaluation criteria.

Users can also add site-specific information to customize the drill/exercise to meet specific needs and produce complete exercise packages. Exercise Builder is both user-friendly and cost-effective. Coupled with ORAU Exercise Design Workshops, exercise developers learn to effectively develop exercises within a very compact time frame and with fewer resources.

Exercise Builder provides a step-by-step approach to exercise design and development. It has built-in help screens to assist the end-user on-demand. Exercise Builder is designed to save time and money by eliminating months in the design and development of EP exercises. A current user of Exercise Builder indicated a savings of 50% in time and costs. Tailored versions of Exercise Builder are being used by the Veteran's Administration (Exercise Builder Hospital) and for DOE International Exercise Design and Development (Exercise Builder International).

Exercise Builder[®] Overview

- **Windows[®]** based application
- **Customizes** drill and exercise plans, templates, and reports
- **Stores** data for repeated use
- **Produces** documentation for each drill/exercise component

Site Specific Input

- Site/Facility Specific Information
- Emergency Response Organization (ERO) Positions
- Offsite Organizations
- Objectives for Each Key Position and Offsite Organizations
- Anticipated Responses
- Evaluation Criteria

Documentation Generated By Exercise Builder[®]

- Exercise Scope
- Exercise Objectives
- Scenario Narrative
- Scenario Data
- Design and Development Guidelines
- Pre-Approved Simulations
- Master Scenario Events List (MSEL)
- Messages
- Safety Plan
- Security Plan
- Logistics Plan
- Controller Directory
- Responder Directory
- Evaluator Guides
- Glossary
- After Action Report (AAR)

AS AN EXAMPLE of time savings, exercise objectives for participants are linked to both anticipated responses and the evaluation criteria for that objective. These items are compiled automatically by Exercise Builder to create two documents: ① the Master Scenario Events List (MSEL)/ Timeline, and, ② the Exercise Evaluation Guides (EEGs) for exercise controllers and evaluators. When changes need to be made to the MSEL, Exercise Builder automatically reconfigures the timeline to include these changes. These features alone can save hundreds of hours of development and the associated costs.

ORAU Emergency Management Technological Tools continued



EXAMPLES OF ETAT'S RAPID IN-DEPTH SEARCH CAPABILITY

In a review of exercise data from multi-site AARs, ETAT revealed the greatest frequency in findings occurred in:

- Victim Care (62%)
- Consequence Assessment (13%)
- Responder Protection (10%)
- Hazard Mitigation (8%)

ETAT also revealed performance issues in Emergency Public Information:

- Media releases disseminated without prior approval.
- Site commander not briefed before a news conference.
- No pre-determined list of persons warranting special consideration (e.g., delayed response to requests for incident updates from U.S. Senators)

Exercise and Training Analysis Tool

ORAU has developed an electronic Exercise and Training Analysis Tool (ETAT) that enables users to view their exercise data to identify issues and trends. Exercise and corrective action data from AARs are entered directly into the system. Users identify and examine critical issues (e.g., command and control), assess NIMS compliance, and look in-depth into different aspects of functional issues (e.g., decontamination, emergency public information). ETAT features enable users to:

- **Track** trends in emergency response outcomes and performance indicators
- **Centralize** AAR data
- **Identify** NIMS-related issues, e.g., communications interoperability
- **Identify** training and other performance solutions by site, jurisdiction, and facility
- **Increase** exercise planning and training effectiveness with response partners
- **Assist** in HSEEP crosswalk
- **Reduce** time from days to hours to identify trends, issues, and root cause
- **Improve** procedure and position checklists and job aids
- **Reveal** additional aspects of issues assumed to be single-focused
- **Examine** trends in functional procedures, e.g., public action recommendations, safety, decontamination, information dissemination
- **Increase** exercise planning and training effectiveness

Conclusion

Many components contribute to an organization's readiness to respond, whether to a plant emergency, a natural disaster such as a tornado or hurricane, or a terrorist attack.

The nuclear power plant industry, along with federal, state, and local government agencies, needs emergency planning and operational support to enhance and integrate its efforts to respond to natural disasters, acts of terrorism, and other man-made hazards.

ORAU experts provide operational and response experience in real-world environments. ORAU has demonstrated capabilities in planning and implementing a broad spectrum of emergency preparedness and readiness activities to strengthen its clients' preparedness and response capabilities.

ORAU REGULARLY
teams with a broad range
of organizations and
partners to pursue oppor-
tunities of mutual interest
through a competitive
procurement process.

For More Information

Technical Information

For technical information on ORAU
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How to Do Business with Us

ORAU is a 501(c)(3), not-for-profit enter-
prise that has been working with govern-
ment agencies, universities, and corporate
entities since 1946.

We regularly team with a broad range of cus-
tomers and partners to explore opportunities
of mutual interest. ORAU has a variety of
contract vehicles in place that may help you
establish a working relationship with us more
quickly and efficiently.

**If you have questions about these con-
tracting vehicles or how to work with us,
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