UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 6, 2013

Mr. Randall K. Edington
Executive Vice President Nuclear/
Chief Nuclear Officer
Mail Station 7602
Arizona Public Service Company
P.O. Box 52034
Phoenix, AZ 85072-2034

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3 – STAFF ASSESSMENT IN RESPONSE TO REQUEST FOR INFORMATION PURSUANT TO 10 CFR 50.54(f) - RECOMMENDATION 9.3 COMMUNICATIONS ASSESSMENT (TAC NOS. MF0023, MF0024, AND MF0025)

Dear Mr. Edington:

By letter dated March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued a request for information pursuant to Section 50.54(f) to Title 10 of the *Code of Federal Regulations* (henceforth referred to as the 50.54(f) letter). The request was issued as a part of implementing lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 5 to the 50.54(f) letter contained specific requested information associated with the NRC's Near-Term Task Force Recommendation 9.3 for emergency preparedness communications. Specifically, the letter requested that licensees provide an assessment of the current communications systems and equipment used during an emergency event.

By letter dated October 31, 2012, Arizona Public Service Company (the licensee) responded to this request for Palo Verde Nuclear Generating Station, Units 1, 2, and 3. In response to NRC staff questions, the licensee provided additional information by letter dated February 22, 2013.

The NRC staff has reviewed the communications assessments for Palo Verde Nuclear Generating Station, Units 1, 2, and 3, and as documented in the enclosed staff analysis, determined that the assessment for communications is reasonable, and the interim measures, analyzed existing systems, and proposed enhancements will help to ensure that communications are maintained. Further, in coordination with the Near-Term Task Force Recommendation 4.2 (mitigating strategies), the NRC staff plans to follow up with the licensee to confirm that upgrades to the site's communications systems have been completed.

If you have any questions, please contact me at (301) 415-1530 or via e-mail at Jennivine.Rankin@nrc.gov.

Sincerely,

Jennivine K. Rankin, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-528, STN 50-529,
and STN 50-530

Enclosure:
As stated

cc w/encl: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY ASSESSMENT BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REVIEW OF COMMUNICATIONS ASSESSMENT IN RESPONSE TO

REQUEST FOR INFORMATION DATED MARCH 12, 2012

ARIZONA PUBLIC SERVICE COMPANY

PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3

DOCKET NOS. 50-52, 50-529, AND 50-530

1.0 INTRODUCTION

By letter dated March 12, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340), the U.S. Nuclear Regulatory Commission (NRC) issued a request for information pursuant to Section 50.54(f) to Title 10 of the *Code of Federal Regulations* (henceforth referred to as the 50.54(f) letter). The request was issued as a part of implementing lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 5 to the 50.54(f) letter contained specific requested information associated with the NRC's Near-Term Task Force Recommendation 9.3 for emergency preparedness communications. Specifically, the letter requested that licensees provide an assessment of the current communications systems and equipment used during an emergency event.

By letter dated October 31, 2012 (ADAMS Accession No. ML12310A368), as supplemented by letter dated February 22, 2013 (ADAMS Accession No. ML13063A034), Arizona Public Service Company (the licensee), provided an assessment of its communications capabilities for Palo Verde Nuclear Generating Station, Units 1, 2, and 3, in response to the NRC's request for information.

Within the licensee's response letter, an assessment of the current communications systems and equipment to be used during an emergency event was performed to identify any enhancements needed to ensure communications are maintained during and following a beyond design basis large-scale natural event. In this assessment, it was assumed that a large-scale natural event causes: (1) a loss of all alternating current (ac) power, and (2) extensive damage to normal and emergency communications systems both onsite and in the area surrounding the site (i.e., within 25 miles of the site, consistent with the guidance endorsed by the NRC's letter dated May 15, 2012[1]). Additionally, interim actions were identified by the licensee during the period of implementation of the planned improvements to the communications systems or procedures.

[1] Skeen, D. L., U.S. Nuclear Regulatory Commission, letter to Susan Perkins-Grew, Nuclear Energy Institute, "U.S. Nuclear Regulatory Commission Review of NEI 12-01, 'Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities,' Revision 0," dated May 2012," dated May 15, 2012 (ADAMS Accession No. ML12131A043).

1.1 Background

On March 12, 2012, NRC issued a letter entitled "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident." In accordance with 10 CFR 50.54(f), addressees were requested to submit a written response to the information requests within 90 days.

The 50.54(f) letter states that if an addressee cannot meet the requested response date, then the addressee must respond within 60 days of the date of the letter, and describe the alternative course of action that it proposes to take, including any estimated completion date. By letter dated May 11, 2012 (ADAMS Accession No. ML12139A324), the licensee committed to submitting its completed communications assessment and implementation schedule by October 31, 2012. By letter dated June 8, 2012 (ADAMS Accession No. ML12171A202), the licensee also provided its description of interim actions (discussed in further detail in Section 3.0) that have been taken or are planned to be taken to enhance existing communications systems power supplies until the communications assessment and the resulting actions are complete. The NRC staff found the proposed schedule acceptable by letter dated July 26, 2012 (ADAMS Accession No. ML12200A106).

Enclosure 5 of the 50.54(f) letter contained specific requested information associated with NRC's Near-Term Task Force Recommendation 9.3 for emergency preparedness communications. Specifically, the letter requested that licensees provide an assessment of the current communications systems and equipment used during an emergency event to identify any enhancements that may be needed to ensure communications are maintained during a large-scale natural event and subsequent loss of ac power. The licensee's assessment should:

- identify any planned or potential improvements to existing onsite communications systems and their required normal and/or backup power supplies;
- identify any planned or potential improvements to existing offsite communications systems and their required normal and/or backup power supplies;
- provide a description of any new communications system(s) or technologies that will be deployed based upon a large-scale natural event and extensive damage to normal and emergency communications systems both onsite and offsite; and
- provide a description of how the new and/or improved systems and power supplies will be able to provide for communications during a loss of all ac power.

The 50.54(f) letter also asked for licensees to:

- describe any interim actions that have been taken or are planned to be taken to enhance existing communications systems power supplies until the communications assessment and the resulting actions are complete; and
- provide an implementation schedule of the time needed to conduct and implement the results of the communications assessment.

2.0 REGULATORY EVALUATION

The NRC staff reviewed the licensee's responses to the 50.54(f) letter against the regulations and guidance described below.

2.1 Regulations

Section 50.47, "Emergency plans," to 10 CFR Part 50, sets forth emergency plan requirements for nuclear power plant facilities.

Section 50.47(b) establishes the standards that the onsite and offsite emergency response plans must meet for NRC staff to make a positive finding that there is reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency. Planning Standard (6) of this section requires that a licensee's emergency response plan contain provisions for communications among principal response organizations to emergency personnel and the public. Planning Standard (8) requires that adequate emergency facilities and equipment to support emergency response are provided and maintained.

Section IV.D, "Notification Procedures," of Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50, requires that a licensee have the capability to notify responsible State and local governmental agencies within 15 minutes after declaring an emergency. The design objective of the prompt public alert and notification system shall be to have the capability to complete the alerting and initiate notification of the public within the plume exposure pathway within about 15 minutes. This alerting and notification capability will include a backup method of public alerting and notification.

Section IV.E, "Emergency Facilities and Equipment," of Appendix E to 10 CFR Part 50, states that adequate provisions shall be made and described for emergency facilities including at least one onsite and one offsite communications system; and each system shall have a backup power source. These arrangements will include:

a. Provision for communications with contiguous State/local governments within the plume exposure pathway emergency planning zone.

b. Provision for communications with Federal emergency response organizations.

c. Provision for communications among the nuclear power reactor control room, the onsite technical support center, and the emergency operations facility; and among the nuclear facility, the principal State and local emergency operations centers, and the field assessment teams.

d. Provisions for communications by the licensee with NRC Headquarters and the appropriate NRC Regional Office Operations Center from the nuclear power reactor control room, the onsite technical support center, and the emergency operations facility.

2.2 Guidance

Nuclear Energy Institute (NEI) 12-01, Revision 0, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communication Capabilities," dated May 2012, presents a methodology for licensees to analyze their ability to perform critical communications during and after a large-scale natural event. The NRC staff has previously reviewed NEI 12-01 (ADAMS Accession No. ML12131A043), and determined that it was an acceptable method for licensees to use in responding to the 50.54(f) letter.

The NRC staff reviewed the licensees' analyses against the assumptions and guidance within NEI 12-01, Sections 2.2, 2.4, and 4. These sections provide a discussion on the assumptions and criteria to be used for a communications assessment.

3.0 TECHNICAL EVALUATION

In its letter dated October 31, 2012, as supplemented by letter dated February 22, 2013, the licensee submitted its assessment of communications assuming a large-scale natural event, which would lead to an extended loss of all ac power. This letter included a discussion of required communications links, primary and backup methods of communications, and any identified improvements.

3.1 Communication Areas Reviewed

3.1.1 Communication Links

Palo Verde Nuclear Generating Station Units 1, 2, and 3 currently has communications capabilities with offsite response organizations (OROs), the NRC, between licensee emergency response facilities, with field and offsite monitoring teams, and with in-plant and offsite licensee emergency response organization staff. As part of its communications assessment, the licensee has determined that many of the communications equipment described in its emergency plan can be assumed to not be available. However, certain existing onsite communications system equipment, such as radio-to-radio communications and sound-powered phones, would be available after implementation of planned enhancements, for some communication links listed above given a seismic, high-wind, or flooding event. The field monitoring team vehicle satellite telephones has also been analyzed to be available. The availability of the sound-powered phones was determined by evaluating that the system location was in a seismic category I building. The final location of the radio equipment will be consistent with meeting NRC Order EA-12-049, "Order to Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012 (ADAMS Accession No. ML12054A735).

As an interim measure prior to the implementation of all planned enhancements, the licensee had previously purchased portable satellite phones. These portable satellite phones have been ordered and are available for use onsite. Existing sound-powered phones and radio-to-radio communications are available to allow for onsite communications. Additional supplies of batteries have been ordered and will be onsite by September 2013, to help power satellite phones. Training for the satellite phones will be completed by December 2013. This communications

equipment will be stored in seismic category 1 protected areas or diverse locations onsite until the final storage locations are determined in meeting NRC Order EA-12-049.

As the planned enhancement, the licensee is purchasing mobile communications vehicles with voice over internet protocol network phones and satellite connectivity, as well as enhancing existing communication systems for links outlined in Section 4 of NEI 12-01. The mobile communications vehicles with associated phones will be utilized as one of the key methods for maintaining each offsite communication link[2]. Communications onsite will utilize combinations of the mobile communications vehicles, sound-powered phones, and radio communications. The radio-to-radio communications will be augmented by existing sound-powered phones for onsite, in-plant communications. The radios will be enhanced by relocating them in a protective area in alignment with NRC Order EA-12-049. The licensee also confirmed that communications with affected OROs may be maintained with portable satellite phones at these offsite locations. The licensee will put these enhancements in place by April 2015.

The NRC staff has reviewed the licensee's expected communications links within its communications assessment. In reviewing the licensee's submittal, the NRC staff considered whether it is reasonable that each communication link can be maintained, after the implementation of all planned enhancements, in accordance with the NRC-endorsed guidance of NEI 12-01. The mobile communications vehicles and associated telephones are expected to help maintain communications offsite and between emergency response facilities by their ability to function without infrastructure postulated to be damaged by a large-scale natural event. The site radios will help ensure communications in areas of the plant due its ability for these radios to communicate without repeaters. The sound-powered phones will provide augmented communications capabilities along with radio-to-radio communications in needed areas of the plant. The NRC staff concludes that since the licensee's assessment for the availability of communications systems is reasonable, and planned enhancements are to be made for communications areas to help ensure availability, the licensee's interim measures and proposed enhancements will help to ensure that communications are maintained consistent with the assumptions in the NRC-endorsed guidance of NEI 12-01.

3.1.2 Equipment Location

The licensee has analyzed the survivability of its existing sound-powered phone equipment for large-scale natural events by crediting equipment located in seismic category 1 buildings. Further, these equipment locations were also analyzed to also be protective against wind and flooding. Enhancements to equipment protection will be made by storing equipment in accordance with NRC Order EA-12-049 criterion. This criterion was also used to determine ancillary equipment storage locations, including the batteries and battery chargers that will be used to support the interim measures and/or planned enhancements.

The NRC staff reviewed the licensee's submittal and verified that the licensee has considered the equipment location and protection contained within the NRC-endorsed guidance of NEI 12-01. The NRC staff also verified that all equipment discussed in Section 3.1.1 of this document has been analyzed to be available after a large-scale natural event or would be

---

[2] The portable satellite phones are to be used primarily as an interim measure after the mobile communications vehicles are put into place, with the exception of field/offsite monitoring team communications.

stored in a reasonably protected area from seismic, flooding, and high-wind events as discussed in NEI 12-01. The NRC staff also ensured that ancillary equipment such as batteries also would be protected from seismic, flooding, and high-wind events.

Based on this review, the NRC staff considers the licensee's analysis of communications assessment equipment survivability and proposed enhancements for equipment location to be consistent with the NRC-endorsed guidance of NEI 12-01. This determination of equipment protection supports the conclusion that these measures will help to ensure communications equipment availability for a large-scale natural event.

3.1.3 Equipment Power and Fuel

The licensee has analyzed the availability of its communications system power supplies following the loss of all ac power. The licensee has proposed a combination of batteries and generators to power site communications equipment, including the satellite phones and radios, and has procured extra batteries for this equipment. The site strategies will result in: (1) radios having an adequate battery supply for operations and to allow for generator[3] charging of spare batteries; (2) the mobile communications vehicle has its own generator and its associated wired phones will be powered from the vehicle; (3) each satellite phone for the offsite radiological assessment teams will be powered by the field team vehicles; and (4) sufficient fuel for the vehicles and generators to allow for communications for a greater than 24-hour duration. It is expected that this equipment has power to support communications for a minimum of 24 hours, based on assumptions for impeded site access. The licensee is planning on having the communication vehicles available by April 2015.

The NRC staff has reviewed the licensee's communications assessment power supplies. In reviewing the licensee's submittal, the NRC staff concludes that it is reasonable that power for the existing equipment and proposed enhancement equipment, as listed in Section 3.1.1 of this document, would remain available for a 24-hour duration, based on the availability of extra batteries and generator fuel. Additionally, the licensee's proposed enhancement is in accordance with the NRC-endorsed guidance of NEI 12-01.

Based on this review, the NRC staff considers the licensee's analysis of equipment power and proposed enhancements for equipment power to be consistent with the NRC-endorsed guidance of NEI 12-01. This determination of available equipment power supports the conclusion that these measures will help to ensure communications equipment functionality for a large-scale natural event.

3.1.4 Proceduralization and Training

The licensee has confirmed that there are sufficient reserves of equipment to minimize the need of multi-use equipment for different communication functions. Existing procedures are in place for the inventory and testing of the sound-powered phones, portable radios, and will be modified by September 2013 to include the satellite phones. New procedures will be created for the communications vehicles for the inventory, maintenance, and testing of the vehicles and

[3] Site fire engine generators are to be used to recharge batteries.

associated equipment. The licensee's staff will receive training on the new communications vehicles and equipment.

Site procedures will be modified by June 2013 to allow for the use of security sweeps to provide for notification to plant employees if the public address system is non-functional after a large-scale natural event. The licensee also has procedures in place for emergency response organization staff self-activation due to major disturbances in the power grid. These existing site procedures will activate the offsite emergency response organization and notify plant staff.

The NRC staff reviewed the licensee's commitments on the planned quality assurance and maintenance of the equipment and licensee staff training on the use of this equipment. The NRC staff determined that the licensee's submittal is in accordance with the NRC-endorsed guidance of NEI 12-01.

Based on this review, the NRC staff considers the licensee's planned proceduralization of equipment use and licensee staff training to be consistent with the NRC-endorsed guidance of NEI 12-01. This determination of equipment availability and functionality supports the conclusion that these measures will help to ensure communications equipment functionality for a large-scale natural event.

3.2 Regulatory Commitments

The licensee provided the following regulatory commitment in Enclosure 2 of its submissions dated October 31, 2012, as supplemented by letter dated February 22, 2013:

1. Procure two communications trailers equipped with a satellite uplink antenna system to facilitate further communications. This commitment will be implemented as part of Phase 1 (to align with FLEX schedule). Scheduled completion date (SCD): October 31, 2014.

2. Complete an Engineering study to determine conceptual design, cost, and schedule for an Internet Protocol (IP) mesh network to provide onsite and offsite communication capabilities. The network will use mobile vehicles and will contain equipment capable of providing Voice over Internet Protocol (VoIP) phones. SCD: December 31, 2013.

3. Procure an additional 3 communications vehicles equipped with a satellite uplink antenna system. SCD: April 1, 2015.

4. APS will revise Procedure EP-0900, Appendix AO, Security Director Checklist. This revision will include the use of security sweeps inside the Protected Area to notify personnel that Assembly and Accountability are required when the Public Address system and the Site Warning Siren system are out of service.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's communications assessment for communications with or among: OROs, the NRC, licensee emergency response facilities, field and offsite monitoring teams, and on-site and in-plant response teams. In reviewing the licensee's submittal, the NRC staff considered the factors, outlined above, and determined that its assessment of existing equipment, proposed enhancements, and interim actions was in accordance with the NRC-endorsed guidance of NEI 12-01. The NRC staff concludes that the licensee's assessment for communications is reasonable, and the licensee's interim measures, analyzed existing systems, and proposed enhancements will help to ensure that communications are maintained. Further, in coordination with the Near-Term Task Force Recommendation 4.2 (mitigating strategies), NRC staff is planning to follow up with the licensee to confirm that upgrades to the site's communications systems have been completed.

Principal Contributor: Richard Chang, NSIR/NRLB

Date: June 6, 2013

If you have any questions, please contact me at (301) 415-1530 or via e-mail at Jennivine.Rankin@nrc.gov.

Sincerely,

/RA/

Jennivine K. Rankin, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-528, STN 50-529,
and STN 50-530

Enclosure:
As stated

cc w/encl: Distribution via Listserv

DISTRIBUTION:
PUBLIC
LPL4 Reading
RidsAcrsAcnw_MailCTR Resource
RidsNrrDorlLpl4 Resource
RidsNsirDprDdep Resource
RidsNrrLAJBurkhardt Resource
RidsNrrPMPaloVerde Resource
RidsRgn4MailCenter Resource
MMitchell, NRR/JLD/PMB
BHarris, NRR/JLD/PMB
RChang, NSIR
ERobinson, NSIR

ADAMS Accession No. ML13149A055 ***via email**

OFFICE	NRR/DORL/LPL4/PM	NRR/DORL/LPL4/LA	NSIR/DPR/DDEP/NRLB/BC
NAME	JRankin	JBurkhardt	KWilliams*
DATE	06/03/13	5/30/13	05/23/13
OFFICE	OGC /NLO	NRR/DORL/LPL4/BC	NRR/DORL/LPL4/PM
NAME	MSpencer	MMarkley	JRankin
DATE	06/05/13	06/06/13	06/06/13

OFFICIAL AGENCY RECORD