



Palo Verde Generating Station Biennial Plume Phase Exercise After Action Report

Exercise Date: March 9, 2021

Radiological Emergency Preparedness Program



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EXECUTIVE SUMMARY

The United States (U.S.) Department of Homeland Security's (DHS) Federal Emergency Management Agency (FEMA), Region 9, National Preparedness Division, Technological Hazards Branch, evaluated a Plume Pathway Exercise (PPX) for the 10-mile Emergency Planning Zone (EPZ) surrounding the Palo Verde Generating Station (PVGS) on March 9, 2021.

During the PVGS PPX, FEMA assessed the ability of state and local offsite response organizations (ORO) to implement plans and procedures to protect the public, in the event of a radiological incident at PVGS. This biennial exercise is part of the FEMA Radiological Emergency Preparedness Program (REPP) to ensure that adequate capabilities exist to prevent, protect against, mitigate the effects of, respond to, and recover from incidents involving commercial nuclear power plants. The exercise was held in accordance with FEMA's policies and guidance for the implementation of state and local ORO radiological emergency response plans and procedures. This exercise implemented the revised NUREG 0654/FEMA REP 1 Rev 2 document and the 2019 Radiological Emergency Preparedness (REP) Program Manual (RPM).

The scenario and Extent of Play (EOP) agreement was reviewed and approved by the FEMA Region 9 Regional Assistance Committee (RAC) Chair on March 5, 2021. The EOP agreement was based on the objectives and capability targets outlined in the December 2019, REP Program Manual. Due to the ongoing COVID-19 public health emergency, some capabilities were demonstrated virtually, and other capabilities needed to be demonstrated out of sequence. The Reception Center Exercise was pushed back completely into 2022 under the assumption the public health emergency would subside for the exercise which must take place in a closed school gymnasium facility with constant close contact. Lastly, all exercise activities were required to comply with both local public health directives as well as FEMA internal COVID specific guidelines for staff.

There were no Level 1 or Level 2 Findings. There were no Open Findings from previous exercises.

In summary: the PVGS OROs adequately demonstrated their capability to implement plans and procedures. FEMA has reasonable assurance that measures can be taken to protect the health and safety of the public in the event of a radiological incident at PVGS.

SECTION 1: EXERCISE OVERVIEW

Exercise Name	2021 Palo Verde Generating Station (PVGS) Biennial Plume Phase Exercise
Exercise Dates	March 9, 2021
Scope	This exercise is a full-scale exercise, planned for one day at designated offsite response organization (ORO) locations and the PVGS.
Mission Area(s)	Protection, Response
Core Capabilities	Planning Operational Coordination Operational Communication Public Health, Healthcare, and EMS Mass Care Services On-Scene Security, Protection, and LE Environmental Health/Response and Safety Situational Assessment Critical Transportation Public Information and Warning
Objectives	Emergency Operations Management Exposure Control Alert and Notification Detect, Measure, Sample, Analyze, and Assess Operate
Threat or Hazard	Release of radiological materials from a commercial nuclear power plant
Scenario	This exercise required coordinated decisions of offsite response organizations (OROs) to address a radiological hazard from an emergency at PVGS. OROs demonstrated the implementation of protective actions to preserve health and safety of the public due to a potential or actual offsite release of radioactive materials from PVGS.
Sponsor	Arizona Department of Emergency and Military Affairs Maricopa County Department of Emergency Management Maricopa County Sheriff Office Palo Verde Generating Station
Participating Organizations	Agencies at the local, state, and federal level participated in this exercise. Voluntary organizations and private organizations also participated. A complete list of participating agencies and organizations is attached in Appendix B.

SECTION 2: ANALYSIS OF CAPABILITY TARGETS

2.1 Summary Results of Exercise Evaluation

Table 1 below includes the exercise objectives, capability targets, selected core capabilities, and status of each capability target evaluated during the PVGS Plume Phase Full Scale Exercise.

Each jurisdiction and functional entity were evaluated based on the demonstration of core capabilities and capability targets. Capability targets are listed, and the demonstration status of those capability targets are indicated using the following terms:

- **Met (M):** The jurisdiction or functional entity performed all activities under the objective/capability target to the level required per the work plan and/or the extent-of-play agreement, with no Level 1 or Level 2 Findings evaluated under that objective/capability target during the current activity and no unresolved prior Level 2 Finding(s).
- **Level 1 Finding (L1):** An observed or identified inadequacy of organizational performance during an assessment activity that could cause a determination that offsite emergency preparedness is not adequate to provide reasonable assurance that appropriate protective measures can be taken in the event of a radiological emergency to protect the health and safety of the public living in the vicinity of a NPP.
- **Level 2 Finding (L2):** An observed or identified inadequacy of organizational performance during an assessment activity that is not considered, by itself, to adversely impact public health and safety.
- **Plan Issue (P):** An observed or identified inadequacy in the ORO's emergency plan/implementing procedures, rather than in that of the ORO's performance.
- **Not Demonstrated (N):** For a justifiable reason, the jurisdiction or functional entity did not perform assessment activities under the objective/capability target as specified in the extent-of-play agreement.
- **Not Applicable (N/A):** The objective/capability target does not apply to the jurisdiction.

Table 1. Summary Results of Capability Targets

Venue	Target	CORE Capability	Status
Objective 1: Emergency Management Operations			
Technical Operations Center	1.3	Environmental Response/Health and Safety; Situational Assessment	M
Emergency Operations Facility	1.1	Operational Coordination	M
	1.3	Environmental Response/Health and Safety; Situational Assessment	M
Radiological Emergency Assistance Team - Forward	1.1	Operational Coordination	M
Field Monitoring Team-A	1.1	Operational Coordination	M
Field Monitoring Team-B	1.1	Operational Coordination	M
State Emergency Operations Center – Policy	1.1	Operational Coordination	M
	1.2	Operational Coordination	M
	1.4	Environmental Response/Health and Safety	M
State Emergency Operations Center – Emergency Operations Center	1.1	Operational Coordination	M
	1.2	Operational Coordination	M
	1.5	Environmental Response/Health and Safety	M
Joint Information Center	1.1	Operational Coordination	M
	1.2	Operational Coordination	M
Warning Point/ Maricopa County Department of Emergency Management	1.1	Operational Coordination	M
Maricopa County Department of Emergency Management Emergency Operations Center	1.2	Operational Coordination	M
	1.5	Environmental Response/Health and Safety	M
Maricopa County Department of Emergency Management Emergency Operations Center – Policy Group	1.3	Environmental Response/Health and Safety; Situational Assessment	M
	1.4	Environmental Response/Health and Safety	M
Maricopa County Sheriff's Office On-Scene Command Post	1.1	Operational Coordination	M
	1.2	Operational Coordination	M
	1.5	Environmental Response/Health and Safety	M
Palo Verde Elementary School	1.5	Environmental Response/Health and Safety	M
Buckeye Emergency Operations Center	1.1	Operational Coordination	M
	1.2	Operational Coordination	M
	1.5	Environmental Response/Health and Safety	M

Venue	Target	CORE Capability	Status
Objective 2: Exposure Control			
Technical Operations Center	2.1	Environmental Response/Health and Safety	M
Emergency Operations Facility	2.1	Environmental Response/Health and Safety	M
Radiological Emergency Assistance Team - Forward	2.1	Environmental Response/Health and Safety	M
	2.2	Environmental Response/Health and Safety	M
Field Monitoring Team-A	2.2	Environmental Response/Health and Safety	M
Field Monitoring Team-B	2.2	Environmental Response/Health and Safety	M
Maricopa County Department of Emergency Management Emergency Operations Center	2.2	Environmental Response/Health and Safety	M
Objective 3: Alert and Notification			
Emergency Operations Facility	3.1	Operational Communications	M
Radiological Emergency Assistance Team - Forward	3.1	Operational Communications	M
Field Monitoring Team-A	3.1	Operational Communications	M
Field Monitoring Team-B	3.1	Operational Communications	M
State Emergency Operations Center – Policy	3.1	Operational Communications	M
State Emergency Operations Center – Emergency Operations Center	3.1	Operational Communications	M
Joint Information Center	3.1	Operational Communications	M
	3.3	Public Information and Warning	M
Maricopa County Department of Emergency Management Emergency Operations Center	3.1	Operational Communications	M
	3.2	Public Information and Warning	M
Emergency Alert System, National Weather Service	3.2	Public Information and Warning	M
Maricopa County Sheriff's Office On-Scene Command Post	3.1	Operational Communications	M
	3.2	Public Information and Warning	M
Buckeye Emergency Operations Center	3.1	Operational Communications	M
Objective 4: Detect, Measure, Sample, Analyze, and Assess			
Emergency Operations Facility	4.5	Environmental Response/Health and Safety	M
Radiological Emergency Assistance Team - Forward	4.1	Environmental Response/Health and Safety	M

Venue	Target	CORE Capability	Status
Field Monitoring Team-A	4.2	Environmental Response/Health and Safety	M
Field Monitoring Team-B	4.2	Environmental Response/Health and Safety	M
Objective 5: Operate			
Radiological Emergency Assistance Team - Forward	5.2	Environmental Response/Health and Safety	M
Maricopa County Department of Emergency Management Emergency Operations Center	5.4	Critical Transportation; On-Scene Security, Protection and Law Enforcement	M
Maricopa County Sheriff's Office On-Scene Command Post	5.4	Critical Transportation; On-Scene Security, Protection and Law Enforcement	M

2.2 DETAILED RESULTS OF EXERCISE EVALUATION

2.2.1 Technical Operations Center

Objective 1: Emergency Operations Management

Capability Target 1.3 – Protective Action Recommendations

Intent: *The capability to use dose assessment and field data, compare this data to the PAGs, and choose among a range of protective actions those most appropriate in a given emergency.*

Planning Reference: D.4, J.7, J.8, J.8.b, J.9, O.1

All relevant critical tasks were adequately demonstrated

Objective 2: Exposure Control

Capability Target 2.1 – Emergency Worker Exposure Control Decision-Making Process

Intent: *The capability to assess and control the radiation exposure and dose received by emergency workers and utilize a decision-making chain to authorize emergency worker exposure limits to be exceeded for specific missions*

Planning Reference: C.2.c, H.11, K.2, K.2.b, K.3, K.3.a, M.1.b, M.8, and O.1

All relevant critical tasks were adequately demonstrated

2.2.2 Emergency Operations Facility

Objective 1: Emergency Operations Management

Capability Target 1.1 – Mobilization

Intent: *The capability to alert, notify, and mobilize OROs to staff facilities in support of emergency operations.*

Planning Reference: A.1, A.1.a, A.1.b, A.3, A.4, A.5, C.1, C.2, C.2.a, C.2.b, C.3, E.1, E.1.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.3 – Protective Action Recommendations

Intent: *The capability to use dose assessment and field data, compare this data to the PAGs, and choose among a range of protective actions those most appropriate in a given emergency*

Planning Reference: D.4, J.7, J.8, J.8.b, J.9, and O.1

All relevant critical tasks were adequately demonstrated

Objective 2: Exposure Control**Capability Target 2.1 – Emergency Worker Exposure Control Decision-Making Process**

Intent: *The capability to assess and control the radiation exposure and dose received by emergency workers and utilize a decision-making chain to authorize emergency worker exposure limits to be exceeded for specific missions.*

Planning Reference: C.2.c, H.11, K.2, K.2.b, K.3, K.3.a, M.1.b, M.8, and O.1

All relevant critical tasks were adequately demonstrated

Objective 3: Alert and Notification**Capability Target 3.1 – Communications**

Intent: *The capability to provide and maintain reliable communications with emergency personnel.*

Planning Reference: E.1.a, E.3, F.1, F.1.a, F.1.b, F.1.c, F.3, and O.1

All relevant critical tasks were adequately demonstrated

Objective 4: Detect, Measure, Sample, Analyze, and Assess**Capability Target 4.5 – Plume Phase Analysis and Dose Assessment**

Intent: *The capability to collect data, project doses to members of the public and emergency workers, and analyze and communicate the results.*

Planning Reference: A.3, H.13, I.6, I.8, I.10, K.3, and O.1

All relevant critical tasks were adequately demonstrated

2.2.3 Radiological Emergency Assistance Team - Forward**Objective 1: Emergency Operations Management****Capability Target 1.1 – Mobilization**

Intent: *The capability to alert, notify, and mobilize OROs to staff facilities in support of emergency operations.*

Planning Reference: A.1, A.1.a, A.1.b, A.3, A.4, A.5, C.1, C.2, C.2.a, C.2.b, C.3, E.1, E.1.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Objective 2: Exposure Control**Capability Target 2.1 – Emergency Worker Exposure Control Decision-Making Process**

Intent: *The capability to assess and control the radiation exposure and dose received by emergency workers and utilize a decision-making chain to authorize emergency worker exposure limits to be exceeded for specific missions.*

Planning Reference: C.2.c, H.11, K.2, K.2.b, K.3, K.3.a, M.1.b, M.8, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 2.2 – Emergency Worker Exposure Control Management

Intent: *The capability of emergency workers to manage dose and exposure, use equipment (e.g., dosimetry, radio protective drugs), and identify procedures to monitor their exposure and dose, including following procedures to obtain authorization to receive emergency exposures in excess of the PAGs.*

Planning Reference: C.2.c, H.11, H.11.b, K.2.b, K.3, K.3.a, M.1.b, and O.1

All relevant critical tasks were adequately demonstrated

Objective 3: Alert and Notification**Capability Target 3.1 – Communications**

Intent: *The capability to provide and maintain reliable communications with emergency personnel.*

Planning Reference: E.1.a, E.3, F.1, F.1.a, F.1.b, F.1.c, F.3, and O.1

All relevant critical tasks were adequately demonstrated

Objective 4: Detect, Measure, Sample, Analyze, and Assess**Capability Target 4.1 – Field Monitoring Teams (FMTs) Management**

Intent: *The capability to provide overall management of FMTs to direct movements and measurements to characterize the plume and its impacts.*

Planning Reference: H.11, H.13, I.5, I.6, I.9, I.10, M.7, M.8, and O.1

All relevant critical tasks were adequately demonstrated

Objective 5: Operate**Capability Target 5.2 – Monitoring and Decontamination of Emergency Workers, Equipment, and Vehicles**

Intent: *The capability to implement radiological monitoring and decontamination of emergency workers, equipment, and vehicles.*

Planning Reference: K.4 and O.1

All relevant critical tasks were adequately demonstrated

2.2.4 Field Monitoring Team – A**Objective 1: Emergency Operations Management****Capability Target 1.1 – Mobilization**

Intent: *The capability to alert, notify, and mobilize OROs to staff facilities in support of emergency operations.*

Planning Reference: A.1, A.1.a, A.1.b, A.3, A.4, A.5, C.1, C.2, C.2.a, C.2.b, C.3, E.1, E.1.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Objective 2: Exposure Control**Capability Target 2.2 – Emergency Worker Exposure Control Management**

Intent: *The capability of emergency workers to manage dose and exposure, use equipment (e.g., dosimetry, radio protective drugs), and identify procedures to monitor their exposure and dose, including following procedures to obtain authorization to receive emergency exposures in excess of the PAGs.*

Planning Reference: C.2.c, H.11, H.11.b, K.2.b, K.3, K.3.a, M.1.b, and O.1

All relevant critical tasks were adequately demonstrated

Objective 3: Alert and Notification**Capability Target 3.1 – Communications**

Intent: *The capability to provide and maintain reliable communications with emergency personnel.*

Planning Reference: E.1.a, E.3, F.1, F.1.a, F.1.b, F.1.c, F.3, and O.1

All relevant critical tasks were adequately demonstrated

Objective 4: Detect, Measure, Sample, Analyze, and Assess**Capability Target 4.2 – Plume Phase Measurements and Sampling**

Intent: *The capability to make and report measurements of ambient radiation.*

Planning Reference: H.9, H.11, H.11.a, H.11.b, H.12, H.13, I.2, I.5, I.6, I.7, I.8, I.9, I.10, and O.1

All relevant critical tasks were adequately demonstrated

2.2.5 Field Monitoring Team – B**Objective 1: Emergency Operations Management****Capability Target 1.1 – Mobilization**

Intent: *The capability to alert, notify, and mobilize OROs to staff facilities in support of emergency operations.*

Planning Reference: A.1, A.1.a, A.1.b, A.3, A.4, A.5, C.1, C.2, C.2.a, C.2.b, C.3, E.1, E.1.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Objective 2: Exposure Control**Capability Target 2.2 – Emergency Worker Exposure Control Management**

Intent: *The capability of emergency workers to manage dose and exposure, use equipment (e.g., dosimetry, radio protective drugs), and identify procedures to monitor their exposure and dose, including following procedures to obtain authorization to receive emergency exposures in excess of the PAGs.*

Planning Reference: C.2.c, H.11, H.11.b, K.2.b, K.3, K.3.a, M.1.b, and O.1

All relevant critical tasks were adequately demonstrated

Objective 3: Alert and Notification**Capability Target 3.1 – Communications**

Intent: *The capability to provide and maintain reliable communications with emergency personnel.*

Planning Reference: E.1.a, E.3, F.1, F.1.a, F.1.b, F.1.c, F.3, and O.1

All relevant critical tasks were adequately demonstrated

Objective 4: Detect, Measure, Sample, Analyze, and Assess**Capability Target 4.2 – Plume Phase Measurements and Sampling**

Intent: *The capability to make and report measurements of ambient radiation.*

Planning Reference: H.9, H.11, H.11.a, H.11.b, H.12, H.13, I.2, I.5, I.6, I.7, I.8, I.9, I.10, and O.1

All relevant critical tasks were adequately demonstrated

2.2.6 State Emergency Operations Center – Policy**Objective 1: Emergency Operations Management****Capability Target 1.1 – Mobilization**

Intent: *The capability to alert, notify, and mobilize OROs to staff facilities in support of emergency operations.*

Planning Reference: A.1, A.1.a, A.1.b, A.3, A.4, A.5, C.1, C.2, C.2.a, C.2.b, C.3, E.1, E.1.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.2 – Direction and Control

Intent: *The capability to provide overall direction and control of response efforts, commensurate with the responsibilities of leadership, as detailed in plans/procedures.*

Planning Reference: A.1, A.1.a, A.1.b, A.1.c, A.2, A.3, A.5, C.2, C.2.a, C.2.b, C.3, D.4, E.1, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.4 – Protective Action Decisions for the Plume Phase

Intent: *The capability to utilize appropriate factors and necessary coordination in the decision-making process used to make PADs for the public.*

Planning Reference: D.1.b, D.4, J.6, J.7, J.8, J.8.b, J.10, J.10.a, J.10.b, J.11.c-g, and O.1

All relevant critical tasks were adequately demonstrated

Objective 3: Alert and Notification**Capability Target 3.1 – Communications**

Intent: *The capability to provide and maintain reliable communications with emergency personnel.*

Planning Reference: E.1.a, E.3, F.1, F.1.a, F.1.b, F.1.c, F.3, and O.1

All relevant critical tasks were adequately demonstrated

2.2.7 State Emergency Operations Center – EOC**Objective 1: Emergency Operations Management****Capability Target 1.1 – Mobilization**

Intent: *The capability to alert, notify, and mobilize OROs to staff facilities in support of emergency operations.*

Planning Reference: A.1, A.1.a, A.1.b, A.3, A.4, A.5, C.1, C.2, C.2.a, C.2.b, C.3, E.1, E.1.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.2 – Direction and Control

Intent: *The capability to provide overall direction and control of response efforts, commensurate with the responsibilities of leadership, as detailed in plans/procedures.*

Planning Reference: A.1, A.1.a, A.1.b, A.1.c, A.2, A.3, A.5, C.2, C.2.a, C.2.b, C.3, D.4, E.1, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.5 – Protective Action Decision Implementation for the Plume Phase

Intent: *The capability to implement precautionary protective action and/or PADs, including evacuation and/or sheltering, for all populations within the plume and ingestion exposure pathway EPZs. The populations include those with access and functional needs, students, and institutionalized individuals.*

Planning Reference: A.4, C.2.a, G.1, J.11, J.11.a, J.11.b, J.11.c, J.11.e, J.11.g, and O.1

All relevant critical tasks were adequately demonstrated

Objective 3: Alert and Notification**Capability Target 3.1 – Communications**

Intent: *The capability to provide and maintain reliable communications with emergency personnel.*

Planning Reference: E.1.a, E.3, F.1, F.1.a, F.1.b, F.1.c, F.3, and O.1

All relevant critical tasks were adequately demonstrated

2.2.8 Joint Information Center**Objective 1: Emergency Operations Management****Capability Target 1.1 – Mobilization**

Intent: *The capability to alert, notify, and mobilize OROs to staff facilities in support of emergency operations.*

Planning Reference: A.1, A.1.a, A.1.b, A.3, A.4, A.5, C.1, C.2, C.2.a, C.2.b, C.3, E.1, E.1.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.2 – Direction and Control

Intent: *The capability to provide overall direction and control of response efforts, commensurate with the responsibilities of leadership, as detailed in plans/procedures.*

Planning Reference: A.1, A.1.a, A.1.b, A.1.c, A.2, A.3, A.5, C.2, C.2.a, C.2.b, C.3, D.4, E.1, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Objective 3: Alert and Notification**Capability Target 3.1 – Communications**

Intent: *The capability to provide and maintain reliable communications with emergency personnel.*

Planning Reference: E.1.a, E.3, F.1, F.1.a, F.1.b, F.1.c, F.3, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 3.3 – Emergency Information and Instructions for Public and News Media

Intent: *The capability to disseminate emergency information and instructions to the public during all phases of an incident.*

Planning Reference: E.2, E.4, E.5, G.1, G.2, G.3, G.3.a, G.4, G.5, and O.1

All relevant critical tasks were adequately demonstrated

2.2.9 Warning Point/Maricopa County Department of Emergency Management**Objective 1: Emergency Operations Management****Capability Target 1.1 – Mobilization**

Intent: *The capability to alert, notify, and mobilize OROs to staff facilities in support of emergency operations.*

Planning Reference: A.1, A.1.a, A.1.b, A.3, A.4, A.5, C.1, C.2, C.2.a, C.2.b, C.3, E.1, E.1.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated

2.2.10 Maricopa County Department of Emergency Management - Emergency Operations Center**Objective 1: Emergency Operations Management****Capability Target 1.2 – Direction and Control**

Intent: *The capability to provide overall direction and control of response efforts, commensurate with the responsibilities of leadership, as detailed in plans/procedures.*

Planning Reference: A.1, A.1.a, A.1.b, A.1.c, A.2, A.3, A.5, C.2, C.2.a, C.2.b, C.3, D.4, E.1, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.5 – Protective Action Decision Implementation for the Plume Phase

Intent: *The capability to implement precautionary protective action and/or PADs, including evacuation and/or sheltering, for all populations within the plume and ingestion exposure pathway EPZs. The populations include those with access and functional needs, students, and institutionalized individuals.*

Planning Reference: A.4, C.2.a, G.1, J.11, J.11.a, J.11.b, J.11.c, J.11.e, J.11.g, and O.1

All relevant critical tasks were adequately demonstrated

Objective 2: Exposure Control**Capability Target 2.2 – Emergency Worker Exposure Control Management**

Intent: *The capability of emergency workers to manage dose and exposure, use equipment (e.g., dosimetry, radio protective drugs), and identify procedures to monitor their exposure and dose, including following procedures to obtain authorization to receive emergency exposures in excess of the PAGs.*

Planning Reference: C.2.c, H.11, H.11.b, K.2.b, K.3, K.3.a, M.1.b, and O.1

All relevant critical tasks were adequately demonstrated

Objective 3: Alert and Notification**Capability Target 3.1 – Communications**

Intent: *The capability to provide and maintain reliable communications with emergency personnel.*

Planning Reference: E.1.a, E.3, F.1, F.1.a, F.1.b, F.1.c, F.3, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 3.2 – Alert and Notification of the Public

Intent: *The capability to provide instructions to the public.*

Planning Reference: E.2, E.4, E.5, F.3, and O.1

All relevant critical tasks were adequately demonstrated

Objective 5: Operate**Capability Target 5.4 – Traffic and Access Control**

Intent: *The capability to select, establish, and staff traffic and access control points and removing impediments to the flow of evacuation traffic.*

Planning Reference: H.12, J.8, J.8.b, J.10, J.10.a, J.11.c, J.11.e, J.11.f, J.14.d, J.14.e, M.1.b, and O.1

All relevant critical tasks were adequately demonstrated

2.2.11 Maricopa County Department of Emergency Management - Policy Group**Objective 1: Emergency Operations Management****Capability Target 1.3 – Protective Action Recommendations**

Intent: *The capability to use dose assessment and field data, compare this data to the PAGs, and choose among a range of protective actions those most appropriate in a given emergency*

Planning Reference: D.4, J.7, J.8, J.8.b, J.9, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.4 – Protective Action Decisions for the Plume Phase

Intent: *The capability to utilize appropriate factors and necessary coordination in the decision-making process used to make PADs for the public.*

Planning Reference: D.1.b, D.4, J.6, J.7, J.8, J.8.b, J.10, J.10.a, J.10.b, J.11.c-g, and O.1

All relevant critical tasks were adequately demonstrated

2.2.12 Emergency Alert System/National Weather Service**Objective 3: Alert and Notification****Capability Target 3.2 – Alert and Notification of the Public**

Intent: *The capability to provide instructions to the public.*

Planning Reference: E.2, E.4, E.5, F.3, and O.1

All relevant critical tasks were adequately demonstrated

2.2.13 Maricopa County Sherriff’s Office On Scene Command Post**Objective 1: Emergency Operations Management****Capability Target 1.1 – Mobilization**

Intent: *The capability to alert, notify, and mobilize OROs to staff facilities in support of emergency operations.*

Planning Reference: A.1, A.1.a, A.1.b, A.3, A.4, A.5, C.1, C.2, C.2.a, C.2.b, C.3, E.1, E.1.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.2 – Direction and Control

Intent: *The capability to provide overall direction and control of response efforts, commensurate with the responsibilities of leadership, as detailed in plans/procedures.*

Planning Reference: A.1, A.1.a, A.1.b, A.1.c, A.2, A.3, A.5, C.2, C.2.a, C.2.b, C.3, D.4, E.1, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.5 – Protective Action Decision Implementation for the Plume Phase

Intent: *The capability to implement precautionary protective action and/or PADs, including evacuation and/or sheltering, for all populations within the plume and ingestion exposure pathway EPZs. The populations include those with access and functional needs, students, and institutionalized individuals.*

Planning Reference: A.4, C.2.a, G.1, J.11, J.11.a, J.11.b, J.11.c, J.11.e, J.11.g, and O.1

All relevant critical tasks were adequately demonstrated

Objective 3: Alert and Notification**Capability Target 3.1 – Communications**

Intent: *The capability to provide and maintain reliable communications with emergency personnel.*

Planning Reference: E.1.a, E.3, F.1, F.1.a, F.1.b, F.1.c, F.3, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 3.2 – Alert and Notification of the Public

Intent: *The capability to provide instructions to the public.*

Planning Reference: E.2, E.4, E.5, F.3, and O.1

All relevant critical tasks were adequately demonstrated

Objective 5: Operate**Capability Target 5.4 – Traffic and Access Control**

Intent: *The capability to select, establish, and staff traffic and access control points and removing impediments to the flow of evacuation traffic.*

Planning Reference: H.12, J.8, J.8.b, J.10, J.10.a, J.11.c, J.11.e, J.11.f, J.14.d, J.14.e, M.1.b, and O.1

All relevant critical tasks were adequately demonstrated

2.2.14 Palo Verde Elementary School**Objective 1: Emergency Operations Management****Capability Target 1.5 – Protective Action Decision Implementation for the Plume Phase**

Intent: *The capability to implement precautionary protective action and/or PADs, including evacuation and/or sheltering, for all populations within the plume and ingestion exposure pathway EPZs. The populations include those with access and functional needs, students, and institutionalized individuals.*

Planning Reference: A.4, C.2.a, G.1, J.11, J.11.a, J.11.b, J.11.c, J.11.e, J.11.g, and O.1

All relevant critical tasks were adequately demonstrated

2.2.15 Buckeye Emergency Operations Center**Objective 1: Emergency Operations Management****Capability Target 1.1 – Mobilization**

Intent: *The capability to alert, notify, and mobilize OROs to staff facilities in support of emergency operations.*

Planning Reference: A.1, A.1.a, A.1.b, A.3, A.4, A.5, C.1, C.2, C.2.a, C.2.b, C.3, E.1, E.1.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.2 – Direction and Control

Intent: *The capability to provide overall direction and control of response efforts, commensurate with the responsibilities of leadership, as detailed in plans/procedures.*

Planning Reference: A.1, A.1.a, A.1.b, A.1.c, A.2, A.3, A.5, C.2, C.2.a, C.2.b, C.3, D.4, E.1, H.6, and O.1

All relevant critical tasks were adequately demonstrated

Capability Target 1.5 – Protective Action Decision Implementation for the Plume Phase

Intent: *The capability to implement precautionary protective action and/or PADs, including evacuation and/or sheltering, for all populations within the plume and ingestion exposure pathway EPZs. The populations include those with access and functional needs, students, and institutionalized individuals.*

Planning Reference: A.4, C.2.a, G.1, J.11, J.11.a, J.11.b, J.11.c, J.11.e, J.11.g, and O.1

All relevant critical tasks were adequately demonstrated

Objective 3: Alert and Notification**Capability Target 3.1 – Communications**

Intent: *The capability to provide and maintain reliable communications with emergency personnel.*

Planning Reference: E.1.a, E.3, F.1, F.1.a, F.1.b, F.1.c, F.3, and O.1

All relevant critical tasks were adequately demonstrated

CONCLUSION

FEMA, Region 9, National Preparedness Division (NPD), Technological Hazards Branch (THB), evaluated a Plume Pathway Exercise (PPX) for the 10-mile Emergency Planning Zone surrounding PVGS on March 09, 2021. The purpose of the biennial PPX was to assess certain aspects of the level of emergency preparedness in response to a simulated radiological incident occurring at or within the vicinity of PVGS. The biennial exercise and related criteria were conducted in accordance with FEMA policies and guidance concerning emergency response plans and procedures.

A copy of the approved EOP agreement is maintained by FEMA Region 9 NPD/THB and the state of Arizona Department of Emergency and Military Affairs and is incorporated by reference.

Based on the evaluation of the biennial PPX, the offsite plans and procedures for jurisdictions site specific to PVGS can be implemented and are adequate to provide continued reasonable assurance that appropriate measures can be taken to protect the health and safety of the public in the event of a radiological incident occurring at or within the vicinity of PVGS.

Due to the ongoing novel b-coronavirus SARS-CoV-2 (COVID-19) public health emergency, some capabilities were demonstrated virtually. All exercise activities complied with public health precautions. Additionally, some capabilities were demonstrated and evaluated out of sequence from the main portion of the biennial exercise. Additional capabilities will be demonstrated later in 2021 to complete the evaluation requirements.

Therefore, Title 44 C.F.R. § 350 (October 2020), approval of the offsite plans and procedures and preparedness for the state of Arizona site-specific to PVGS will remain in effect.

Appendix A: EXERCISE TIMELINE

Emergency Classification Level Event or Action	Time Utility Declared	Time that Notification Was Received or Action Was Taken All times are Arizona, Mountain Standard Time (MST)							
		SEOC	TOC	EOF	REAT-F	JIC	MCEOC	MCSO OSCP	BEOC
Unusual Event	0819	0835	0832	0841	N/A	0823	0832	0835	0832
Alert	0902	0916	0911	0949	0935	0915	0913	0916	N/A
Site Area Emergency	1141	1153	1153	1156	1222	1144	1154	1156	1141
General Emergency	1219	1230	1230	1227	1244	1219	1230	1233	1219
Release of Rad Material Started	1133	1133	1126	1120	1151	1120	1133	1139	N/A
Release of Rad Material Terminated	N/A								
Facility Declared Operational		0919	0852	0915	0935	0943	0915	0930	0958
Declaration of State/Local Emergency (drafted)		1330				1158	1158	1158	1249
Exercise Terminated		1428	1427	1428	1417	1419	1429	1429	1446
Early Precautionary Action Recommendations:									
Relocate School Children:		1229					1229		
Restrict Air and Rail Traffic									
Close Parks		N/A							
Livestock Advisory		1229					1229		
General Information Message Only:									
1 st Siren Activation:							1327		
1 st EAS/EBS/WEA Message:							1337		
Protective Action Decisions (PAD):									
PAD # 1 0900 No action		0900		0930	0930		0900	0930	
PAD # 2 1009 Public facilities placed on standby		1009		1135	1135	1009	1009		
PAD # 3 1229 Evacuate schools		1229		1210	1210	1229	1229	1304	
PAD # 4 1327 Evacuate 2 mile radius, 5 miles down in sectors A, B, C		1327		1245	1245	1327	1327	1333	
2 nd Siren Activation:		N/A					N/A		
2 nd EAS/EBS Message:		N/A					N/A		
KI Administration Decision: N/A									

Appendix B: ADDITIONAL INFORMATION

Participating Organizations

Federal
Federal Emergency Management Agency
National Weather Service, Phoenix Office
State
Arizona Department of Agriculture
Arizona Department of Corrections
Arizona Department of Emergency and Military Affairs
Arizona Department of Environmental Quality
Arizona Department of Health Services
Arizona Department of Public Safety
Arizona Department of Transportation
Arizona National Guard, 91 st Civil Support Team
County
Maricopa County Department of Emergency Management
Maricopa County Department of Public Health Administration
Maricopa County Sheriff's Office
Maricopa Department of Transportation
Maricopa County of Environmental Services Department
Local
City of Buckeye, Police Department
City of Buckeye, Fire-Medical-Rescue Department
Palo Verde Elementary School
Non-governmental Organizations
American Red Cross, Greater Phoenix Chapter
Private
Palo Verde Generating Station

Acronyms and Abbreviations

ACRONYM	DESCRIPTION
AAR	After Action Report
ADHS	Arizona Department of Health Services
AG	Agriculture
APD	Adult Probation Department
AZ	Arizona
AZDACC	Arizona Department of Agriculture Command Center
BEOC	Buckeye Emergency Operations Center
COVID-19	SARS-CoV-2
CST	Civil Support Team
DEMA	Department of Emergency and Military Affairs
DHS	Department of Homeland Security
EAS	Emergency Alert System
EBS	Emergency Broadcast System
EMS	Emergency Medical Services
ENDEX	End Exercise
EOC	Emergency Operations Center - An offsite facility that provides for the overall control of emergency operations during a response effort. The primary EOCs are located at ADEM and MCDEM.
EOF	Emergency Operations Facility - An onsite support facility for management of overall licensee emergency response, coordination of radiological and environmental assessments, and determination of recommended public protective actions.
EOP	Extent of Play
EOR	Emergency Operations Room
EPZ	Emergency Planning Zone
EXSTART	Exercise Start
FEMA	Federal Emergency Management Agency
FSE	Full Scale Exercise
GE	General Emergency
HEOC	Health Emergency Operations Center
IAP	Incident Action Plan
ICP	Incident Command Post
IP	Improvement Plan
JIC	Joint Information Center - Palo Verde Energy Education Center, 600 N. Verrado Way, Buckeye, AZ.
KI	Potassium Iodide
LE	Law Enforcement
MC	Maricopa County
MCDEM	Maricopa County Department of Emergency Management
MCDES	Maricopa County Department of Environmental Services
MCDOT	Maricopa County Department of Transportation
MCDPH	Maricopa County Department of Public Health

ACRONYM	DESCRIPTION
MCEOC	Maricopa County Emergency Operations Center
MCOET	Maricopa County Office of Enterprise Technology
MCSO	Maricopa County Sheriff's Office
MS-1	Medical Services Drill
MST	Mountain Standard Time
NGO	Non-Governmental Organization
NPP	Nuclear Power Plant
NRC	U.S. Nuclear Regulatory Commission
NWS	National Weather Service
ORO	Offsite Response Organization
OSCP	On-Scene Command Post
PAD	Protective Action Decision - Measures taken in anticipation of, or in response to, a release of radioactive material to the environment to avoid or minimize the dose and adverse health effects received by individuals.
PAR	Protective Action Recommendation - Advice from PVGS to the State on protective measures it should consider based on plant conditions.
PD	Police Department
PPE	Personal Protective Equipment
PPX	Plume Pathway Exercise
PV	Palo Verde
PVGS	Palo Verde Generating Station
RCC	Reception and Care Center
REAT	Radiological Emergency Assistance Team
REAT – F	Radiological Emergency Assistance Team – Forward
REPP	Radiological Emergency Preparedness Program
SEOC	State Emergency Operations Center
SERRP	State Emergency Response and Recovery Plan
SME	Subject Matter Expert
TOC	Technical Operations Center
WEA	Wireless Emergency Alerts