



**ENERGY  
NORTHWEST**

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10 CFR 50.54(f)

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397  
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION  
REGARDING NRC BULLETIN 2012-01**

- References:
- 1) NRC Bulletin 2012-01, "Design Vulnerability in Electric Power System," dated July 27, 2012
  - 2) Letter, GO2-12-152, dated October 25, 2012, AL Javorik (Energy Northwest) to NRC, "Response to NRC Bulletin 2012-01, Design Vulnerability in Electric Power System"
  - 3) Letter dated December 20, 2013, MG Evans (NRC) to ME Reddemann (Energy Northwest), "Request for Additional Information Regarding Response to Bulletin 2012-01, Design Vulnerability in Electric Power System"
  - 4) Letter dated October 9, 2013, AR Pietrangelo (NEI) to MA Satorius (NRC), "Industry Initiative on Open Phase Condition"

Dear Sir or Madam:

By Reference 1, NRC requested that licensees submit information confirming compliance with 10 CFR 50.55a(h)(2), 10 CFR 50.55a(h)(3), and Appendix A to 10 CFR 50, General Design Criteria 17 or principal design criteria specified in the updated final safety analysis report and address the two issues related to their electric power systems. Reference 2 documents Energy Northwest's response.

Via Reference 3, the Nuclear Regulatory Commission (NRC) requested additional information related to the Energy Northwest submittal. Transmitted herewith in Attachment 1 is the response to the request for additional information (RAI).

As a result of Reference 4, Energy Northwest intends to follow the industry schedule for the open phase condition initiative. Attachment 2 provides additional details regarding this commitment. Should you have any questions or require additional information regarding this matter, please contact Ms. LL Williams, Licensing Supervisor, at (509) 377-8148.

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I declare under penalty of perjury that the foregoing is true and correct. Executed on the date of this letter.

Respectfully,

 Fov

AL Javorik  
Vice President, Engineering

Attachments: as stated

cc: NRC Region IV Administrator  
NRC NRR Project Manager  
NRC Senior Resident Inspector/988C  
AJ Rapacz - BPA/1399 (w/o Enclosure 1)  
WA Horin - Winston & Strawn (w/o Enclosure 1)

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Attachment 1

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**NRC Request:**

1. Provide a summary of all interim corrective actions that have been taken since the January 30, 2012, event at Byron Station, Unit 2, to ensure that plant operators can promptly diagnose and respond to open phase conditions on the offsite power circuits for Class-1 E vital buses until permanent corrective actions are completed.

**Response:**

Based upon an Operating Experience (OE) evaluation of the applicability of the Byron Unusual Event to Columbia Generating Station (Columbia) the following interim correction actions have been taken to ensure plant operators can promptly diagnose and respond to open phase conditions (OPC):

- Interim Corrective Actions
  - On shift crews were briefed on means of identifying OPC with existing plant monitoring equipment and that operator manual action may be required to respond to OPC.
  - Shiftly monitoring of voltage on individual phases of offsite power sources was increased from one to three times per shift.
  - Visual survey of condition of phase conductors on offsite power sources added to operator rounds.
  - The annunciator response procedure for undervoltage alarms was revised to include additional actions to check for OPC in the offsite power system.
  - The abnormal electrical grid procedure was revised to provide actions in response to OPC in offsite power sources including enabling trip logic if the resulting voltage from OPC as sensed at the engineered safety feature (ESF) 4.16kV bus with offsite power connected is below the relay setting.
  - The Byron event was included in operator continuing training.
  - Additional voltage alarm modules were installed to alert operators of gross voltage unbalance or loss of phase at the point of interconnection by providing this input to the existing main control room trouble alarms.
  - The Division 3 ESF 4.16 kV switchgear undervoltage monitoring was augmented from monitoring two phases to monitoring all three phases of the safety bus in the degraded voltage protection system to aid in detecting degraded voltage on a single phase. Similar monitoring already existed on the Division 1 and 2 ESF 4.16 kV switchgear.

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**NRC Request:**

2. Provide a status and schedule for completion of plant design changes and modifications to resolve issues with an open phase of electric power.

**Response:**

Columbia's strategy for resolving the open phase event vulnerability in the long term is based upon providing defense-in-depth features for protecting the 4.16kV ESF switchgear bus from the effects of an open phase condition in the offsite power interconnections to the station which are part of the general design criteria (GDC)17 offsite power circuits

- **Status**

- Columbia and its transmission operator are investigating options being researched by several vendors to detect OPC faults.
- Columbia is engaged in the development of the NEI OPC Guidance Document, as well as development of enhancements to software tools being used to analyze OPC faults.
- Columbia is actively monitoring industry preliminary design and testing activities and will conduct site testing to ensure the design selected for Columbia will provide accurate detection without compromising nuclear safety.
- Columbia has commissioned screening studies to determine vulnerability and consequences of OPC faults.

- **Schedule**

- Columbia is committed to the generic schedule provided in the Industry OPC initiative outlined in the Nuclear Energy Institute (NEI) letter to the Nuclear Regulatory Commission (NRC) dated October 9, 2013, "Industry Initiative on Open Phase Condition".
- Columbia intends to meet the milestones of this schedule with one exception; a deviation to the December 2016 implementation milestone will be required to accommodate outage scheduling. Additional deviations may be required due to software and hardware availability, manufacturer's delivery capabilities, licensing delays, etc.
- Any additional deviations from the Industry OPC Initiative schedule will be documented through the forthcoming deviation/exemption process addressed in the NEI OPC Guidance Document.

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Attachment 2

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**List of Commitments**

The following table identifies the regulatory commitments in this document. Any other statements in this submittal, including intended or planned actions, are provided for information purposes and are not considered to be regulatory commitments.

Commitment	Scheduled Completion Date
Energy Northwest will follow the milestone schedule established in the NEI Letter to NRC, "Industry Initiative on Open Phase Condition", dated October 9, 2013 with the exception of the December 31, 2016 milestone for implementation of design changes.	December 31, 2017
Energy Northwest will implement design changes associated with the Open Phase Condition initiative by the completion of refueling outage 23 (R-23).	Prior to startup from R-23

**Discussion:**

Energy Northwest's project plan to meet this commitment is scheduled to support final equipment installation in the Spring 2017 (R-23) refueling outage. Field installation activities will complete May 2017 with a monitoring period to follow. Completion of any design adjustments identified due to monitoring and enabling all "active" actuation features will be completed no later than December 31, 2017.

Any additional deviations from the Industry OPC Initiative schedule will be documented through the forthcoming deviation/exemption process addressed in the NEI OPC Guidance Document.