



Callaway Energy Center After Action Report/ Improvement Plan

Exercise Date – September 21, 2021

Radiological Emergency Preparedness (REP) Program



FEMA

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Callaway Energy Center After Action Report/Improvement Plan

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Contents

EXECUTIVE SUMMARY	4
SECTION 1: EXERCISE OVERVIEW	5
1.1 Exercise Details	5
1.2 Exercise Planning Team Leadership	5
1.3 Participating Organizations	6
SECTION 2: EXERCISE DESIGN SUMMARY	9
2.1 Exercise Purpose and Design	9
2.2 Exercise Objectives, Capabilities and Activities	9
2.3 Scenario Summary.....	10
SECTION 3: ANALYSIS OF CAPABILITIES	13
3.1 Exercise Evaluation and Results	13
3.2 Summary Results of Exercise Evaluation	13
3.3 Criteria Evaluation Summaries.....	15
3.3.1 State Jurisdictions	15
3.3.1.1 Missouri State Emergency Operations Center.....	15
3.3.1.2 Missouri Dose Assessment/Field Team Coordination	15
3.3.1.3 Missouri Radiological Field Teams A and B	16
3.3.1.4 Missouri Joint Information Center	16
3.3.1.5 Missouri Forward Command Post/Emergency Operations Facility	17
3.3.1.6 EAS Station KTXY	17
3.3.2 Risk Jurisdictions.....	18
3.3.2.1 Callaway County/Fulton Emergency Operations Center	18
3.3.2.2 SSM Health St. Mary's Hospital.....	19
3.3.2.3 Callaway County Emergency Medical Service	20
3.3.2.4 Gasconade Emergency Operations Center	20
3.3.2.5 Montgomery County Emergency Operations Center	20
3.3.2.6 Osage County Emergency Operations Center	21
3.3.3 Federal Jurisdictions	23
3.3.3.1 National Weather Service	23
CONCLUSION	24
APPENDIX A: IMPROVEMENT PLAN.....	26
APPENDIX B: EXERCISE TIMELINE.....	30
APPENDIX C: EXERCISE EVALUATORS AND TEAM LEADERS	31
APPENDIX D: ACRONYMS AND ABBREVIATIONS	33

EXECUTIVE SUMMARY

On September 21, 2021, the Department of Homeland Security (DHS)/Federal Emergency Management Agency (FEMA) Region VII evaluated a plume pathway exercise for the Callaway Energy Center. The purpose of the exercise was to assess the level of State and local preparedness in responding to a radiological emergency. The exercise was held in accordance with FEMA's policies and guidance concerning the exercise of State and local radiological emergency response plans and procedures.

The previous exercise at this site was conducted on August 13, 2019. The qualifying emergency preparedness exercise for this Power Plant was conducted on March 21, 1987.

DHS/FEMA wishes to acknowledge the efforts of the many individuals who participated in this exercise. In the State of Missouri, the counties of Callaway, Gasconade, Montgomery, and Osage participated along with various organizations of the State, County, and local governments. The Callaway Energy Center emergency response staff should also be commended for their work on the scenario development and exercise preparation.

Protecting the public health and safety is the full-time job of some of the exercise participants and an additional assigned responsibility for others. Still others have willingly sought this responsibility by volunteering to provide vital emergency services to their communities. Cooperation and teamwork of all the participants was evident during this exercise.

The State and local organizations demonstrated knowledge of their emergency response plans and procedures and adequately implemented them. Two Level 2 Findings and no Planning Issues were identified as a result of this exercise. There were no findings from previous exercises to be corrected during this exercise.

For this exercise there was one protective action decision (PAD) made. The PAD was for the evacuation of subareas C1, C4, C5 and O1. Approximately 1,299 residents were affected by the PAD.

SECTION 1: EXERCISE OVERVIEW

1.1 Exercise Details

Exercise Name

Callaway Energy Center

Type of Exercise

Radiological Emergency

Exercise Dates

September 21, 2021

Program

Department of Homeland Security/FEMA Radiological Emergency Preparedness Program

Scenario Type

Plume Phase

1.2 Exercise Planning Team Leadership

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1.3 Participating Organizations

Agencies and organizations of the following jurisdictions participated in the Callaway Energy Center exercise and drills:

State Jurisdictions

- Missouri Department of Agriculture
- Missouri Department of Conservation
- Missouri Department of Health and Senior Services
- Missouri Department of Public Safety
- Missouri Department of Natural Resources
- Missouri Department of Social Services, Family Support Division
- Missouri Department of Transportation
- Missouri Information Analysis Center
- Missouri State Emergency Management Agency
- Missouri State Highway Patrol
- Missouri State Public Information Officer
- University of Missouri Extension Service

Risk Jurisdictions

- Callaway County 911/Communications Dispatch
- Callaway County Ambulance District/EMS
- Callaway County Commission
- Callaway County Emergency Management Agency
- Callaway County Fire
- Callaway County Health Department
- Callaway County Road and Bridge Department
- Callaway County Sheriff's Department
- Callaway County Transportation Department
- Fulton Police Department
- Fulton City Administrator
- Fulton Fire Department
- Gasconade County 911/Communications Dispatch
- Gasconade County Clerk's Office
- Gasconade County Commission
- Gasconade County Emergency Management Agency
- Gasconade County Family Services
- Gasconade County Health Department
- Gasconade County Sheriff's Office
- Gasconade County Treasurers Office
- Gasconade R-1 Schools
- Jonesburg-High Hill Fire Protection District
- Montgomery County 911/Dispatch
- Montgomery County Ambulance District
- Montgomery County Board of Commissioners
- Montgomery County Emergency Management Agency
- Montgomery County Health Department

Montgomery County Public Information Officer
Montgomery County Road and Bridge Department
Montgomery County Sheriff's Department
Montgomery City Police Department
Osage County Commission
Osage County Public Information Officer
Osage County Specialist Service
Osage County Road & Bridge
Osage County Health Department
Osage County Emergency Management Agency
Osage County Emergency Medical Services
Osage County Sheriff's Department
Osage Fire Protection District
Osage County Transportation Officer

Support Jurisdictions

Audrain County Emergency Management Agency

Private Organization

Ameren - Callaway Energy Center

Federal Jurisdictions

Federal Emergency Management Agency
United States Department of Agriculture

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SECTION 2: EXERCISE DESIGN SUMMARY

2.1 Exercise Purpose and Design

The Callaway Energy Center (CEC) Emergency Plan describes CEC's capability to respond effectively to a radiological emergency at the site and provides a detailed description of CEC's interaction with Federal, State, and local government agencies and private organizations. The Emergency Plan provides for continuous emergency preparedness including the conduct of an annual exercise and preparatory drills.

The purpose of this exercise was to activate and evaluate portions of the Missouri State Emergency Plan, and the Callaway, Montgomery, Gasconade, and Osage County Emergency Plans, and associated implementing procedures, in accordance with 44 CFR 350. The conduct and evaluation of this exercise provided additional training for emergency response organization personnel and a means to further enhance CEC emergency response capability.

The scenario was designed to provide the basis for the conduct of a plume scenario at the Callaway Energy Center, located near Reform, Missouri, through which the capabilities and effectiveness of the emergency response plans for Callaway Energy Center, the State of Missouri, Callaway, Montgomery, Gasconade, and Osage Counties were evaluated. The scenario was utilized by the exercise controllers/evaluators as the control mechanism for the conduct of the exercise.

The scenario was developed by Ameren with input from designated trusted agents from the Missouri State Emergency Management Agency and Missouri Department of Health and Senior Services. It was reviewed by a Health Physicist from the FEMA Technological Hazards Program headquarters, prior to the final review and approval by FEMA Region VII.

The scenario, as driven by the CEC Control Room Simulator, depicted a simulated sequence of events which resulted in escalating conditions of sufficient magnitude to warrant mobilization of state and local agencies to respond to the simulated emergency. Whenever practical, the exercise incorporated provisions for "free play" on the part of the participants.

2.2 Exercise Objectives, Capabilities and Activities

The Callaway Energy Center Emergency Preparedness exercise and drills are conducted to test and provide the opportunity to evaluate emergency plans, associated implementing procedures, facilities, and equipment. This exercise tested the CEC emergency response organization's ability to assess and respond to emergency conditions and coordinate efforts with other agencies for protection of the health and safety of the public.

The CEC Emergency Preparedness Exercise & Drill Program objectives are based on the Federal requirements delineated in 44 CFR 350, as well as on the priorities and procedures detailed in the emergency preparedness plans for the State of Missouri, Callaway County, Montgomery County, Osage County, and Gasconade County. Additional guidance provided in NUREG-0654, NUREG-0696, and NUREG-0737, was utilized in developing these objectives.

The objective of the exercise was to test the implementation of the plans and procedures of participating agencies, along with the capability of these agencies to conduct operations in

accordance with these plans. This objective is further defined by the criteria evaluated for each participating location.

This Exercise included full participation by the State of Missouri, and Callaway, Montgomery, Osage and Gasconade Counties and other associated offsite response organizations. A summary of the specific areas evaluated for all the participating organizations is listed in Table 3.1.

2.3 Scenario Summary

The plant is at 100% with 5 months of run since the last Refuel outage. The 'A' Emergency Diesel Generator (EDG) and 'A' Train of Essential Service Water (ESW) are out of service in a 36-hour scheduled Technical Specification Outage (TSO). The TSO is currently 24 hours into the 36 hours and is on schedule.

The weather forecast for today calls for partly cloudy skies. Winds are from the Northwest at 9 - 12 miles per hour. Highs today are predicted in the low 70's. Current conditions are cloudy with a 10% chance of thunderstorms this afternoon and evening.

Fulton and South Callaway schools are in session today with partial classroom participation due to COVID-19.

At 0739, Steam Generator (SG) A Main Steam Outlet Channel 1 (Red) Pressure Transmitter, will slowly fail from normal pressure and crew will notice SG A Pressure and SG A level start to lower. No EAL declaration for this event.

At 0801, 2/4 offsite lines are lost due to a fire at the sub-station. The Power Supply Supervisor (PSS) will report that damage assessment will be started once the fire is out and therefore cannot determine a restoration time

At 0823, an earthquake is confirmed and, due to downed powerlines and earthquake movement, the reactor trips. The 'B' EDG will start, but trip immediately from a mechanical failure of the EDG. Restoration of this EDG will not be successful. All diesels start but does not load onto the PA501 Bus due to a bus fault. Extensive maintenance support will be required to repair. Restoration of this bus will be unsuccessful during the remainder of the scenario. A Site Area Emergency should be classified/declared, and the corresponding initial notification completed within 15 minutes after the initial classification/declaration.

At 0828, if the US Geological Survey or St. Louis University Geophysical Observatory is contracted, they will report that a magnitude 8.1 earthquake with the epicenter near Steelville, Missouri, occurred at 0823. There are currently no details of damage in the area.

At 0834, the control room will receive a report that the Demin building has collapsed damaging all three fire pumps. A fire starts within the building and the fire brigade will be called out. The onsite fire truck will run; however, the Fire Brigade members will not be able to engage the pump on the truck due to a sheared shaft on the pump.

At 0855, the Emergency Operations Facility (EOF) and Technical Support Center (TSC) should be activated and accept turnover from the Control Room. Evaluation of security personnel movement should be evaluated and the need to declare the inability to implement the protective strategy.

At 0901, Callaway County will receive notification that there is a large fire at the Dollar General Distribution Warehouse (1900 Cardinal Drive). The fire is causing a large chemical cloud/smoke that is blowing toward William Woods University. Mutual aid firefighting support from multiple fire department agencies are called in to assist in putting out the fire.

At 0912, a major aftershock will occur and be felt by all personnel. The Fuel Building Crane dislodges from its track that was weakened by the earthquake and falls. The crane cracks the Spent Fuel Pool (SFP) cask wash-down pit wall. Personnel find that there is water flow from the SFP to the cask wash-down pit. The cask wash-down pit is overflowing onto the truck bay floor. Flooding is beginning to occur. This information on flooding is reported back to the Control Room. Radiation levels begin to rise in the SFP due to water level drop in the SFP. When SFP level reaches 120", EAL RA2.3 applies.

At 1032, Osage County will receive notification that there is a three-vehicle accident at the intersection of Highway 50 and Route 100 (West of Linn, MO). The accident is two cars and a semi-truck with multiple injuries (2 in one car, 3 in the other car and the truck driver). The semi has jackknifed and is lying on its side blocking both Highway 50 lanes. One car (2 individuals) has overturned and is lying on its roof.

At 1046, Spent Fuel Pool (SPF) level lowers and will stabilize at 10.9 inches.

Depending on which indication the ERO team determined exceeded the General Emergency threshold or when the 60 minutes approaches since SFP level is less than 12", a General Emergency should be declared based on EAL RG2.1. The initial PAR associated with the General Emergency Declaration should be to evacuate 2 miles around the plant and evacuate out to 5 miles in the downwind sectors (F, G, H). The initial Protective Action Recommendation (PAR) will be issued based on plant condition GE PAR and wind direction. Weather indications are provided to the Emergency Response facilities based on simulated data.

At 1159, The operating crew will inform the TSC and EOF that off-site power can be restored. Once power has been restored, efforts to refill the SFP will be restored.

Scenario will end after the GE EAL declaration and notifications have been sent to State Emergency Management Agency (SEMA) and the 4 Emergency Planning Zone (EPZ) counties, and the SFP starts to refill. The exercise can be terminated following verification that SEMA/Federal Emergency Management Agency (FEMA) exercise objectives have been met and the Radiological Field Team (RFT) data have been collected and analyzed. The exercise may also be terminated at the direction of the lead drill controller. Functional Area Critiques and Facility Critiques will begin after exercise termination.

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SECTION 3: ANALYSIS OF CAPABILITIES

3.1 Exercise Evaluation and Results

Contained in this section are the results and findings of the evaluation of the participants in the September 21, 2021, plume exercise. The exercise tested the offsite emergency response capabilities of state and local governments in the 10-mile plume emergency planning zone.

Each jurisdiction and functional entity were evaluated on the basis of its demonstration of the criteria delineated in FEMA's Radiological Emergency Preparedness Program Manual, dated January 2016.

3.2 Summary Results of Exercise Evaluation

Table 3.1 presents all the exercise criteria which were successfully demonstrated during this exercise at all participating jurisdictions and functional entities. Any findings and/or planning issues are addressed in Section 3.3: Criteria Evaluation Summaries. The types of findings/issues are:

M - Met, No new Findings, or previously unresolved issues

L1 - Level 1 Finding

L2 - Level 2 Finding

P - Planning Issue

N - Not Demonstrated

Table 3.1 - Summary of Exercise Evaluation

DATE: 2021-09-21 SITE: Callaway Energy Center M: Met, L2: Level 2 Finding, L1: Level 1, P: Plan Issue, N: Not Demonstrated		MO SEOC (GAR)	MO DA/FTC	MO RFT A	MO RFT B	MO JIC	MO FCP/EOF	EAS Station KTXV	Callaway EOC	SSM St. Mary's Hosp.	Callaway Co. EMS	Gasconade Co. EOC	Montgomery Co. EOC	Osage Co. EOC	National Weather Serv.
Emergency Operations Management															
Mobilization	1a1	M	M			M	M		M			M	M	M	
Facilities	1b1												M		
Direction & Control	1c1	M							M			M	M	M	
Communications Equipment	1d1	M	M	M	M	M	M		M			M	M	M	
Equipment and Supplies	1e1	M	M	M	M	M	M		M	M	M	M	M	M	
Protective Action Decision Making															
EW Exp. Control Decisions	2a1	M	M						M			M	M	M	
PARs	2b1	M	M												
PADs	2b2	M	M						M			M	M	M	
PADs for Disabled/Functional Needs	2c1	M							M			M	M	M	
Ingestion PADs	2d1														
RRR Decisions	2e1														
Protective Action Implementation															
EW Exp. Control Implementation	3a1		M	M	M		M		M	M	M	M	M	M	
KI Public/Institutionalized	3b1								M			M	M	M	
PAD Imp. Disabled/Functional Needs	3c1								M			M	M	M	
PAD Imp. Schools	3c2														
TACP Establishment	3d1	M							M			M	M	M	
Impediments to Evacuation	3d2								M			M	M	M	
Implementation of Ingestion PADs	3e1														
Ingestion Strategies and Information	3e2														
Imp. of RRR Decisions	3f1														
Field Measurement and Analysis															
RESERVED	4a1														
Field Team Management	4a2		M												
Field Team Operations	4a3			M	M										
Field Team Sampling	4b1														
Laboratory Operations	4c1														
Emergency Notification and Public Info															
Initial Alert & Notification	5a1	M						M	M			M	M	M	M
RESERVED	5a2														
Backup Alert & Notification	5a3							M				M	M	M	
Exception Area Alerting	5a4														
Subsequent Public Information	5b1	M				M		M	L2			M	M	L2	
Support Operations/Facilities															
Reception Center Operations	6a1														
EW Monitoring & Decon	6b1														
Congregate Care	6c1														
Contaminated Injured Transport & Care	6d1									M	M				

3.3 Criteria Evaluation Summaries

3.3.1 State Jurisdictions

3.3.1.1 Missouri State Emergency Operations Center

The Missouri State Emergency Operations Center (SEOC) located near Jefferson City, Missouri, had eleven State agencies participate in the September 21, 2021, Callaway Energy Center (CEC) Plume Exercise. In addition, Ameren and USDA also had liaisons in the SEOC. All eleven criteria at this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

There was seamless and consistent coordination and communication between the Ameren liaisons and SEOC staff on the SEOC floor and in the Joint Information Center (JIC). The exercise design was unique and challenging but the scenario had significant supplementary events that kept the SEOC and the risk county EOCs engaged and communicating.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 2.a.1, 2.b.1, 2.b.2, 2.c.1, 3.d.1, 5.a.1, 5.b.1.
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.1.2 Missouri Dose Assessment/Field Team Coordination

The Missouri Dose Assessment/Field Team Coordination activities were conducted out of the Callaway Energy Center (CEC) Emergency Operations Facility (EOF). Missouri Department of Health and Senior Services (DHSS) staff were the lead for all Dose Assessment/Field Team Coordination decisions. All eight criteria assigned were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

DHSS utilized a CENTREX WebEx application when communicating with the Missouri Governor's Authorized Representative (GAR) and all risk jurisdictions. The application enhanced the transmission and confirmation of Protective Action Recommendations (PARs).

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.a.1, 1.d.1, 1.e.1, 2.a.1, 2.b.1, 2.b.2, 3.a.1, 4.a.2.
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.1.3 Missouri Radiological Field Teams A and B

The Missouri Radiological Field Teams (RFTs) are staffed with personnel from the Missouri Department of Health and Senior Services (DHSS). RFTs are dispatched from the Callaway Energy Center (CEC) Emergency Operations Facility (EOF). Upon arrival at the EOF, RFTs are briefed and deployed to predetermined locations or traverse routes. All four criteria for both field teams were adequately demonstrated in accordance with plans, procedures, and the extent of play agreement.

The RFTs were very conscientious of sample integrity and limiting cross contamination issues. RFTs demonstrated excellent equipment set-up skills and the design of the purpose-built response vehicle should be commended. RFTs displayed excellent teamwork skills and were very professional during the demonstration.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.d.1, 1.e.1, 3.a.1, 4.a.3.
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.1.4 Missouri Joint Information Center

The Missouri Joint Information Center (JIC) was co-located with the Missouri State Emergency Operations Center at 2302 Militia Drive, Jefferson City, MO. In addition to the State Public Information Officers (PIOs), Ameren also dispatched PIOs to the JIC and coordinated with the State PIOs for the release of information to the general public. All four criteria assigned to the JIC were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

Press briefings at the JIC were conducted in a timely manner with numerous and challenging questions from mock media. All questions directed at JIC staff were answered professionally and accurately. In addition, the JIC rumor control staff did an outstanding job dealing with frequent calls and inquiries.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.a.1, 1.d.1, 1.e.1, 5.b.1
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.1.5 Missouri Forward Command Post/Emergency Operations Facility

The Missouri Forward Command Post (FCP)/Emergency Operations Facility (EOF) was established in the Callaway Energy Center (CEC) Emergency Operations Facility (EOF) and was co-located with the Dose Assessment and Field Team Coordination. The Missouri State Emergency Management Agency (SEMA) deployed a two-person liaison team to the FCP/EOF to coordinate response actions to an event at CEC. All four criteria for this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

The two-person SEMA liaison team was proactive in keeping the State Emergency Operations Center (SEOC) informed of CEC plant status and updates. The liaison team established a relationship with CEC staff and worked to obtain water tanker assistance for CEC. During the September 21, 2021, CEC plume exercise, the SEMA liaisons demonstrated a thorough knowledge of their responsibilities at the FCP/ EOF.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.a.1, 1.d.1, 1.e.1, 3.a.1
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.1.6 EAS Station – KTTY

The primary Emergency Alert System (EAS) station for incidents at the Callaway Energy Center (CEC) is KTTY 106.9 FM located at 3215 Lemone Industrial Boulevard, Suite 200, Columbia, MO. KTTY has the capability to receive and broadcast EAS messages 24 hours a day. Both criteria for this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

An out-of-sequence evaluation was performed on December 14, 2021, by interview. KTTY radio station's staff displayed knowledge of the CEC procedures and acknowledged the importance of their roles to inform the public. Staff demonstrated use of procedures for coordinating and confirming with the alerting authority to ensure proper and timely broadcast of the EAS message. Staff demonstrated strong knowledge of emergency alerting procedures.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 5.a.1, 5.b.1
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.2 Risk Jurisdictions

3.3.2.1 Callaway County/Fulton Emergency Operations Center

The Callaway County/Fulton Emergency Operations Center (EOC) was located at 1201 State Route O in Fulton, Missouri. There were representatives from numerous County agencies present to assist the Emergency Management staff in the EOC. Fourteen of the fifteen criteria for this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

During the September 21, 2021, Callaway Energy Center (CEC) plume exercise, Callaway County utilized experienced EOC staff to mentor inexperienced or new staff for back up positions. This enabled all staff to cross train and become familiar with other positions and duties within the EOC.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 2.a.1, 2.b.2, 2.c.1, 3.a.1, 3.b.1, 3.c.1, 3.d.1, 3.d.2, 5.a.1, 5.a.3
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: 5.b.1

ISSUE NUMBER: 10-21-5b1-L2-01

CONDITION:

The emergency information and instructions for the public and media was not adequately demonstrated by Callaway County Emergency Operations Center (EOC). Specifically, information concerning Callaway County transportation pickup points was not effectively coordinated and communicated between the Callaway County EOC and the State Emergency Management Agency (SEMA). Unaware of the changes, SEMA provided messaging that was consistent with their current policies and procedures. At 1037, the Callaway County Public Information Officer (PIO) sent information to the JIC regarding the two Callaway County established transportation dependent pickup points, should an evacuation be ordered due to the event occurring at the Callaway Energy Center (CEC). At 1134, the Callaway County PIO sent Message Number 5 "Pickup Points Notification Message" to the JIC through an email and posted the information in WebEOC at 1139. At 1230, the FEMA evaluator asked if the pickup points had been included in News Release #2 sent out by the JIC at 1150. The Callaway County PIO pulled the News Release uploaded in WebEOC by the JIC at 1151, and the information regarding the Callaway County pickup points was not included.

POSSIBLE CAUSE:

There was delayed follow-up from the Callaway County PIO in reviewing the Special News Broadcasts/News Releases developed by the Missouri Joint Information Center, with input from the four risk counties.

REFERENCE:

NUREG-0654/FEMA-REP-1, E.5, 7; G.3.a, G.4.a, c

EFFECT:

When the Protective Action Recommendation was made to evacuate subareas C1, C4 and C5 for Callaway County, briefed by the Emergency Management Director at 1116, the pickup points established for Callaway County transportation dependent individuals were not included in the News Release #2 issued at 1150. Callaway County residents located in the evacuation area did not receive information on where to report to if they required necessary transportation to the Hearn Center in Columbia. It should be noted that a phone number was included in News Release #2 for Callaway County residents to call if they needed transportation assistance, however, the pickup points should have been included as well for completeness of emergency information.

RECOMMENDATION:

Provide training to County Public Information Officers (PIOs) and add an action step in the plans/procedures that all Press Releases/Special News Broadcasts require immediate review. Consider utilizing WEBEX with a dedicated line for State and County PIOs for rapid peer checks and concurrence of all Press Releases/Special News Broadcasts. This dedicated line for any JIC related calls should be located near the JIC for easy PIO access.

PROPOSED CORRECTION ACTION:

Current plan will be to provide training to the counties. The counties and SEMA have agreed that specific training on PIO, County Health, Radiation specific first responder training, WebEOC, and IPAWS are needed. State and counties are working on modifications to PIO procedures to ensure that all public information is reviewed in a timely manner. A culminating event occurring on June 28th will be designed in a manner that will test the identified L2 findings. The Callaway Energy Center has already stated their support in exercise design for the June 28th drill.

- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.2.2 SSM Health St. Mary's Hospital

The SSM Health St. Mary's Hospital is located at 2505 Mission Drive, Jefferson City, Missouri. An out-of-sequence demonstration was conducted on November 16, 2021. All three criteria for this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

Hospital staff utilized an excellent Radiological Emergency Area (REA) design for patient treatment and decontamination. Staff in REA and buffer area used checklists and wax board extensively during the demonstration.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.e.1, 3.a.1, 6.d.1.
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None

-
- e. NOT DEMONSTRATED: None
 - f. PRIOR ISSUES - RESOLVED: None
 - g. PRIOR ISSUES - UNRESOLVED: None

3.3.2.3 Callaway County Emergency Medical Service

The Callaway County Emergency Medical Service (EMS) is located at 311 Hickman Avenue, in Fulton, Missouri. An out-of-sequence demonstration was conducted on November 16, 2021. All three criteria for this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

Personnel demonstrated excellent awareness and contamination control throughout the demonstration. Staff followed procedures for patient assessment and transport.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.e.1, 3.a.1, 6.d.1.
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.2.4 Gasconade County Emergency Operations Center

The Gasconade County Emergency Operations Center (EOC) was located at 119 East First Street, in Hermann, Missouri. During the September 21, 2021, plume exercise all fifteen criteria at this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

An excellent display of leadership and participation from the County Commissioners was observed. The Gasconade County Emergency Management Director was proactive and stayed engaged with all county agency representatives.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 2.a.1, 2.b.2, 2.c.1, 3.a.1, 3.b.1, 3.c.1, 3.d.1, 3.d.2, 5.a.1, 5.a.3, 5.b.1.
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.2.5 Montgomery County Emergency Operations Center

The Montgomery County Emergency Operations Center (EOC) was located at 211 East 3rd Street

in Montgomery City, Missouri. During the September 21, 2021 exercise, there were representatives from numerous County agencies present to assist the Emergency Management staff in the EOC. All sixteen criteria at this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

The Montgomery County Radiation Officer gave an excellent Emergency Worker (EW) radiological briefing utilizing a newly developed briefing script. During the exercise there were numerous briefs led by the Montgomery County Emergency Management Director. As part of these briefs there was excellent inter-agency collaboration with each agency giving thorough brief-outs for their activities.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.a.1, 1.b.1, 1.c.1, 1.d.1, 1.e.1, 2.a.1, 2.b.2, 2.c.1, 3.a.1, 3.b.1, 3.c.1, 3.d.1, 3.d.2, 5.a.1, 5.a.3, 5.b.1.
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.2.6 Osage County Emergency Operations Center

The Osage County Emergency Operations Center (EOC) was located at 205 East Main Street in Linn, Missouri. During the September 21, 2021, plume exercise fourteen of the fifteen criteria at this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

County agencies present in the EOC and the Emergency Management Director (EMD) were extremely proactive in preparation for response activities and potential needs and requests. The County EOC staff ensured that the best detour routes were used in response to an impediment on an evacuation route.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 2.a.1, 2.b.2, 2.c.1, 3.a.1, 3.b.1, 3.c.1, 3.d.1, 3.d.2, 5.a.1, 5.a.3, 5.b.1.
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: 5.b.1

ISSUE NUMBER: 10-21-5b1-L2-02

CONDITION:

The emergency information and instructions for the public and media was not adequately demonstrated by Osage County Emergency Operations Center (EOC). Specifically, information concerning Osage County schools and day care centers was not effectively coordinated and communicated between the Osage County EOC and the State Emergency Management Agency (SEMA) and the information that was released by SEMA from the Joint Information Center (JIC)

in News Releases did not contain accurate information concerning the protective actions taken for Osage County Schools. Osage County EOC elected to take protective actions for the schools that differed from the preplanned actions contained in the plans. According to the Osage County Radiological Emergency Response Plan, J.IV.A.1.a., and J.VI.E., the Osage County schools and day care centers would normally close at the Site Area Emergency declaration according to their normal early closure procedures to allow families to re-unite prior to the need for a potential evacuation. At 0915, Osage County EOC posted on WebEOC that they approved “**closing and evacuating** schools and daycares in the area”. Later, at 0958, Osage County EOC posted on WebEOC that they were “moving students to the reception center”. At 1047 Osage County EOC posted on WebEOC (original time of action indicated as 0921) that “buses will be picking up the children at 10 a.m. and transporting them to the reception center at Jason Gymnasium in Jefferson City”. Despite these messages posted on WebEOC, all public information released by the State Emergency Management Agency (SEMA) from the Joint Information Center indicated that the schools and day care centers, including those in Osage County, were closing in accordance with their normal closure procedures and did not contain any information concerning movement of schools and day care centers to reception centers. Specifically, News Release #1 at 0931 indicated that the Osage County R1 Chamois Schools, the Alverda Buscher Day Care, and the Tiny Pirates Early Learning Center were closing early, that R1 buses would run their normal routes, and that parents could pick up their children from the R1 Chamois Schools as well as from Alverda Buscher and Tiny Pirates. New Release #2 at 1150 further indicated that those schools and day cares had closed early and remain closed. Again, there was no mention of any movement of students to the reception center at Jason Gym in Jefferson City. While the decision by Osage County to move the students to the reception center is certainly an acceptable decision, and the school and day care children were protected at all times through the actions taken, the inconsistent public information could have caused confusion for parents and guardians as to where their children were and what protective actions were being taken for them.

POSSIBLE CAUSE:

While Osage County did post information to WebEOC indicating that school and day care students were being moved to the reception center, some of the information on the posts was either ambiguous and/or posted late. The initial post at 0915 indicated that the schools were both “closing” and “evacuating” which SEMA and the JIC could have interpreted to mean that they were closing in accordance with their normal closure procedures as that is what SEMA apparently believed they were doing. The Osage County WebEOC posts at 0958 and 1047 concerning movement of students to the reception center were well after News Release #1 had been published.

REFERENCE:

NUREG-0654/FEMA-REP-1, E.7; Osage County Radiological Emergency Response Plan J.IV.A.1. a. and J.VI.E.

EFFECT:

The inconsistent public information could have caused confusion for parents and guardians as to where their children were and what protective actions were being taken for them.

RECOMMENDATION:

Provide training to County Public Information Officers (PIOs) and add an action step in the

plans/procedures that all Press Releases/Special News Broadcasts require immediate review. Consider utilizing WEBEX with a dedicated line for State and County PIOs for rapid peer checks and concurrence of all Press Releases/Special News Broadcasts. This dedicated line for any JIC related calls should be located near the JIC for easy PIO access.

PROPOSED CORRECTION ACTION:

Current plan will be to provide training to the counties. The counties and SEMA have agreed that specific training on PIO, County Health, Radiation specific first responder training, WebEOC, and IPAWS are needed. State and counties are working on modifications to PIO procedures to ensure that all public information is reviewed in a timely manner. A culminating event occurring on June 28th will be designed in a manner that will test the identified L2 findings. The Callaway Energy Center has already stated their support in exercise design for the June 28th drill.

- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

3.3.3 Federal Jurisdictions

3.3.3.1 National Weather Service

The National Weather Service (NWS) Office was located at 12 Research Park Drive, Saint Charles, Missouri. This NWS Office has the capability to receive and broadcast EAS messages 24 hours a day. The one criterion at this location was adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

An out-of-sequence evaluation was performed on December 6, 2021, by virtual interview. The NWS staff member demonstrated outstanding professionalism and knowledge of the CEC procedures for EAS messages.

In summary, the status of DHS/FEMA criteria for this location is as follows:

- a. MET: 5.a.1.
- b. LEVEL 1 FINDINGS: None
- c. LEVEL 2 FINDINGS: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

SECTION 4: CONCLUSION

Based on the results of the September 21, 2021, plume exercise, and associated out of sequence drills, the offsite radiological emergency response plans and preparedness for the State of Missouri and the affected local jurisdictions are deemed adequate to provide reasonable assurance that appropriate measures can be taken to protect the health and safety of the public in the event of a radiological emergency.

Therefore, 44 CFR Part 350 approval of the offsite radiological emergency response plans and preparedness for the State of Missouri, Callaway County, Gasconade County, Montgomery County, and Osage County site-specific to the Callaway Energy Center, will remain in effect.

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APPENDIX A: IMPROVEMENT PLAN

Issue Number: 10-21-5b1-L2-01		Criterion: 5b1
<p>ISSUE: The emergency information and instructions for the public and media was not adequately demonstrated by Callaway County Emergency Operations Center (EOC). Specifically, information concerning Callaway County transportation pickup points was not effectively coordinated and communicated between the Callaway County EOC and the State Emergency Management Agency (SEMA). Unaware of the changes, SEMA provided messaging that was consistent with their current policies and procedures. At 1037, the Callaway County Public Information Officer (PIO) sent information to the JIC regarding the two Callaway County established transportation dependent pickup points, should an evacuation be ordered due to the event occurring at the Callaway Energy Center (CEC). At 1134, the Callaway County PIO sent Message Number 5 "Pickup Points Notification Message" to the JIC through an email and posted the information in WebEOC at 1139. At 1230, the FEMA evaluator asked if the pickup points had been included in News Release #2 sent out by the JIC at 1150. The Callaway County PIO pulled the News Release uploaded in WebEOC by the JIC at 1151, and the information regarding the Callaway County pickup points was not included.</p>		
<p>RECOMMENDATION: Provide training to County Public Information Officers (PIOs) and add an action step in the plans/procedures that all Press Releases/Special News Broadcasts require immediate review. Consider utilizing WEBEX with a dedicated line for State and County PIOs for rapid peer checks and concurrence of all Press Releases/Special News Broadcasts. This dedicated line for any JIC related calls should be located near the JIC for easy PIO access.</p>		
<p>PROPOSED CORRECTION ACTION: Current plan will be to provide training to the counties. The counties and SEMA have agreed that specific training on PIO, County Health, Radiation specific first responder training, WebEOC, and IPAWS are needed. State and counties are working on modifications to PIO procedures to ensure that all public information is reviewed in a timely manner. A culminating event occurring on June 28th will be designed in a manner that will test the identified L2 findings. The Callaway Energy Center has already stated their support in exercise design for the June 28th drill.</p>		
<p>CAPABILITY: Alert and Notification</p>		<p>PRIMARY RESPONSIBLE AGENCY: Callaway County/Fulton EOC</p>
<p>CAPABILITY ELEMENT: Emergency Information and Instructions</p>		<p>START DATE: November 23, 2021</p>
<p>AGENCY POC: Michelle Kidwell, County EMD</p>		<p>ESTIMATED COMPLETION DATE: June 28, 2022</p>

Issue Number: 10-21-5b1-L2-02

Criterion: 5b1

The emergency information and instructions for the public and media was not adequately demonstrated by Osage County Emergency Operations Center (EOC). Specifically, information concerning Osage County schools and day care centers was not effectively coordinated and communicated between the Osage County EOC and the State Emergency Management Agency (SEMA) and the information that was released by SEMA from the Joint Information Center (JIC) in News Releases did not contain accurate information concerning the protective actions taken for Osage County Schools. Osage County EOC elected to take protective actions for the schools that differed from the preplanned actions contained in the plans. According to the Osage County Radiological Emergency Response Plan, J.IV.A.1. a., and J.VI.E., the Osage County schools and day care centers would normally close at the Site Area Emergency declaration according to their normal early closure procedures to allow families to re-unite prior to the need for a potential evacuation. At 0915, Osage County EOC posted on WebEOC that they approved “closing and evacuating schools and daycares in the area”. Later, at 0958, Osage County EOC posted on WebEOC that they were “moving students to the reception center”. At 1047 Osage County EOC posted on WebEOC (original time of action indicated as 0921) that “buses will be picking up the children at 10 a.m. and transporting them to the reception center at Jason Gymnasium in Jefferson City”. Despite these messages posted on WebEOC, all public information released by the State Emergency Management Agency (SEMA) from the Joint Information Center indicated that the schools and day care centers, including those in Osage County, were closing in accordance with their normal closure procedures and did not contain any information concerning movement of schools and day care centers to reception centers. Specifically, News Release #1 at 0931 indicated that the Osage County R1 Chamois Schools, the Alverda Buscher Day Care, and the Tiny Pirates Early Learning Center were closing early, that R1 buses would run their normal routes, and that parents could pick up their children from the R1 Chamois Schools as well as from Alverda Buscher and Tiny Pirates. New Release #2 at 1150 further indicated that those schools and day cares had closed early and remain closed. Again, there was no mention of any movement of students to the reception center at Jason Gym in Jefferson City. While the decision by Osage County to move the schools to the reception is certainly an acceptable decision, and the school and day care children were protected at all times through the actions taken, the inconsistent public information could have caused confusion for parents and guardians as to where their children were and what protective actions were being taken for them.

RECOMMENDATION: Provide training to County Public Information Officers (PIOs) and add an action step in the plans/procedures that all Press Releases/Special News Broadcasts require immediate review. Consider utilizing WEBEX with a dedicated line for State and County PIOs for rapid peer checks and concurrence of all Press Releases/Special News Broadcasts. This dedicated line for any JIC related calls should be located near the JIC for easy PIO access.

PROPOSED CORRECTION ACTION: Current plan will be to provide training to the counties. The counties and SEMA have agreed that specific training on PIO, County Health, Radiation specific first responder training, WebEOC, and IPAWS are needed. State and counties are working on modifications to PIO procedures to ensure that all public information is reviewed in a timely manner. A culminating event occurring on June 28th will be designed in a manner that will test the identified L2 findings. The Callaway Energy Center has already stated their support in exercise design for the June 28th drill.

Unclassified

Radiological Emergency Preparedness Program (REP)

After Action Report/Improvement Plan

Callaway Energy Center

CAPABILITY: Alert and Notification	PRIMARY RESPONSIBLE AGENCY: Osage County EOC
CAPABILITY ELEMENT: Emergency Information and Instructions	START DATE: November 23, 2021
AGENCY POC: Ron Hoffman, EMD	ESTIMATED COMPLETION DATE: June 28, 2022

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APPENDIX B: EXERCISE TIMELINE

Table 1 presents the times recorded for various activities and decisions at each of the evaluated locations during the Callaway Energy Center plume exercise held on September 21, 2021. A disparity in times is normal given the need for message transmissions and decision-making at the various locales.

Date & Site: September 21, 2021		Callaway Energy Center Exercise							
Emergency Classification Level or Event	Time Utility Declared	Time that notification was received, or action was taken							
		Missouri State EOC	Missouri JIC	Missouri FCP EOF	Dose Assess. Field Team Coordination	Callaway County EOC	Gasconade County EOC	Montgomery County EOC	Osage County EOC
Unusual Event	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alert	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Site Area Emergency	0836	0846	0850	0857	0859	0846	0848	0846	0846
General Emergency	1103	1113	1113	1105	1104	1113	1107	1115	1107
Radiation Release Started	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Radiation Release Terminated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Facility Declared Operational		Activated	0914	0910		0829	0836	0915	0910
Governor Declared State of Emergency		1034	1034	1038		1030		1010	
Precautionary Actions - Dairy Animals placed on Stored Feed & Water 10 Mile EPZ; Monitor EAS; Air & River access control; Schools closed.				0908	0908	0920	0931	0932	0936
Siren Activation		0924	0924	0924		0924			0924
Initial EAS Message		0927	0927	0927		0927			0927
News Release #1		0931	0931	0931					0931
1st Protective Action Decision - Evacuation of Subareas C1, C4, C5, and O1.			1119		1110	1132	1130	1130	1127
Siren Activation		1140	1140	1140		1140	1140	1140	1140
EAS Message		1143	1143	1143		1143	1143	1143	1143
News Release #2		1150	1150					1150	1150
KI Recommended to Emergency Workers			N/A	N/A				N/A	
Exercise Terminated		1217	1217	1230		1248	1216	1247	1216

APPENDIX C: EXERCISE EVALUATORS AND TEAM LEADERS

SITE: Callaway Energy Center

LOCATION	EVALUATOR	AGENCY
Missouri State Emergency Operations Center	*Kerris Bates Brian Hasemann	FEMA HQ FEMA II
Missouri Dose Assessment/Field Team Coordination	*Ken Wierman Chuck Hooper	FEMA HQ EPA VII
Missouri Radiological Field Team A	*Greg Voss	FEMA VII
Missouri Radiological Field Team B	*Tim Pflieger	FEMA VI
Missouri Joint Information Center	*Linda Gee Lisa Rink	FEMA VI FEMA HQ
Missouri Forward Command Post/EOF	*Norm Valentine	FEMA VII
EAS Station KTXV	*Jeff Clark	FEMA VII
Callaway County Emergency Operations Center	*Chris Bellone Lee Torres Heather Wilson	FEMA HQ FEMA III FEMA VII
SSM Health St. Mary's Hospital	*Jeff Clark	FEMA VII
Callaway County Emergency Medical Service	*Greg Voss	FEMA VII
Gasconade County Emergency Operations Center	*Scott Hallett Brad DeKorte Michele Sturman	FEMA HQ FEMA VI FEMA II
Montgomery County Emergency Operations Center	*Andy Chancellor Joe Suders Cody McKown	FEMA VII FEMA III FEMA VII
Osage County Emergency Operations Center	*Kathy Duran Larry Broockerd Miriam Weston	FEMA III FEMA HQ FEMA II
National Weather Service	*Jeff Clark	FEMA VII
* Team Leader		

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APPENDIX D: ACRONYMS AND ABBREVIATIONS

Acronym	Meaning
CEC	Callaway Energy Center
CFR	Code of Federal Regulations
DA	Dose Assessment
DHS	Department of Homeland Security
DHSS	Department of Health and Senior Services
EAL	Emergency Action Level
EAS	Emergency Alert System
ECL	Emergency Classification Level
EDG	Emergency Diesel Generator
EPD	Electronic Personal Dosimeter
EMD	Emergency Management Director
EMS	Emergency Medical Service
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
EPA	Environmental Protection Agency
EPZ	Emergency Planning Zone
ERO	Emergency Response Organization
ESW	Essential Service Water
ETE	Evacuation Time Estimate
EW	Emergency Worker
FCP	Forward Command Post
FEMA	Federal Emergency Management Agency
FTC	Field Team Coordination
GAR	Governor's Authorized Representative
GE	General Emergency
JIC	Joint Information Center
KI	Potassium Iodide
NUREG	Nuclear Regulatory
NWS	National Weather Service
ORO	Offsite Response Organization
PAD	Protective Action Decision
PAR	Protective Action Recommendation
PIO	Public Information Officer
PPE	Personnel Protective Equipment
REA	Radiological Emergency Area
REP	Radiological Emergency Preparedness
RFT	Radiological Field Team

SAE	Site Area Emergency
SEMA	State Emergency Management Agency
SEOC	State Emergency Operations Center
SFP	Spent Fuel Pool
SG	Steam Generator
TACP	Traffic Access Control Point
TSC	Technical Support Center
TSO	Technical Specification Outage
USDA	United States Department of Agriculture