



David A. Swank
Acting Vice President, Engineering
P.O. Box 968, Mail Drop PE23
Richland, WA 99352-0968
Ph. 509-377-2309 F. 509-377-4173
daswank@energy-northwest.com

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GO2-11-163

10 CFR 51.53

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

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
LICENSE RENEWAL APPLICATION**

- References: 1) Letter, GO2-10-11, dated January 19, 2010, WS Oxenford (Energy Northwest) to NRC, "License Renewal Application"
- 2) Letter dated August 30, 2011, NRC to DA Swank (Energy Northwest), "Request for Additional Information for the Review of the Columbia Generating Station, License Renewal Application," (ADAMS Accession No. ML11214a237)

Dear Sir or Madam:

By Reference 1, Energy Northwest requested the renewal of the Columbia Generating Station (Columbia) operating license. Via Reference 2, the Nuclear Regulatory Commission (NRC) requested additional information related to the Energy Northwest submittal.

Transmitted herewith in the Attachment is the Energy Northwest response to the Request for Additional Information (RAI) contained in Reference 2. No revised or new commitments are included in this response.

If you have any questions or require additional information, please contact Abbas Mostala at (509) 377-4197.

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NRC

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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,

A handwritten signature in black ink, appearing to read "DA Swank", written in a cursive style.

DA Swank
Acting Vice President, Engineering

Attachment: Response to Request for Additional Information

cc: NRC Region IV Administrator
NRC NRR Project Manager
NRC Senior Resident Inspector/988C
EFSEC Manager
RN Sherman – BPA/1399
WA Horin – Winston & Strawn
AD Cunanan - NRC NRR (w/a)
D Doyle – NRC NRR (w/a)
BE Holian - NRC NRR
RR Cowley – WDOH

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

"Request for Additional Information for the Review of the Columbia Generating Station,
License Renewal Application,"
(ADAMS Accession No. ML11214a237)

Background:

In its letter dated January 28, 2011 (ADAMS Accession Number ML 110330395), Energy Northwest identified Severe Accident Mitigation Alternative (SAMA) candidate FL-06R as potentially cost-beneficial.

In the January 28th letter, there were several different descriptions of SAMA FL-06R:

- "Add additional [nondestructive examination (NDE)] and inspections to increase probability of detecting degraded lines in raw water systems in the Control Building." (page 6 of 173)
- "Improve control building flooding scenarios" (page 19 of 173)
- "Perform additional NDE and inspections to the three lines identified in SAMA candidate FL-04R to verify that degradation is not occurring in these lines. The specific locations of the NDE would be selected from potentially susceptible areas using similar methods as used in the risk-informed in-service inspection program to detect wall thinning." (pages 119 and 120 of 173)
- "Perform additional NDE and inspections of the [service water (SW), turbine service water (TSW), and fire protection (FP)] lines in the Control Building area of the Radwaste Building." (page 167 of 173)

Issue:

Based on the descriptions of SAMA FL-06R, it appears to relate to managing the effects of aging.

Potentially cost-beneficial SAMAs that relate to adequately managing the effects of aging may be mandated by the NRC as part of license renewal pursuant to 10 CFR Part 54.

Requests:

RAI 1:

Provide a determination as to whether the affected structures, systems, or components (SSCs) identified in the SAMA candidate are within the scope of the license renewal safety review under 10 CFR Part 54. If they are within the scope of license renewal, explain how the NDE and inspections proposed in SAMA FL-06R differ from the aging management programs proposed for the same SSCs in the safety portion of the license

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renewal application (e.g., SW and FP systems).

Energy Northwest Response:

The fire protection (FP) system piping sections are within the scope of the Fire Water aging management program (AMP) proposed in the License Renewal Application (LRA). The plant service water (TSW) and standby service water (SW) systems piping sections are within the scope of the Open Cycle Cooling Water AMP proposed in the LRA. Both of these programs include nondestructive examination (NDE) techniques to determine loss of material. The SAMA candidate FL-06R uses the risk importance measures to provide insight to identify in-scope piping sections that are more important to reducing the core damage frequency (CDF) contribution.

Prior to submittal of the application, the issue associated with moderate and large piping breaks in the SW, TSW, and FP systems piping was identified in the Energy Northwest (EN) self-assessment and peer review as significant contributors to the CDF. As such, in accordance with EN procedures, the condition was identified in the corrective action program. The corrective action includes evaluating the performance of NDE tests and monitoring of the piping systems. The performance of NDE will allow the probabilistic safety assessment (PSA) to reduce the frequency pipe-break initiating event for these systems and reduce the CDF.

Subsequently, upon finalization of the Revision 7.1 PSA model, the SAMA candidate FL-06R was established during the sensitivity analysis. The importance values of the initiating events in these lines were significantly high enough to warrant a SAMA candidate consideration. The SAMA (through PSA importance evaluation) identified certain line sections that were a major contribution to the PSA flooding model. These were selected to assess the benefit of improving the probability of detecting a pipe wall thinning condition. Through improved probability of detecting a piping thinning condition, corrective repair can be scheduled to minimize moderate and large break potential. Moderate or large breaks in these piping sections could have impact to the emergency switchgear located on a lower elevation. This SAMA candidate supplements the SW, TSW, and FP piping AMPs by providing insight into the more risk significant piping sections of these piping systems.

Final determination of the AMP testing and inspection locations will use plant experience and engineering evaluations to identify the most susceptible piping sections, as well as risk importance for selection of the testing frequency and locations.

Because the piping systems and locations identified by FL-06R are within scope of the associated AMPs and the testing proposed does not differ from the described testing in the associated AMP, no additional commitment is required to assure the aging effects are managed appropriately.

RAI 2:

The SAMAs listed below were identified as potentially cost-beneficial in the

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January 28th letter. Energy Northwest stated that all these SAMA candidates will be considered for implementation through the normal processes for evaluating possible plant changes at Columbia Generating Station as described in response to RAI 6.j-1iv. For each of the 16 potentially cost-beneficial SAMAs, provide a determination and rationale (basis) as to whether the SAMA relates to managing the effects of aging.

SAMA ID	SAMA Description
AC/DC-28	Reduce common cause failures between EDG-3 and EDG-1/2
CC-03b	Raise reactor core isolation cooling system backpressure trip setpoints
FR-07a	Improve the fire resistance of critical cables for containment venting
FR-07b	Improve the fire resistance of critical cables for transformer E-TR-6
FR-08	Improve the fire resistance of cables to residual heat removal and standby SW
HV-02	Provide a redundant train or means of ventilation
SR-05R	Improve seismic ruggedness of MCC-7F and MCC-8F
FL-05R	Clamp on flow instruments to certain drain lines in the control building of the radwaste building and alarm in the control room
FL-04R	Add one isolation valve in the SW, turbine SW, and fire protection lines in the control building area of the radwaste building
FL-06R	Additional non-destructive evaluation and inspections to increase probability of detecting degraded lines in raw water systems in the Control Building
CC-24R	Backfeed the HPCS system with emergency bus SM-8 to provide a third power source for HPCS
CC-25R	Enhance alternate injection reliability by including residual heat removal service water and fire water crosstie in maintenance program
OT-07R	Increase operator training on systems and operator actions determined to be important from the PSA
FW-05R	Examine the potential for operators to control reactor feedwater and avoid a reactor trip
OT-09R	For the non-LOCA initiating events, credit the Z (power conversion system recovery) function
FR-11R	Install early fire detection in the following analysis units: RC-02, RC-03, RC-04, RC-05, RC-07, RC-08, RC-11, RC-13, RC-14, and RC-1A

Energy Northwest Response:

The following table provides a determination and rationale that none of the identified SAMA candidates relate to managing the effects of aging.

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SAMA ID	SAMA Candidate Description	Basis
AC/DC-28	Reduce common cause failures (CCF) between EDG-3 and EDG-1/2	The CCF associated with this SAMA candidate are fail to run and fail to start failure modes of emergency diesel generators (EDG). The failure probabilities for the CCF events were developed based on the random failure probability of the underlying event and the appropriate alpha factor from the NRC CCF data base and NUREG/CR-6819, Volume 1, Common Cause Failure Event Insights: Emergency Diesel Generators. The CCF proximate causes included design, construction, installation, manufacture inadequacy, internal component failure, operational and human error. Of these, only internal component failure has mechanisms, such as wear out, internal corrosion, or erosion and fatigue that could be related to aging management. The standard maintenance practices for the diesel generators at Columbia provide an engine overhaul every 12 years, which preclude significant contributions for age related mechanisms. This SAMA candidate was intended to address changes in practices such as maintenance activities related to human error, avoidance of fuel contamination events from a common supplier, and evaluation of past control system failures to identify potential diversity between EDG-3 and EDG-1/2. This SAMA candidate would improve the availability of the EDG-3 to EDG-1 or EDG-2 cross connect. The SAMA candidate was not intended to address aging management for EDGs.

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SAMA ID	SAMA Candidate Description	Basis
CC-03b	Raise reactor core isolation cooling (RCIC) system backpressure trip setpoints	This SAMA candidate would provide additional operating range for the RCIC system by raising the back pressure trip set point. There are no aging management elements to this SAMA candidate.
FR-07a	Improve the fire resistance of critical cables for containment venting	This SAMA candidate would improve the fire resistance of certain cabling, reducing the probability of losing containment venting due to a fire. There are no aging management elements to this SAMA candidate.
FR-07b	Improve the fire resistance of critical cables for transformer E-TR-S	This SAMA candidate would improve the fire resistance of certain cabling, reducing the probability of losing the primary offsite power transformer due to a fire induced spurious operation. There are no aging management elements to this SAMA candidate.

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SAMA ID	SAMA Candidate Description	Basis
FR-08	Improve the fire resistance of cables to residual heat removal (RHR) and standby service water (SW)	This SAMA candidate would improve the fire resistance of certain cabling, reducing the probability of losing an RHR pump due to a fire. There are no aging management elements to this SAMA candidate.
HV-02	Provide a redundant train or means of ventilation	This SAMA candidate would provide an alternate means to cool an emergency switchgear division if a loss of the HVAC system to that division occurred. The design change considered would provide a hard ventilation duct cross connection from an existing HVAC system that has redundant subsystems to the critical switchgear ducting. There are no aging management elements to the SAMA candidate.
SR-05R	Improve seismic ruggedness of MCC-7F and MCC-8F	The motor control centers (MCC)-7F and 8F were evaluated as the weakest base of the MCCs. These MCCs supply power for the Divisions 1 and 2 electrical equipment. The SAMA candidate assumed that additional support brackets and welding to the existing MCCs would be required to strengthen its seismic ruggedness. There are no aging management elements to this SAMA candidate.

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SAMA ID	SAMA Candidate Description	Basis
FL-05R	Clamp on flow instruments to certain drain lines in the control building area of the radwaste building and alarm in the control room	This SAMA candidate would detect if flooding was occurring in the areas that could impact the critical electrical switchgear. The areas do not have equipment and floor drain lines that end in sumps with alarms that could be used for early detection. The flow instruments would detect flow in normally dry lines and provide early warning to the operators to institute investigation and isolation of the piping system if the draining was caused by that piping system. There are no aging management elements to this SAMA candidate.
FL-04R	Add one isolation valve in the SW, TSW, and FP lines in the control building area of the radwaste building	This SAMA candidate would provide another means of isolation of a piping system leak in the areas that could impact the critical electrical switchgear without causing an isolation of other critical equipment cooling. Additional local isolation valves would allow the operator to maintain cooling from the TSW or SW to other equipment cooling, thereby preserving that equipment for mitigation of the event. There are no aging management elements to this SAMA candidate.

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SAMA ID	SAMA Candidate Description	Basis
FL-06R	Additional non-destructive evaluation and inspections to increase probability of detecting degraded lines in raw water systems in the Control Building	Additional non-destructive testing for specific sections of the FP, TSW, and SW systems will enhance the ability to manage aging. The lines in the systems are in-scope. This SAMA candidate was created due to the importance of the pipe break initiation event frequency basic event. The SAMA candidate demonstrates the usefulness of the PSA in supporting the Columbia AMP by providing insight to those locations that have higher risk benefit. See response to RAI 1 for further detail.
CC-24R	Backfeed the HPCS system with emergency bus SM-8 to provide a third power source for HPCS	The Columbia design incorporates the ability to cross connect EDG-3 to either EDG-1 or EDG-2. This SAMA candidate evaluated the ability of using this feature in reverse to cross connect Division 2 emergency bus to high pressure core spray (HPCS) system. This SAMA candidate would provide an alternate use of existing electrical distribution. Division 2 was selected as the SAMA candidate while preserving Division 1 for the RCIC injection. This would provide HPCS with an additional onsite (EDG-2) and offsite (115kV back up transformer) power source. There are no aging management elements to this SAMA candidate.

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SAMA ID	SAMA Candidate Description	Basis
CC-25R	Enhance alternate injection reliability by including residual heat removal service water and fire water crosstie in the maintenance program	This SAMA candidate would have reliability testing through periodic exercising and valve operator maintenance to assure the valve would have high reliability to change state (normally close to open). This type of reliability improvement is not part of the scope for aging management programs.
OT-07R	Increase operator training on systems and operator actions determined to be important from the PSA	This SAMA candidate would provide a link from those significant operator error basic events in the PSA to the operator procedures for easy identification of important procedure steps. There are no aging management elements to this SAMA candidate.

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SAMA ID	SAMA Candidate Description	Basis
FW-05R	Examine the potential for operators to control reactor feedwater and avoid a reactor trip	This SAMA candidate added an additional source of power for the DC system that provides turbine control. The operator would position a bypass switch from an existing plant inverter to provide power if the normal DC power source was lost. This modification was implemented after the application was submitted. There are no aging management elements to this SAMA candidate.
OT-09R	For the non-LOCA initiating events, credit the Z (power conversion system recovery) function	The Z function in the PSA is the probability that the operators would not reestablish the condenser as a decay heat removal method. This could be accomplished by allowing the use of a main steam isolation valve (MSIV) trip bypass and reopening the steam lines to the condenser. The SAMA candidate would provide procedures to the operators to use this decay heat removal method for non-LOCA events to prevent fuel damage. The PSA models the recovery of the condenser as a decay heat removal method, but because operator emergency procedures do not provide direction for using the bypass for non-LOCA events, no credit is modeled. There are no aging management elements to this SAMA candidate.

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SAMA ID	SAMA Candidate Description	Basis
FR-11R	Install early fire detection in the following analysis units: RC-02, RC-03, RC-04, RC-05, RC-07, RC-08, RC-11, RC-13, RC-14, and RC-1A	This SAMA candidate would provide improved fire detection ability by an instrument that has greater ability to detect the initial stages of electrical cable insulation failure prior to a combustible state being reached. This early failure mode could be due to overload, installation damage, or other means. This system does not manage cable degradation, but does provide early warning of conditions that are resulting in the cable's insulation failure. There are no aging management elements to this SAMA candidate.