



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

March 22, 2017

Mr. George Lippard III, Vice President  
Nuclear Operations  
South Carolina Electric & Gas Company  
Virgil C. Summer Nuclear Station  
Post Office Box 88, Mail Code 800  
Jenkinsville, SC 29065

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – FLOOD HAZARD  
MITIGATION STRATEGIES ASSESSMENT (CAC NO. MF7979)

Dear Mr. Lippard:

The purpose of this letter is to provide the U.S. Nuclear Regulatory Commission's (NRC's) assessment of the flood hazard mitigation strategies assessment (MSA), as described in the December 22, 2016, letter (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16357A603), submitted by South Carolina Electric & Gas Company (SCE&G, the licensee) for Virgil C. Summer Nuclear Station, Unit 1 (V. C. Summer). The MSA confirms that the licensee has adequately addressed the reevaluated flooding hazards within its mitigating strategies for beyond-design-basis external events.

BACKGROUND

By letter dated March 12, 2012 (ADAMS Accession No. ML12053A340), the NRC issued a request for information pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f) (hereafter referred to as the 50.54(f) letter). The 50.54(f) letter 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 that licensees reevaluate flood-causing mechanisms using present-day methodologies and guidance. Concurrent with the reevaluation of flood hazards, licensees were required to develop and implement mitigating strategies using the most recent external hazard information in accordance with NRC Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A735). That order requires holders of operating reactor licenses and construction permits issued under 10 CFR Part 50 to modify the plants to provide additional capabilities and defense-in-depth for responding to beyond-design-basis external events, and to submit to the NRC for review a final integrated plan that describes how compliance with the requirements of Attachment 2 of the order was achieved. In order to proceed with implementation of Order EA-12-049, licensees used the current licensing basis flood hazard or the most recent flood hazard information, which may not be based on present-day methodologies and guidance, in the development of their mitigating strategies.

The NRC staff and industry recognized the difficulty in developing and implementing mitigating strategies before completing the reevaluation of flood hazards. The NRC staff described this issue and provided recommendations to the Commission on integrating these related activities in COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flood Hazards," dated November 21, 2014 (ADAMS Accession No. ML14309A256). The Commission issued a staff requirements memorandum on March 30, 2015 (ADAMS Accession No. ML15089A236), affirming that the Commission expects licensees for operating nuclear power plants to address the reevaluated flood hazards, which are considered beyond-design-basis external events, within their mitigating strategies.

Nuclear Energy Institute (NEI) 12-06, Revision 2, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" (ADAMS Accession No. ML16005A625), has been endorsed by the NRC as an appropriate methodology for licensees to perform assessments of the mitigating strategies against the reevaluated flood hazards developed in response to the March 12, 2012, 50.54(f) letter. The guidance in NEI 12-06, Revision 2, and Appendix G in particular, supports the proposed Mitigation of Beyond-Design-Basis Events rulemaking. The endorsement, including exceptions, clarifications, and additions, is described in NRC Japan Lessons-Learned Division (JLD) interim staff guidance (ISG) JLD-ISG-2012-01, Revision 1, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML15357A163). Therefore, Appendix G of NEI 12-06, Revision 2, describes acceptable methods for demonstrating that the reevaluated flooding hazard is addressed within V. C. Summer mitigating strategies for beyond-design-basis external events.

#### MITIGATION STRATEGIES ASSESSMENT

By letter dated March 12, 2013 (ADAMS Accession No. ML13073A114), as supplemented by letters dated August 22, 2013, and March 26, 2014 (ADAMS Accession Nos. ML13240A005 (non-public) and ML14093A320, respectively), SCE&G submitted its Flood Hazard Reevaluation Report (FHRR) for V. C. Summer. By letter dated December 23, 2014 (ADAMS Accession No. ML14356A002), the NRC provided the staff assessment of the FHRR. The staff assessment was supplemented by letter dated November 3, 2015 (ADAMS Accession No. ML15296A377), which, together with the staff assessment, provided the mitigating strategies flood hazard information that was suitable for use in additional assessments related to Near-Term Task Force Recommendation 2.1. The staff assessment and its supplements identified the following flood hazard mechanisms that are not bounded by the current design basis for V. C. Summer: local intense precipitation (LIP), streams and rivers, and storm surge. By letter dated December 22, 2016 (ADAMS Accession No. ML16357A603), the licensee submitted its MSA for V. C. Summer for review by the NRC staff.

In its MSA, the licensee states that only LIP was considered in the MSA because the other flooding mechanisms did not reach site grade. The NRC staff noted in the staff assessment that,

....storm surge does not inundate the site. Furthermore, the increase in the combined effects flood [streams and rivers plus storm surge] has resulted in a margin that is quantitative minor (0.4 ft (0.1m)) and characterized by brief and intermittent impingement of waves on a passive low-head flood protection feature( a 3 ft (1 m) berm). For this reason, the staff expects that the resulting

scope of the integrated assessment addressing this mechanism would be limited.

The staff thus finds it reasonable to only consider the LIP mechanism in the MSA.

In its MSA, the licensee states that FLEX design-basis is based on the FHRR and its supplement dated March 26, 2014. Table 1 of the MSA compares the FLEX design-basis to the reevaluated flood hazard information for LIP and demonstrates that they are equal.

The NRC staff has reviewed the flood hazard MSA for V. C. Summer. The NRC staff confirmed that the licensee's flood hazard MSA was performed consistent with the guidance in Appendix G of NEI 12-06, Revision 2, as endorsed by JLD-ISG-2012-01, Revision 1. Based on the reevaluated flood parameters for LIP being equal to the FLEX design-basis, the NRC staff concludes that the licensee has demonstrated that the mitigation strategies are reasonably protected from reevaluated flood hazards conditions.

If you have any questions, please contact me at (301) 415-1056 or e-mail at [Lauren.Gibson@nrc.gov](mailto:Lauren.Gibson@nrc.gov).

Sincerely,

A handwritten signature in black ink that reads "Lauren Kati Gibson". The signature is written in a cursive, flowing style.

Lauren Gibson, Project Manager  
Hazards Management Branch  
Japan Lessons-Learned Division  
Office of Nuclear Reactor Regulation

Docket No.: 50-395

cc: Distribution via Listserv

VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – FLOOD HAZARD MITIGATION STRATEGIES ASSESSMENT, DATED March 22, 2017

**DISTRIBUTION:**

PUBLIC	JLD R/F	RidsNRRJLD Resource
RidsNrrDorlLpl2-1Resource	RidsNrrDorl Resource	RidsNrrPMSummer Resource
RidsRgn2MailCenter Resource	RidsNrrLaSLent Resource	GBowman, NRR
RidsOpaMail Resource	RidsAcrsAcnw_MailCtr Resource	RidsNroDsea Resource
LKGibson, NRR	MValentin-Olmeda, NRR	CWolf, OCA

**ADAMS Accession No.: ML17072A259**

OFFICE	NRR/JLD/JHMB/PM	NRR/JLD/LA	NRR/JLD/JOMB/PM	NRR/JLD/JHMB/BC	NRR/JLD/JHMB/PM
NAME	LKGibson	SLent	MValentin-Olmeda	NSanfilippo	LKGibson
DATE	3/13/17	3/13/17	3/16/17	3/17/17	3/22/17

**OFFICIAL RECORD COPY**