

NRC Emergency Preparedness Fundamentals Workshop

Session 3

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U.S. Nuclear Regulatory Commission

Learning Objectives

1. State the reason for maintaining radiological emergency preparedness at nuclear facilities.
2. List the major events that have prompted changes to domestic emergency preparedness.
3. Identify the changes to domestic emergency preparedness as a result of the major events.

Learning Objectives

4. List the locations of the NRC's emergency preparedness regulations.
5. List the major activities of an emergency response.
6. List the onsite emergency response facilities.

Learning Objectives

7. List the offsite emergency response facilities.
8. List the Public Alert Notification (ANS/PANS) devices to notify the public of an emergency.
9. List the four emergency classification levels for nuclear power plants from least to most severe.

Learning Objectives

- 10. State when emergency classifications must be declared and by whom.
- 11. State when emergency notifications must be completed and to whom from whom.
- 12. List the two forms of emergency planning zones for operating nuclear power plants.

Learning Objectives

13. List the offsite protective actions, at what emergency classification level they are generally implemented, and where those actions take place.
14. Identify what conditions require protective action recommendations, when those must be issued, and to whom notification must be made.

What's In It For Me?

- What are the benefits of attending this training?
- What do you think are the rewards and recognition that may become after participating in this training?
- How do you see yourself engaging with your fellow attendants in this training?
- Social success
- Learning Culture

Activity

- Suppose that you are ...

Part 1: History of EP and Regulatory Development

Clarifications

- Focus on commercial nuclear power plants
 - (There are EP requirements for other NRC-licensed facilities.)
- EP is for **ALL** initiating events
 - Operational accident, natural disaster, or terrorist attack
 - Regardless of cause, EP objective is the same
 - Radiological consequences of hostile action can be no greater than operational reactor event
- EP and Incident Response are **NOT** the same
 - EP creates the response framework
 - Incident Response is the action itself
 - NRC role during Incident Response
 - Provide assistance and expertise
 - Evaluate licensee response
 - Interface with Federal family

Objective of Radiological Emergency Preparedness

- The overall objective of EP at NRC is to ensure that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency
 - Reasonable Assurance finding is made before a nuclear facility is licensed
 - Inspected over the lifetime of that facility
- Meeting this objective requires adequate preparedness both onsite and offsite.

About the NRC

- What does the NRC do?
 - The NRC licenses and regulates the civilian uses of radioactive materials in the United States to protect public health and safety, promote the common defense and security, and protect the environment.
- The focus of today's lesson is mainly on nuclear power plants, which are those nuclear facilities that are commercially operated to generate electrical power.

The Commission

- NRC headed by five Commissioners
 - President appoints Commissioners
 - Confirmed by Senate
 - Five-year terms
 - Term can be renewed
 - President designates one Commissioner as Chairman
 - Official Commission spokesperson
 - President can change Chairman designation at any time
 - President can not add or remove Commissioners without the consent of Congress
 - No more than 3 of the 5 Commissioners can be of the same political party
 - Policy decisions by the Commission require a majority vote



NRC Commissioners

The Commission



Kristine L. Svinicki, Chairman
Began Serving: March 2008
Term ending: June 2022



Jeff Baran
Began Serving: October 2014
Term Ending: June 2023



Stephen G. Burns
Began Serving: November 2014
Term Ending: June 2019



Annie Caputo
Confirmed: May 2018
Term Ending: June 2021



David Wright
Confirmed: May 2018
Term Ending: June 2020

NRC Staff

- NRC HQ in Rockville, MD, four regional offices, and a training center:
 - Region I King of Prussia, PA
 - Region II Atlanta, GA
 - Region III Lisle, IL
 - Region IV Arlington, TX
 - Technical Training Center, Chattanooga, TN
- Directed by Executive Director for Operations (EDO)
 - carries out policies and decisions of Commission

The Role of the NRC within the Federal Government

Executive Branch

- Created to “execute” the law
- Run the day-to-day activities of the government
- Comprised of several different entities:
 - Executive Office of the President
 - Support staff and Councils
 - Executive departments
 - Department of State, Department of Defense
 - Independent agencies and government corporations
 - NRC, Tennessee Valley Authority (TVA)
 - Quasi-Official agencies
 - Smithsonian Institution

Departments

- Heads of executive departments are members of Cabinet
- Cabinet members appointed by President
 - Confirmed by simple majority of Senate
- Cabinet members serve for that President while in office
 - President can remove member without consulting Senate
- These departments are sensitive to political factors and partisan politics

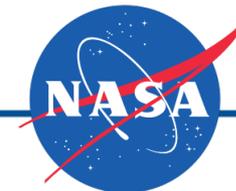


Independent Agencies

- Commissioners/Administrators typically appointed by President
 - Confirmed by simple Senate majority to fixed terms
 - President cannot remove from position
 - Requires act of Congress for removal
- Established and given authority and direction by Congress
 - Includes power of rulemaking
 - Matters too complex for ordinary legislation
- Agency rules (or regulations)
 - Authority derives from federal law
 - Code of Federal Regulations

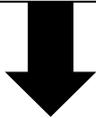
Independent Agencies

- Not under direct control of President
 - Partisan politics have less effect on daily operations or policy
- Examples
 - National Aeronautics and Space Administration
 - Federal Communications Commission
 - National Transportation Safety Board
 - Federal Reserve System
 - Central Intelligence Agency
 - Social Security Administration
 - Nuclear Regulatory Commission



Atomic Energy Act of 1954

Made development of commercial nuclear energy possible



Atomic Energy Commission (AEC)

- development and production of nuclear weapons
- development and regulation of civilian uses of nuclear materials
- Sought to ensure public health and safety without inhibiting nuclear industry growth

Energy Reorganization Act of 1974

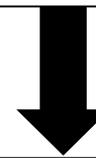
Addressed conflict of interest between regulating & promoting nuclear power



Nuclear Regulatory Commission

(Independent agency)

- license and regulate civilian nuclear materials
 - may enter into agreements to delegate authority over some materials to states
- license and regulate civilian nuclear facilities
- does not regulate defense nuclear facilities



Department of Energy

(Cabinet agency)

- development and production of nuclear weapons
- promotion of nuclear power
- other energy-related work

Atomic Energy Commission

- Existed before the NRC and Department of Energy.
 - Created in 1946
 - Assigned development of commercial nuclear power and regulating its safety
- NRC created in 1974
- Began operating in January, 1975

Department of Energy

- Energy Research and Development Agency created in 1974 from the breakup of the AEC.
- Evolved into the Department of Energy
 - Consolidated energy responsibilities among the Federal agencies.
 - Began operating on October 1, 1977

NRC and DOE

- NRC
 - Headed by 5 Commissioners
 - Independent regulator
 - Civilian uses of nuclear materials
- DOE
 - Headed by a cabinet level Secretary
 - Military uses of nuclear materials
 - Research and development of all forms of energy sources
 - Promotes energy policy
 - Regulates transmission and distribution of energy

History of EP Requirements

- 1958 – Atomic Energy Commission (AEC)
 - Outlines procedures for radiological emergency response
 - Emergency plans were vague, sketchy, and low in priority
 - Emphasis was placed on plant design adequacy
- 1966 – Advisory Committee on Reactor Safeguards (ACRS)
 - Raised concern regarding adequacy of emergency planning as plant size increased
- 1970 – AEC drafted guidelines for public comment
 - Existing requirements improved
 - New Appendix E to 10 CFR Part 50
 - Approved by Commission in December, 1970

History of EP Requirements

- 1970 – Appendix E to 10 CFR Part 50

ONSITE

- Assign duties and authorities of emergency response personnel
- Arrangements for working with local, State and Federal agencies to notify and evacuate the public
- Procedures for training personnel
- Conduct of drills and exercises

History of EP Requirements

- 1970 – Appendix E to 10 CFR Part 50

OFFSITE (licensees were responsible)

- Traffic Control
- Fire Protection
- Medical Support
- Decontamination
- Evacuation
 - Provide for transportation, shelter, food, sanitation

History of EP Requirements

- 1973 – AEC designated as lead agency for radiological emergency planning
 - AEC issues guidance to State and local governments
 - checklist of 154 items
 - Emphasized that emergency plans should cover most serious “design basis” accidents
- 1975 – January 19th
 - Nuclear Regulatory Commission created
 - Focused attention on protecting public health and safety

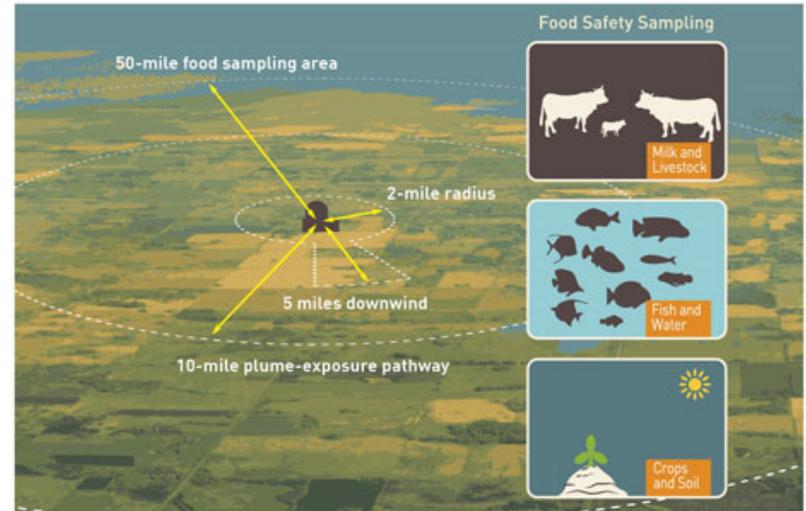
History of EP Requirements

- 1976 CRCPD and States requested guidance on the distance to which to plan
 - EPA and NRC established a task force to address the request
- 1977 NRC publishes Regulatory Guide 1.101
 - Detailed information on emergency plan content
- 1978 NRC and EPA task force created
 - NUREG-0396/EPA 52/1-78-16
 - **Recommends** 10 and 50 mile Emergency Planning Zones (EPZs)
 - Spectrum of accidents (not the source term from a single accident sequence) should be considered in developing a basis for emergency planning

Emergency Planning Zones

- Plume exposure pathway emergency planning zone (10 miles) for implementing prompt protective actions.
- Ingestion pathway emergency planning zone (50 miles) for protecting against contaminated food and water from entering the food chain.

Emergency Planning Zones



Note: A 2-mile ring around the plant is identified for evacuation, along with a 5-mile zone downwind of the projected release path.

History of EP Requirements

- Creation of FEMA
 - Before 1979, emergency response activities were fragmented
 - 100+ federal agencies involved
 - Compounded complexity of federal disaster relief efforts
 - National Governor's Association asked President Jimmy Carter to centralize Federal emergency functions

Federal Emergency Management Agency

- Happy Birthday FEMA!
 - Turns 40 this year
- Executive Order 12127
- Executive Order 12148
- Coordinates the emergency response to disasters within the US
- Absorbed responsibilities across the Federal government



FEMA

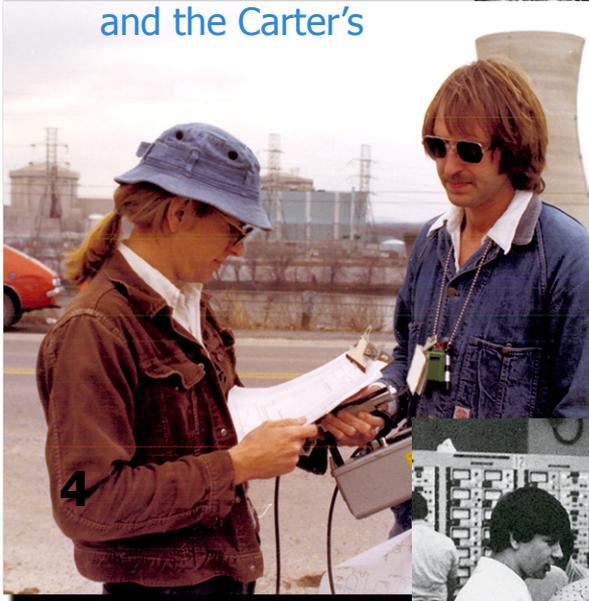


**NUCLEAR ACCIDENT AT
THREE MILE ISLAND**

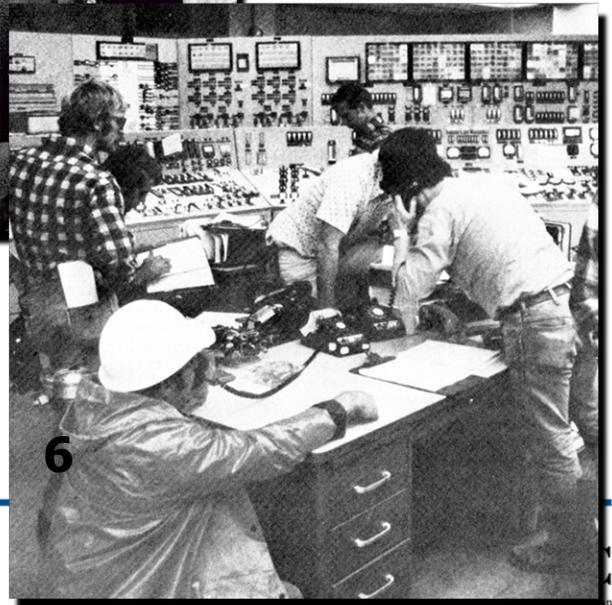
On March 28, 1979, and for several days thereafter -- as a result of technical malfunctions and human error -- Three Mile Island's Unit 2 Nuclear Generating Station was the scene of the nation's worst commercial nuclear accident. Radiation was released, a part of the nuclear core was damaged, and thousands of residents evacuated the area. Events here would cause basic changes throughout the world's nuclear power industry.

PANHANDLE HISTORICAL AND NUCLEAR COMMISSION 1999

1. The "JIC"
2. Gov. Thornburg and Pres. Jimmy Carter
3. Harold Denton and the Carter's



4. Rad Techs
5. Unit 2 CR (G. Miller plant mgr. on left)
6. Unit 2 Control Room



Three-Mile Island

- Precautionary evacuation of pregnant women and pre-school-age children within 5 miles
- ~140,000 people evacuated
- ~1/2 of the population within 20 miles



History of EP Requirements

- Post-Three Mile Island
 - General Accounting Office (GAO) recommends State/local emergency plans meet NRC guidelines
 - GAO urged adoption of EPZ concept
 - GAO called for measures to better inform the public
 - Kemeny Commission report (TMI investigation)
 - FEMA designated lead agency for offsite oversight
 - MOU delineating FEMA and NRC roles
 - NRC retained responsibility for judging whether or not the “overall state of emergency preparedness” was satisfactory for licensing, considering FEMA findings regarding offsite preparedness

History of EP Requirements

- 1980 – NRC authorization bill mandates stricter EP requirements
 - Licenses contingent on approved State/local plans
 - Concern State/local governments have veto authority
 - Congress declined to expand NRC’s authority to provide emergency plans for States that refused to cooperate
 - Legislation failed 3 times
 - Owners of existing plants had until April 1, 1981 to develop adequate plan

1980-1981

- In the aftermath of TMI, the NRC implemented the 16 planning standards in 10 CFR 50.47(b).
 - Together, the NRC and FEMA published NUREG-0654 / FEMA REP-1.
 - The recommended EPZ from NUREG-0396 were incorporated into the 1980 Final rule.
 - EPZs mandatory.
1. Assignment of responsibilities
 2. Onsite emergency organization
 3. Emergency response support
 4. Emergency classification system
 5. Emergency notification methods
 6. Emergency communications
 7. Public education and information
 8. Emergency facilities and equipment
 9. Accident assessment
 10. Protective response
 11. Radiological exposure control
 12. Medical and public health
 13. Recovery and reentry planning
 14. Exercises and drills
 15. Response training
 16. Plan development and review

History of EP Requirements

- 1982 – FEMA finds State/local plans deficient for Indian Point Units 2 & 3
 - Westchester County evacuation uncertainties
 - Rockland County refusal to participate in drill
 - State of New York substituted for Rockland County
 - Commission voted 3-2 to allow operation
 - NRC staff discussed creation of 2-mile “prompt” action zone within EPZ
 - Congress did not approve

1980's Shoreham

- Evacuation issue
- Suffolk County determined they couldn't evacuate
- Conducted low power testing, but never fully operated
- Long Island Power Authority bought the plant for \$1
- Dismantled in 1994
- FEMA consulting to the NRC issue
- Suffolk County filed to compel discovery of FEMA documents
- ASLB ruled FEMA consulted with NRC per regulations and MOU
- FEMA couldn't testify on intervenors' behalf.
- Ruling affirmed in appeals courts

1980's Seabrook

- Environmental and evacuation issues blocked opening for several years
- Utility requested exemption to NRC's rules
 - Argued 2 mile EPZ was sufficient
- Resolved by having beaches evacuated not at expected General Emergency but at a Site Area Emergency.
- Massachusetts refused to participate in exercise, would not prepare plans



1986 Chernobyl Accident

- Uncontrollable reactor conditions
 - Late-night safety test which simulated a station blackout power failure
 - Safety systems were intentionally turned off
 - RBMK design issues (Not like USA PWR/BWR design)
 - Reactor operators misarranging the core
- Result in a STEAM explosion that destroyed the reactor and building

History of EP Requirements

- 1987 – Realism Rule
 - Allows issuance of license in the absence of State/local government cooperation **if**:
 - Applicant made good faith effort to obtain cooperation
 - Applicant prepared achievable emergency with “likely State or local response to an actual emergency”
 - Based on assumption that State/local governments would protect public during event

History of EP Requirements

- 1992 – Turkey Point & Hurricane Andrew
 - Clarified roles between NRC and FEMA
 - FEMA reasonable assurance determination
 - MC 1601, “Communication Protocol For Assessing Offsite Emergency Preparedness Following a Natural Disaster”
 - Provides a process for NRC and FEMA to conduct a Disaster Initiated Review.
- 2000 – Reactor Oversight Process (ROP)
 - Emergency Preparedness is one of seven cornerstones

History of EP Requirements

- September 11th, 2001
 - NRC Operations Center activated for several months
- February 25th, 2002
 - Order issued to all nuclear power plants
 - Onsite worker evacuation
 - Alternate facilities
 - Onsite staffing
 - Security Emergency Action Level
 - These orders were incorporated into the 2011 Final EP Enhancements rule

History of EP Requirements

- 2004
 - Need for larger focus and increased communication of EP
 - Created Division of Preparedness and Response in Nuclear Security and Incident Response (NSIR)
 - EP staff rose from ~10 to >30 HQ employees
- 2005
 - Bulletin 2005-02, “Emergency Preparedness and Response Actions for Security-Based Events”
 - Comprehensive review of EP regulations and guidance
- FEMA changed
 - Absorbed by DHS as part of the Emergency Preparedness and Response Directorate on March 1, 2003.
 - Became FEMA again on March 31, 2007, but a part of DHS

History of EP Requirements

- March 11, 2011
 - Fukushima
 - Tsunami caused by earthquake damaged four reactor units
 - Core melt damage at three units
 - Offsite evacuations
 - NRC Ops Center activated 24/7 for two months
 - Near Term Task Force Recommendations
 - Plant modifications
 - EP to be enhanced to address multiple-unit events
- November 23, 2011
 - EP rule published in Federal Register
 - Effective date – December 23, 2011
 - Implementation dates vary by rulemaking topic

2006 - 2011 Rulemaking

- Security Requirements
 - Protective measures from NRC Bulletin 2005-02 and other Commission orders from 9/11
 - Maximize capability between Security and EP
 - Staffing and Alternate facilities
 - Notification of security events
 - Coordination between ERO and OROs
 - Security EALs
 - Protective actions
- Non-Security requirements
 - Challenging drills and exercises
 - Backup PANS
 - Emergency declaration timeliness
 - Performance-based EOF
 - ETE updating
 - Emergency plan change process

Review

- State the reason for maintaining radiological emergency preparedness at nuclear facilities.
- List the major events that have prompted changes to domestic emergency preparedness.
- Identify the changes to domestic emergency preparedness as a result of the major events.
- List the two forms of emergency planning zones for operating nuclear power plants.

Summary

- Emergency Preparedness has developed from something more than an afterthought to a robust system to respond to any emergency at a nuclear power plant.
- EP evolved using foresight to recognize weaknesses ahead of events and the lessons-learned from events.
- Emergency Preparedness will continue to evolve.