



# NRC's Role in Emergency Preparedness Regulations, Inspection, and Guidance

Informational Workshop

National Radiological Emergency Preparedness Conference

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Robert Kahler  
Team Leader

Nathan Sanfilippo  
Emergency Preparedness Specialist

# Presenters

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- Office of Nuclear Security and Incident Response (NSIR)
  - Division of Preparedness and Response (DPR)
    - Inspection and Communications Branch
      - Inspection Team
  
- Robert Kahler
  - [rek@nrc.gov](mailto:rek@nrc.gov), 301-415-2992
  
- Nathan Sanfilippo
  - [nts1@nrc.gov](mailto:nts1@nrc.gov), 301-415-3951

# Meet your presenters...

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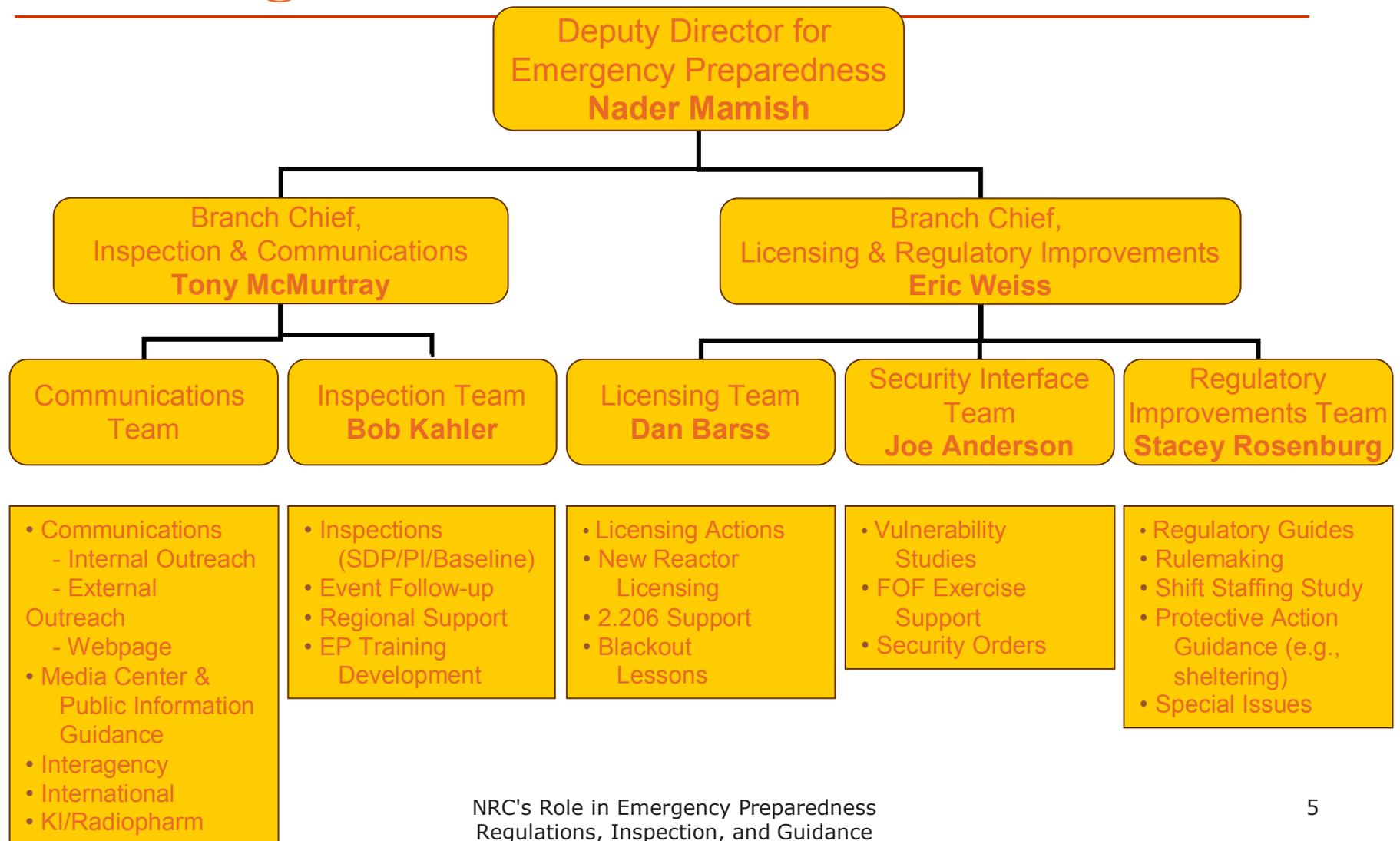
- Robert E. Kahler
  
- NRC
  - NSIR/DPR Inspection Team Leader
  
- Duquesne Light Company
  - Beaver Valley Power Station
    - EP Manager
    - Simulator / Classroom Instructor
    - SRO on both units
  - Shippingport Atomic Power Station
    - Reactor Operator

# Meet your presenters...

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- Nathan T. Sanfilippo
  
- NRC
  - NSIR/DPR Inspection Team
  - Inspector qualified
  - Nuclear Safety Professional Development Program graduate
    - Materials Engineering, Project Management, HQ Incident Response/Ops Officer, NRR Communications Analyst, Millstone Resident Office
  
- Past Experience
  - Penn State University – Materials (Ceramic) Engineering degree/Business minor
  - Powerex, Inc. – Intern Engineer

# EP Organization



# Workshop Overview

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- Introduction and History of EP
- Emergency Planning Zones (EPZs) and Emergency Action Levels (EALs)
- EP Regulations and Guidance
- EP Inspection Program
- NRC, DHS, and Offsite Preparedness
- EP/Security Interface

# Introduction and History of EP



# Topics:

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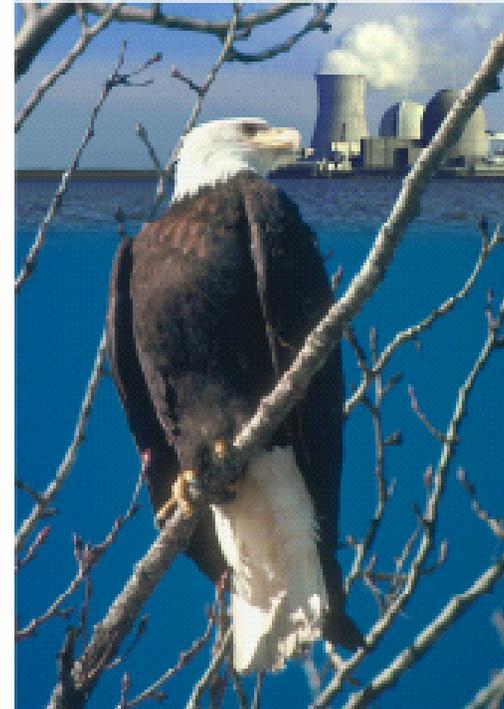
- ❑ What is Emergency Preparedness?
- ❑ Why prepare?
- ❑ History of EP



## Protecting Our Nation

*Since 9-11-01*

A Report of the U.S. Nuclear Regulatory Commission



# What is Emergency Preparedness?

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- What is the overall objective of Emergency Preparedness at the NRC?
  - To ensure that the nuclear power plant operator is **capable** of **implementing adequate measures** to protect public health and safety in the event of a radiological emergency

# Philosophy

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- How do we ensure that the licensee is always capable of protecting public health and safety during an accident?
  - Defense-in-depth
  - EP does not factor in the small chance that a radiological event may occur. EP requires a constant state of readiness in case it does occur.
  - Last line of defense

# Regulations

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- What are adequate measures?
  - To ensure that when that accident does happen, all steps to prepare have been taken.
    - 10 CFR 50.47
    - 10 CFR 50 Appendix E
    - Supporting documentation



# Components

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- What is required of an onsite Emergency Plan?
  - Documentation
    - Emergency Plan, Implementing Procedures, EALs
  - People
    - On-call, trained, positions
  - Facilities
    - Equipment, maintenance, power/survivability, notification means
  - Agreements
    - Offsite assistance

# Why prepare?

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- ❑ Prudence – to prepare for a radiological release, regardless of how unlikely it may be
- ❑ Planning – to have a strategy (with supporting infrastructure) put in place to be activated during an emergency
- ❑ Training and practice – to maintain the human expertise needed to conduct a well organized response
- ❑ Examples:
  - Emergency Plan
  - NRC Operations Center
  - Fire drill

# Clarifications

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- ❑ This course focuses on EP for fixed nuclear power facilities
- ❑ Emergency Preparedness is for **ALL** initiating events
  - Operational accident, natural disaster, or terrorist attack
  - Regardless of the cause of the event, the EP response will be the same – to protect the public from radiological consequences
  - The consequences of a terrorist attack can be no greater than those of a traditional reactor accident
- ❑ Emergency Preparedness and Incident Response are **NOT** the same
  - EP creates the response framework and requires action during Incident Response – which is the action itself
  - They go hand in hand
  - During Incident Response, NRC takes the role of helper, rather than inspector

# History of Emergency Preparedness Requirements – Pre-TMI

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- 1958 – Atomic Energy Commission (AEC) outlines procedures for dealing with radiological emergencies
  - Emergency plans were vague, sketchy, and low in priority
- 1966 – Advisory Committee on Reactor Safeguards (ACRS) raised concern regarding emergency planning
  - No longer certain containment would remain intact under all conditions in a severe accident
- 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 Emergency Preparedness Requirements – Pre-TMI

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## □ 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 Emergency Preparedness Requirements – Pre-TMI

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- 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 Emergency Preparedness Requirements – Pre-TMI

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- 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 19<sup>th</sup>
  - Nuclear Regulatory Commission created
  - Focused attention on protecting public health and safety

# History of Emergency Preparedness Requirements – Pre-TMI

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- 1977 – NRC publishes Regulatory Guide 1.101
  - More detailed information on what should be included in emergency plans
- 1978 – NRC-EPA task force developed
  - NUREG-0396 created
  - Emergency Planning Zones (EPZs) created
  - Spectrum of accidents (not the source term from a single accident sequence) should be considered in developing a basis for emergency planning

# History of Emergency Preparedness Requirements – Pre-TMI

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## □ Creation of FEMA

- Before 1979, emergency and disaster activities were fragmented
- More than 100 federal agencies were involved in some aspect of disasters, hazards, and emergencies; compounding the complexity of federal disaster relief efforts
- The National Governor's Association asked President Jimmy Carter to centralize federal emergency functions to decrease the many agencies with whom State and local governments were forced to work
- President Carter's 1979 executive order merged many of the separate disaster-related responsibilities into a new Federal Emergency Management Agency (FEMA)



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# History of Emergency Preparedness Requirements – TMI

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- 1979
  - Three Mile Island accident
  - General Accounting Office (GAO) recommends NRC license plants where 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 (created in '78)
  - MOU delineating FEMA and NRC roles
    - On the basis of FEMA's assessment, NRC retained responsibility for judging whether or not the "overall state of emergency preparedness" was satisfactory

# History of Emergency Preparedness Requirements – Post-TMI

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- 1980 – NRC authorization bill mandates stricter EP requirements
  - Licenses would be contingent upon NRC approved State/local plans
  - Concern that State or local governments would have a veto on plant operations
  - Congress declined to expand NRC's authority to provide emergency plans for States that refused to cooperate – legislation failed 3X's
  - Owners of existing plants had until April 1, 1981 to develop adequate plan

# History of Emergency Preparedness Requirements – Controversy

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- 1982 – FEMA finds State/local plans deficient for Indian Point 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

# History of Emergency Preparedness Requirements – Controversy

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- 1982 – Shoreham
  - Consultant concluded 10 mile EPZ was inadequate (25% of residents would leave island)
  - Suffolk County Executive and New York Governor (Cuomo) refused to cooperate with emergency planning efforts
  - Long Island Lighting Co (LILCO) argued State/local agencies were misusing NRC's regulations
- 1986 – Seabrook
  - Controversy of evacuation/sheltering of beaches
  - Massachusetts refused to participate in exercise and would not prepare plans
  - Utility requested exemption to NRC's rules
    - Argued 2 mile EPZ was sufficient
- 1986 – Chernobyl

# History of Emergency Preparedness Requirements – Controversy

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## □ 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 an emergency plan that seem achievable with a “likely State or local response to an actual emergency”
- Based on assumption that State/local governments would protect public

# History of Emergency Preparedness Requirements

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- 1992 – Turkey Point & Hurricane Andrew
  - Clarified roles between NRC and FEMA
  - Due to devastation of hurricane, FEMA reasonable assurance was not determined
  - MC 1601, “Communication Protocol For Assessing Offsite Emergency Preparedness Following a Natural Disaster”
- 2000 – Reactor Oversight Process (ROP)
  - Emergency Preparedness becomes one of the seven cornerstones of safety as the ROP is launched

# History of Emergency Preparedness Requirements – 9/11/2001

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- September 11<sup>th</sup>, 2001
  - Terrorist events cause activation of the NRC Operations Center for several months following the attacks
- 2002 – NRC issues Orders to all 104 nuclear power plants to implement interim compensatory measures for the high-level terrorist threat environment,
  - which included 3 items addressing Emergency Preparedness

# History of Emergency Preparedness Requirements – NSIR/DPR & DHS

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- 2004 – NRC identifies the need for a larger focus on and increased communication of its emergency preparedness activities
  - The Division of Preparedness and Response was created within NSIR
  - EP staff levels rose from ~10 to ~30 HQ employees
  - A new training course was created to increase awareness of EP internally and externally
- 2005 – Responsibility for offsite radiological emergency preparedness is now with the Department of Homeland Security

End



# EPZs and EALs



# Topics:

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- Defense-in-Depth
- Protective Action Guides
- Emergency Planning Zones
- Emergency Classes
- Emergency Action Levels

# Defense-in-Depth Safety Philosophy

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- Requires high quality design, construction, and operation
  - Reduces likelihood of malfunctions
  - Requires safety systems
    - Recognizes equipment can fail
    - Recognizes operators can make mistakes
  - Requires containment structures
  - Emergency Planning to provide public protective actions

# Planning Philosophy

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- Planning reduces the complexity of decisions required to effectively protect the public
- Planning simplifies the choice of possible responses so that judgment is required only for viable and useful alternatives

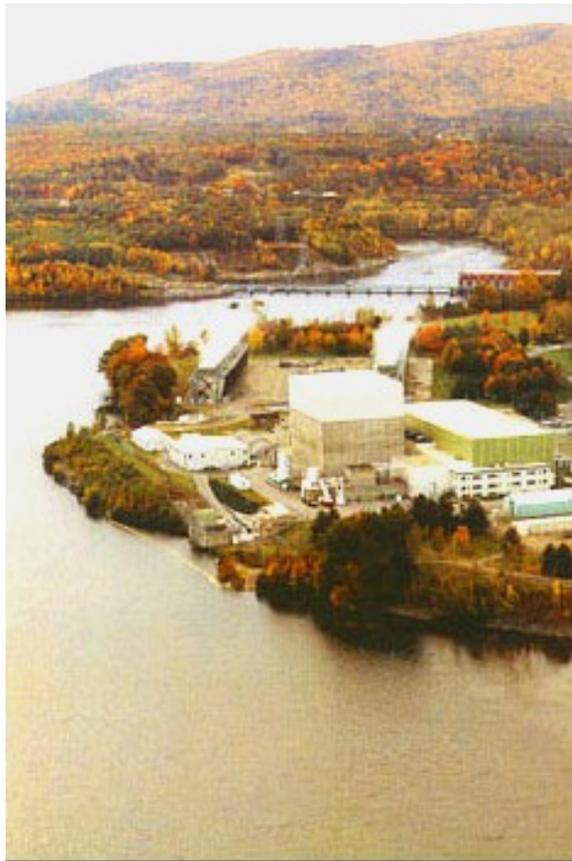
# Protecting Public Health and Safety

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- What radioactive exposure do we need to protect the public from?
  - Protective Action Guides
- What strategies do we use to do that?
  - Emergency Planning Zones
  - Emergency Plans
  - Emergency Action Levels
- What tools are at our disposal?
  - Facilities
  - Equipment
  - People

# 2 Pieces of Emergency Preparedness

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Offsite

Onsite



# EPA-400

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- ❑ “Manual of Protective Action Guides and Protective Actions for Nuclear Incidents”
- ❑ Provides radiological protection guidance to assist officials in creating emergency response plans and making decisions during emergencies
- ❑ Source of Protective Action Guidelines (PAGs) for specific exposure pathways
- ❑ Suggested protective actions based on dose assessment/PAGs

# Protective Action Guide (PAG)

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- ❑ A PAG is the projected dose to a reference individual from an unplanned release of radioactive material at which a specific protective action to reduce or avoid that dose is recommended
- ❑ To be used as guidance for triggering appropriate protective actions to minimize dose
- ❑ At the PAG levels, no health effects would be detectable, even for sensitive populations such as pregnant women

# PAGs

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- ❑ Established by the EPA and FDA
- ❑ Current guidance: EPA-400, October 1991
  - 1-5 rem warrants evacuation or sheltering
  - 25 rem to the thyroid warrants administration of stable iodine
- ❑ Based on projected dose
  - does not count dose already received

# Emergency Planning Zones

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- Plume Exposure Pathway
  - 10 mile radius
- Ingestion Exposure Pathway
  - 50 mile radius

# EPZs

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## □ Plume Exposure Pathway

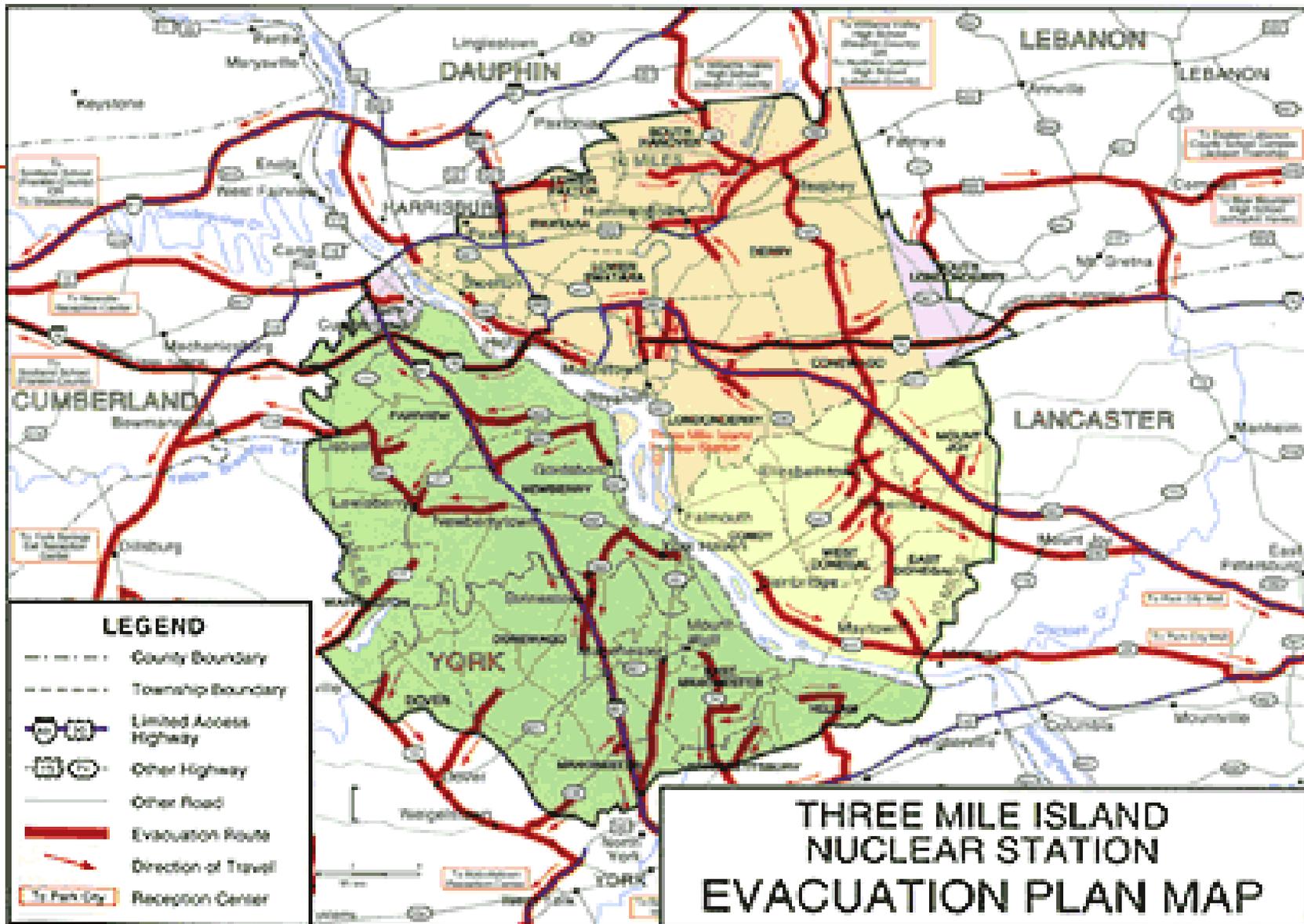
- Area requiring possible immediate protective action to reduce public risk
- Approximately 10 miles in radius
- Sized based upon:
  - Projected doses from design basis accident (DBA) do not exceed EPA Protective Action Guide (PAG) levels outside the zone
  - Immediate life-threatening doses would generally not occur outside zone for worst-case core melt sequence
  - 10 mile EPZ provides base for expansion if necessary

# EPZs

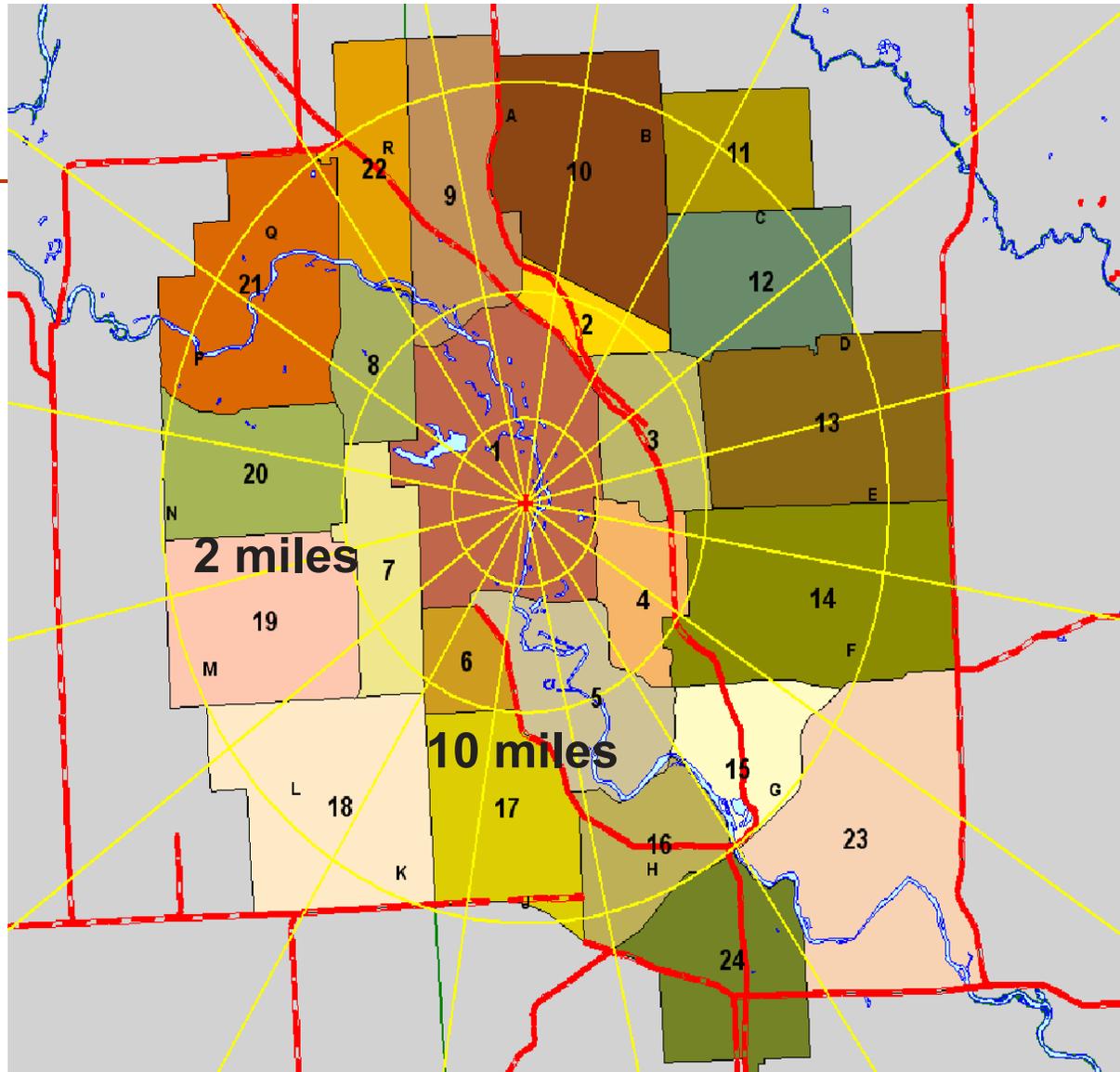
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- Plume Exposure Pathway
  - Boundaries typically determined by topography and political jurisdictions
    - Roads, rivers, lakes, peninsulas
    - Municipal, County, State jurisdictions





This map directs motorists to corridors for prompt exit outside of the emergency planning zone.  
 3 For specific locations and directions to care centers, refer to evacuation descriptions for your municipality.



# EPZs

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## □ Plume Exposure Pathway

### ■ Provisions for action within EPZ

- Prompt decision making for public protective actions
- Development of evacuation plans
- Public information program
- Prompt public alerting and notification protective actions
- 24 hour communication capability between licensee and State/local officials
- Monitoring of offsite radiological release
- Activating & maintaining Emergency Operations Centers

# IMPORTANT EMERGENCY INFORMATION

FOR THESE COLUMBIANA COUNTY COMMUNITIES:

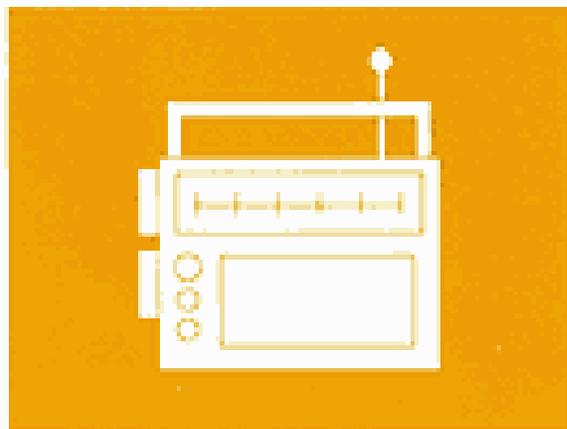
- EAST LIVERPOOL, FIRST WARD • EAST LIVERPOOL, SECOND WARD • EAST LIVERPOOL, THIRD WARD
- EAST LIVERPOOL, FOURTH WARD • LIVERPOOL, TOWNSHIP EAST • LIVERPOOL, TOWNSHIP WEST
- MIDDLETON TOWNSHIP (EAST OF 170 AND SOUTH OF TOWNSHIP ROAD 1000) • ST. CLAIR TOWNSHIP (EAST OF CANNON MILLS ROAD)

THIS INFORMATION IS IMPORTANT. DO NOT DISCARD. KEEP IN A HANDY PLACE, DISPLAY IT PROMINENTLY.



DO YOU  
KNOW WHAT  
TO DO WHEN  
THE ALERT  
SIREN\*  
SOUNDS?

TURN ON  
YOUR RADIO  
OR TV!



\*The Alert siren signal is a steady, three-minute tone. It will be used to alert of an impending natural emergency (such as a flood, tornado, or earthquake) or a man-made emergency (such as a chemical spill or a nuclear power plant emergency). If you hear the Alert signal . . . Turn on your radio or TV for instructions.

This brochure has been prepared and printed by Duquesne Light Company, in cooperation with the County of Columbiana Board of Commissioners and the Columbiana County Emergency Management Agency.

## RECEPTION CENTERS

# For Hospitals, Nursing Homes and Schools within ten miles of River Bend Station

## Emergency Planning Background Information

**FOR PLANNING PURPOSES, THERE ARE FOUR CLASSES OF EMERGENCIES AT NUCLEAR POWER PLANTS.**

Local officials may use these terms:

### Notification of Unusual Event

A minor problem has taken place. No release of radioactive matter is expected. Federal, state and parish officials will be told of this. You will not have to do anything.

### Alert

This is also a minor problem. No release of radioactive matter is expected. All the officials will be told of this and will be asked to stand by. It is not likely that you will have to do anything.

### Site Area Emergency

This is a more serious problem. Small amounts of radioactive matter could be released into the area right around the plant. If you need to take special action, sirens will be turned on. Turn on your radio for more information. All officials will be ready to help you, if needed.

### General Emergency

This is the most serious kind of problem. Radioactive matter could be released outside the plant site. You may have to protect yourself. If action is needed, the sirens will be turned on. Turn on your radio for more information. The officials will tell you what you need to do.



# EPZs

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## ◆ Ingestion Exposure Pathway

- Area in which plans exist for protecting public from consumption of contaminated food
- Considerable time to action (typically at State level)
- Approximately 50 miles in radius
- Sized based upon:
  - ◆ Contamination will not exceed PAGs beyond 50 miles due to wind shifts during release and travel periods
  - ◆ Particulate material would be deposited within 50 miles
  - ◆ Likelihood of exceeding PAGs at 50 miles is comparable to exceeding PAGs at 10 miles

# Brief History of EPZs

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## □ 1970s

- Dilemma – federal government does not have statutory authority over offsite agencies
- Accomplished on a cooperative basis
- Growing concern over ability of State and local governments to respond to nuclear incident
- NRC publishes NUREG-75/111, “Guide and Checklist for Development and Evaluation of State and Local Government Radiological Emergency Response Plans in Support of Fixed Nuclear Facilities” and NUREG-0396

# Brief History of EPZs

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- 1978 – Established concept of EPZs
  - Joint NRC/EPA task force findings
    - Major threat for DBA in range of 2-3 miles
    - Establishment of EPA PAGs and 10 mile EPZ appeared conservative approach
    - Response not necessary in entire 10 mile EPZ, but planning mechanisms would be in place

# Relationship between PAGs and EPZs

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- PAGs to be utilized as trigger for appropriate protective actions
  - Protect public health and safety
  - Minimize exposure to general public and emergency workers
  - It is not to be used as acceptable dose limits
  - PAGs and EPZs complement each other
    - Not to be used to determine EPZ size

# Onsite EP

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- Technical Support Center (TSC)
  - Established because extra personnel in the Control Room can congest and confuse the situation
  - Diagnose and mitigate the event
    - Access to technical data
    - Responsible for engineering support
  - Staffing a TSC typically requires about 30 minutes during normal operating hours
  - Located close to Control room to allow for fast access

# Onsite EP

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- Operations Support Center (OSC)
  - Established to relieve the influx of emergency response personnel in the Control Room
  - A place for emergency response personnel to receive instruction and coordination by the operations support staff
  - Coordination of damage control teams

# Emergency Operations Facility

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- ❑ Near-site\*
- ❑ Primary responsibility for licensee response to severe accidents
- ❑ Receives turnover from TSC
- ❑ Organization
  - Emergency Director
  - Communications
  - Public information
  - Accident analysis
  - Dose assessment/offsite monitoring
  - Protective actions
  - State and county liaisons
  - Support

# Offsite EP Interface

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- State/local 24 hour communication
- 2 activity levels of interest at State level
  - Technical assessment of situation
    - Dose Assessment
  - Decision Makers

# Offsite EP

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- Joint Information Center (JIC)
  - Coordination point for licensee dissemination of public information
  - State/county liaisons
  - Media liaisons
  - Location for media briefings and news conferences

# JIC



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# Event Classification

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## □ Emergency Classes

- Notification of Unusual Event (NOUE or UE)
- Alert
- Site Area Emergency (SAE)
- General Emergency (GE)

# Class definitions

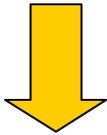
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- Unusual event
  - Events are in progress or have occurred which indicate a ***potential degradation of the level of safety of the plant.***
    - No release expected
- Alert
  - Events are in progress or have occurred which involve actual or potential ***substantial degradation of the level of safety of the plant.***
    - Any release is expected to be a small fraction of EPA PAG levels
- Site Area Emergency
  - Events are in progress or have occurred which involve actual or likely ***major failures of plant functions needed for protection of the public.***
    - Any release is not expected to exceed EPA PAG levels near the site boundary
- General Emergency
  - Events are in progress or have occurred which involve an actual or imminent ***substantial core degradation or melting with the potential for loss of containment integrity.***
    - Releases can be reasonably expected to exceed EPA PAG levels offsite
    - NOTE: a GE does **NOT NECESSARILY** mean that a release is in progress

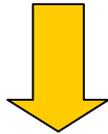
# Flow of Events

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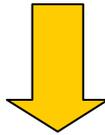
□ Initiating Conditions



□ Emergency Action Levels



□ Emergency Classifications



□ Offsite Actions

# Initiating Conditions

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- One of a predetermined subset of nuclear power plant conditions where either the potential exists for a radiological emergency, or such an emergency has occurred.
  - For example:
    - Measurable parameter (RCS temperature)
    - Event (fire, flood, security)
    - Barrier breach (RCS pipe break)

# Emergency Action Levels (EALs)

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- A pre-determined, site-specific, observable threshold for a plant Initiating Condition that places the plant in a given emergency class.
  - An EAL can be:
    - Instrument reading
    - Equipment status indicator
    - Measurable parameter
    - Discrete, observable event
    - Results of analyses
    - Entry into emergency operations procedures

# EAL Example

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- Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT
- Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes.
- Operating Mode Applicability:
  - Power Operation
  - Startup
  - Hot Standby
  - Hot Shutdown
- Example Emergency Action Level:
  - 1. Loss of power to (site-specific) transformers for greater than 15 minutes.
- AND**
  - At least (site-specific) emergency generators are supplying power to emergency busses.
- Basis:
  - Prolonged loss of AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete Loss of AC Power (e.g., Station Blackout). Fifteen minutes was selected as a threshold to exclude transient or momentary power losses. Plants that have the capability to cross-tie AC power from a companion unit may take credit for the redundant power source in the associated EAL for this IC. Inability to effect the cross-tie within 15 minutes warrants declaring a NOUE.

# Summary

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	UE	Alert	SAE	GE
ERO	On-shift staff	Augmented	Augmented	Augmented
Facility	Control Room	TSC/OSC/EOF (staffing)	TSC/OSC/EOF (turnover/control)	TSC/OSC/EOF (control)
ORO	Notified	Staffing	Preliminary Protective Actions	Protective Actions

End



# EP Regulations and Guidance



# Topics:

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- ❑ 10 CFR 50.47(b) -- The 16 Planning Standards
- ❑ 10 CFR 50 Appendix E
- ❑ 10 CFR 50.54(q)
- ❑ 10 CFR 50.54(t)
- ❑ Supporting Guidance



# 10 CFR 50.47(b)

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- 16 Emergency Planning Standards
  - A high-level set of standards to be applied to emergency planning
    - Further detail on how to practically apply the planning standards is contained in Appendix E and NUREG 0654
  - Must be met in licensee and State and local emergency plans

# 10 CFR 50.47(b)(1)

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- **Primary responsibilities for emergency response** by the nuclear facility licensee and by State and local organizations within the EPZs **have been assigned**, emergency responsibilities of the various supporting organizations have been specifically established, and **each principal response organization has staff to respond and to augment its initial response on a continuous basis.**
  
- ***Translated:***
  - Responsibilities for onsite/offsite personnel/organizations are established to support 24/7 coverage
  
- ***Examples:***
  - Emergency response organizational chart
  - Position descriptions

# 10 CFR 50.47(b)(2)

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- ❑ On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available and the interfaces among various onsite response activities and offsite support are specified.
  
- ❑ **Translated:**
  - Transition from normal duties to emergency responsibilities; ensuring sufficient onshift emergency staff at all times; timely augmentation of onshift staff; and identifying offsite emergency resources
  
- ❑ **Examples:**
  - Shift Manager to Emergency Director
  - Shift Staffing Schedule to Support Onshift Emergency Response
  - Table B-1
  - Identify local ambulance agency(s), fire department(s), police, hospital(s), etc. and obtain MOU's

# 10 CFR 50.47(b)(3)

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- Arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and local staff at the licensee's near-site EOF have been made, and other organizations capable of augmenting the planned response have been identified.
  
- ***Translated:***
  - Federal, State, and local governmental assistance is arranged with space available in EOF for their response and other technical organizations as needed by the plan
  
- ***Examples:***
  - INPO
  - Utility Owner's Groups
  - Coast Guard

# 10 CFR 50.47(b)(4)

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- A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.
  
- **Translated:**
  - Ability to classify an emergency via a standard scheme
- **Examples:**
  - Emergency Action Levels
  - ORO Standard Operating Plans (SOPs) entry conditions

# 10 CFR 50.47(b)(5)

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- ❑ Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow-up messages to response organizations and the public have been established; and the means to provide early notification and clear instruction to the populace within the plume exposure pathway EPZ have been established.
  
- ❑ ***Translated:***
  - Capability to provide notification and response instructions to onsite/offsite emergency response personnel and the public.
  
- ❑ ***Examples:***
  - Call out list
  - Notification Forms
  - EAS Messages
  - ANS
  - Tone Alert Radios

# 10 CFR 50.47(b)(6)

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- Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public.
  
- ***Translated:***
  - Have plans for contacting all necessary OROs and emergency personnel
  
- ***Examples:***
  - Pagers, Cell Phones, Blackberries
  - ENS
  - Direct ringdown phones from licensee to counties/States

# 10 CFR 50.47(b)(7)

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- Information is made available to the public on a periodic basis on how they will be notified and what their initial actions should be in an emergency, the principal points of contact with the news media for dissemination of information during an emergency are established in advance, and procedures for coordinated dissemination of information to the public are established.
  
- **Translated:**
  - Information on nuclear power plant emergencies shall be provided annually to the general public and the media
  
- **Examples:**
  - JICs
  - Phone Books
  - Annual Mailers, Calendars
  - Annual Media Training

# 10 CFR 50.47(b)(8)

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- Adequate emergency facilities and equipment to support the emergency response are provided and maintained.
  
- ***Translated:***
  - Provide and maintain all facilities and equipment necessary to support emergency response at all times.
  
- ***Examples:***
  - TSC, EOF, OSC, EMAs
  - Air Samplers, Computers, FAX machines, UPS
  - Met towers

# 10 CFR 50.47(b)(9)

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- Adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use.
  
- **Translated:**
  - Ability to monitor and assess radiological release
  
- **Examples:**
  - Dose modeling software (RASCAL)
  - Radiation monitors

# 10 CFR 50.47(b)(10)

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- A range of protective actions has been developed for the plume exposure pathway EPZ for emergency workers and the public. In developing this range of actions, consideration has been given to evacuation, sheltering and as a supplement to these, the prophylactic use of potassium iodide as appropriate. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place and protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed.
  
- **Translation:**
  - Have a set of preplanned protective actions (that must consider evacuation and sheltering – potassium iodide is a possible supplement, but not a replacement) that can be implemented based on radiological conditions for both EPZs
  
- **Examples:**
  - Evacuation sector maps
  - Onsite Assembly Areas
  - List of Dairy Farms within 50 miles

# 10 CFR 50.47(b)(11)

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- Means for controlling radiological exposures, in an emergency, are established for emergency workers. The means for controlling radiological exposures shall include exposure guidelines consistent with EPA Emergency Worker and lifesaving Activity Protective Action Guides.
  
- **Translated:**
  - Have a plan for protecting and directing plant personnel that must respond to radiological hazards during an emergency and base it on the EPA guidance
  
- **Examples:**
  - Life-saving dose levels identified and those who can authorize entry
  - Emergency worker dosimetry both onsite and offsite

# 10 CFR 50.47(b)(12)

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- ❑ Arrangements are made for **medical services for contaminated injured individuals**.
  
- ❑ ***Translated:***
  - Arrangements made with ambulance and hospitals responsible for contaminated personnel
  
- ❑ ***Examples:***
  - Evaluated drills with ambulance and hospital personnel
  - Onsite emergency medical squads

# 10 CFR 50.47(b)(13)

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- General plans for recovery and reentry are developed.
  
- ***Translated:***
  - Create a framework for recovering from an emergency
  
- ***Examples:***
  - Event Termination and/or de-escalation criterion pre-established in the emergency plan

# 10 CFR 50.47(b)(14)

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- **Periodic exercises are (will be) conducted** to evaluate major portions of emergency response capabilities, periodic drills are (will be) conducted to develop and maintain key skills, and **deficiencies identified as a result of exercises or drills are (will be) corrected.**
  
- ***Translated:***
  - Evaluated and training exercises/drills are conducted to identify and correct weaknesses and maintain proficiency
  
- ***Examples:***
  - Biennial Evaluated Exercise (DHS)
  - Licensed Operator Requal (LOR) Drills
  - Fire Drills
  - Critiques

# 10 CFR 50.47(b)(15)

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- Radiological emergency response training is provided to those who may be called on to assist in an emergency.
  
- **Translated:**
  - Training to onsite and offsite emergency response personnel
  
- **Examples:**
  - Fire Department training on decontamination efforts
  - Classroom training on classifying emergencies

# 10 CFR 50.47(b)(16)

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- Responsibilities for plan development and review and for distribution of emergency plans are established and **planners are properly trained**.
  
- ***Translation:***
  - An emergency planning department is established with qualified personnel
  
- ***Examples:***
  - Initial and continuous training of EP department staff
  - Annual review of emergency plan

# 10 CFR 50 Appendix E

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- “Emergency Planning and Preparedness for Production and Utilization Facilities”
- Contains the requirements for emergency plans that support the 16 planning standards
- Examples
  - Requires the capability to notify State and local authorities within 15 minutes of emergency declaration
  - Defines equipment and facility needs
  - Defines exercise and training expectations

# 10 CFR 50.54(q)

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- Allows licensees to make changes to their emergency plan without prior Commission approval as long as it does not represent a Decrease in Effectiveness (DIE) of the plan



# 10 CFR 50.54(t)

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- ❑ Requires a periodic review of the licensee's EP program
  - A deliberately critical examination, including observation of plant operation, evaluation of audit results, procedures, certain contemplated actions and after the fact investigations of abnormal conditions
- ❑ Review conducted by persons having no direct responsibility for implementation of Emergency Preparedness Program Evaluation of adequacy of interfaces with State and local governments
- ❑ Evaluation of licensee's drills and exercises and emergency response capabilities
- ❑ Results of review and recommendations are documented
  - Results are reported to corporate and plant management
  - Report retained for 5 year period
  - Report is made available to State and local governments

# 10 CFR 50.72

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## □ Licensee notifications to NRC

### ■ Emergencies

- Notify the NRC immediately following notification of State and local agencies and not later than one hour after declaration
- Immediately notify NRC of emergency class escalation

### ■ Non-emergency events

- One, four, and eight hour reports
- EP related eight hour report: 10 CFR 50.72(b)(3)(xiii)
  - Any event that results in a major loss of emergency assessment capability, offsite response capability, or offsite communications capability (e.g., significant portion of control room indication, ENS, or offsite notification system).

# NUREG-0654/FEMA-REP-1

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- ❑ “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants”
- ❑ Product of a joint NRC/FEMA Steering Committee
- ❑ Guidance and criteria for satisfying 10 CFR 50.47(b) and Appendix E
- ❑ Generic, systematic approach to EALs
- ❑ Organized to link back to the regulations

# Alternate EAL Schemes

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- ❖ Products of NRC and industry
  - ❖ Acceptable alternatives to NUREG-0654 EAL Scheme
- ❖ NUMARC/NESP-007, "A Methodology for Development of Emergency Action Levels"
  - ❖ Endorsed by Reg Guide 1.101, rev. 3
- ❖ NEI 99-01, "Methodology for Development of Emergency Action Levels"
  - ❖ Endorsed by Reg Guide 1.101, rev. 4
  - ❖ Added EALs for permanently shutdown reactors and dry cask spent fuel storage
  - ❖ Improvements to NUMARC/NESP-007
- ❖ Cannot mix portions of methodologies

# Generic Communications

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- ❑ Used to inform industry of generic issues relating to emergency preparedness
- ❑ Bulletins, Generic Letters, Regulatory Issue Summaries, Information Notices
- ❑ Recent examples:
  - RIS 2004-13 – Consideration of Sheltering
  - RIS 2004-15 – EP Issues: Post 9/11
  - IN 2004-19 – Backup power supplies to ERFs
  - RIS 2005-02 – 10 CFR 50.54q
  - Bulletin 2005-02 – EP Enhancements
  - RIS 2006-03 – Guidance on Exercise Exemptions
- ❑ A complete list of EP-related generic communications can be found at:  
<http://www.nrc.gov/what-we-do/emerg-preparedness/regs-guide-comm/ep-generic-comm.html>

End



# EP Inspection Program and Enforcement

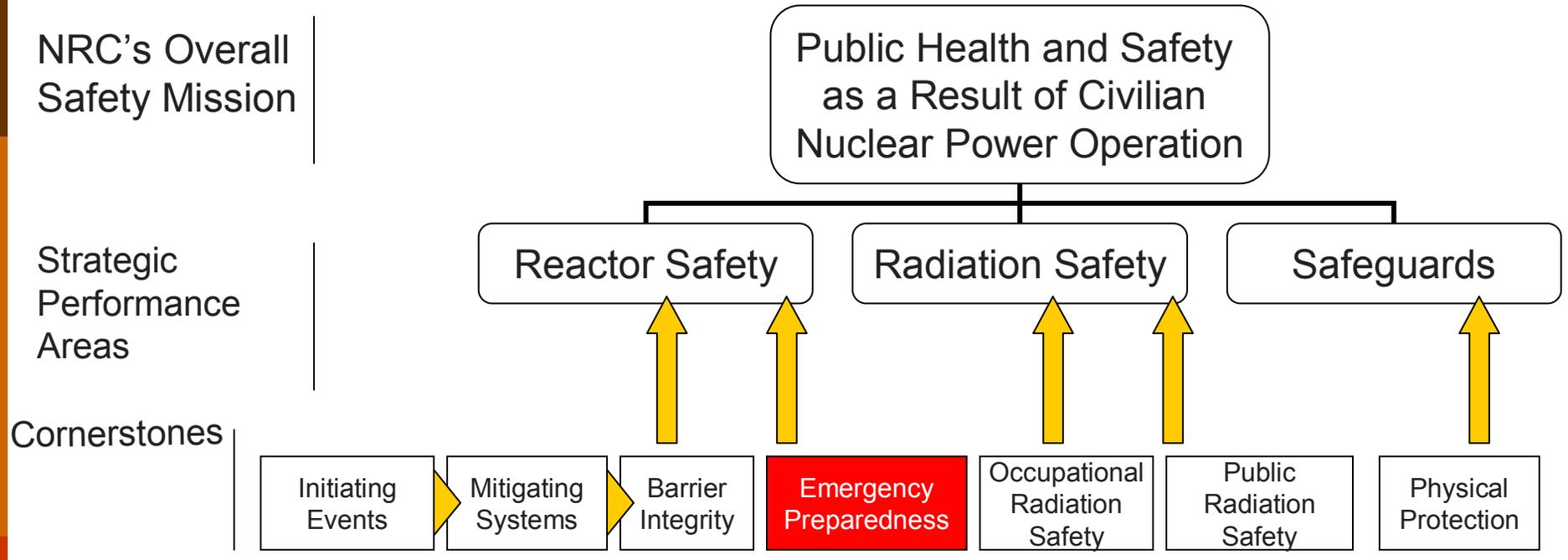


# Topics:

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- ROP Framework
- EP Performance Indicators
- EP Baseline Inspection Program
- EP Significance Determination Process

# Regulatory Framework



Cross-cutting Issues

3/27/06

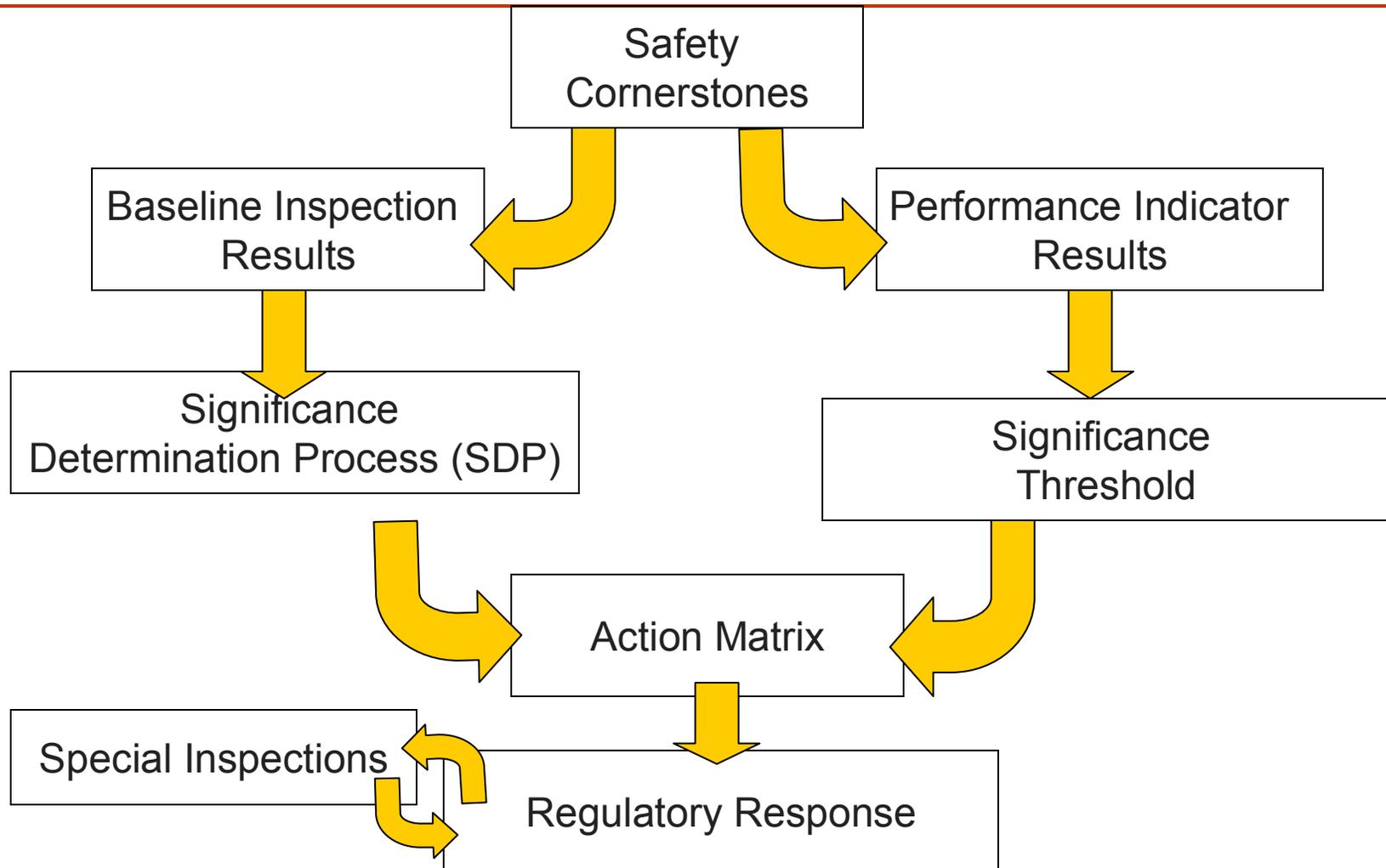
Human Performance

Safety Conscious Work Environment

Problem Identification and Resolution

NRC's Role in Emergency Preparedness Regulations, Inspection, and Guidance

# Performance Assessment



# Finding Colors / Significance Levels

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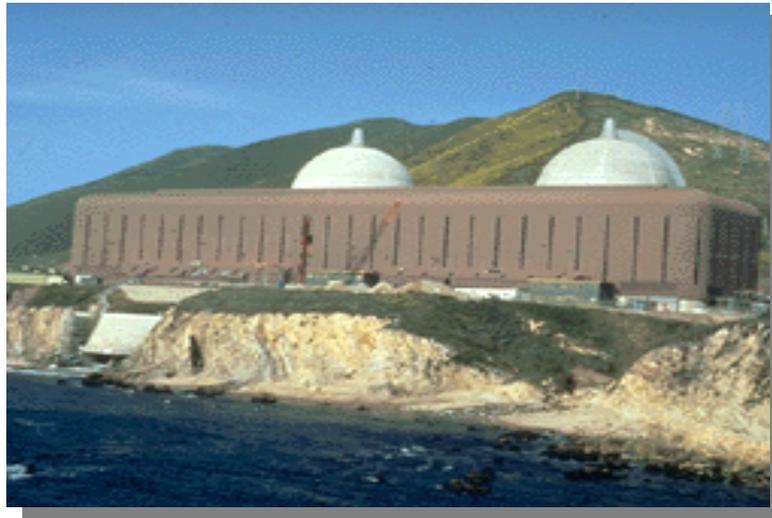
- **Green** Very low safety significance (licensee response band)
- **White** Low to moderate safety significance (increased regulatory response band)
- **Yellow** Substantial safety significance (required regulatory response band)
- **Red** High safety significance (unacceptable performance band)

# Emergency Preparedness Cornerstone

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## □ Objective:

“Ensure that the licensee is capable of implementing adequate measures to protect the public health and safety in the event of a radiological emergency.”



# Emergency Preparedness Cornerstone

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- ❑ 3 Performance Indicators
- ❑ Baseline Inspection Program
- ❑ Special Inspection Program



# Emergency Preparedness Performance Indicators

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- Drill and Exercise Performance (DEP)
  - Monitors timely and accurate licensee performance in drills and exercise when presented with “opportunities” for classification, notification, and protective action recommendations
- Emergency Response Organization Drill Participation (ERO)
  - Monitors the percentage of ERO members assigned to fill key positions who have participated in a performance-enhancing drill/exercise
- Alert and Notification System Performance (ANS)
  - Monitors the reliability of offsite ANS

# Emergency Preparedness Baseline Inspections

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- IP 71114 Attachments .01 - .07
  - Exercise Evaluation (biennial exercise)
  - Alert and Notification System Testing
  - Emergency Response Organization Augmentation
  - Emergency Action Levels And Plan Changes
  - Correction of Weaknesses
  - Drill Evaluation (resident inspector)
  - Force-on-Force Exercise Evaluation

# Emergency Preparedness SDP

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- EP is a defense-in-depth measure
- Emergency Plan being implemented in response to event
- **Impact** on public health and safety of a program failure
  - No actual affect on public health and safety
- Risk to public health and safety increased due to lack of fully functioning defense-in-depth feature

# 2 Types of Entry into the SDP

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- ❑ Actual Event Implementation Problem
- ❑ Failure to Meet Regulatory Requirements
  - 16 Planning Standards



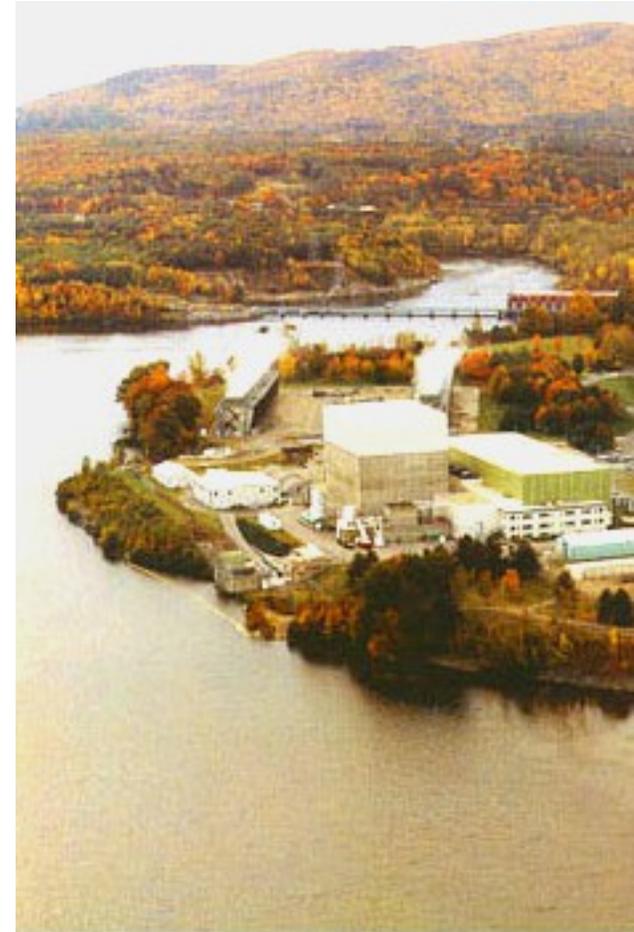
# Risk Significant Planning Standards (RSPSs)

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- ❑ Origins of the RSPSs
  - Developed by a group of EP subject matter experts, including NRC staff and industry stakeholders, with input from members of the public
  
- ❑ *Classification* - (b)(4)
  - Emergency Action Level Classification Scheme
- ❑ *Notification* - (b)(5)
  - Prompt notification of offsite officials and the public
- ❑ *Dose Assessment* - (b)(9)
  - Dose assessment capabilities
- ❑ *Protective Action Recommendations* - (b)(10)
  - Range of protective actions for 10 mile EPZ

# Findings and Violations

- In Fiscal Year 2004
  - 1 Severity Level III violation
  - 4 Severity Level IV NCVs
  - 18 Green NCVs
  - 9 Green findings
- In Fiscal Year 2005
  - 7 White violations
  - 1 Severity Level III violation
  - 5 Severity Level IV NCVs
  - 17 Green NCVs



End



# NRC, DHS, and Offsite Preparedness



# Topics:

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- ❑ Role of DHS
- ❑ Realism Rule
- ❑ Reasonable Assurance
- ❑ Exercises
- ❑ Licensing
- ❑ 10 CFR 50.54(s)
- ❑ Memorandum of Understanding
- ❑ MC 1601

# Offsite Emergency Preparedness

- ❑ Applicant/licensee does not operate in a vacuum
- ❑ Reliance on State and local governments to plan and prepare offsite
- ❑ Contiguous-jurisdiction governmental emergency planning
- ❑ Integrated guidance and criteria (NUREG-0654)

# NRC and DHS

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- ❑ NRC responsible for regulating & assessing onsite emergency planning, preparedness & response
- ❑ DHS takes the lead in offsite emergency planning & in the review and assessment of offsite emergency plans & preparedness



# Realism Rule

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- ❑ What happens if a State or local government refuses to participate in emergency planning?
- ❑ 10 CFR 50.47(c)(1)
  - Provides means for an applicant to obtain a license when State or local governments decline or fail to participate adequately in offsite emergency planning
  - Applicant/licensee may:
    - ❑ Demonstrate that deficiencies in emergency plans are not significant
    - ❑ Show that adequate interim compensatory actions have been or will be taken promptly
    - ❑ Assert that other compelling reasons exist that would permit plant operations
- ❑ Compensatory actions may be required for licensing
  - ❑ May involve some form of utility offsite plan
  - ❑ Guidance contained in NUREG-0654/FEMA-REP-1, Rev. 1, Supp. 1
- ❑ NRC recognizes that in an actual emergency, State and locals will exercise best efforts to protect the public
  - ❑ Hence, 10 CFR 50.47(c)(1) is known as the “realism” rule

# Reasonable Assurance

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- Following TMI, Commission issued regulations stating:
  - “no operating license for a nuclear power reactor will be issued unless a finding is made by the NRC that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency”
- Adequacy of Reasonable Assurance
  - Requires NRC to make a predictive finding that there are no undue risks to public safety. It does not require zero risk.

# Reasonable Assurance

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- NRC must find that the state of emergency preparedness provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency
- or*
- Take steps under 10 CFR 50.54(s)(2)(ii) to correct the situation

# Reasonable Assurance

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- ❑ Emergency plans evaluated against 16 planning standards
- ❑ Objective is achievement of reasonable and feasible dose reductions in the event of an accident
  - Not a preset minimum dose saving or minimum evacuation time
- ❑ What may be reasonable and feasible for one plant site may not be for another

# Reasonable Assurance

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- ❑ NRC bases findings on review of DHS findings and determinations as to whether State and local plans are adequate and capable of being implemented
- ❑ In addition, NRC assesses whether the onsite plan is adequate and capable of being implemented
- ❑ Adequate emergency plans are in place
  - ❑ Adequate staff and facilities to implement plan
  - ❑ Emergency Plans are workable

# Offsite Exercise Deficiencies

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## □ What is a Deficiency?

Observed or identified inadequacy of organizational performance in an exercise that could cause a finding that offsite EP is not adequate to provide reasonable assurance that appropriate protective actions can be taken in the event of a radiological emergency to protect the health & safety of the public living in the vicinity of a nuclear power plant [44 CFR 353, App A]

# Offsite Exercise Deficiencies

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- Handling of Exercise Deficiencies
  - Deficiencies should be corrected within 120 days through remedial actions
  - DHS HQ promptly (1-2 days) discusses these with NRC HQ
  - Within 10 days of the exercise, official notification of the deficiency is made by DHS to the State, NRC HQ & the Regional Assistance Committee (RAC) with an information copy to the licensee

# Offsite Exercise Deficiencies

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- NRC notifies licensee & monitors licensee's efforts to work with State & local authorities to correct deficiency
- Approximately 60 days after official notification of the deficiency, NRC (in consultation with DHS) assesses progress toward resolution

# Withdrawal of Reasonable Assurance -- 10 CFR 50.54(s)

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- DHS Withdraws “Approval”
  - Evaluation of Biennial Full Participation Exercises
  - “350” Process
  
- NRC Withdraws “Reasonable Assurance” (10 CFR 50.54(s))
  - 120-day clock
  - Commission determines whether the reactor is shut down or other actions are taken if the issues aren’t addressed in 120 days

# Licensing – Initial vs. Operating

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- Initial licensing
  - Granting a license is based on a ***finding of reasonable assurance***
  - Governed by 10 CFR 50.47
- Operating reactor licensing
  - Required to maintain Emergency Plan
  - Governed by 10 CFR 50.54(q)
  - Decision to shut down an operating plant or take other enforcement action is based on a ***finding of no reasonable assurance***
- ***Reasonable assurance does not need to be reaffirmed on a periodic basis***

# The NRC/DHS Interface

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- Memorandum of Understanding (MOU)
  - Clarifies roles & responsibilities
    - DHS
    - NRC
    - Joint
  - MOU first issued January 1980
  - Current version issued June 1993
    - Under revision
  - Appendix A to 44 CFR 353

# MOU for Radiological Emergency Planning & Preparedness

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## □ DHS Responsibilities

- Lead in offsite EP
- Reviews & assesses offsite emergency plans & preparedness for adequacy
- Makes findings & determinations as to whether offsite emergency plans are adequate & can be implemented
- Assumes some responsibility for radiological EP training of States & locals
- Develops & issues series of interagency assignments

# MOU for Radiological Emergency Planning & Preparedness

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## □ NRC Responsibilities

- Assesses licensee emergency plan
- Verifies adequate implementation of plan
- Reviews DHS findings & determinations
- Makes radiological health & safety decisions on the overall state of EP

# NRC Inspection Manual Chapter 1601

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- ❑ A natural disaster, malevolent act, or extended shutdown calls into question the readiness of EP infrastructure around a plant site
- ❑ MC 1601 defines interaction between DHS and the NRC during restart situations
  - As defined in the MOU
- ❑ DHS performs offsite EP assessment and informs NRC of results
- ❑ NRC performs onsite EP assessment
- ❑ Restart requires DHS and NRC approval
- ❑ Requires rapid, effective communications to many stakeholders in many areas

# New Reactor Licensing

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- Design Certification
- Early Site Permits (ESPs)
- Combined Licenses (COLs)
  
- New reactor licensing activities will include extensive coordination and input from DHS with regards to offsite preparedness
  - With offsite stakeholder input
- At this time, the EP program will not change based on potential new reactors

End



# EP/Security Interface



# Security-related EP

- ❑ EP planning basis for nuclear power reactors remains valid
  - A security related event can't cause a nuclear accident to occur faster or be more severe
  
- ❑ Challenges for EP in post 9/11 world
  - Revised design basis threat
  - Communication strategies
  - Coordination among Federal agencies (including creation of Dept. of Homeland Security and State DHS offices)
  - National Response Plan



# Challenges & Improvements

- ❑ New EALs based on hostile actions
- ❑ Accelerated communications with OROs
- ❑ PARs
  - Sheltering vs. Evacuation
  - Security PARs
- ❑ Local law enforcement resources



# Bulletin 2005-02

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- “Emergency Preparedness and Response Actions for Security-based Events”
  - 5 issues
    - Security-based EALs
    - NRC notification
    - Onsite protective measures
    - Emergency Response Organization augmentation
    - Drill and Exercise Program

# Emergency Classifications for Security-based Events

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- ❑ Enhanced definition of emergency classes to include terrorism
- ❑ Added emergency action levels for site attack modes
  - aircraft threat and attack
  - armed attack, explosive attack, airline impact or other hostile action
- ❑ Enhanced emergency action level basis
- ❑ Regulations allow implementation without prior NRC approval

# Integrated Drill and Exercise Program

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- ❑ Designed to test the licensee's emergency plan when the event initiator is security-related
- ❑ NRC Bulletin 2005-02: Drill and Exercise Program for Security-Based Events
  - Phase 1: Development of guidelines and conducted 4 table top drills and 1 pilot drill
  - Phase 2: Conduct non-evaluated integrated drills over a 3 year period
  - Phase 3: Incorporate scenarios into six-year exercise cycle
- ❑ Unlike this exercise program, Force-on-Force exercises are designed to test the licensee's security plan

End

