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GNRO-2017/00080

10 CFR 20.1501(c)

December 21, 2017

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

SUBJECT: Reply to Notice of Violation – Clarification of Information  
Grand Gulf Nuclear Station, Unit 1  
Docket No. 50-416  
License No. NPF-29

REFERENCES: NRC Radiation Protection Inspection Report 05000416/2017012 and Notice of  
Violation August 22, 2017  
Reply to Notice of Violation dated September 21, 2017  
Docket No. 50-416  
License No. NPF-29

Dear Sir or Madam:

Entergy Operations, Inc. (Entergy) hereby provides clarification to the Reply to Notice of Violation for Grand Gulf Nuclear Station in Attachment 1. The subject Notice of Violation was issued in Nuclear Regulatory Commission (NRC) Radiation Protection Inspection Report No. 05000416/2017012 and Notice of Violation August 22, 2017. The Reply to Notice of Violation was submitted to the NRC on September 21, 2017 (GNRO-2017/00059).

There are no regulatory commitments contained in this letter.

If you have any questions or require additional information, please contact Douglas Neve at (601) 437-2103.

Sincerely,

Eric A. Larson  
Site Vice President  
Grand Gulf Nuclear Station

EAL/dre

Attachments:

1. Reply to Notice of Violation – Clarification of Information

cc: (see next page)

IEDI  
NRR

cc: with Attachment

Mr. Kriss Kennedy  
Regional Administrator, Region IV  
U. S. Nuclear Regulatory Commission  
1600 East Lamar Boulevard  
Arlington, TX 76011-4511

U. S. Nuclear Regulatory Commission  
ATTN: Mr. Siva Lingam  
Washington, DC 20555

State Health Officer  
Mississippi Department of Health  
P. O. Box 1700  
Jackson, MS 39215-1700

NRC Senior Resident Inspector  
Grand Gulf Nuclear Station  
Port Gibson, MS 39150

**bcc:**

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**Attachment 1**

**GNRO-2017/00080**

**Reply to Notice of Violation – Clarification of Information**

**Reply to Notice of Violation – Clarification of Information**

The elements that require clarification:

1. The incident identification date is 2015 per Nuclear Regulatory Commission (NRC) records.

Response:

Grand Gulf concurs that the NRC identified the issue in 2015 via Inspection Report 05000416/2015001-04

2. Procedures listed in the reply need to have their revision numbers provided.

Response:

06-IC-1D17-R-1002, Main Steam Line High Radiation Monitor Calibration, Revision 111, dated September 20, 2017

06-IC-1D21-R-1002, Containment/Drywell High Range Area Radiation Monitor Calibration, Revision 110, dated August 24, 2017

3. The "decades of response" statement needs to be clarified to specify which decades were electronically calibrated, and to specify which decades were radiologically tested.

Response:

Containment and Drywell High Range Radiation Monitors

Calibration for the Containment and Drywell Radiation Monitors was performed in accordance with NUREG 0737. Containment and Drywell Radiation Monitor electronic calibration was performed at each decade from 1.00E+00 to 1.00E+07 Rem per hour. Containment and Drywell Radiation calibrated radiation source response checks were performed at approximately 5 Rem per hour.

Table 1 Radiation Monitors		
Drywell/Containment		
Decades (Rem/hr)	Electronic Calibration Check	Radiation Source Calibration Check
1.00E+00	Yes	Yes
1.00E+01	Yes	No
1.00E+02	Yes	No
1.00E+03	Yes	No
1.00E+04	Yes	No
1.00E+05	Yes	No
1.00E+06	Yes	No
1.00E+07	Yes	No

Main Steam Line Radiation Monitors

Following the guidance in ANSI N323D-2002, the Main Steam Line Radiation Monitors were electronically calibrated at each decade from 1.00E+00 to 1.0E+05 mRem per hour.

Following the guidance in ANSI N323D-2002, Main Steam Line calibrated radiation source response checks were performed at approximately 5000 mRem per hour and at approximately 100 mRem per hour.

Table 2		
Main Steam Line Radiation Monitors		
Decades (mRem/ hr)	Electronic Calibration Check	Radiation Source Calibration Check
1.00E+00	Yes	No
1.00E+01	Yes	No
1.00E+02	Yes	Yes
1.00E+03	Yes	Yes
1.00E+04	Yes	No
1.00E+05	Yes	No

4. Clarification statement is needed to confirm which instrument readout is the one for which GGN is taking credit: Computer point, recorder, or meter face?

Response:

Containment/Drywell High Range Area Radiation Monitors

GGN credits the satisfactory completion of 06-IC-1D21-R-1002 to satisfy the Technical Specification (TS) Surveillance Requirement. This includes the recorder and the meter face for the calibrated radiation source check. The recorder, meter face, and computer point is included in the electronic calibration.

Performance of procedure 06-IC-1D21-R-1002 is required every 24 months to satisfy CHANNEL CALIBRATION requirements for Post Accident Monitoring instrumentation in accordance with Surveillance Requirement (SR) 3.3.3.1.3, Table 3.3.3.1-1, Functions 12 & 13.

Main Steam Line Radiation Monitors

GGN credits the meter face of 1D17-K610A-D Radiation Monitor, per 06-IC-1D17-R-1002 Section 1.2 Step 26, to satisfy the Technical Requirements (TR) Manual Surveillance Requirement.

Performance of procedure 06-IC-1D17-R-1002 is required every 18 months to satisfy CHANNEL CALIBRATION requirements for Isolation Instrumentation in accordance with "non-TS" SR TR3.3.6.1.4, Table TR3.3.6.1-2, Function 5.a.

5. The standard referenced in the Main Steam Line Radiation Monitor discussion needs to be revised to reflect a more appropriate standard.

Response:

The correct standard is ANSI N323D-2002 American National Standard for Installed Radiation Protection Instrumentation.

6. When two points are used to establish response to a range of radiation levels, the linear relationship of the detected points needs to be stated and supported by evidence.

Response:

Main Steam Line Radiation Monitors

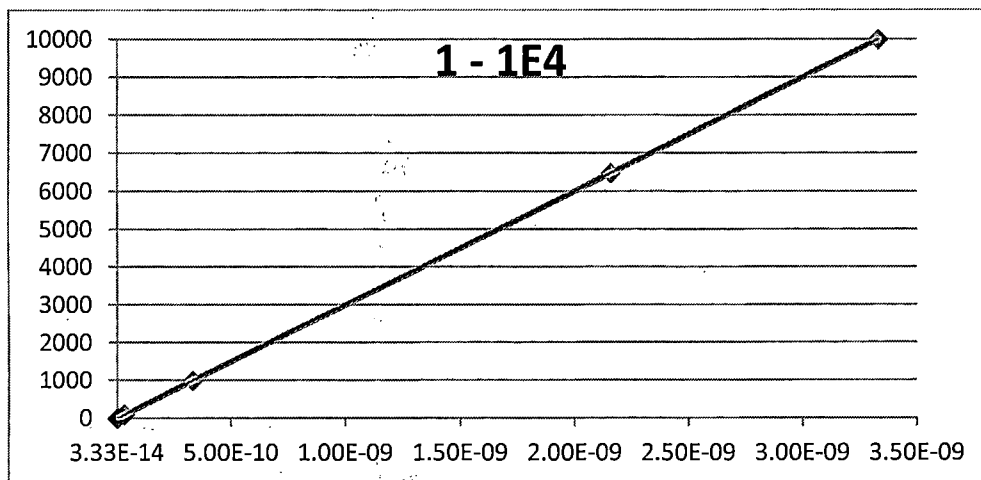
Linearity applies to the Main Steam Line Monitors only. Two radiation source calibration data points are plotted on the electronic calibration results line.

The CALIBRATE function of the NUMAC Logarithmic Radiation Monitor checks the internal calibration sources to external standards and allows the user to initiate an internal and automatic calibration sequence. The plant surveillance procedure 06-IC-1D17-R-1002 validates that the radiation monitors are indicating within the acceptable ranges. The radiation calibration section of 06-IC-1D17-R-1002 validates the detector response is within the allowable tolerances.

From NUMAC Logarithmic Radiation Monitor Vendor Manual 460002963:

<u>Input Current (For Sensitivity Factor = 1.0)</u>	<u>Indicated Rad Level (Units)</u>
3.33 E-13 Amps	1.00 E0 mR/Hr
-12	1.00 E1
-11	1.00 E2
-10	1.00 E3
-9	1.00 E4
-8	1.00 E5
3.33 E-7	1.00 E6

Graph with measured responses:



Amps	mR/hr
3.33E-13	1
3.33E-12	1.00E+01
3.16E-11	9.50E+01
3.33E-11	1.00E+02
3.33E-10	1.00E+03
2.16E-09	6.48E+03
3.33E-09	1.00E+04



From ANSI N323D-2002 American National Standard for Installed Radiation Protection Instrumentation:

*"4.2 Calibration: A calibration shall include adjustment and/or determination of new readings for each point selected or confirmation of previously determined responses on the scale or range of interest. Electronic calibration shall be acceptable for some instrument ranges where calibration with a source is impractical provided the electronic calibration is related to actual exposure data at one or more points.*

*If the instrument uses a digital and analog readout, both readouts should be calibrated. If one or the other is not calibrated, it shall be noted on the instrument.*

*The response test acceptance range should be established as part of the calibration or as a separate step performed as soon as possible after the calibration.*

*The following conditions shall be established prior to exposing the instrument to a source for adjustment and calibration:*

- The instrument shall be turned on and allowed to stabilize.*
- Electronic adjustments, such as high voltage or discriminator thresholds, shall be set to the site or manufacturer's specifications, as applicable.*

*4.2.1 Dose and dose rate 4.2.1.2 Logarithmic readout: Logarithmic readout instruments that have a single readout scale spanning several decades normally have two or more adjustments. The instrument shall be adjusted according to the user's or manufacturer's specifications.*

*After adjustment, response shall be checked at a minimum of one point on each decade and instrument readings shall have a maximum deviation from the conventionally true value of no more than +/- 10% of the full decade value."*

#### Containment/Drywell High Range Area Radiation Monitors

The Containment/Drywell High Range Area Radiation Monitors are calibrated in accordance with NUREG 0737.

From NUREG 0737 II.F.1 Additional Accident-Monitoring Instrumentation:

*"In containment radiation-level monitors with a maximum range of 10E8 rad/hr shall be installed. Monitors are required in both the drywell and in containment. Electronic calibration is acceptable for higher dose rate ranges because such methods are sufficient to provide acceptable accuracy.*

*Containment High-Range Radiation Monitors are required to have the capability to detect and measure the radiation level within the reactor containment during and following an accident.*

*Range: 1 rad/hr to 10E8 rad/hr (beta and gamma).*

*Response: 0.1 MeV to 3 MeV photons, with linear energy response +/- 20%*

*Calibration: In situ calibration by electronic signal substitution is acceptable for all range decades above 10 R/hr. In situ calibration for at least one decade below 10 R/hr shall be by means of calibrated radiation source.*

*Clarification (2) states as follows:*

*The specification of  $10E8$  rad/hr in the above position was based on a calculation of postaccident containment radiation levels that included both particulate (beta) and photon (gamma) radiation. A radiation detector that responds to both beta and gamma radiation cannot be qualified to post-LOCA (loss-of-coolant-accident) containment environments but gamma-sensitive instruments can be so qualified. In order to follow the course of an accident, a containment monitor that measures on gamma radiation is adequate. The requirement was revised in the October 30, 1979 letter to provide for a photon-only measurement with an upper range of  $10E7$  R/hr."*