



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

September 4, 2009

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, AND  
INDEPENDENT SPENT FUEL STORAGE INSTALLATION - REVISION TO  
EMERGENCY ACTION LEVELS (TAC NOS. MD9642, MD9643, AND MD9644)

Dear Mr. Edington:

By application dated September 15, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082680088), as supplemented by letters dated March 5, 2009 and June 9, 2009 (ADAMS Accession Nos. ML090761165 and ML091670517, respectively), Arizona Public Service Company (the licensee), requested prior U.S. Nuclear Regulatory Commission (NRC) approval for proposed changes to the emergency action levels (EALs) for the Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, and for the independent spent fuel storage installation. The requested changes to the EALs for PVNGS support a conversion from the current EAL scheme to a scheme based on Nuclear Energy Institute (NEI) 99-01, "Methodology for Development of Emergency Action Levels," Revision 5, dated February 22, 2008 (ADAMS Accession No. ML080450149).

The NRC staff reviewed the proposed changes to the EALs for PVNGS, as required by Section IV.B.(1) of Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to Title 10 of the Code of Federal Regulations (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities." As discussed in the enclosed safety evaluation, the staff has determined that the proposed changes meet the standards in 10 CFR 50.47(b) and the requirements of Appendix E to 10 CFR Part 50, and they provide reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency. Therefore, the NRC staff concludes that the licensee's proposed changes to the EALs for PVNGS, Units 1, 2, and 3, as described in the application dated September 15, 2008, as supplemented by letters dated March 5, 2009, and June 9, 2009, are acceptable.

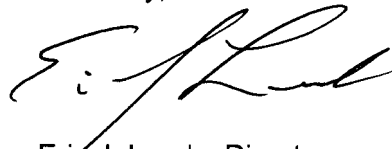
The NRC expects the licensee to implement the EALs as approved by the NRC (i.e., as provided in Enclosure 2 of the licensee's letter dated June 9, 2009, which includes the implementation of the EAL design-basis document). If the licensee changes the EALs, as approved in the enclosed safety evaluation, through 10 CFR 50.54(q) before implementation, the licensee shall ensure that it provides the changes to the NRC during the next emergency preparedness baseline inspection.

R. Edington

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If you have any questions, please contact Mr. Randy Hall, the NRC Project Manager for PVNGS, at (301) 415-4032, or through email to [randy.hall@nrc.gov](mailto:randy.hall@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Eric J. Leeds". The signature is fluid and cursive, with the first name "Eric" and last name "Leeds" clearly distinguishable.

Eric J. Leeds, Director  
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-528, STN 50-529,  
STN 50-530, and 72-44

Enclosure:  
As stated

cc: ListServ



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PROPOSED REVISIONS TO EMERGENCY ACTION LEVELS

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

AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION

ARIZONA PUBLIC SERVICE COMPANY

DOCKET NOS. STN 50-528, STN 50-529, STN 50-530, AND 72-44

1.0 INTRODUCTION

By application dated September 15, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082680088) (Ref. 1), as supplemented by letters dated March 5, 2009, and June 9, 2009 (ADAMS Accession Nos. ML090761165 and ML091670517, respectively) (Refs. 2 and 3), Arizona Public Service Company (the licensee) requested prior U.S. Nuclear Regulatory Commission (NRC) approval for proposed changes to the emergency action levels (EALs) for the Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, and for the associated independent spent fuel storage installation.

The requested changes to the licensee's EALs support a conversion from the current EAL scheme to a scheme based on Nuclear Energy Institute (NEI) 99-01, "Methodology for Development of Emergency Action Levels," Revision 5, dated February 22, 2008 (ADAMS Accession No. ML080450149) (Ref. 4). PVNGS currently uses an EAL scheme based on Nuclear Management and Resources Council, Inc. (NUMARC)/National Environmental Studies Project (NESP)-007, "Methodology for Development of Emergency Action Levels," Revision 2, dated January 31, 1992 (ADAMS Accession No. ML041120174) (Ref. 5).

2.0 REGULATORY EVALUATION

The NRC staff reviewed the proposed revision against the regulations and guidance described below.

2.1 Regulations

Title 10 of the *Code of Federal Regulations* (10 CFR) 50.47, "Emergency Plans," sets forth emergency plan requirements for nuclear power plant facilities. The NRC regulation at 10 CFR 50.47(a)(1)(i) states, in part, "no initial operating license for a nuclear power reactor will be issued unless a finding is made by the NRC that there is reasonable assurance that

Enclosure

adequate protective measures can and will be taken in the event of a radiological emergency." The NRC regulation at 10 CFR 50.47(b) establishes the standards that the onsite and offsite emergency response plans must meet in order for the 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. One of these standards, 10 CFR 50.47(b)(4), stipulates that emergency plans include a standard emergency classification and action level scheme.

Section IV.B of Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," states, in part, the following:

The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described, including emergency action levels that are to be used as criteria for determining the need for notification and participation of local and State agencies, the Commission, and other Federal agencies, and the emergency action levels that are to be used for determining when and what type of protective measures should be considered within and outside the site boundary to protect health and safety. The emergency action levels shall be based on in-plant conditions and instrumentation in addition to onsite and offsite monitoring. These initial emergency action levels shall be discussed and agreed on by the applicant or licensee and state and local governmental authorities, and approved by the NRC. Thereafter, emergency action levels shall be reviewed with the State and local governmental authorities on an annual basis. A revision to an emergency action level must be approved by the NRC before implementation if:

- (1) The licensee is changing from one emergency action level scheme to another emergency action level scheme (e.g., a change from an emergency action level scheme based on NUREG-0654 to a scheme based upon NUMARC/NESP-007 or NEI-99-01);
- (2) The licensee is proposing an alternate method for complying with the regulations; or,
- (3) The emergency action level revision decreases the effectiveness of the emergency plan.

## 2.2 Guidance

Section IV.B of Appendix E to 10 CFR Part 50 specifies that a revision to an entire EAL scheme, from NUREG-0654/Federal Emergency Management Agency (FEMA)-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, dated November 30, 1980 (ADAMS Accession No. ML040420012) (Ref. 6), to another NRC-endorsed EAL scheme, must be submitted for prior NRC approval. The Statement of Considerations for the final rule amending the NRC's regulations on NRC approval of EAL changes (70 FR 3591; January 26, 2005), states the following, in part:

The Commission believes a licensee's proposal to convert from one EAL scheme (e.g., NUREG-0654-based) to another EAL scheme (NUMARC/NESP-007 or NEI-99-01 based)...is of sufficient significance to require prior NRC review and approval. NRC review and approval for such major changes in EAL methodology is necessary to ensure that there is reasonable assurance that the final EAL change will provide an acceptable level of safety.

NRC Regulatory Guide (RG) 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors" Revision 3, dated August 31, 1992 (ADAMS Accession No. ML003740302), and Revision 4, dated July 31, 2003 (ADAMS Accession No. ML032020276) (Ref. 7), endorses NUMARC/NESP-007 and NEI 99-01 EAL guidance respectively, as acceptable alternatives to the guidance provided in NUREG-0654/FEMA-REP-1 for development of EALs to comply with 10 CFR 50.47 and with Appendix E to 10 CFR Part 50. A change in an EAL scheme that would incorporate the improvements provided in NUMARC/NESP-007 or NEI 99-01 would not decrease the overall effectiveness of the emergency plan, but the change would need prior NRC review and approval because of its potential safety significance.

In a letter dated February 22, 2008 (ADAMS Accession No. ML080430535) (Ref. 8), the NRC staff concluded that the guidance contained in NEI 99-01 is an acceptable method for use in developing an EAL scheme that meets the requirements in Section IV of Appendix E to 10 CFR Part 50 and in 10 CFR 50.47(b)(4).

The NRC staff also considers the following methods acceptable for use in developing EALs that meet the requirements in Section IV of Appendix E to 10 CFR Part 50 and in 10 CFR 50.47(b)(4):

- Appendix 1 to NUREG-0654/FEMA-REP-1
- NUMARC/NESP-007, Revision 2
- NEI 99-01, Revision 4

The agency also provides guidance in NRC Regulatory Issue Summary (RIS) 2003-18, "Use of NEI 99-01, 'Methodology for Development of Emergency Action Levels,' Revision 4, Dated January 2003," dated October 8, 2003 (ADAMS Accession No. ML032580518), with Supplement 1, dated July 13, 2004 (ADAMS Accession No. ML041550395), and Supplement 2, dated December 12, 2005 (ADAMS Accession No. ML051450482) (Ref. 9). RIS 2003-18 provides guidance for developing or changing a standard emergency classification and action level scheme. In addition, RIS 2003-18 provides recommendations to assist licensees, consistent with Section IV.B of Appendix E to 10 CFR Part 50, in determining whether to seek prior NRC approval of deviations from the guidance.

### 3.0 TECHNICAL EVALUATION

The licensee submitted the proposed changes to the NRC for a technical and regulatory review before implementing them, as required under Section IV.B.(1) of Appendix E to 10 CFR Part 50.

This evaluation is based on a revision to EALs provided in the licensee's application letter and supplemented by its responses to the NRC's requests for additional information.

PVNGS currently uses an EAL scheme based on NUMARC/NESP-007 and is proposing to convert to an EAL scheme based on NEI 99-01.

In its application and supplemental letters, the licensee submitted the proposed EALs for PVNGS, their technical bases, a comparison matrix, the EAL numbering scheme, and an explanation for any difference or deviation from NEI 99-01. The comparison matrix cross-referenced the proposed EAL scheme to the EALs in NEI 99-01. The NRC staff has reviewed the technical bases for the proposed EALs, the differences or deviations from NEI 99-01, and the licensee's justifications.

The NRC staff reviewed the proposed EALs against the guidance in NEI 99-01 to determine if the EALs for PVNGS, as provided in the licensee's application and supplemental letters, meet the guidelines in that document. The staff considered the following NEI 99-01 guidelines in its review:

- consistency (i.e., the EALs would lead to similar decisions under similar circumstances at different plants)
- human engineering and user friendliness
- potential for classification upgrade only when there is an increasing threat to public health and safety
- ease of upgrading and downgrading
- thoroughness in addressing and in disposing of the issues of completeness and accuracy raised regarding Appendix 1 to NUREG-0654
- technical completeness for each classification level
- logical progression in classification for multiple events
- objective and observable values

The NRC staff reviewed the proposed EALs and has determined that they are consistent with EALs implemented at similarly designed plants, that they use objective and observable values, and that they are consistent with the intent of NEI 99-01.

The NRC staff reviewed the proposed EALs to determine if they are worded in a manner that addresses human engineering and user friendliness concerns. The proposed EALs use procedure language, including specific tag numbers for instrument readings and alarms and use flow charts, critical safety function status trees, check lists, and combinations thereof. Based on this review, the staff has determined that the proposed EALs meet the guidelines in NEI 99-01 in these areas.

The NRC staff reviewed the proposed EAL sets<sup>1</sup> and has determined that classification upgrades are based upon an increasing threat to public health and safety, that they can effectively support upgrading and downgrading, and that they follow a logical progression for multiple events. Based on this review, the NRC staff concludes that the EALs are in accordance with the intent of NEI 99-01 in these areas.

The NRC staff also reviewed the proposed EALs for technical completeness and accuracy for each classification level. The proposed EALs are based on risk assessment to set the boundaries of the emergency classification levels and to ensure that all EALs that trigger that emergency classification are in the same range of relative risk. Precursor conditions of more serious emergencies also represent a potential risk to the public and are therefore appropriately classified. The staff has determined that the proposed EALs are consistent with NEI 99-01, which is an acceptable alternative to EALs based on Appendix 1 to NUREG-0654/FEMA-REP-1.

Based on its review of the proposed EALs, the NRC staff concludes that these EALs meet the guidelines in NEI 99-01 for all of the areas listed above. Therefore, the staff further concludes that the proposed EALs meet NEI 99-01, which is an acceptable method for use in complying with the regulatory requirements listed in Section 2.0 of this safety evaluation.

#### 4.0 CONCLUSION

The NRC staff performed a technical and regulatory review of the proposed changes to the EALs for PVNGS. The staff has determined that the proposed changes meet the guidelines in NEI 99-01, which is an acceptable method for use in developing an EAL scheme that meets the regulatory requirements. Based on this determination, the staff concludes that the proposed EALs meet the standards in 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50, and that they also provide reasonable assurance that the licensee will take adequate protective measures in a radiological emergency. Therefore, the NRC staff concludes that the proposed EAL changes are acceptable.

#### 5.0 REFERENCES

1. Mims, Dwight C., Arizona Public Service Company, letter to the U.S. Nuclear Regulatory Commission, "Proposed PVNGS Emergency Plan Change To Implement NEI 99-01, Revision 5, Emergency Action Levels," September 15, 2008. (ADAMS Accession No. ML082680088)
2. Bauer, Scott, Arizona Public Service Company, letter to the U.S. Nuclear Regulatory Commission, "Response to Request for Additional Information regarding Proposed PVNGS Emergency Plan Change to Emergency Action Levels," March 5, 2009. (ADAMS Accession No. ML090761165)
3. Bauer, Scott, Arizona Public Service Company, letter to the U.S. Nuclear Regulatory Commission, "Response to Request for Additional Information Regarding Proposed

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<sup>1</sup> EAL sets are groups of EALs within a category related to a common concern. For example, unusual event, alert, site area emergency, and general emergency EALs related to the failure of a plant to shut down through an automatic scram would be considered an EAL set.

PVNGS Emergency Plan Change to Emergency Action Levels,” June 9, 2009. (ADAMS Accession No. ML091670517)

4. Nuclear Energy Institute, “Methodology for Development of Emergency Action Levels,” NEI 99-01, Rev. 5, February 22, 2008. (ADAMS Accession No. ML080450149)
5. Nuclear Management and Resources Council, Inc., “Methodology for Development of Emergency Action Levels,” NUMARC/NESP-007, Rev. 2, January 31, 1992. (ADAMS Accession No. ML041120174)
6. U.S. Nuclear Regulatory Commission, “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants,” NUREG-0654/FEMA-REP-1, Rev. 1, November 30, 1980. (ADAMS Accession No. ML040420012)
7. U.S. Nuclear Regulatory Commission, “Emergency Planning and Preparedness for Nuclear Power Reactors,” Regulatory Guide 1.101, Rev. 3, August 31, 1992, and Rev. 4, July 31, 2003. (ADAMS Accession Nos. ML003740302 and ML032020276)
8. Miller, Christopher, U.S. Nuclear Regulatory Commission, letter to Alan Nelson, Nuclear Energy Institute, “U.S. Nuclear Regulatory Commission Review and Endorsement of NEI 99-01, Revision 5, Dated February 2008,” February 22, 2008. (ADAMS Accession No. ML080430535)
9. U.S. Nuclear Regulatory Commission, “Use of NEI 99-01, ‘Methodology for Development of Emergency Action Levels,’ Revision 4, Dated January 2003,” RIS 2003-18, October 8, 2003; Supplement 1, July 13, 2004, and Supplement 2, December 12, 2005. (ADAMS Accession Nos. ML032580518, ML041550395, and ML051450482)

Principal Contributor: D. Johnson

Date: September 4, 2009



R. Edington

- 2 -

If you have any questions, please contact Mr. Randy Hall, the NRC Project Manager for PVNGS, at (301) 415-4032, or through email to [randy.hall@nrc.gov](mailto:randy.hall@nrc.gov).

Sincerely,

*/ra/*

Eric J. Leeds, Director  
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-528, STN 50-529,  
STN 50-530, and 72-44

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(\*) SE input memo

(\*\*) concurrence via email

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