Palo Verde Nuclear Generating Station After Action Report/ Improvement Plan

Exercise Dates – March 7-8, 2017

Radiological Emergency Preparedness Program (REPP)

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FEMA

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Palo Verde Nuclear Generating Station

After Action Report/Improvement Plan

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EXECUTIVE SUMMARY

The U.S. Department of Homeland Security's (DHS) Federal Emergency Management Agency (FEMA), Region IX, National Preparedness Division, Technological Hazards Branch, evaluated a Plume and Ingestion Pathway exercise for emergency offsite response organizations (ORO) on March 7-8, 2017. Exercise activities were conducted within the 10-mile emergency planning zone (EPZ) and the 50-mile ingestion pathway planning zone around the Palo Verde Nuclear Generating Station (PVNGS). The findings in this report contain the FEMA evaluation results, with final determinations made by the FEMA Region IX Acting Regional Assistance Committee (RAC) Chair, with approval by the Regional Administrator for FEMA Region IX.

The purpose of the exercise is to assess the ability of OROs to implement plans and procedures to protect the public, in the event of a radiological incident at PVNGS. This 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.

The scenario and Extent of Play (EOP) agreement were reviewed by the FEMA Region IX Acting RAC Chair and approved for use in this exercise. The evaluation resulted in no Level 1 or Level 2 Findings (previously called deficiencies and areas requiring corrective action, respectively). One Level 2 finding from the previous exercise was corrected. One Plan Issue was identified in this exercise.

In summary: The OROs adequately demonstrated their capability to implement plans and procedures, and therefore provided confirmation of reasonable assurance that adequate measures can be taken to protect the health and safety of the public in the event of a radiological incident at PVNGS.

SECTION 1: EXERCISE OVERVIEW

1.1 Exercise Details

Exercise Name

Palo Verde Nuclear Generating Station Ingestion Pathway Exercise

Type of Exercise

Plume and Ingestion Pathway

Exercise Date

March 7-8, 2017

Program

U.S. Department of Homeland Security's, FEMA REP Program

Scenario Type

Radiological Emergency

1.2 Exercise Planning Team Leadership

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1.3 Participating Organizations

The primary participating agencies and organizations in the PVNGS exercise were:

State Jurisdictions

Arizona Attorney General's Office

Arizona Corporation Commission

Arizona Department of Administration

Arizona Department of Agriculture

Arizona Department of Corrections

Arizona Department of Economic Security

Arizona Department of Emergency and Military Affairs

Arizona Department of Environmental Quality

Arizona Department of Health Services

Arizona Department of Homeland Security

Arizona Department of Housing Services

Arizona Department of Public Safety

Arizona Department of Transportation

Arizona Department of Water Resources

Arizona Radiation Regulatory Agency

Central Arizona Water Project

Risk Jurisdictions

Maricopa County Department of Emergency Management

Maricopa County Department of Environmental Services

Maricopa County Department of Public Health

Maricopa County Department of Transportation

Maricopa County Sheriff's Office

Pinal County Office of Emergency Management

Saddle Mountain Unified School District

Private Organizations

Palo Verde Nuclear Generating Station

Federal Agencies

Federal Radiological Monitoring and Assessment Center

National Weather Service

National Nuclear Security Administration, Radiological Assistance Program

U.S. Department of Homeland Security

Office of Infrastructure Protection

Federal Emergency Management Agency

U.S. Nuclear Regulatory Commission

Tribal Nations

Ak-Chin Indian Community

Gila River Indian Community

Tohono O'odham Nation

SECTION 2: EXERCISE DESIGN SUMMARY

2.1 Exercise Purpose and Design

FEMA Region IX evaluated this Plume and Ingestion Pathway exercise, on March 7-8, 2017, to assess the capabilities of the OROs to implement their radiological emergency plans and procedures to protect public health and safety, in response to an incident at PVNGS. This exercise satisfied the requirement of Title 44 of the Code of Federal Regulations, Part 350.9 for state participation in biennial REPP exercises. After Action Reports of FEMA's evaluation of the demonstrated capabilities are transmitted to the U.S. Nuclear Regulatory Commission to support a recommendation that state and local plans are:

- Adequate to protect the health and safety of the public living in the vicinity of the nuclear power facility; and
- That appropriate protective measures can be implemented off-site in the event of a radiological incident occurring at the nuclear power facility

2.2 Exercise Activities, Criteria and Capabilities

Plume and Ingestion Pathway exercises provide the opportunity to evaluate and assess emergency plans, implementing procedures, facilities and equipment that would be used in response to a radiological incident at the nuclear power facility.

Capabilities-based planning allows exercise planning teams to develop exercise objectives and evaluate exercise outcomes through a framework of specific action items related to core capabilities. The following core capabilities were demonstrated in this exercise.

<u>Environmental Response/Health and Safety</u>

Description: Conduct appropriate measures to ensure the protection of the health and safety of the public and workers, as well as the environment, from all-hazards in support of responder operations and the affected communities.

Mass Care Services

Description: Provide life-sustaining and human services to the affected population, to include hydration, feeding, sheltering, temporary housing, evacuee support, reunification and distribution of emergency supplies.

Operational Communications

Description: Ensure the capacity for timely communications in support of security, situational awareness, and operations by any means available, among and between affected communities in the impacted area and all response forces.

Operational Coordination

Description: Establish and maintain a unified and coordinated operational structure and process that appropriately integrates all critical stakeholders and supports the execution of core capabilities.

Planning

Description: Conduct a systematic process engaging the whole community as appropriate in the development of executable strategic, operational, and/or tactical-level approaches to meet defined objectives.

Public Health, Healthcare, and Emergency Medical Services

Description: Provide lifesaving medical treatment via Emergency Medical Services and related operations and avoid additional disease and injury by providing targeted public health, medical, and behavioral health support, and products to all affected populations.

Public Information and Warning

Description: Deliver coordinated, prompt reliable and actionable information to the whole community through the use of clear, consistent, accessible, and culturally and linguistically appropriate methods to effectively relay information regarding any threat or hazard, as well as the actions being taken and the assistance being made available, as appropriate.

Situational Assessment

Description: Provide all decision makers with decision-relevant information regarding the nature and extent of the hazard, any cascading effects, and the status of the response.

Each capability is linked to corresponding exercise activities and the following REPP exercise demonstration criteria.

2.2.1 FEMA REPP Exercise Demonstration Criteria

The REPP exercise demonstration criteria listed below are followed by references to the sixteen planning standards published in NUREG-0654/FEMA-REP-1 and the REP Program Manual (January 2016). The planning standards are identified as planning standard A through planning standard N, with numbered subsections. The REP Program Manual has crosswalks relating the core capabilities, planning standards and REPP exercise demonstration criteria.

Evaluation Area 1 – Emergency Operations Management:

Criterion 1.a.1: OROs use effective procedures to alert, notify, and mobilize emergency personnel and activate facilities in a timely manner. (A.1.a, e; A.3, 4; C.1, 4, 6; D.4; E.1, 2; H.3, 4)

Criterion 1.c.1: Key personnel with leadership roles for the ORO provide direction and control to that part of the overall response effort for which they are responsible for. (A.1.d; A.2.a, b; A.3; C.4, 6)

Criterion 1.d.1: At least two communication systems are available, at least one operates properly, and communication links are established and maintained with appropriate locations. Communications capabilities are managed in support of emergency operations. (F.1, 2)

Criterion 1.e.1: Equipment, maps, displays, monitoring instruments, dosimetry, potassium iodide (KI) and other supplies are sufficient to support emergency operations. (H.7, 10; I.7, 8, 9; J.10.a, b, e: J.11, 12; K3.a; K.5.b).

Evaluation Area 2 – Protective Action Decision-Making (PAD)

Criterion 2.a.1: OROs use a decision-making process, considering relevant factors and appropriate coordination, to ensure that an exposure control system, including the use of KI, is in place for emergency workers, including provisions to authorize radiation exposure in excess of administrative limits or protective action guides. (C.6; J.10.e, f; K.3.a; K.4)

Criterion 2.b.1: Appropriate protective action recommendations (PAR) are based on available information on plant conditions, field monitoring data, and licensee and ORO dose projections, as well as knowledge of on-site and off-site environmental conditions. (I.10 and Supplement 3)

Criterion 2.b.2: A decision-making process involving consideration of appropriate factors and necessary coordination is used to make PADs for the general public (including the recommendation for the use of KI, if ORO policy). (A.3; C.4, 6; D.4; J.9; J.10.f, m)

Criterion 2.c.1: PADs are made, as appropriate, for groups of persons with disabilities and access/functional needs. (D.4; J.9; J.10.d, e)

Criterion 2.d.1: Radiological consequences for the ingestion exposure pathway are assessed and appropriate PADs are made based on the ORO planning criteria. (A.3; C.1, 4; D.4; J.9, 11)

Criterion 2.e.1: Timely post-plume phase relocation, reentry, and return decisions are made and coordinated as appropriate, based on assessments of radiological conditions and criteria in the ORO's plan and/or procedures. (I.10; J.9; K.3.a; M.1)

Evaluation Area 3 – Protective Action Implementation:

Criterion 3.a.1: The OROs issue appropriate dosimetry, KI, and procedures, and manage radiological exposure to emergency workers in accordance with the plans/procedures. Emergency workers periodically and at the end of each mission read their dosimeters and record the readings on the appropriate exposure record or chart. OROs maintain appropriate record-keeping of the administration of KI to emergency workers. (J.10.e; K.3.a, b; K.4).

Criterion 3.b.1: KI and appropriate instructions are available if a decision to recommend use of KI is made. Appropriate record keeping of the administration of KI for institutionalized individuals is maintained. (NUREG-0654/FEMA-REP-1, J.10.e, f)

Criterion 3.c.1: Precautionary and/or PADs are implemented for persons with disabilities and access/functional needs other than schools within areas subject to protective actions. (NUREG-0654/FEMA-REP-1, J.10.e, f)

Criterion 3.d.1: Appropriate traffic and access control is established. Accurate instructions are provided to traffic and access control personnel. (NUREG-0654/FEMA-REP-1, A.3; C.1.4; J.10.g, j)

Criterion 3.d.2: Impediments to evacuation are identified and resolved. (NUREG-0654/FEMA-REP-1, J.10.k)

Criterion 3.e.1: The ORO demonstrates the availability and appropriate use of adequate information regarding water, food supplies, milk, and agricultural production within the ingestion exposure pathway emergency planning zone for implementation of protective actions. (A.3; C.1, 4; J.11)

Criterion 3.e.2: Appropriate measures, strategies, and pre-printed instructional material are developed for implementing PADs for contaminated water, food products, milk, and agricultural production. (G.1; J.9, 11)

Criterion 3.f.1: Decisions regarding controlled reentry, relocation, and return of individuals during the post-plume phase are coordinated with appropriate organizations and implemented. (E.7; J.10.j; J.12; k.5.b; M.1, 3)

Evaluation Area 4 – Field Measurements and Analyses

Criterion 4.a.2: Field teams (two or more) are managed to obtain sufficient information to help characterize the release and to control radiation exposure. (C.1; H.12; I.7, 8, 11; J.10.a)

Criterion 4.a.3: Ambient radiation measurements are made and recorded at appropriate locations, and radioiodine and particulate samples are collected. Teams will move to an appropriate low-background location to determine whether any significant (as specified in the plan and/or procedures) amount of radioactivity has been collected on the sampling media. (C.1; H.12; I.8, 9; J.10.a)

Criterion 4.b.1: The field teams (two or more) demonstrate the capability to make appropriate measurements and collect samples (e.g. food crops, milk, water, vegetation, and soil) to support adequate assessments and protective action decision-making. (C.1; K.8; J.11)

Criterion 4.c.1: The laboratory is capable of performing required radiological analyses to support PADs. (C.1, 3; J.11)

Evaluation Area 5 – Emergency Notification and Public Information.

Criterion 5.a.1: Activities associated with primary alerting and notification of the public are completed in a timely manner following the initial decision by authorized off-site emergency officials to notify the public of an emergency situation. The initial instructional message to the public must include as a minimum the elements required by current REP guidance. (E.5, 6, 7)

Criterion 5.a.3: Backup alert and notification of the public is completed within a reasonable time following detection by the ORO of a failure of the primary alert and notification system. (E.6; Appendix 3.B.2.c)

Criterion 5.b.1: OROs provide accurate subsequent emergency information and instructions to the public and the news media in a timely manner. (E.5, 7; G.3.a, G.4.a, c)

Evaluation Area 6 – Support Operations, Facilities.

Criterion 6.b.1: The facility/ORO has adequate procedures and resources to accomplish monitoring and decontamination of emergency workers and their equipment and vehicles. (K.5.a, b).

2.2.2 Core Capability, REPP Criteria Crosswalk

The Offsite Response Organizations demonstrated the core capabilities from the U.S. Department of Homeland Security's National Preparedness Goal, (September 2015) that are associated with the REPP demonstration criteria. Core capabilities are organized by five mission areas: Prevention, Protection, Mitigation, Response and Recovery. These five mission areas

serve as an aid in organizing our national preparedness activities and enabling integration and coordination across core capabilities. The mission areas are interrelated and require coordination to be effective. The core capabilities of Planning, Public Information and Warning, and Operational Coordination span all mission areas. The Protection, Response and Recovery mission areas were demonstrated in this exercise.

Protection Mission Area:

Protection includes the capabilities to safeguard the homeland against acts of terrorism and man-made or natural disasters.

Protection mission area core capabilities were met by the demonstration of REPP demonstration criteria 2.b.1 and 2.b.2.

Response Mission Area:

Response emphasizes saving and sustaining lives, stabilizing the incident, rapidly meeting basic human needs, establishing a safe and secure environment, and supporting the transition to recovery.

Response mission area core capabilities were met by the demonstration of REPP demonstration criteria 1.a.1, 1.d.1, 1.e.1, 2.a.1, 2.b.1, 2.b.2, 2.c.1, 2.d.1, 2.e.1, 3.a.1, 3.b.1, 3.c.1, 3.d.1, 3.d.2, 3.e.1, 3.e.2, 3.f.1, 4.a.2, 4.c.1, 5.a.1, 5.a.3, 5.b.1 and 6.b.1.

Recovery Mission Area:

Recovery is focused on timely restoration, strengthening, and revitalization of the infrastructure; housing; a sustainable economy; and the health, social, cultural, historic, and environmental fabric of communities:

Recovery mission area core capabilities were met by the demonstration of REPP demonstration criteria 2.e.1 and 3.f.1.

2.3 Scenario Summary

This section contains a summary of the simulated sequence of events that formed the basis for the ORO's emergency response during the Plume and Ingestion Pathway exercise on March 7-8, 2017. FEMA approved the scenario and extent of play as adequate to demonstrate the REP Program evaluation criteria and associated capabilities for this exercise on February 14, 2017.

Initial conditions: plume phase, day 1. All three units were in normal operation, producing full power.

0800 Seismic event beyond design basis occurred. Plant shutdown was required. Pressure loss in unit 1 indicated that the containment was cracked. PVNGS declared an Alert, emergency classification level (ECL).

1000 An aftershock occurred. The reactor coolant system developed a leak of 150 gallons per minute.

1005 Containment radiation monitors alarmed. Monitors indicated a release to the environment of 1.1 Roentgens per hour. A steam leak was also identified. Containment pressure dropped. Pump and valve failures occurred. PVNGS declared a Site Area Emergency.

1145 Monitors reading 250 Roentgens per hour confirmed a fuel clad failure. PVNGS declared a General Emergency ECL. As readings climbed, PVNGS upgraded a protective action recommendation based on a potential public dose of 3.8 Rem Total Effective Dose Equivalent and 48 Rem Committed Dose Equivalent to the thryroid.

1330-1430 Containment sprays, controls restored. End plume phase of the exercise.

Post-plume/ingestion phase, day two. Areas of radiological contamination deposited on the ground were determined to be above federally recommended limits for permanent residency. Relocation for those areas should be considered. Areas of potential contamination of food crops and milk were identified. Agricultural restrictions should be considered.

Extent of Play Agreement Summary

The Extent of Play agreement identified the conditions that will be used to develop, conduct, control, and evaluate the 2017 PVNGS plume phase and post-plume/ingestion phases of the exercise as agreed to by the Arizona Department of Emergency and Military Affairs, Division of Emergency Management; Maricopa County Department of Emergency Management; Arizona Radiation Regulatory Agency; and the PVNGS.

All play, demonstrations, and interviews were conducted in accordance with the 2016 *State of Arizona/Maricopa County Offsite Emergency Response Plan – Palo Verde Nuclear Generating Station* and related procedures, protocols and checklists. The following primary references, plans, and procedures were used during exercise play:

- State of Arizona/Maricopa County Offsite Emergency Response Plan – Palo Verde Nuclear Generating Station (2016 Revision)
- Arizona State Emergency Response and Recovery Plan (SERRP) (2016 Revision)
- Arizona Radiation Regulatory Agency (ARRA) Response Procedures
- Palo Verde Nuclear Generating Station Emergency Plan (Revision 56)
- Maricopa County Emergency Operations Plan (2015 Revision)
- Maricopa County Sheriff's Office Policy GJ-16 Emergency Response Plan (sensitive)

The 2017 Palo Verde Nuclear Generating Station Plume and Ingestion Pathway exercise required decisions from Offsite response agencies to protect the health and safety of the public as the result of an incident at the PVNGS involving the release of radioactive materials into the environment. Approximately 10 separate offsite response venues were activated, including Emergency Operation Centers, On-Scene Command Posts, Radiological Emergency Assistance Teams, Reception and Care Centers, and the Joint Information Center. Controllers and/or evaluators were able to request re-demonstration of any area as long as it did not impede exercise play.

SECTION 3: ANALYSIS OF CAPABILITIES

3.1 Exercise Evaluation and Results

Contained in this section are the results and findings of the evaluation of all jurisdictions and functional entities that participated in the March 7-8, 2017, Plume and Ingestion Pathway exercise, demonstrating portions of the off-site emergency response capabilities in the EPZ surrounding the PVNGS.

Each jurisdiction and functional entity was evaluated based on its demonstration of selected criteria as indicated in the Extent of Play agreement and as outlined in the FEMA REP Program Manual (January 2016).

3.2 Summary Results of Exercise Evaluation

The matrix presented in Table 3.1, on pages 17 and 18, presents the status of all exercise evaluation area criteria which were scheduled for demonstration during this exercise by all participating jurisdictions and functional entities. Exercise evaluation area criteria are listed by number and the demonstration status of those evaluation area criteria is indicated by the use of the following letters:

M – Met (No Level 1 or Level 2 findings assessed and no unresolved findings from prior exercises)
L1 – A Level 1 finding was identified (previously Deficiency)
L2 – A Level 2 finding was identified (Previously Area Requiring Corrective Action)
P - A Plan issue was identified
N – Not Demonstrated

The following are classifications and definitions of the types of issues that are discussed in this report:

Level 1 Finding:

Defined in the FEMA REP Program Manual, (January 2016) as "An observed or identified inadequacy of organizational performance in an exercise that could cause a finding 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 nuclear power plant."

Level 2 Finding:

Defined in the FEMA REP Program Manual, (January 2016) as "An observed or identified inadequacy of organizational performance in an exercise that is not considered, by itself, to adversely impact public health and safety."

Plan Issue:

Defined in the FEMA REP Program Manual, (January 2016) as "An observed or identified inadequacy in the ORO's emergency plan/procedures, rather than in the ORO's performance."

Table 3.1 – Summary of Exercise Evaluation

(Page 1 of 2)

DATE: March 7-8, 2017 SITE: Palo Verde Nuclear Generating Station, AZ M: Met, L1: Level 1 Finding, L2: Level 2 Finding, P: Plan Issue, N: Not Demonstrated		FMT-A	FMT-B	REAT-F	Lab	Re-Entry	EOF	TOC	SEOC	JIC	KTAR EAS	NWS EAS
Emergency Operations Management												
Mobilization	1a1			M					M			
Facilities	1b1						M					
Direction and control	1c1								M	M		
Communications equipment	1d1	M	M	M					M		M	M
Equip & supplies to support operations	1e1	M	M	M					M			
Protective Action Decision Making												
Emergency worker exposure control	2a1							M				
Radiological assessment and PARs	2b1						M	M				
Decisions for the plume phase -PADs	2b2								M			
PADs for protection of special populations	2c1								M			
Rad assessment and decision making for the ingestion exposure pathway	2d1							M	M			
Rad assessment and decision making concerning relocation, reentry, and return	2e1								P			
Protective Action Implementation												
Implementation of emergency worker exposure control	3a1	M	M	M								
Implementation of KI decision	3b1											
Implementation of protective actions for special populations -	3c1											
Implementation of protective actions for Schools	3c2											
Implementation of traffic and access control	3d1											
Impediments to evacuation are identified and resolved	3d2											
Implementation of ingestion pathway decisions - availability/use of info	3e1											
Materials for ingestion pathway PADs are available	3e2											
Implementation of relocation, re-entry, and return decisions.	3f1					M						
Field Measurement and Analysis												
Adequate equipment for plume phase field measurements	4a1											
Field teams obtain sufficient information	4a2			M								
Field teams manage sample collection appropriately	4a3	M	M									
Post plume phase field measurements and sampling	4b1	M	M									
Laboratory operations	4c1				M							
Emergency Notification and Public Info												
Activation of the prompt alert and notification system	5a1										M	M
Activation of the prompt alert and notification system – backup route alerting	5a3											
Emergency information and instructions for the public	5b1								M	M	M	M
Support Operations/Facilities												
Mon / decon of evacuees and EWs, and registration of evacuees	6a1											
Mon / decon of emergency worker equipment	6b1			M								
Temporary care of evacuees	6c1											
Transportation and treatment of contaminated injured individuals	6d1											

Table 3.1 – Summary of Exercise Evaluation

(Page 2 of 2)

DATE: March 7-8, 2017 SITE: Palo Verde Nuclear Generating Station, AZ M: Met, L1: Level 1 Finding, L2: Level 2 Finding, P: Plan Issue, N: Not Demonstrated		ADA CP	FCP	Warning Point	MC EOC	MCSO OSCP	SMUSD	MCSO KI	La Paz	Pinal	Yavapai	Yuma
Emergency Operations Management												
Mobilization	1a1	M		M	M	M						
Facilities	1b1											
Direction and Control	1c1	M			M	M						
Communications equipment	1d1			M	M	M						
Equip & Supplies to support operations	1e1			M	M	M	M	M				
Protective Action Decision Making												
Emergency worker exposure control	2a1											
Radiological assessment and PARs	2b1											
Decisions for the plume phase -PADs	2b2											
PADs for protection of special populations	2c1						M					
Rad assessment and decision making for the ingestion exposure pathway	2d1											
Rad assessment and decision making concerning relocation, reentry, and return	2e1											
Protective Action Implementation												
Implementation of emergency worker exposure control	3a1					M	M					
Implementation of KI decision	3b1						M					
Implementation of protective actions for special populations -	3c1				M	M						
Implementation of protective actions for schools	3c2				M		M					
Implementation of traffic and access control	3d1				M	M						
Impediments to evacuation are identified and resolved	3d2				M	M						
Implementation of ingestion pathway decisions - availability/use of info	3e1	M	M						N	M	N	N
Materials for ingestion pathway PADs are available	3e2	M										
Implementation of relocation, re-entry, and return decisions.	3f1											
Field Measurement and Analysis												
Adequate equipment for plume phase field measurements	4a1											
Field teams obtain sufficient information	4a2											
Field teams manage sample collection appropriately	4a3											
Post plume phase field measurements and sampling	4b1											
Laboratory operations	4c1											
Emergency Notification and Public Info												
Activation of the prompt alert and notification system	5a1				M							
Activation of the prompt alert and notification system – backup route alerting	5a3					M						
Emergency information and instructions for the public	5b1				M							
Support Operations/Facilities												
Mon / decon of evacuees and EWs, and registration of evacuees	6a1											
Mon / decon of emergency worker equipment	6b1											
Temporary care of evacuees	6c1											
Transportation and treatment of contaminated injured individuals	6d1											

3.3 Evaluation Summaries

3.3.1 Arizona Jurisdictions

3.3.1.1 Field Monitoring Team – Alpha (FMT-A)

Field Monitoring Team (FMT) – Alpha (A) demonstrated the core capabilities for Environmental Response, Health and Safety and Operational Communication in the Response mission area during the PVNGS IPX, March 7-8, 2017. FMT-A demonstrated field measurement on March 7th and sampling on March 8th.

FMT-A carefully checked the operation of all their instruments before leaving for their field assignments. Equipment not operating properly was replaced. During plume monitoring on March 7th and during sampling on March 8th, FMT-A recorded the results of their work. FMT-A communicated with the field team coordinator with handheld radios and emailed sampling results from the team's laptop computer. Using their Radeye personal radiation detectors, FMT-A properly identified a control sample of Iodine – 131. Personal safety was ensured by accurately measuring radiation exposure, properly recording measurements and reporting exposure to the field team coordinator at designated intervals.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.1.2 Field Monitoring Team – Bravo (FMT-B)

Field Monitoring Team (FMT) – Bravo (B) demonstrated the core capabilities for Environmental Response, Health and Safety and Operational Communication in the Response mission area during the PVNGS IPX, March 7-8, 2017. FMT-B demonstrated field measurement on March 7th and sampling on March 8th.

FMT-B demonstrated operational checks of all their instruments before leaving for their field assignments. During plume monitoring on March 7th the team accurately measured ambient background radiation at their assigned locations. Federal Radiological Monitoring and Assessment Center sampling procedures were demonstrated on March 8th. FMT-A transmitted sampling results from the team's laptop computer by email. The team implemented radiation safety by reporting exposure readings at designated intervals. Permanent record dosimeters were appropriately worn and tracked to show the total dose each team member received during their assignments.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.1.3 Radiological Emergency Assessment Team – Forward (REAT-F)

The Radiological Emergency Assessment Team – Forward (REAT-F) demonstrated the core capabilities for Environmental Response, Health and Safety and Operational Coordination in the

Response mission area during the PVNGS IPX, March 7-8, 2017. REAT-F effectively managed FMTs in field measurement, sampling and emergency worker exposure and decontamination.

The REAT-F captain briefed the field teams on radiation safety and sample collection procedures before they were deployed to the field. By radio, the field team coordinator directed the field teams to specific locations within the 10-mile EPZ. The teams verified the location with GPS and printed location maps. Field teams transmitted their data electronically. This data populated a computer tracking systems at REAT-F as well as at the Emergency Operations Facility (EOF) and the Technical Operations Center (TOC). Real time field information allowed REAT-F to respond to requests for additional information from management.

All persons entering the EPZ evacuation areas would require REAT-F authorization and badging. Law enforcement would secure access using traffic control points. Contamination control was established at REAT-F. The field team members and their equipment would be monitored and decontaminated using portal monitors and hand held equipment. Samples collected in the field were labeled by location and time collected. The REAT-F captain sent the field samples to the laboratory for analysis to determine the level of deposited ground contamination in the areas of interest.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

a. MET: 1.a.1, 1.d.1, 1.e.1, 3.a.1, 4.a.2, 6.b.1
b. LEVEL 2 FINDING: None
c. LEVEL 1 FINDING: None
d. PLAN ISSUES: None
e. NOT DEMONSTRATED: None
f. PRIOR ISSUES - RESOLVED: None
g. PRIOR ISSUES - UNRESOLVED: None

3.3.1.4 Lab

The Arizona Radiation Regulatory Agency (ARRA) Radiation Measurements Laboratory (Lab) demonstrated the Environmental Response, Health and Safety core capability in the Response mission area in an out of sequence demonstration during the PVNGS IPX on March 8, 2017. The Lab demonstrated the capability to perform radiological analysis of field samples. Protective action recommendations in the post plume phase would be based on the summary of sample analysis.

The lab staff followed strict protocols to prevent cross contamination, identify and track sample analysis, identify isotopes, measure the level and type of radioactivity. The level of radioactivity could be calculated for the time the sample was taken. Samples with higher levels of radioactivity were immediately identified and separated from the samples with lower levels of activity. The lab had the capability to accurately measure levels of radioactivity well below the established thresholds for protective action recommendations.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.1.5 Re-Entry

The Re-Entry point demonstrated Operational Coordination to support multiple objectives in the Response and Recovery mission areas during the PVNGS IPX on March 8, 2017. When authorities limited access to specific areas, a re-entry check point would be enforced. Entry into

the restricted area would be controlled for a limited amount of time to perform emergency work, maintain critical infrastructure or for essential personal activities. Re-entry staff demonstrated a badging and tracking process. This process included contamination surveys, dosimetry, identification, purpose for entry and a radiological safety briefing. Law enforcement ensured compliance with re-entry requirements. Persons exiting the restricted area were monitored and decontaminated if needed to control contamination.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.1.6 Emergency Operations Facility (EOF)

The ARRA Director and staff at the PVNGS Emergency Operations Facility (EOF) demonstrated the core capabilities for Situational Assessment, Environmental Response, Health and Safety and Operational Communication in the Protect and Response mission areas during the PVNGS IPX on March 7, 2017. ARRA dose assessment staff were co-located with PVNGS health physics staff at the EOF.

ARRA dose assessment staff formulated protective action recommendations (PAR) based on plant conditions, field monitoring data and computer analysis of dose projection modeling software. The dose assessment staff used their knowledge of environmental conditions to validate modeling assumptions and dose projections. ARRA dose assessments were within 10 percent of the PVNGS health physics staff models. The ARRA Director signed formal PARs for the Governor’s Policy Chief at the State Emergency Operations Center (SEOC) through the

ARRA Technical Operations Center (TOC) Policy Liaison. PARs were also transmitted to the REAT-F for the situational awareness of the field staff.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.1.8 Technical Operations Center (TOC)

The TOC demonstrated core capabilities Situational Assessment, Environmental Response, Health and Safety and Operational Communication in the Response and Recovery mission areas during the PVNGS IPX, March 7-8, 2017.

During the plume phase, the TOC Policy Liaison communicated with the REAT –F field team coordinator and the ARRA Director at the EOF. A PVNGS technical liaison supported the TOC with situational awareness of PVNGS conditions. The ARRA Director at the EOF formulated PARs based on the work of the dose assessment staff. The ARRA Director's PARs were signed and transmitted to the TOC Policy Liaison. The TOC Policy Liaison was responsible to explain the PAR to the Governor's Policy Chief in the SEOC.

In the post-plume phase, the TOC Director and dose assessment staff analyzed laboratory results of field samples. They also considered mapping products from the Federal Radiological Monitoring and Assessment Center (FRMAC). FRMAC maps created from the Areal Measuring System flights identified areas where deposited radiological contamination exceeded federal guidance for people to stay in the area. Areas were identified that exceeded the first year

relocation guidance and the second year relocation guidance. Other areas with much lower levels of radiological contamination were identified where food crops and milk may exceed recommended levels for human consumption. The TOC Director presented PARs identifying areas where people should not stay as residents. He also presented PARs where the Arizona Department of Agriculture should consider agricultural restrictions on food crops and milk. These PARs were limited in scope because the Advisory Team for Environment, Food and Health (A-Team) did not participate in the exercise. Since advice from the A-Team was not available, PARs were limited to the information available from lab analysis, FRMAC mapping products and input from liaisons from the U.S. Nuclear Regulatory Commission (NRC).

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.1.9 State Emergency Operations Center (SEOC)

The SEOC demonstrated Operational Communication, Coordination, Situational Assessment capabilities in the Response and Recovery mission areas and protective action decisions (PAD) during the PVNGS IPX, March 7-8, 2017. Resources were provided to Maricopa County and state agencies when requested. Logistical support included out of state assistance through the Emergency Management Assistance Compact. The Policy Chief in the SEOC represented the Governor in making PADs to protect the health and safety of the public in consultation with county, tribal, state agency and federal representatives. Federal consultation was limited to representatives from the NRC and FRMAC since the A-Team, including FDA, USDA, CDC and other federal agencies did not participate in the exercise.

When notified of the Alert ECL, the Policy Chief convened the Policy Group including the section leads for planning, operations and logistics. The Policy Chief consulted with the Maricopa County Emergency Management Director. The Policy Chief ordered a limited activation of the SEOC, appropriate to the mission requirements to assess the risk, determine available resources and plan courses of action should the situation warrant. As conditions worsened, additional state agency liaisons and SEOC staff were activated.

The Policy Chief initiated early precautionary actions, including evacuating school children out of harm's way when a radiological release from PVNGS appeared imminent. The Policy Chief consulted with all the members of the Policy Group in response to PARs to evacuate people in areas threatened by a radioactive plume. Each decision was deliberate, planned and included input from all the affected stakeholders. Public inquiries were effectively managed by an informed call center staff. The finding from the last biennial exercise on the ability of the public inquiry call center was closed by the demonstration of this ability to respond to public concerns.

The post-plume phase considered areas where radioactive material had deposited on the ground. In some areas, the ambient radiation levels were above federal limits for permanent residency. In other areas, radioactive material deposited on food crops made them unsafe to eat. How could emergency management ensure that people were safe? The Policy Chief led the exercise participant's in through discussion on crafting a PAD that incorporated a credible public message. The resulting decisions were as informed as possible with input from the state agencies, county governments, requested tribal nation input and those federal agencies participating.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

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CRITERION: Timely post-plume phase relocation, reentry, and return decisions are made and coordinated as appropriate, based on assessments of radiological conditions and criteria in the ORO's plan and/or procedures.

CONDITION: The Protective Action Recommendation/Decision (PAR/PAD) package was not coordinated well enough with state and county agency plans to develop a PAR sufficient for the AZ DEMA Policy Chief to initially finalize PADs for public relocation from impacted areas and return to areas not impacted. The Offsite Plan states, "The Director, Arizona Radiation Regulatory Agency (ARRA) is responsible for providing technical support in response to a radiological incident and provides Protective Action Recommendations to the Governor and the SEOC Policy Chief." BP-47. A complete PAR requires coordination with agencies that have expertise in geopolitical boundaries, expertise in establishing traffic access points and expertise in communicating public messaging on health and safety. The AZ DEMA Policy Chief needs a complete coordinated PAR package, with all the supporting requirements in order to make a PAD that can be communicated to the public and implemented. The PAR package has checklists for establishing area boundaries, access control points and monitoring stations, however there is no established coordination or communication protocol with state or county agency plans to coordinate implementation of these requirements in the PAR.

POSSIBLE CAUSE: Although the PAR/PAD decision package was widely recognized as an excellent initiative, however, further development in needed. Recommendations

presented to the Policy Group would be more complete if created by a collaborative effort of key stakeholders. For example, geographical boundaries would be better defined with county input. Road locations for checkpoints around restricted areas should be coordinated through law enforcement agencies. The return decision should be coordinated and well supported.

REFERENCE: NUREG-0654, FEMA REP-1, M.1

EFFECT: The Policy Group had difficulty reaching a PAD for the impacted area that exceeded the first and subsequent year relocation PAG. The Policy Group was not provided with a recommendation that clearly explained to the public how this relocation decision would protect their health and safety. In areas where residents could return, returning residents would not initially know what to expect when they returned to their homes.

RECOMMENDATION:

- Revise the PAR/PAD package to better implement Planning Standard M-1 "*Each organization, as appropriate, shall develop general plans and procedures for reentry and recovery and describe the means by which decisions to relax protective measures (e.g. allow reentry into an evacuated area) are reached. This process should consider both existing and potential conditions.*" Plan a coordinated PAR/PAD strategy that incorporates a communication strategy using basic, plain language, includes geopolitical boundaries that can be easily explained to the public, and incorporates the expertise of each participating ORO. The PAR/PAD package should consider implementation requirements.
- The Arizona OROs have begun development of innovative mapping capabilities aimed at improving the PAR/PAD process. Arizona OROs are committed to improving mapping products, and supporting information to inform the Policy Group's decision making process. The integration of ARRA's innovative mapping initiative with support from FRMAC and other federal partners is recognized as an area for further development.

- Conduct quarterly planning meetings to coordinate planning with the offsite response organizations. This should include planners from tribal nations, county governments, state agencies, private sector and PVNGS. Coordinate and cross reference ORO plans and procedures to facilitate the partnership and shared outcomes in each ORO area of responsibility.
- Arizona still needs to demonstrate the capability to understand and process updated results based on the decay of some radioisotopes. The time jump, to support a change in isotopic composition, analysis, and characterization of the impacted area, needs to be demonstrated or discussed. This capability originally was to be conducted via an interview during the post plume phase exercise activities conducted on March 8, 2017 as described in the extent of play agreement. Due to significant delays and the time actually needed for the exercise play, the interview did not take place. The Acting Regional Assistant Committee (RAC) Chair assessed the situation and determined there was not enough time to conduct appropriate interviews. The Acting RAC Chair terminated the exercise at 1700.

  This capability can be demonstrated in a variety of ways. During the demonstration/discussion of the time jump, include a discussion of how to incorporate impacted lands within La Paz, Yavapai and Yuma Counties and tribal lands. The demonstration should include representatives from the Advisory Team for Environment, Food and Health, FEMA, NRC, PVNGS, AZ DEMA, ADHS, MCDEM and appropriate Maricopa County agencies. FEMA will coordinate the involvement of the federal agencies to support enhancing this capability.

3.3.1.10 Joint Information Center (JIC)

The JIC demonstrated the common mission area, core capability for Public Information and Warning, during the PVNGS IPX, March 7-8, 2017.

After declaration of the Alert ECL, the PVNGS public information team activated the JIC, together with state and local public information officers (PIO) at the PVNGS Energy Education Center in Buckeye, Arizona. Throughout the plume phase of the emergency, utility and government PIOs coordinated with the respective agencies and each other to deliver consistent timely information, and a unified response to public concerns. As conditions worsened, JIC staff distributed media statements explaining the condition of plant and government actions to protect the public. Five media briefings were conducted with PIOs from public safety, health, agriculture, radiation protection, Maricopa County, AZ DEMA, American Red Cross and PVNGS. Media briefings included sign language interpretation and a closed caption converter. The PIOs answered media questions and provided supporting material to inform the public.

Public information was managed out of the AZ DEMA office during the post plume/ingestion phase of the exercise on the second day. The PVNGS public information team did not participate in the post plume phase. A small team of state and county PIOs, working out of an AZ DEMA conference room, demonstrated the public information function on the second day. Two media briefings, with sign language interpretation, were demonstrated in the Russell Auditorium with mock media. In addition, the PIO team issued one media advisory and three media statements explaining PADs for agricultural restrictions and management of the areas determined not safe for permanent residence.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.1.11 Arizona Department of Agriculture, Command Post (ADA CP)

The Arizona Department of Agriculture (ADA), Command Post (CP) demonstrated the common mission area core capability for Operational Coordination during the PVNGS IPX, March 7-8, 2017. The ADA deployed a Coordinator and PIO to the SEOC to address agricultural PADs as a member of the Policy Group. Implementation of ADA decisions were coordinated and directed through the ADA CP.

The ADA Coordinator deployed to the SEOC on notification of the Alert ECL. The ADA CP was activated in response to the Site Area Emergency ECL. Staff at the ADA CP logged into the AZ DEMA WebEOC for situational awareness of state activities. The ADA CP coordinated its response activities with the ADA PIO at the JIC as well as with their Policy Group Coordinator. As the incident at PVNGS developed, the ADA Coordinator conveyed this information to the ADA CP staff who identified the affected dairies and other agricultural interests with their computer mapping program. Using GIS overlays from their agency database, the ADA CP staff anticipated the locations and types of restrictions that may be needed and the staffing required to implement agricultural protective measures. Decision implementation was coordinated with support agencies and reported to the ADA Coordinator located at AZ DEMA SEOC through WebEOC, agency email and by phone.
All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.1.12 Food Control Point (FCP)

The Arizona Department of Agriculture (ADA), Food Control Point (FCP) demonstrated the common mission area core capability for Operational Coordination during the PVNGS IPX on March 8, 2017. ADA inspectors at the FCP were supported by law enforcement and ARRA radiation control technicians to inspect, sample and control the movement of agricultural products.

The ADA maintains contact with all agri-businesses in Arizona. Instructional and educational material is available online. All stakeholders would be notified when restrictions were implemented to protect the food supply. At the FCP, inspectors ensured that truck drivers going into the restricted area were badged, tracked, received a radiological safety briefing and complied with ADA orders restricting the movement of agricultural products. The truck driver in the demonstration was given dosimetry to record radiological exposure, explained his purpose for entering the restricted area and was informed of the amount of time that he was allowed to complete his task. The FCP effectively monitored and controlled traffic into and out of the restricted area and facilitated essential services within the restricted area.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

a. MET: 3.e.2
b. LEVEL 2 FINDING: None
c. LEVEL 1 FINDING: 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 Warning Point

The Warning Point demonstrated response mission area core capability for Operational Communication during the PVNGS IPX on March 7, 2017. The Warning Point at the Maricopa County Sheriff's Office (MCSO) is continuously staffed with dispatchers to respond to public safety threats. In response to incidents at PVNGS, the Warning Point only implements the initial notification to state and county EOCs. State and county EOCs then activate their facilities, and manage subsequent ECL notifications.

Warning Point dispatchers verified notifications from PVNGS over a secure phone line using predesignated authentication codes. On notification, the dispatcher reported the information to the MCSO command staff and the duty officers for the responsible state and county agencies. The Warning Point had multiple communication systems to communicate with these points of contact. It was well equipped with displays, procedural and planning guides and capacity to support an emergency operations center function, if required. At the Alert ECL, MCSO activated its On Scene Command Post. This activation completed the Warning Point's responsibilities for this incident.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted below and in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.2.2 Maricopa County Emergency Operations Center (MC EOC)

The Maricopa County Emergency Operations Center (MC EOC) demonstrated Operational Communication, Coordination, Situational Assessment, Public Information and Warning, Critical Transportation and Environmental Response, Health and Safety capabilities in the Response mission area during the PVNGS IPX on March 7, 2017.

The MC Emergency Management Director (EMD) activated the MC EOC at the Alert ECL to coordinate all emergency assessment and response activities in the county. The EMD also briefed county elected officials as the incident progressed. During the plume phase, all response activities are within Maricopa County and are coordinated through the MC EOC. Public information was coordinated with the county PIO at the JIC, public safety, support for persons with functional needs and support for evacuating people at risk of exposure was coordinated with MCSO and the Department of Transportation. The Maricopa County Public Health participated in management PADs and implementation. Schools were briefed, students evacuated and reunified with parents early in the emergency response. The public was appropriately warned by the timely activation of the sirens within the 10-mile EPZ followed by radio broadcast of emergency alert system messages and public information through media briefings at the JIC.

Throughout the response phase of the incident, MC EOC staff maintained a common operating picture through use of coordinated WebEOC with AZ DEMA; interoperable communications strategy with supporting agencies and jurisdictions; and coordinated timely public messaging.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted below and in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.2.3 Maricopa County Sheriff's Office, On Scene Command Post (MCSO OSCP)

The Maricopa County Sheriff's Office, On Scene Command Post (MCSO OSCP) demonstrated Operational Communication, Coordination, Situational Assessment, Public Information and Warning, Critical Transportation and Environmental Response, Health and Safety capabilities in the Response mission area during the PVNGS IPX on March 7, 2017.

The MCSO established the OSCP at the MC Department of Transportation facility just outside the 10-mile EPZ as a base to implement public safety in support of evacuation orders, traffic control, mobile public alerting and to support resource coordination for transportation dependent people. MCSO deployed an array of communications strategies to establish and maintain control of all the missions required to evacuate the public out of harm's way, enforce order and public safety, and provide appropriate warnings. Through the Mobile Public Safety information system, officers and patrol cars communicate with incident command, receive deployment orders, utilize mobile GIS map support and report the status of mission completion. Incident command is supported by facility equipment at the OSCP and by a mobile command vehicle that can maintain communication completely independent of the landline phone system.

Officer safety is paramount to ensure completion of the mission and continuation of MCSO capability. As officers arrived at the MCSO OSCP, the radiation safety officer briefed them on

radiation safety equipment and reporting procedures. Each officer was assigned a permanent record dosimeter, potassium iodide to protect the thyroid if required, and direct reading dosimeters to report exposure. Periodic radiation exposure reporting was strictly enforced.

The MCSO OSCP completed evacuation, traffic control, transportation support and evacuation area perimeter security, efficiently and effectively. County emergency management at the MC EOC was fully informed of the progress of activities throughout the plume phase response operations.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted below and in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.2.4 Saddle Mountain Unified School District (SMUSD)

The Tonopah Valley High School, Saddle Mountain Unified School District (SMUSD) demonstrated Operational Communication, Coordination, Situational Assessment, Critical Transportation and Environmental Response, Health and Safety capabilities in the Response mission area in an out of sequence interview during the PVNGS IPX on March 8, 2017.

If there was an incident at PVNGS, the MC EOC would brief the school districts with students in the 10-mile EPZ at each ECL. The Policy Chief at the AZ DEMA SEOC has the Governor's authority to order school evacuations in advance of a potential release of radioactive material

from the plant. The evacuation PAD would be relayed to the affected school districts by the MC EOC. In an emergency, the school principal is the incident commander for the school. School bus drivers are equipped with two way radios to report when they have delivered students to the reunification center. If the county health officer orders ingestion of potassium iodide for thyroid protection, the school has an adequate supply of potassium iodide for the school staff and for students with parental approval. The school's emergency procedures, staff training and communication protocol with the MC EOC ensure that students and staff will be protected in an emergency.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted below and in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.2.5 Maricopa County Sheriff's Office (MCSO), KI Storage

The Maricopa County Sheriff's Office, potassium iodide (KI) storage location demonstrated its ability to support the Environmental Response, Health and Safety capabilities in the response mission area in an out of sequence site visit during the PVNGS IPX on March 8, 2017.

The county health officer may order KI for the public if there is a risk that a significant amount of radioactive iodine could be released during a PVNGS incident. KI would flood the thyroid gland with safe iodine. Flooding the thyroid gland with safe iodine prevents absorption of radioactive iodine. Since KI must be stored for many years, it is important to follow the manufacturer's instructions. It should be stored away from direct sunlight in a temperature

controlled environment. The KI stockpile at the MCSO storage location was within the expiration date, adequate for the number of people who might be affected and stored in accordance with the manufacturer's recommendations.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted below and in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.2.6 La Paz County

La Paz County did not participate in this exercise. No demonstration of their capability to coordinate with ingestion pathway PADs occurred. There was no opportunity for evaluation of their capability for coordination on population relocation, re-entry and return, embargo of contaminated agricultural products, provision of informational materials or coordination of controlled emergency worker re-entry into restricted areas.

REPP criteria not demonstrated:

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

3.3.2.7 Pinal County

Pinal County demonstrated the common mission area core capability for Operational Coordination during the PVNGS IPX, March 7-8, 2017. Pinal County was a full partner in Policy Group discussions in support of PADs to protect the health and safety of the public both in the plume phase and in the post plume/ingestion phase of the exercise. During the post plume/ingestion phase of the exercise, the area of concern for agricultural products extended well into Pinal County. Pinal County was prepared to coordinate resource requirements with Arizona State agencies to implement all the post plume/ingestion pathway decisions.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.2.8 Yavapai County

Yavapai County did not participate in this exercise. No demonstration of their capability to coordinate with ingestion pathway PADs occurred. There was no opportunity for evaluation of their capability for coordination on population relocation, re-entry and return, embargo of contaminated agricultural products, provision of informational materials or coordination of controlled emergency worker re-entry into restricted areas.

REPP criteria not demonstrated:

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

3.3.2.9 Yuma County

Yuma County did not participate in this exercise. No demonstration of their capability to coordinate with ingestion pathway PADs occurred. There was no opportunity for evaluation of their capability for coordination on population relocation, re-entry and return, embargo of contaminated agricultural products, provision of informational materials or coordination of controlled emergency worker re-entry into restricted areas.

REPP criteria not demonstrated:

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

3.3.3 Support Organizations

3.3.3.1 National Weather Service (NWS) EAS

The National Weather Service (NWS), Emergency Alert System (EAS) radio station demonstrated the common mission area, core capability for Public Information and Warning, during the PVNGS IPX on March 7, 2017.

Communication capability was demonstrated through interview and phone contact with the MC EOC. The NWS EAS radio station received a message that would be broadcasted after sirens in the 10-mile EPZ were sounded. This message had emergency instructions for the public. The NWS EAS radio station would repeat the emergency message broadcast every 10 minutes. Through interview, the NWS EAS radio station staff explained that follow up information would be broadcast.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

3.3.4 Private Organizations

3.3.4.1 KTAR Radio Station (KTAR), EAS

The KTAR, Emergency Alert System (EAS) radio station demonstrated the common mission area, core capability for Public Information and Warning, during the PVNGS IPX on March 7, 2017.

KTAR is a twenty-four hour broadcast station. Its signal covers the entire State of Arizona. Broadcast towers have backup generator power with a seven day fuel supply in the event of a power outage. Dedicated phone lines to PVNGS and the MC EOC were available to support the receipt of emergency messages and instructions. Exercise play included three phone calls from

the MC EOC. Emergency messages were transmitted with instructions to broadcast after the sounding of sirens in the 10-mile EPZ, then rebroadcast every ten minutes. In an actual emergency, KTAR would receive follow up information that would be broadcast after the emergency instructions.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

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

SECTION 4: CONCLUSION

FEMA evaluated an off-site Plume and Ingestion Pathway exercise on March 7-8, 2017 for the emergency planning zones around PVNGS. The purpose of the exercise was to assess the level of state and local preparedness in response to a radiological emergency. This exercise was held in accordance with FEMA's policies and guidance concerning the exercise of state and local plans and procedures.

The findings presented in this report are based on the evaluations of the federal evaluation team, with final determinations made by the FEMA Region IX Acting RAC Chair and approved by the Regional Administrator.

There were no Level 1 and Level 2 findings identified in this exercise. One findings from the previous exercise was successfully demonstrated and closed. One plan issue (page 27) was identified during this exercise. There are no open plan issues from previous exercises.

Based on our evaluation of the March 7-8, 2017, Plume and Ingestion Pathway exercise, the offsite radiological emergency plans and procedures, site specific to PVNGS, can be implemented, and are adequate to provide continued reasonable assurance that appropriate measures can be taken offsite to protect the health and safety of the public in the event of a radiological incident at PVNGS.

Therefore, the Title 44 CFR § 350 approval of the offsite radiological emergency response plans and procedures for the state of Arizona, site specific to PVNGS, will remain in effect.

APPENDIX A: IMPROVEMENT PLAN

Issue Number: 45-13-2e1-P-01	Criterion: 2e1

ISSUE: The Protective Action Recommendation/Decision (PAR/PAD) package was not coordinated well enough with state and county agency plans to develop a PAR sufficient for the AZ DEMA Policy Chief to initially finalize PADs for public relocation from impacted areas and return to areas not impacted. The Offsite Plan states, "The Director, Arizona Radiation Regulatory Agency (ARRA) is responsible for providing technical support in response to a radiological incident and provides Protective Action Recommendations to the Governor and the SEOC Policy Chief." BP-47. A complete PAR requires coordination with agencies that have expertise in geopolitical boundaries, expertise in establishing traffic access points and expertise in communicating public messaging on health and safety. The AZ DEMA Policy Chief needs a complete coordinated PAR package, with all the supporting requirements in order to make a PAD that can be communicated to the public and implemented. The PAR package has checklists for establishing area boundaries, access control points and monitoring stations, however there is no established coordination or communication protocol with state or county agency plans to coordinate implementation of these requirements in the PAR.

RECOMMENDATION:

- Revise the PAR/PAD package to better implement Planning Standard M-1 "*Each organization, as appropriate, shall develop general plans and procedures for reentry and recovery and describe the means by which decisions to relax protective measures (e.g. allow reentry into an evacuated area) are reached. This process should consider both existing and potential conditions.*" Plan a coordinated PAR/PAD strategy that incorporates a communication strategy using basic, plain language, includes geopolitical boundaries that can be easily explained to the public, and incorporates the

expertise of each participating ORO. The PAR/PAD package should consider implementation requirements.

- The Arizona OROs have begun development of innovative mapping capabilities aimed at improving the PAR/PAD process. Arizona OROs are committed to improving mapping products, and supporting information to inform the Policy Group's decision making process. The integration of ARRA's innovative mapping initiative with support from FRMAC and other federal partners is recognized as an area for further development.
- Conduct quarterly planning meetings to coordinate planning with the offsite response organizations. This should include planners from tribal nations, county governments, state agencies, private sector and PVNGS. Coordinate and cross reference ORO plans and procedures to facilitate the partnership and shared outcomes in each ORO area of responsibility.
- Arizona still needs to demonstrate the capability to understand and process updated results based on the decay of some radioisotopes. The time jump, to support a change in isotopic composition, analysis, and characterization of the impacted area, needs to be demonstrated or discussed. This capability originally was to be conducted via an interview during the post plume phase exercise activities conducted on March 8, 2017 as described in the extent of play agreement. Due to significant delays and the time actually needed for the exercise play, the interview did not take place. The Acting Regional Assistant Committee (RAC) Chair assessed the situation and determined there was not enough time to conduct appropriate interviews. The Acting RAC Chair terminated the exercise at 1700.

This capability can be demonstrated in a variety of ways. During the demonstration/discussion of the time jump, include a discussion of how to incorporate impacted lands within La Paz, Yavapai and Yuma Counties and tribal lands. The demonstration should include representatives from the Advisory Team for

Environment, Food and Health, FEMA, NRC, PVNGS, AZ DEMA, ADHS, MCDEM and appropriate Maricopa County agencies. FEMA will coordinate the involvement of the federal agencies to support enhancing this capability.	
CORRECTIVE ACTION DESCRIPTION: Arizona and FEMA are entering into a pilot project based on core capabilities. This pilot project will use the standard emergency management, Planning, Organization, Equipment, Training and Exercise (POETE) process. A joint agreement will be created by the end of June 2017 that addresses the recommendations in this plan issue and other concerns expressed by Arizona OROs. A demonstration of a time jump, to support a change in isotopic composition, analysis, and characterization of the impacted area, will be conducted prior to December 31, 2017.	
CAPABILITY: Operational Coordination, Environmental Response/Health and Safety, Situational Assessment	PRIMARY RESPONSIBLE AGENCY: AZ DEMA
CAPABILITY ELEMENT: Operational Coordination	START DATE: April 17, 2017
AGENCY POC: Matt Heckard	COMPLETION DATE: December 31, 2017

APPENDIX B: EXERCISE EVALUATORS AND TEAM LEADERS

DATE: March 7-8, 2017, SITE: Palo Verde Nuclear Generating Station

LOCATION	EVALUATOR	AGENCY
Field Monitoring Team - Alpha	Thomas Essig	ICFI
Field Monitoring Team - Bravo	Denny Wilford	ICFI
Radiological Emergency Assessment Team - Forward	Daryl Thome Joseph Keller	ICFI ICFI
Lab	John Fill	FEMA HQ
Re-Entry	Joseph Suders	FEMA R3
Emergency Operations Facility	Timothy Pflieger	FEMA R6
Technical Operations Center	*Nan Williams	FEMA R6
State Emergency Operations Center	*Scott Hallett Ryan Jones *Barbara Thomas	FEMA HQ FEMA R1 FEMA R1
Joint Information Center	John Rice	FEMA R1
Arizona Department of Agriculture, Command Post	Todd Smith	USDA APHIS
Food Control Point	Joseph Suders	FEMA R3
Warning Point	Bill Maier	NRC
Maricopa County Emergency Operations Center	*Alberto Sifuentes Dan Feighert Roy Smith	FEMA R9 FEMA R8 ICFI
Maricopa County Sheriff's Office, On Scene Command Post	Joseph Suders Nicholas Buls Elena Joyner Bill Maier	FEMA R3 FEMA R3 FEMA R9 NRC
Saddle Mountain Unified School District	Lee Torres	FEMA R3
Maricopa County Sheriff's Office, KI Storage	Lee Torres	FEMA R3
La Paz County	Lisa Rink	FEMA HQ
Pinal County	Lisa Rink	FEMA HQ
Yavapai County	Lisa Rink	FEMA HQ
Yuma County	Lisa Rink	FEMA HQ
National Weather Service, EAS	Brad DeKorte	FEMA R6
KTAR Radio Station, EAS	Tina Lai Thomas	FEMA R3
* Team Leader		

APPENDIX C: ACRONYMS AND ABBREVIATIONS

List of acronyms and abbreviations used in this document	
ADA CP	Arizona Department of Agriculture, Command Post
ARRA	Arizona Radiation Regulatory Agency
AZ DEMA	Arizona Department of Emergency and Military Affairs
CFR	Code of Federal Regulations
DHS	U.S. Department of Homeland Security
EAL	Emergency Action Level
EAS	Emergency Alert System
ECL	Emergency Classification Level
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
EOP	Extent of Play Agreement
EPZ	Emergency Planning Zone
FCP	Food Control Point
FEMA	Federal Emergency Management Agency
FMT	Field Monitoring Team, Field Sampling Team
FRMAC	Federal Radiological Monitoring Assistance Center
GIS	Geographic Information System
GPS	Global Positioning System
HS	High School
ICFI	ICF International, a contractor to FEMA REPP
IPX	Ingestion Pathway Exercise
JIC	Joint Information Center
KI	Potassium Iodide
MCDEM	Maricopa County Department of Emergency Management
MC EOC	Maricopa County Emergency Operations Center
MCSO	Maricopa County Sheriff's Office
MCSO OSCP	Maricopa County Sheriff's Office, On Scene Command Post
NRC	Nuclear Regulatory Commission
NUREG	US Nuclear Regulatory Commission Regulation
NWS	National Weather Service

List of acronyms and abbreviations used in this document	
ORO	Offsite Response Organization
PAD	Protective Action Decision
PAR	Protective Action Recommendation
PIO	Public Information Officer
POETE	Planning, Organization, Equipment, Training and Exercise
PVNGS	Palo Verde Nuclear Generating Station
RAC	Regional Assistance Committee
REAT-F	Radiological Emergency Assessment Team, Forward
REP	Radiological Emergency Preparedness
REPP	Radiological Emergency Preparedness Program
RPM	Radiological Emergency Preparedness Program Manual
SEOC	State Emergency Operations Center
SERRP	Arizona State Emergency Response and Recovery Plan
SMUSD	Saddle Mountain Unified School District
TOC	Technical Operations Center
WebEOC	Web based crisis information management software

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