

EMERGENCY PREPAREDNESS AT PENNSYLVANIA'S NUCLEAR PLANTS

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Licensee Presenters

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America's Nuclear Power Plants are Well Protected

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- The nation's nuclear power plants are among the safest and most secure industrial facilities in the United States.
- Nuclear energy facilities are designed and built to withstand a variety of natural and other severe events.
- Plants are staffed by highly trained, federally licensed operators that are capable of taking actions necessary to mitigate and control adverse events.

Emergency Preparedness

- Federal law requires nuclear plants ensure that emergency plans are in place to protect the public.
- The plans must be approved in order for a facility to obtain and retain an operating license from the NRC.
- U.S. Nuclear Regulatory Commission (NRC) approves each facility's plan, and approval of state plans is coordinated between the NRC and the Federal Emergency Management Agency (FEMA).
- Each plant must conduct a full-scale emergency exercise every two years, coordinated with local and state government agencies.

Emergency Preparedness (cont'd)

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- Company Emergency Response Organizations/Training
- Protective Action Recommendations
- Drill and Exercise Program
- Maintenance of Planning Effort

Defense in Depth

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➤ **Plant Design**

- Detailed guidance
- Multiple barriers
- Strict standards

➤ **Trained Personnel**

- Detailed training & procedures

➤ **Operation**

- Significant oversight (internal & external)

Federal Responsibility

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- **Federal** ✓ NRC/FEMA set rules and regulations for emergency plans
- **State**
- **County** ✓ NRC/FEMA evaluate plans, procedures and training effectiveness (NRC on-site, FEMA off-site)
- **Licensee** ✓ NRC/FEMA provide Federal support and expertise in emergencies

State Responsibility

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- Federal
 - ✓ Maintains State plans, procedures and facilities
- **State**
 - ✓ Trains state agencies and hospitals
- County
 - ✓ Provides oversight of county and municipal response readiness
- Licensee
 - ✓ Provides technical expertise and additional support to counties and municipalities in emergencies

County Responsibility

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- Federal
 - ✓ Maintains county and local plans, procedures and facilities
- State
 - ✓ Trains the county and local responders
- **County**
 - ✓ Implements protective actions for the public
 - ✓ Activates siren system in an emergency
 - ✓ Operates decontamination and reception centers for the public
 - ✓ Provides emergency workers for field activities
- Licensee

Licensee Responsibility

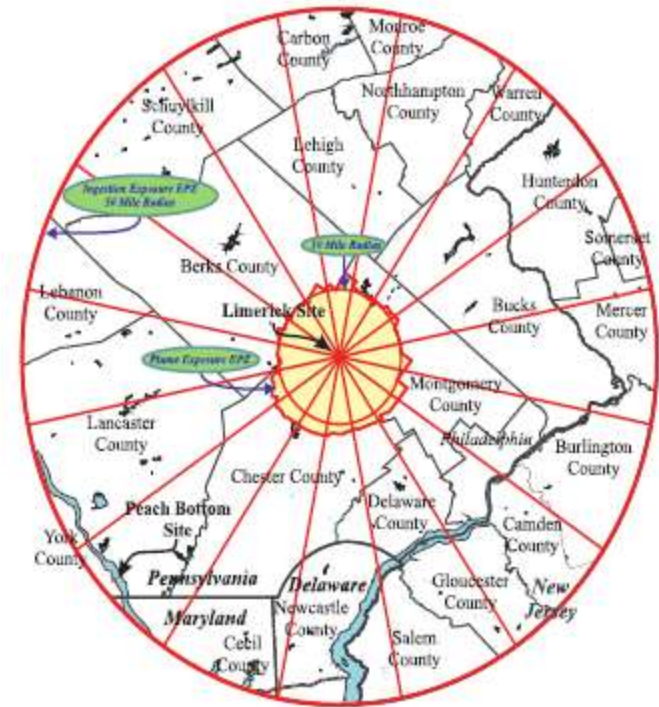
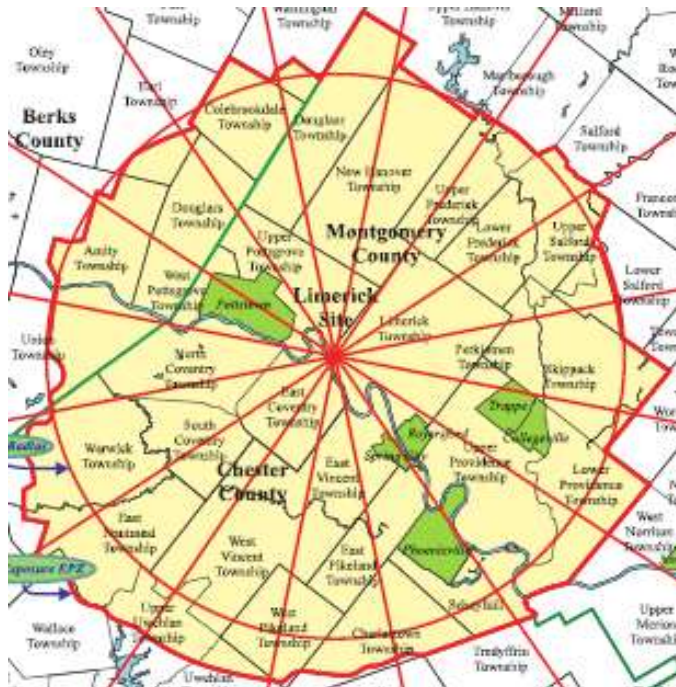
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- Federal
 - ✓ Maintains on-site plans, procedures and facilities
- State
 - ✓ Supports counties and municipalities with maintaining plans and procedures
- County
 - ✓ Supports training of local volunteers and agencies
- **Licensee**
 - ✓ Provides annual updates to public information material
 - ✓ Maintains and tests siren system

Emergency Planning Zones

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- Plume Exposure Pathway
- Ingestion Pathway



Current Events

NRC Rulemaking

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- Hostile Action-Based Exercises
- Alternative Facilities
- Protective Action Recommendation Changes
- On-shift Staffing
- Evacuation Time Estimates
- Offsite Response Organization Capabilities

Fukushima Response

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- Benefits of B.5.b Actions
- Emergency Response Organization Support
- Extensive Loss of AC Power
- Multi-unit Events
- Diverse and Flexible Coping Strategies (FLEX)
 - Installed Plant Equipment
 - Onsite Portable Equipment
 - Regional Center Portable Equipment

MAKING SAFE NUCLEAR ENERGY SAFER AFTER FUKUSHIMA

FLEX is a flexible and diverse strategy developed by the nuclear energy industry to quickly and effectively implement the Nuclear Regulatory Commission (NRC's) Fukushima task force recommendations. The FLEX protection strategy addresses the main safety challenges at Fukushima—the loss of cooling capability and electrical power resulting from a severe natural event that exceeded the plant's design basis—to make U.S. facilities even safer. It builds on safety steps taken by industry during the past three decades by providing a fast, effective and efficient way to apply the lessons learned from Japan's experience.

MULTIPLE LAYERS OF POWER SUPPLY

Backup generators provide reliable electrical power and cooling capability if an extreme event disables the normal plant equipment. Additional battery banks provide electrical power and cooling capability if an extreme event disrupts regular and other backup power supply.



ADDITIONAL SPENT FUEL MONITORING

Additional equipment in spent fuel storage pools will provide another layer of monitoring to ensure temperature and water levels are maintained.



PREPARING OUR PEOPLE

Nuclear plant and emergency response workers will use the FLEX approach to support key safety functions across multiple reactors. Capabilities and training will be verified for nuclear plant workers to assure the continued viability and reliability of equipment. Communications capabilities will be expanded to include satellite phones and equipment to connect personnel at the plant with government emergency communications networks. Specific strategies include the following:

Enhanced Training



Expanded Maintenance and Testing of Equipment



Satellite Communications



PUBLIC OPINION

74%

of Americans believe that U.S. nuclear power plants are safe and secure

80%

of Americans believe U.S. nuclear power plants have been made safer as we've learned from experience and added technology

ADDITIONAL PUMPS

To ensure cooling procedures are maintained during and after an extreme event, additional pumps can supply water where needed.



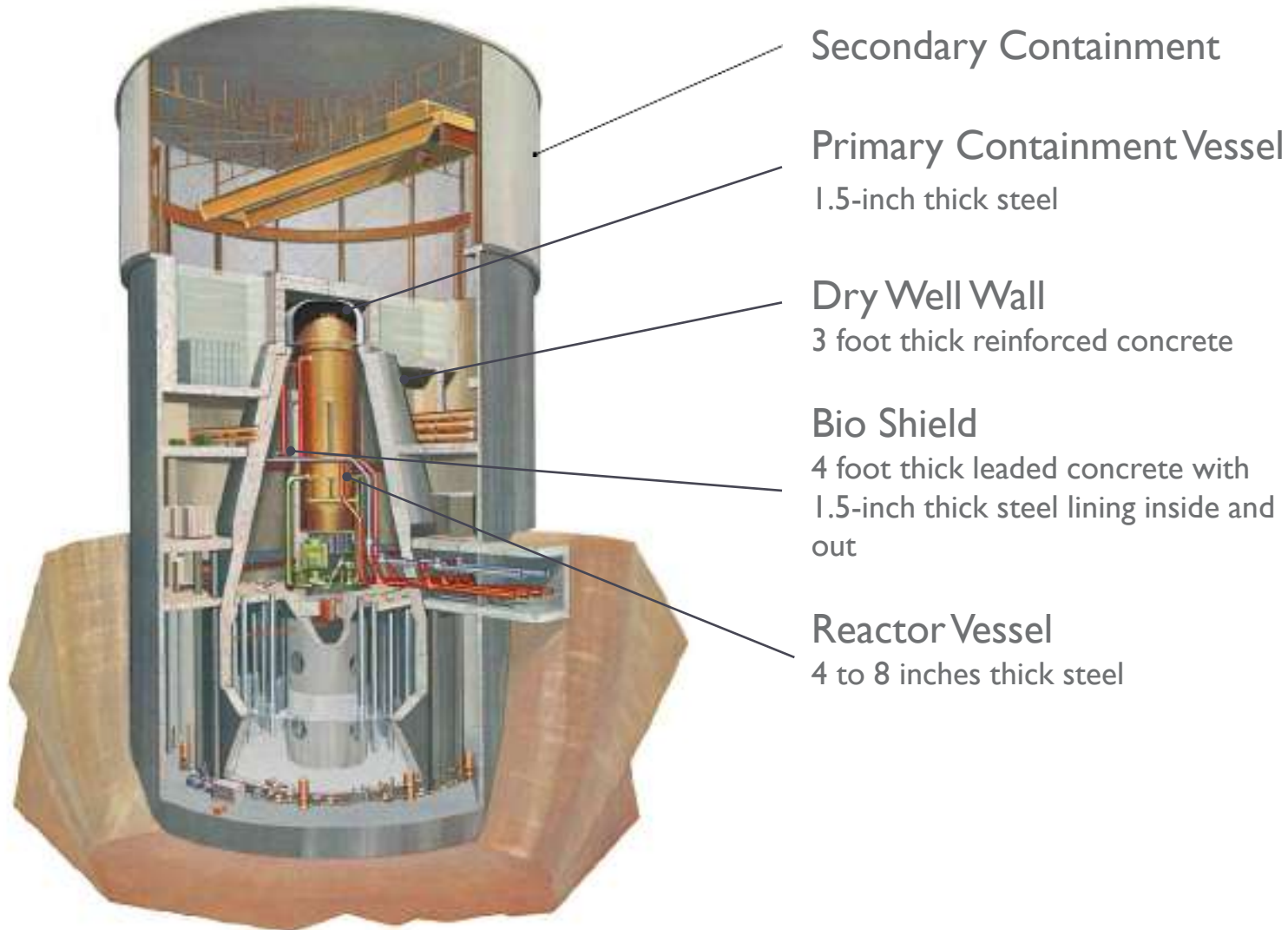
REGIONAL CENTERS

Additional emergency equipment will be stationed in off-site support centers to provide another layer of safety and ensure prolonged reliable operation.



Nuclear Plant Equipment

Nuclear Reactor Layers of Containment



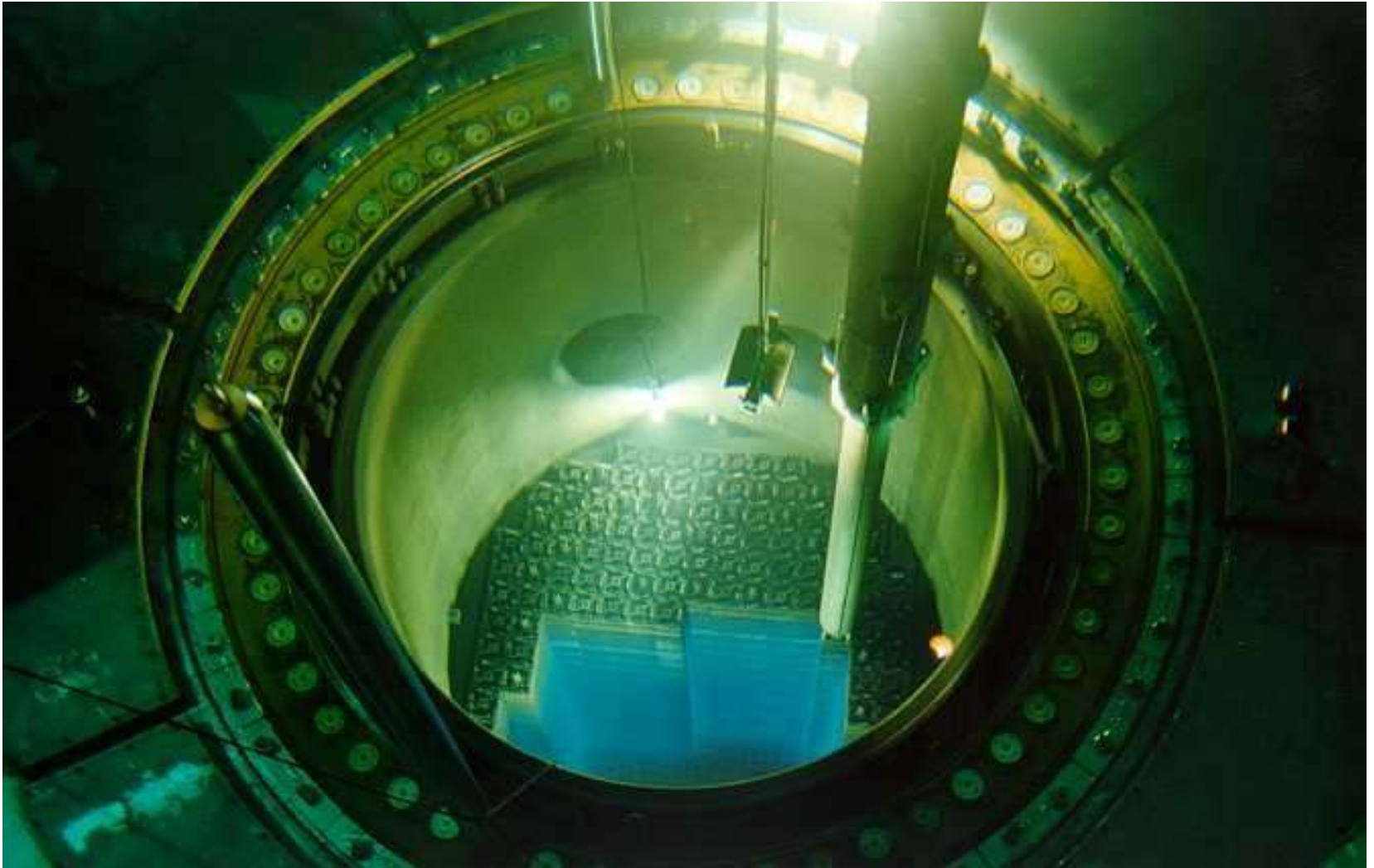
Nuclear Reactor Pressure Vessel



Figure 3.1-1. Cutaway of a Typical Reactor (Four-Loop Plant)

Nuclear Reactor Core

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Refuel Floor During an Outage

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Working in the Reactor Vessel

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Reinstallation of the Reactor Vessel Head



Dry Cask Storage

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Turbine Rotor Inspections

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Questions?