



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

September 28, 2015

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

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2 AND 3 -  
INTERIM STAFF RESPONSE TO REEVALUATED FLOOD HAZARDS  
SUBMITTED IN RESPONSE TO 10 CFR 50.54(f) INFORMATION  
REQUEST – FLOOD-CAUSING MECHANISM REEVALUATION (TAC  
NOS. MF5546, MF5547 AND MF5548)

Dear Mr. Edington:

The purpose of this letter is to provide a summary of the U.S. Nuclear Regulatory Commission (NRC) staff's assessment of the re-evaluated flood-causing mechanisms described in the December 12, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14350A466), flood hazard reevaluation report (FHRR) submitted by Arizona Public Service Company (APS, licensee) for Palo Verde Nuclear Generating Station, Units 1, 2 and 3 (Palo Verde), as well as supplemental information resulting from requests for additional information and audits.

By letter dated March 12, 2012, the NRC issued a request for information pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.54(f) (hereafter referred to as the 50.54(f) letter) (ADAMS Accession No. ML12053A340). The request was issued as part of implementing lessons-learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 2 to the 50.54(f) letter requested licensees to re-evaluate flood-causing mechanisms using present-day methodologies and guidance. Concurrently, with the reevaluation of flooding hazards, licensees were required to develop and implement mitigating strategies in accordance with NRC Order EA-12-049, "Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A735). On March 30, 2015, the Commission provided Staff Requirements Memoranda (SRM) (ADAMS Accession No. ML15089A236) to COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," dated November 21, 2014 (ADAMS Accession No. ML14309A256), affirming that licensees need to address the reevaluated flooding hazards within their mitigating strategies for beyond-design-basis external events.

The NRC staff has reviewed the information submitted by the licensee and has summarized the results of the review in the tables provided as an Enclosure to this letter.

Table 1 provides the current design-basis flood hazard mechanisms. Table 2 provides the reevaluated flood hazard mechanisms; however, the reevaluated flood hazard mechanisms bounded by the current design-basis (Table 1) are not included.

The NRC staff has concluded that the licensee's reevaluated flood hazards information, as summarized in the Enclosure, is suitable for the assessment of mitigating strategies developed in response to Order EA-12-049 (i.e., defines the mitigating strategies flood hazard information described in guidance documents currently being finalized by the industry and NRC staff) for Palo Verde. Further, the NRC staff has concluded that the licensee's reevaluated flood hazard information is a suitable input for other assessments associated with Near-Term Task Force Recommendation 2.1 "Flooding". The NRC staff plans to issue a staff assessment documenting the basis for these conclusions at a later time.

In addition, Nuclear Energy Institute (NEI) guidance document NEI 12-06 "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" is currently being revised. This revision will include a methodology to perform a Mitigating Strategies Assessment (MSA) with respect to the reevaluated flood hazards. Once this methodology is endorsed by the NRC, flood event duration parameters and applicable flood associated effects should be considered as part of the Palo Verde MSA. The NRC staff will evaluate the flood event duration parameters (including warning time and period of inundation) and flood-related associated effects developed by the licensee during the NRC staff's review of the MSA.

As stated above, Table 2 of the enclosure to this letter describes the reevaluated flood hazards that exceed the current design-basis. In order to complete its response to the information requested by Enclosure 2 to the 50.54(f) letter, the licensee is expected to submit an integrated assessment or a focused evaluation, as appropriate, to address these reevaluated flood hazards, as described in the NRC letter, "Coordination of Request for Information Regarding Flooding Hazard Reevaluation and Mitigating Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML15174A257). This letter describes the changes in the NRC's approach to the flood hazard reevaluations that were approved by the Commission in its SRM to COMSECY-15-0019, "Closure Plan for the Reevaluation of Flooding Hazards for Operating Nuclear Power Plants" (ADAMS Accession No. ML15209A682).

R. Edington

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If you have any questions, please contact me at (301) 415-3809 or e-mail at [Juan.Uribe@nrc.gov](mailto:Juan.Uribe@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read 'Juan F. Uribe', written in a cursive style.

Juan F. Uribe, Project Manager  
Hazards Management Branch  
Japan Lessons-Learned Division  
Office of Nuclear Reactor Regulation

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

Enclosure:  
Summary of Results of Flooding  
Hazard Re-Evaluation Report

cc w/encl: Distribution via Listserv

ENCLOSURE:

SUMMARY TABLES OF  
REEVALUATED FLOOD HAZARD LEVELS

**Table 1. Current Design Basis Flood Hazards for Use in the MSA**

<b>Mechanism</b>	<b>Stillwater Elevation</b>	<b>Waves/Runup</b>	<b>Design Basis Hazard Elevation</b>	<b>Reference</b>
<b>Local Intense Precipitation</b>				
Unit 1	955.5 ft NGVD29	Minimal	955.5 ft NGVD29	FHRR Section 2.2.1
Unit 2	952.5 ft NGVD29	Minimal	952.5 ft NGVD29	FHRR Section 2.2.1
Unit 3	949.5 ft NGVD29	Minimal	949.5 ft NGVD29	FHRR Section 2.2.1
<b>Streams and Rivers</b>				
Winters Wash (at Cross Section AA)	956.4 ft NGVD29	5.6 ft	962.0 ft NGVD29	FHRR Section 2.2.2 FHRR Table 2-2
East Wash (at Cross Section G2)	978.8 ft NGVD29	4.0 ft	982.8 ft NGVD29	FHRR Section 2.2.2 FHRR Table 2-2
Gila River	776.0 ft NGVD29	Not applicable	776.0 ft NGVD29	FHRR Section 2.2.2
Centennial Wash	888.0 ft NGVD29	Not applicable	888.0 ft NGVD29	FHRR Section 2.2.2
Hassayampa River	942.0 ft NGVD29	Not applicable	942.0 ft NGVD29	Email from Michael Dilorenzo, APS to Juan Uribe, NRC, Subject: "Palo Verde Flood Hazard Reevaluation Report" (ADAMS Accession No. ML15266A226)
<b>Failure of Dams and Onsite Water Control/Storage Structures</b>				
	900.0 ft NGVD29	Not applicable	900.0 ft NGVD29	FHRR Section 2.2.3

**Table 1. Current Design Basis Flood Hazards for Use in the MSA**

<b>Mechanism</b>	<b>Stillwater Elevation</b>	<b>Waves/ Runup</b>	<b>Design Basis Hazard Elevation</b>	<b>Reference</b>
<b>Storm Surge</b>	No Impact on the Site Identified	No Impact on the Site Identified	No Impact on the Site Identified	FHRR Section 2.2.4
<b>Seiche</b>				
45-Acre Reservoir	951.0 ft NGVD29	Not applicable	951.0 ft NGVD29	FHRR Section 2.2.6
85-Acre Reservoir	951.0 ft NGVD29	Not applicable	951.0 ft NGVD29	FHRR Section 2.2.6
Evaporation Ponds	937.0 ft NGVD29	Not applicable	937.0 ft NGVD29	FHRR Section 2.2.6
<b>Tsunami</b>	No Impact on the Site Identified	No Impact on the Site Identified	No Impact on the Site Identified	FHRR Section 2.2.4
<b>Ice-Induced Flooding</b>	No Impact on the Site Identified	No Impact on the Site Identified	No Impact on the Site Identified	FHRR Section 2.2.4
<b>Channel Migrations/Diversions</b>	No Impact on the Site Identified	No Impact on the Site Identified	No Impact on the Site Identified	FHRR Section 2.2.5

Note 1: Reported values are rounded to the nearest one-tenth of a foot.

R. Edington

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If you have any questions, please contact me at (301) 415-3809 or e-mail at Juan.Uribe@nrc.gov@nrc.gov.

Sincerely,

*/RA/*

Juan F. Uribe, Project Manager  
Hazards Management Branch  
Japan Lessons-Learned Division  
Office of Nuclear Reactor Regulation

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

Enclosure:  
Summary of Results of Flooding  
Hazard Re-Evaluation Report

cc w/encl: Distribution via Listserv

**DISTRIBUTION:**

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ARivera-Varona, NRO	KErwin, NRO	ACampbell, NRO
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MShams, NRR		

**ADAMS Accession No.: PKG ML15268A417; LTR: ML15268A413; ENCL: ML15240A362 \*via email**

OFFICE	NRR/JLD/JHMB/PM	NRR/JLD/LA	NRO/DSEA/RHM1/TR*	NRO/DSEA/RHM1/BC*
NAME	JUribe	SLent	MLee	KErwin(A)
DATE	9/25/2015	9/25/2015	8/31/2015	8/31/2015
OFFICE	NRR/JLD/JHMB/BC	NRR/JLD/JHMB/PM		
NAME	MShams	JUribe		
DATE	9/25/2015	9/28/2015		

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