

Overview of Nuclear Power Plant Emergency Preparedness

**USET HOMELAND SECURITY AND
EMERGENCY SERVICES COMMITTEE
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Presentation Topics

- Defense-in-Depth
- Protective Action Guidelines
- Emergency Planning Zones (EPZs)
- Emergency Classifications
- NRC / FEMA Relationship
- Status of Revision to EP Guidance
- Status of Decommissioning EP Rulemaking

Defense-in-Depth Philosophy

- An approach to designing and operating nuclear facilities that prevents and mitigates accidents that release radiation or hazardous materials
- Multiple independent and redundant layers of defense to compensate for potential human and mechanical failures
- no single layer, no matter how robust, is exclusively relied upon
 - Use of access controls
 - Physical barriers
 - Redundant and diverse key safety functions
 - Emergency response measures

Emergency Preparedness

Emergency Planning

- Reduces complex decision-making
- Simplifies choice of possible responses

NRC Regulations

- 10 CFR 50.47(b)(1) – 10 CFR 50.47(b)(16)
 - 16 planning standards
- 10 CFR 50.54(q)
- 10 CFR 50 Appendix E

Emergency Response Organizations (ERO)

- Licensee
 - Mitigate consequences,
 - Notify agencies, monitor release, provide Protective Action Recommendations (PARs)
- NRC
 - Monitor licensee actions,
 - Provide technical assistance,
- FEMA
 - Reviews offsite EP
- State and local agencies and Tribal Nations
 - Issues protective actions

Protective Action Guides (PAGs)

- EPA-400: “Manual of Protective Action Guides and Protective Actions for Nuclear Incidents”
- Guidance for triggering protective actions
- Suggested protective actions based on dose

Protective Action Guides (PAGs)

- Based on projected dose
 - does not count dose received
- Evacuation/ sheltering
 - 1-5 rem
- Potassium Iodide KI administration
 - 25 rem to thyroid
- PAG levels no health effects detectable

Emergency Planning Zones (EPZs)

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

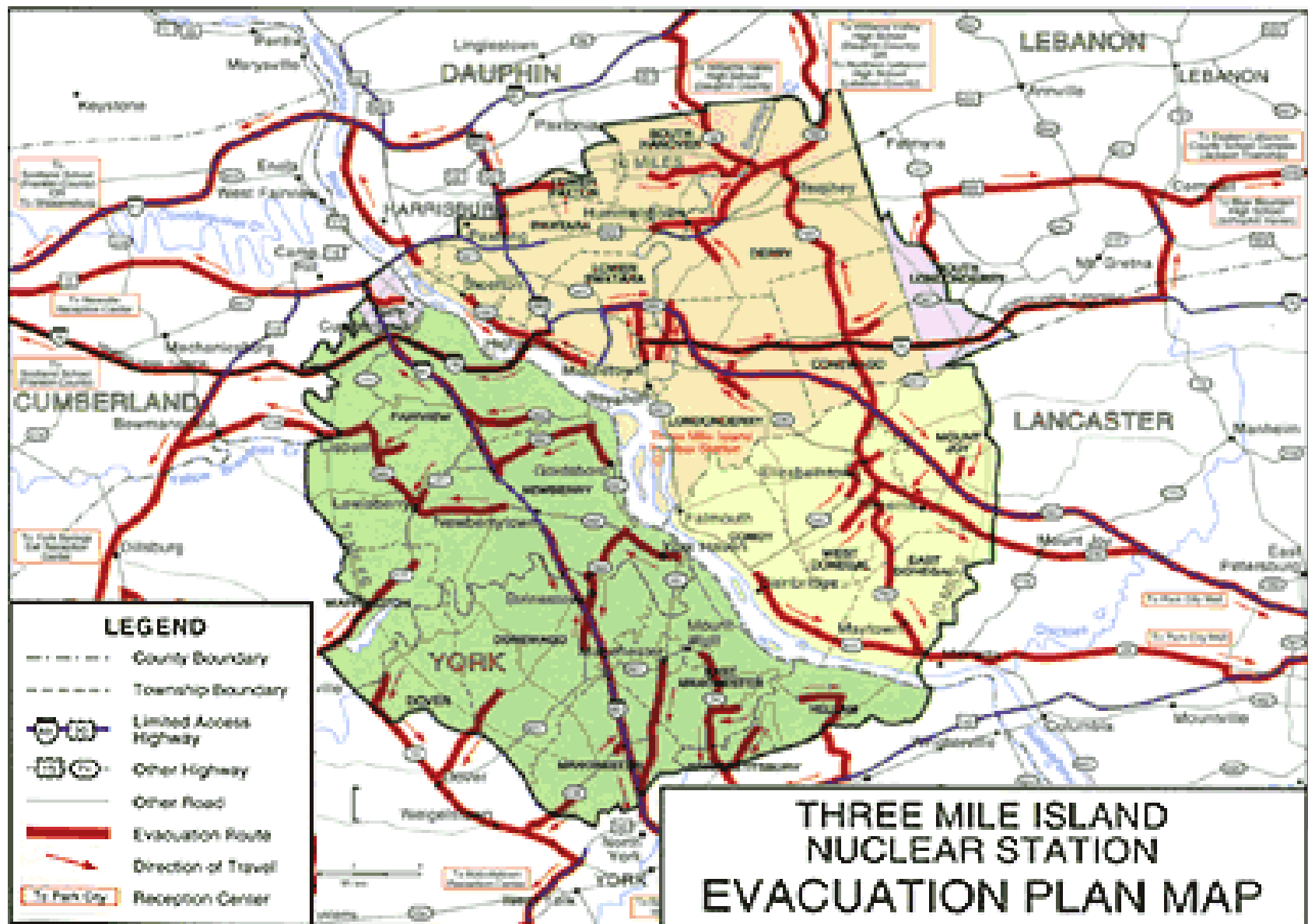
Emergency Planning Zones (EPZs)

- Plume Exposure Pathway
 - Area requiring immediate protective actions
 - Approximately 10 miles in radius
 - Sized based upon:
 - Projected doses won't exceed PAGs outside zone

Emergency Planning Zones (EPZs)

- Plume Exposure Pathway
 - Boundaries determined by topography, 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. For specific locations and directions to care centers, refer to evacuation descriptions for your municipality.

Emergency Planning Zones (EPZs)

- 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
 - 24/7 communication capability with State/local officials
 - Monitoring of offsite radiological release
 - 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 1034) • ST. CLAIR TOWNSHIP (EAST OF CANNON MILLS ROAD)

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



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

TURN ON
YOUR RADIO
OR TV!

13

*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.

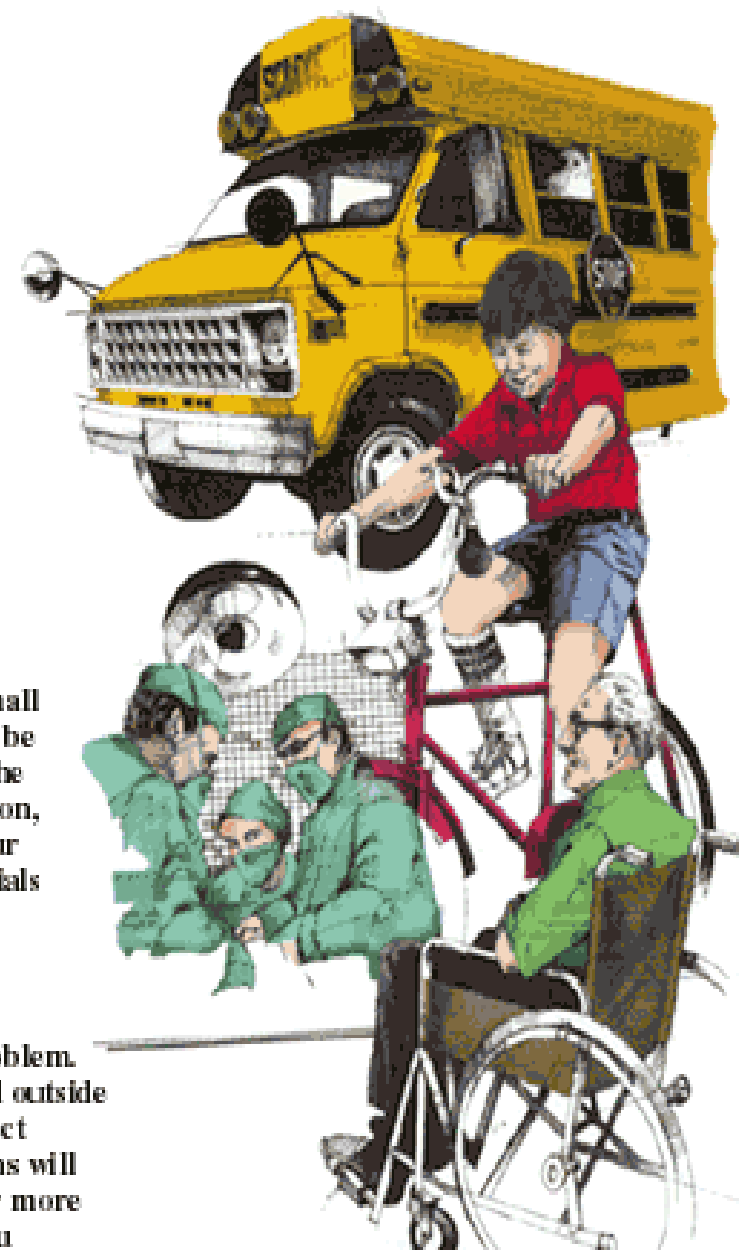
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Site Area Emergency

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.



Emergency Planning Zones (EPZs)

- NRC is singular authority for making decisions regarding overall adequacy of EP
- Includes making a final determination whether EPZ extends beyond site boundary
- Includes making a final determination of appropriate size of EPZ to adequately protect public health and safety
- NRC makes this determination in consultation with FEMA

Emergency Planning Zones (EPZs)

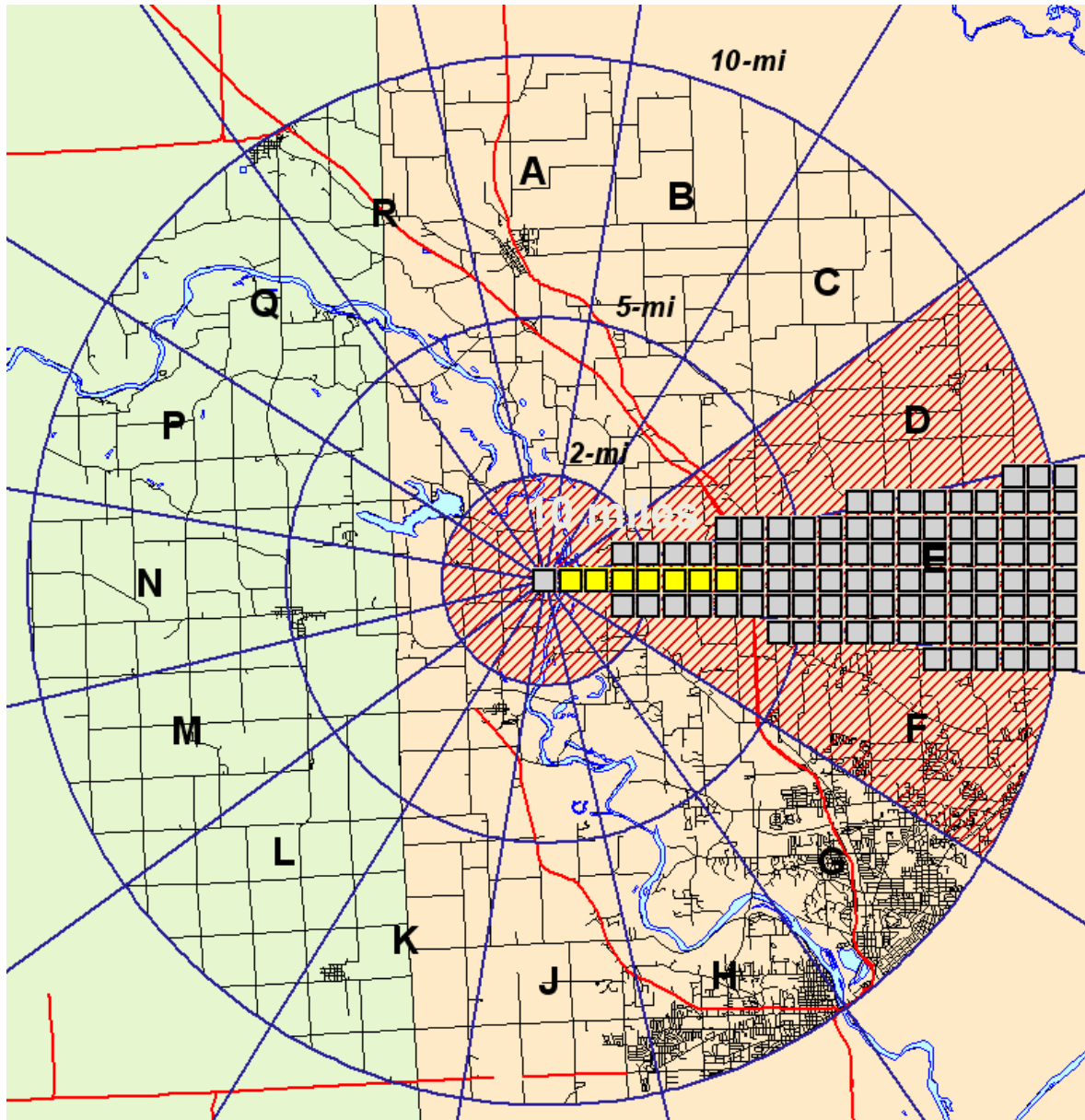
- Ingestion Exposure Pathway
 - Protect from consumption of contaminated food
 - Considerable time to action
 - Approximately 50 miles in radius
 - Sized based upon:
 - Contamination not exceed PAGs beyond 50 miles

Relationship between PAGs and EPZs

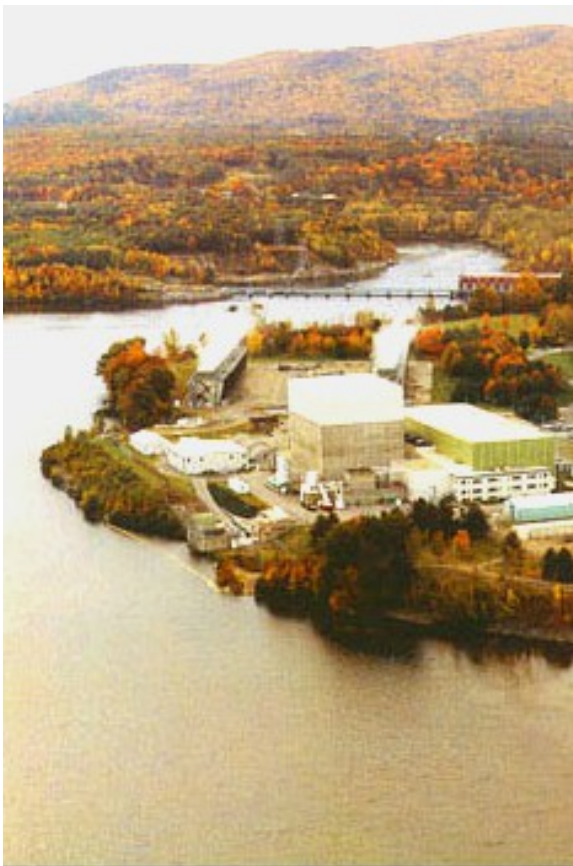
- PAGs are trigger for appropriate protective actions
 - Protect public health and safety
 - Minimize exposure to general public and emergency workers
 - Not to be used as acceptable dose limits
 - PAGs and EPZs complement each other

Emergency Classification Levels

- Unusual event
 - No release expected
- Alert
 - Release small fraction of EPA PAGs
- Site Area Emergency
 - Release won't exceed EPA PAGs at site boundary
- General Emergency
 - Release expected to exceed EPA PAGs offsite



Emergency Preparedness Responsibilities



Offsite

Onsite



NRC and FEMA Relationship

- NRC
 - Regulatory Agency
 - Created in 1974
 - Empowered by Atomic Energy Act as sole authority to establish and enforce rules
 - Overall decisions on “reasonable assurance”
- FEMA
 - Cabinet Agency
 - Created in 1979
 - Oversees Offsite Planning to meet NRC standards
 - Input provided to NRC

NRC and FEMA Relationship

- **10 CFR 50.54(s)(3)**

- The NRC will base its finding on a review of the FEMA findings and determinations as to whether State and local emergency plans are adequate and capable of being implemented, and on the NRC assessment as to whether the licensee's emergency plans are adequate and capable of being implemented. Nothing in this paragraph shall be construed as limiting the authority of the Commission to take action under any other regulation or authority of the Commission or at any time other than that specified in this paragraph.

- **Memorandum of Understanding**

- Revised December 2015

NUREG-0654/FEMA-REP-1

- *“Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants”* Revision 1, November 1980
- Joint NRC/FEMA Guidance
- Revision 2 to be issued this year
- <http://www.regulations.gov>
 - Search for Docket No. FEMA-2012-0026

NUREG-0654/FEMA-REP-1

Sample Format

| Number & Applicability | Evaluation Criteria | | | | |
|---|---------------------|-------|-------|--------|--|
| <p style="text-align: center;">A.1</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="background-color: #c6e0b4;">Licensee</td> <td style="background-color: #c6e0b4;">State</td> </tr> <tr> <td style="background-color: #d9ead3;">Local</td> <td style="background-color: #d9ead3;">Tribal</td> </tr> </table> | Licensee | State | Local | Tribal | <p>The Federal, State, local, Tribal, licensee, and other private sector organizations that comprise the overall response for the EPZs are identified.</p> |
| Licensee | State | | | | |
| Local | Tribal | | | | |
| <p style="text-align: center;">A.1.a</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="background-color: #c6e0b4;">Licensee</td> <td style="background-color: #c6e0b4;">State</td> </tr> <tr> <td style="background-color: #d9ead3;">Local</td> <td style="background-color: #d9ead3;">Tribal</td> </tr> </table> | Licensee | State | Local | Tribal | <p>The organizations having an operational role specify their concept of operations and relationship to the total effort.</p> |
| Licensee | State | | | | |
| Local | Tribal | | | | |
| <p style="text-align: center;">A.1.b</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="background-color: #c6e0b4;">Licensee</td> <td style="background-color: #c6e0b4;">State</td> </tr> <tr> <td style="background-color: #d9ead3;">Local</td> <td style="background-color: #d9ead3;">Tribal</td> </tr> </table> | Licensee | State | Local | Tribal | <p>Each organization's emergency plan illustrates these interrelationships in a block diagram.</p> |
| Licensee | State | | | | |
| Local | Tribal | | | | |
| <p style="text-align: center;">A.1.c</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="background-color: #c6e0b4;">Licensee</td> <td style="background-color: #c6e0b4;">State</td> </tr> <tr> <td style="background-color: #d9ead3;">Local</td> <td style="background-color: #d9ead3;">Tribal</td> </tr> </table> | Licensee | State | Local | Tribal | <p>Each organization identifies the individual, by title/position, who will be in charge of the emergency response.</p> |
| Licensee | State | | | | |
| Local | Tribal | | | | |

Decommissioning Rule Schedule

- Final Regulatory Basis (ADAMS ML17215A010)
 - Nov 20, 2017: Published in Federal Register
- Proposed Rule/Draft Regulatory Guidance
 - May 7, 2018: Provide to Commission
 - Dec 6, 2018: Start 75 day public comment period
- Final Rule/Final Regulatory Guidance
 - Sept 30, 2019: Provide to Commission
- <http://www.regulations.gov>
 - Search for Docket ID NRC–2015–0070

Contact Information

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