Palo Verde Generating Station
2022 Arizona State Lab Exercise
Radiation Safety Engineering Inc
(AAR) After Action Report

Published April 2022

FEMA

Table of Contents

Executive Summary 3
Section 1: Exercise Overview 4
Section 2: Analysis of Capability Targets 5
Table 1. Summary Results of Capability Targets 6
Detailed Results of Exercise Evaluation 7
Section 3: Summary of Evaluation Criterion 8
Conclusion 10
Appendix A: Additional Information 11
Participating Organizations 11
Acronyms and Abbreviations 12

Executive Summary

The week of February 2, 2022, the United States Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) evaluated a laboratory exercise at the Arizona State Certified Radiological Laboratory (Radiation Safety Engineering Inc.) as part of the Palo Verde Generating Station (PVGS) biennial exercise cycle. FEMA conducted its evaluation as part of its Radiological Emergency Preparedness Program (REPP), which works to ensure that adequate capabilities exist to prevent, protect against, mitigate, respond to, and recover from radiological incidents involving commercial Nuclear Power Plants (NPPs).

The purpose of the exercise was to assess the readiness of offsite response organizations (OROs) to respond to an incident occurring at PVGS. The exercise focused on evaluating the ability of the new state certified radiological laboratory to implement appropriate plans and procedures to protect the health and safety of the public during a radiological emergency involving PVGS. FEMA identified one Plan Issue related to equipment during the exercise, and there were no Level 1 (L1) or Level 2 (L2) Findings. The one Plan Issue was successfully addressed in a follow-up demonstration and closed on March 9, 2022.

The evaluation was held in accordance with FEMA's policies and guidance for the implementation of state and local ORO radiological emergency response plans and procedures.

In summary, the OROs adequately demonstrated their capability to implement plans and procedures during the exercise and follow up demonstration. The Regional Assistance Committee (RAC) Chair has continued reasonable assurance that measures can be taken to protect the health and safety of the public in the event of a radiological incident occurring at PVGS.

Section 1: Exercise Overview

Exercise Name	2022 Palo Verde Generating Station (PVGS) Laboratory Exercise
Exercise Dates	02/02/22
Scope	FEMA evaluation of the State of Arizona Radiological Laboratory (Radiation Safety Engineering Inc.) sample management and analysis of potential contaminated materials
Mission Area(s)	Response
Core Capabilities	Environmental Response / Health and Safety Operational Coordination Planning Situational Assessment
Objectives	Emergency Operations Management Exposure Control Detect, Measure, Sample, Analyze, and Assess
Threat or Hazard	Radiological Contamination, Risk Information Management
Sponsor	Radiation Safety Engineering Inc. Arizona Department of Emergency and Military Affairs Palo Verde Generating Station
Participating Organizations	State, county, local government, and private sector organizations participated in these exercises. See Appendix A.

Section 2: Analysis of Capability Targets

2.1 Summary Results of Exercise Evaluation

Table 1 below includes the exercise objectives for the 2022 Palo Verde Generating Station (PVGS) Laboratory Exercise evaluation, as well as the capability targets evaluated for each objective, its associated core capabilities, and its status.

Each jurisdiction and functional entity were evaluated based on their demonstrated ability to meet selected capability targets. FEMA selected one of the following terms to indicate its findings for each target:

- **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 an 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.

Table 1. Summary Results of Capability Targets

Venue	Capability Target	CORE Capability	Status
Objective 1: Emergency Operations Management			
Radiation Safety Engineering Inc.	1.1	Operational Coordination and Planning	M
Objective 2: Exposure Control			
Radiation Safety Engineering Inc.	2.2	Operational Coordination and Environmental Response/ Health & Safety	M
Objective 4: Detect, Measure, Sample, Analyze, and Assess			
Radiation Safety Engineering Inc.	4.4	Environmental Response/ Health & Safety and Planning	P**

**Note: The Plan Issue was closed on March 9, 2022, after the revised procedure was demonstrated during a follow up staff assistance visit (SAV).

Detailed Results of Exercise Evaluation

2.1.1Radiation Safety Engineering Inc.

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.a, E.3, F.1.c, H.6, and O.1

All relevant critical tasks were adequately demonstrated to meet the intent of the capability target.

2.1.2 Radiation Safety Engineering Inc.

Objective 2: Exposure Control

Capability Target 2.2: Emergency Worker Exposure Control Management

Intent: The capability 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 to meet the intent of the capability target.

2.1.3 Radiation Safety Engineering Inc.

Objective 4: Detect, Measure, Sample, Analyze, and Assess

Capability Target 4.4: Laboratory Operations

Intent: The capability to perform laboratory analyses of radioactivity in environmental, food, and drinking water samples to support decision making.

All relevant critical tasks were adequately demonstrated to meet the intent of the capability target, except for H.11.b. A Plan Issue was identified and then closed on March 9, 2022.

Planning Reference: C.4, H.11, H.11.b, H.13, I.2, I.6, M.7, and O.1

Section 3: Summary of Evaluation Criterion

3.1.1 Radiation Safety Engineering Inc.

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

a. MET: 1.1, 2.2
b. LEVEL 1 FINDING: None
c. LEVEL 2 FINDING: None
d. PLAN ISSUES: 1 (Closed March 9, 2022)
e. NOT DEMONSTRATED: None
f. PRIOR ISSUES – RESOLVED: None
g. PRIOR ISSUES – UNRESOLVED: None

PLAN ISSUE: 45-22-4.4-P-01

CAPABILITY TARGET: 4.4 Laboratory Operations

CRITERION: H.11.b Calibration and operational checks of emergency equipment per national standards or the manufacturer's instructions, whichever is more frequent.

CONDITION: No operational response check of radiation detection equipment to ensure proper functionality was demonstrated during the exercise. No acceptable check source response range information was affixed to any radiation detection meter, nor was paperwork available to support an operational response check against a known primary radioactive material source or check source.

POSSIBLE CAUSE: Radiation Safety Engineering Inc. is a new contract laboratory for Arizona State. The contract laboratory may not have fully understood or was aware of all Radiological Emergency Preparedness Program (REPP) requirements.

REFERENCES:
1) NUREG-0654/FEMA REP-1, Rev. 2, Dec 2019
2) REP Program Manual, Dec 2019
3) Radiation Safety Engineering Lab "RSE SOP page 1or 4" Sample Handling

EFFECT: The instrument user/operator could not verify that handheld instruments were operating within acceptable range. Equipment users should be confident that instruments are operating as intended.

RECOMMENDATION: Procedures should include Ludlum Model 3 Survey Meters with various probes, Victoreen 450CHP Ion Chamber Survey Meters, and other handheld instruments routinely used for survey and screening. Each probe needs an operational response check range.

Radiation Safety Engineering, Inc. performs its own instrument calibrations and documents it on their instruments. Radiation Safety Engineering, Inc. should add a procedure to determine accepted target

reading with a standard check source immediately after calibration and affix a sticker indicating a range of ± 20% of the target reading to the instrument. Procedures should be added and documented that, before daily use, each instrument should be response checked using the standard check source to assure readings within the ± 20% range.

After procedures are developed to address this concern, demonstration is still required for this requirement. FEMA Region 9 will evaluate the revised procedure for the operational response check of handheld instruments within the current biennial cycle. The evaluation can be conducted virtually with live video feed or in person.

Corrective Action Taken:

On March 9, 2022, FEMA evaluators conducted a follow up demonstration of the operational source checks for instrumentation. The new revised procedure was provided to FEMA Region 9 on March 1, 2022. On March 9, 2022, FEMA Region 9 evaluated the implementation of the new and revised laboratory procedure for how to conduct operational checks on handheld instrumentation. The instruments were operationally checked and found to be within operational specifications. The demonstration correctly followed the revised procedures and took approximately 20 minutes to complete.

Conclusion

FEMA evaluated the Arizona State Certified Radiological Laboratory (Radiation Safety Engineering Inc.) for the 10-mile Emergency Planning Zone and the 50-mile Ingestion Pathway Zone surrounding PVGS on February 2, 2022.

The purpose of this exercise was to evaluate the ability of OROs to implement REPP plans and procedures to protect the health and safety of the public during a radiological emergency involving PVGS. FEMA focused its evaluation of the exercise on assessing the demonstrated ability of OROs to meet capability targets delineated in the exercise areas as outlined in NUREG-0654/FEMA-REP-1 Rev. 2, and Radiological Emergency Preparedness Program (REPP) Manual, (December 2019). The exercise and evaluation were conducted in accordance with FEMA policies and guidance concerning plans and procedures. All exercise activities were also conducted in accordance with local, state, and federal health guidelines for the ongoing COVID-19 public health emergency. This after-action report captures the results of FEMA's evaluation of OROs' demonstrated ability to meet the REPP requirements.

In summary, one Planning Issue was identified, corrected, and closed. The OROs demonstrated their capability to implement plans and procedures during the exercise and follow up demonstration. The Regional Assistance Committee Chair has continued reasonable assurance that measures can be taken to protect the health and safety of the public in the event of a radiological incident occurring at PVGS.

Appendix A: Additional Information

Participating Organizations

State
Arizona Department of Emergency and Military Affairs
Private
Radiation Safety Engineering Inc.

Acronyms and Abbreviations

ACRONYM	DESCRIPTION
AAR	After Action Report
AG	Agriculture
AZ	Arizona
AZDACC	Arizona Department of Agriculture Command Center
DEMA	Department of Emergency and Military Affairs
DHS	Department of Homeland Security
ENDEX	End Exercise
EOC	Emergency Operations Center
EOP	Extent of Play
EPZ	Emergency Planning Zone
FEMA	Federal Emergency Management Agency
FSE	Full Scale Exercise
IAP	Incident Action Plan
PPE	Personal Protective Equipment
PVGS	Palo Verde Generating Station
TOC	Technical Operations Center