ENERGY NORTHWEST

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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 – SCOPING AND SCREENING METHODOLOGY**

References:
1) Letter, G02-10-11, dated January 19, 2010, WS Oxenford (Energy Northwest) to NRC, "License Renewal Application"

2) Letter dated June 9, 2010, NRC to WS Oxenford (Energy Northwest), "Request for Additional Information for the Review of the Columbia Generating Station, License Renewal Application – Scoping and Screening Methodology," (ADAMS Accession No. ML101530226)

3) Letter GO2-10-094, dated July 17, 2010, SK Gambhir (Energy Northwest) to NRC, "License Renewal Application First Annual Update"

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 Attachment 1 is the Energy Northwest response to a Request for Additional Information.

No new commitments are included in this response.

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

A035
NRR

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

Respectfully,

SK Gambhir
Vice President, Technical Services

Attachment: Response to Request for Additional Information

cc: NRC Region IV Administrator
NRC NRR Project Manager
NRC Senior Resident Inspector/988C
EJ Leeds - NRC NRR
EFSEC Manager
RN Sherman – BPA/1399
WA Horin – Winston & Strawn
EH Gettys - NRC NRR
BE Holian - NRC NRR
RR Cowley – WDOH

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

RAI 2.1-1

Background

10 CFR 54.4, "Scope," states, in part,

(a) Plant systems, structures, and components within the scope of this part are –

(1) Safety-related systems, structures, and components (SSCs) which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49 (b)(1)) to ensure the following functions –

(i) The integrity of the reactor coolant pressure boundary;

(ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or

(iii) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11, as applicable.

(2) All nonsafety-related systems, structures and components whose failure could prevent satisfactory accomplishment of any of the functions identified in (a)(1)(i), (ii), or (iii) of this section.

(A) Issue

During the scoping and screening methodology audit, performed onsite May 10-13, 2010, the staff reviewed the license renewal application (LRA) and 10 CFR 54.4(a) implementing documents and had discussions with the applicant. The staff determined that the applicant had identified safety-related components and cables located in the turbine building. The applicant had performed an evaluation, as documented in license renewal implementing documents and reports, that concluded that the nonsafety-related SSCs in the proximity of, or attached to, the safety-related components and cables were not required to be included within the scope of license renewal because the safety-related components and cables had been evaluated to be fail-safe.

Request

The staff requests that the applicant provide the details of the evaluation and basis for the conclusion that nonsafety-related SSC's, in the proximity of or attached to safety-related components and cables, are not required to be included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2).

Describe any additional scoping evaluations performed to address the 10 CFR 54.4(a) criteria. List any additional SSCs that were included within the scope of license renewal as a result of the reviews discussed in this RAI. List the structure and component types subject to aging management review, aging management review results and aging management programs, as applicable, to be credited for managing the identified aging effects.

Energy Northwest Response

As described in the FSAR Section 3.6.1.20.3.6, the only components having safety-related functions that are located in the Turbine Generator Building are Reactor Protection System (RPS) sensor inputs from the Main Steam (MS) System, main steam isolation valve (MSIV) isolation logic inputs from the MS System, and the Tower Makeup (TMU) System transformers.

The FSAR discusses that the TMU transformers are required to function only for the design basis tornado event. The TMU transformers are classified as non-safety-related, and are not Seismic Category I components. Because these transformers are not safety related, they are not a concern with regard to nearby nonsafety related (NSR) components, because failure of the nearby NSR components would not prevent the accomplishment of a safety-related system, structure, and component (SSC) to perform its intended function as defined in 10 CFR 54.4(a)(1).

Because the RPS and MSIV isolation logic sensor inputs are "fail-safe" components, in accordance with NEI 95-10 [Appendix F Section 5.2.3.1], loss of the RPS and MSIV isolation logic sensor inputs during a postulated event would not result in loss of capability to bring the plant to a cold shutdown or mitigate the radiological consequences of such an event, even assuming a single failure among the safety systems that remain unaffected. Therefore, there are no credible NSR failures that could prevent the MS System and the RPS from performing their safety-related functions.

The "fail-safe" design features of turbine throttle and governor valve closure signals to the RPS are discussed below.

a. Shorts to ground: Each trip function input circuit to the RPS is individually fused to prevent degradation of other channels if a short to ground occurs on one channel. This protection also applies to the turbine throttle and governor valve

closure trip inputs to the RPS. Therefore, a short to ground would be interrupted by the protective fuses eliminating any interaction or degradation of other channels, as well as resulting in a channel trip due to "fail-safe" logic.

b. Opens: The normal operating state of the RPS trip inputs is a closed contact condition. Therefore, an open in an RPS input channel circuit would result in failure in the safe direction causing a trip of that channel with no degradation or interaction with other channels.

c. Hot shorts: Reactor protection system cabling that is routed from trip instrumentation through the Turbine Generator Building is enclosed in conduit. Each trip channel has a separate and dedicated conduit. Therefore, hot shorts would be confined to one channel of trip instrumentation and would not degrade or interact with other protective channels.

d. Other diverse variables (reactor pressure and neutron flux trips) may be relied on for reactor scram if components in the Turbine Generator Building fail.

The MSIV isolation logic sensor inputs, located in the Turbine Generator Building, monitor MS line low steam line pressure and low condenser vacuum. They provide an input to the Primary Containment and Reactor Vessel Isolation Control System (PCRVICS) that initiates closure of MSIVs and Residual Heat Removal (RHR) System valves. The MS lines are isolated on low steam pressure in the event of failure of the main turbine pressure regulator controls or on loss of condenser vacuum. The FSAR identifies these components as part of the PCRVICS and they are classified as safety related because of an NRC commitment but they do not perform a 10 CFR 54.4(a)(1) function. Loss of these signals would not result in unacceptable off-site doses since other isolation signals from devices in the Reactor Building (i.e. MS line flow) would initiate isolation of the PCRVICS. Therefore, nonsafety-related SSCs inside the Turbine Generator Building do not have a plausible potential for failure to impair or prevent the MSIV isolation logic sensor inputs located in the Turbine Generator Building from performing a function defined in 10 CFR 54.4(a)(1).

The safety-related components of the Miscellaneous Drains (MD) System located in the Turbine Generator Building, including isolation valves, and drain valves, and associated piping, strainers, and orifices, are classified as safety-related because of a commitment to the NRC . They do not perform a 10 CFR 54.4(a)(1) function. Therefore, there are no credible NSR failures that could prevent the MD System from performing a function defined in 10 CFR 54.4(a)(1).

The safety related MS valves located in the Turbine Generator Building are classified as safety-related because of a commitment to the NRC. They do not perform a 10 CFR 54.4(a)(1) function. Therefore, there are no credible NSR failures could prevent the MS System from performing a function defined in 10 CFR 54.4(a)(1).

Therefore, NSR SSCs inside the Turbine Generator Building do not have a plausible potential for failure to impair or prevent the accomplishment of a 10 CFR 54.4(a)(1) function by physical interaction, do not satisfy the nonsafety affecting safety (NSAS), 10 CFR 54.4(a)(2) scoping criterion and are not within the scope of license renewal.

The following additional evaluations were performed: a review of Passport database for all Quality Class 1 components located in the Turbine Generator Building and a review of cable routing drawings for the Turbine Generator Building. The cable drawing review determined that the only 10 CFR 54.4(a)(1) cables located in the Turbine Generator Building are associated with the components discussed above. Pressure switches MS-PS-3A through 3D and MS-PS-56A through 56D were not highlighted on license renewal boundary drawing LR-M502-1 as being in scope. The discrepancy was documented in the corrective action program.

The revised boundary drawing LR-M502-1 was submitted in Reference 3. The switches are within scope because they are classified as safety related but screen out mechanically because they do not have a 10 CFR 54.4(a)(1) pressure boundary function. All of the electrical devices screen out either because they are active or the circuits are "fail safe".

No SSCs were added due to 10 CFR 54.4(a)(2) spatial interaction requirements because there are no NSR SSCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1)(i), (ii), or (iii).

(B) Issue

During the scoping and screening methodology audit, performed onsite May 10-13, 2010, the staff reviewed the LRA and 10 CFR 54.4(a) implementing documents and had discussions with the applicant. The applicant indicated that additional nonsafety-related SSCs, with the potential to spatially interact with safety-related SSCs, had been identified and would be included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2). The nonsafety-related SSCs are located in corridors between buildings and were identified by the applicant during walkdowns performed subsequent to the issuance of the LRA and prior to the scoping and screening methodology audit and had not been identified in the LRA.

Request

(B.1) The staff requests that the applicant perform a review of the scoping methodology (as described in the LRA) and indicate why the methodology or its implementation precluded the identification of the nonsafety-related SSCs to be included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2) prior to the issuance of the LRA.

(B.2) Describe any changes to the scoping methodology (as described in LRA) or its implementation, that resulted in the identification of additional nonsafety-related SSCs, not previously identified in the LRA, to be included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2).

(B.3) Describe any additional scoping evaluations performed to address the 10 CFR 54.4(a) criteria. List any additional SSCs that were included within the scope of license renewal as a result of the reviews discussed in this RAI. List the structure and component types subject to aging management review, aging management review results and aging management programs, as applicable, to be credited for managing the identified aging effects.

Energy Northwest Response

B.1 The initial scoping and screening methodology focused on spaces containing safety related equipment. The spaces with safety related equipment were determined using plant drawings. The mechanical scoping focused on each in-scope space (e.g. Reactor Building or Control Structure) individually and did not fully consider the corridors between the spaces. The initial scoping process was performed independently by each of the License Renewal (LR) discipline leads (Civil, Electrical, and Mechanical). As no safety related components were identified in the Radwaste Building, no SSCs in that building had a 10 CFR 54.4(a)(2) function. The review shows that the scoping methodology is sound and it was the implementation of the scoping process that precluded the identification of the NSR SSCs to be in the scope of the LRA.

Most of the drawings used for scoping show building boundaries for systems that span multiple buildings. Some drawings depict the corridors and others do not. Because the drawings were relied upon, the inconsistent use of showing corridors contributed to the scoping errors.

B.2 Based on lessons learned at the Palo Verde and Diablo Canyon scoping and screening audits, Energy Northwest reviewed the Columbia (a)(2) scoping methodology and implementation. The scoping implementation was changed to assemble the discipline leads to participate in cross-functional walkdowns of in-scope and out-of-scope spaces, focusing on the corridors between spaces. This review was performed by the LR Civil Lead, the LR Electrical Lead, and the LR nuclear steam supply system (NSSS) Mechanical Lead. Scoping errors were found in some of the corridors.

B.3 Energy Northwest entered the scoping errors into the corrective action program. The extent of condition review reevaluated all structures that could possibly house 10 CFR 54.4(a)(1) equipment. This included structures such as the circulation water (CW) pump house, floculator building, and cooling tower electrical buildings. Office buildings, trailers, fabrication shops, and warehouse structures were not within the scope of the review since the intent of this type of

structure is routine maintenance and support. Structures were evaluated to determine if any safety related equipment or cables were overlooked. Since design specifications prohibit routing safety related cables in non seismic Class 1 buildings, only in-scope structures were reevaluated, with the exception that the turbine building was included because it is a modified non-seismic category 1 structure.

The reviews revealed that steam from auxiliary steam (AS), heating steam (HS), heating steam vent (HSV), condensate (auxiliary) (CO), heating steam condensate (HCO), and sealing steam (SS) systems could impact cables with an 10 CFR 54.4(a)(1) function in a corridor. Additionally, sections of the condensate (COND), equipment drains radioactive (EDR), miscellaneous waste radioactive (MWR), floor drains radioactive (FDR), fuel pool cooling (FPC), demineralized water (DW), plant service water (TSW), fire protection (FP), potable hot water (PWH), and potable cold water (PWC) systems that have the potential to spray or splash on the cables with an 10 CFR 54.4(a)(1) function located in corridors were found. Portions of these systems were added to the 10 CFR 54.4(a)(2) scope in Reference 3.

The review found cables with a 10 CFR 54.4(a)(1) function in conduits attached to the ceiling of 437' Radwaste Building which is the bottom of the 467' floor of the Control Structure. Therefore, water filled pipes that can directly spray or splash and steam containing piping in the Radwaste Building were added to the LR scope (Reference 3). This additional scope includes piping for HS, HCO, HSV, CO, TSW, DW, PWC, COND, reactor building closed cooling water (RCC), MWR, condensate processing radioactive (CPR), control air system (CAS), floor drains (FD), EDR, FDR and reactor water clean up (RWCU) systems.

The extent of condition determination also validated LRA table 2.2-1, which provides a listing of systems that are in-scope or out-of-scope for License Renewal. The out-of-scope systems were reevaluated to ensure that initial scoping was correct. When LRA table 2.2-1 was reviewed no additional systems (beyond those in part B.2 of this response) were added to scope. The Reactor Building Potable Hot Water System had been eliminated by plant modification and was removed from LRA table 2.2-1 (Reference 3).

Energy Northwest provided the additional scope and revised Table 2.2-1 as marked up LRA sections in Reference 3. Information copies of Amendment 1 in Attachment 2. The updates to the LRA list the additional SSCs included within the scope of license renewal as a result of the reviews discussed in this RAI. It lists the component types subject to aging management review, aging management review results and aging management programs, as applicable, to be credited for managing the identified aging effects.

A list of the new or revised LRA boundary drawings is provided below. Information only copies of these new and revised drawings were provided as part of LRA Amendment 1 in Reference 3.

Drawing number	Reason
LR-M508-1	TSW 437' RW
LR-M-513	AS, CO,
LR-M515-4	FP in 441' E-W corridor
LR-M515-5	FP in 437' RW
LR-M517	DW in 441' E-W corridor and 437' RW
LR-M525-2	RCC in 437' RW. Added to existing note D to say that chillers are behind walls and can't spray.
LR-M526-1	FPC 441' N-S corridor
LR-M526-2	FPC 441' N-S corridor
LR-M527-1	COND 441' corridors and 437' RW.
LR-M537	EDR in 441' N-S corridor
LR-M539	FDR, MWR in N-S corridor
LR-P541-1	PWH and PWC
LR-M502-3	SS 441' N-S corridor
LR-M508-2	TSW 441' corridor
LR-M514-1	HCO, HS, HSV, (CO reference to LR-M513)
LR-M527-2	COND on 437' RW
LR-M531	FDR, FD, MWR
LR-M532	EDR 441' N-S corridor and 437' RW, CAS 437' RW
LR-M533-1	MWR in 441' N-S corridor
LR-M533-2	MWR on 437' RW
LR-M534	COND on 437' RW
LR-M536	RWCU, CPR on 437' RW

(C) Issue

During the scoping and screening methodology audit, performed onsite May 10-13, 2010, the staff reviewed the LRA and 10 CFR 54.4(a) implementing documents and had discussions with the applicant. The applicant discussed the bounding conditions (as described in NEI 95-10, Appendix F) that had been used to identify the portion of nonsafety-related pipe, attached to safety-related SSCs, to be included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2). The staff determined that the use of some bounding conditions had not been described in the LRA.

Request

The staff requests that the applicant discuss all bounding conditions used to identify the portion of nonsafety-related pipe, attached to safety-related SSCs, to be included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2).

Energy Northwest Response

The following discussion describes the methodology for establishment of license renewal boundaries for NSR piping that is directly attached to safety-related SSCs.

1. Where identified on plant drawings or in piping design analyses, anchors were the preferred method for the establishment of license renewal boundaries for NSR piping attached to safety-related SSCs. As defined in the Columbia design standard, an anchor is a

   "*... rigid restraint providing full fixation, ideally permitting neither translatory nor rotational displacement of the pipe in the direction of or about any of the three reference axes.*"

   This approach is consistent with NEI 95-10 Appendix F Section 4.1 for establishment of a license renewal boundary at a "seismic" anchor, which is defined as:

   "*... a device or structure that ensures that forces and moments are restrained in three (3) orthogonal directions.*"

2. If a license renewal boundary could not be identified at a seismic anchor, a review of plant documentation was conducted to determine if an "equivalent" anchor was defined in plant-specific piping design analyses. Columbia's overlap criteria are applied in piping design analyses in overlap areas (SR/NSR interfaces). The overlap method is used for analyzing the dynamic response of a piping system by performing separate analyses of two or more overlapped subsystems of the complete piping system. This method is used only when the overlap region has enough rigid restraints in each of the three orthogonal directions to prevent the transmission of motion due to modal excitation from one end to the other and to reduce to a negligible level the sensitivity of the piping system to the direction of excitation. If the overlap method was used, the series of supports which define the overlap region (consisting of at least three rigid restraints or snubbers in each of three orthogonal directions) serves an equivalent anchor.

   This approach is consistent with NEI 95-10 Appendix F Section 4.3 for establishment of a license renewal boundary at an equivalent anchor, which is defined as:

> *"... a series of supports that have been evaluated as a part of a plant-specific piping design analysis to ensure that forces and moments are restrained in three orthogonal directions."*

3. If an anchor could not be identified as a license renewal boundary, and the overlap method could not be used to define an equivalent anchor, as described above, an equivalent anchor was established at a boundary point defined to include of at least 2 supports in each of the 3 orthogonal directions.

   This approach is consistent with NEI 95-10 Appendix F Section 4.4 for establishment of a license renewal boundary at an equivalent anchor, which is defined as:

   > *"... a combination of restraints or supports such that the NSR piping and associated structures and components attached to SR piping is included in scope up to a boundary point that encompasses at least two (2) supports in each of three (3) orthogonal directions."*

4. Consistent with NEI 95-10 Appendix F Section 4, the following alternatives to identifying a seismic anchor or an equivalent anchor were also used in determining end points for the portions of NSR piping attached to safety related piping to be included in the scope of license renewal:

   - A base-mounted component (e.g., heat exchanger, pump)
   - A flexible connection
   - A free end of NSR piping (e.g., piping drains and vents, instrument loops)
   - NSR piping runs that are connected at both ends to safety related piping
   - Buried piping, which is considered to be an acceptable anchor for piping systems not subject to significant thermal loads.
   - A smaller branch line can be decoupled where the moment of inertia ratio of the larger piping to the smaller piping is equal to or greater than 25 to 1 ratio

   The review included all branch lines from the main piping runs, regardless of size, to ensure that forces and moments could not be transmitted back through the SR/NSR interface.

RAI 2.1.1.2.2-1

Background

Section 2.1.1.2.2 of the Columbia Generating Station LRA, "Spatial Failures of Non-safety Related SSCs," describes the methodology used for scoping SSCs for spatial interaction per the criteria of 10 CFR 54.4(a)(2). As described, all fluid-containing components within an entire structure were included in the scope of license renewal if that building also contained safety related SCCs.

Issue

During plant walkdowns for the scoping and screening audit, several components were chosen to spot check the scoping results. In the DG-1 room, the scoping of a floor drain on the 441 elevation was questioned and this drain line was found to not be in scope. Under the methodology described in the LRA, this line should have been scoped under 10 CFR 50.54(a)(2) for spatial interaction.

Request

The NRC staff requests that the licensee provide additional information to address the scoping of this drain line.

Energy Northwest Response

Energy Northwest scoped plant drains for possible 10 CFR 50.54(a)(2) interaction based on flow diagrams. There is no flow diagram for the floor drains in the diesel generator rooms, and a mechanical piping embedment drawing was used. Use of the embedment drawing allowed for inadvertently omitting some of the drain piping from the scope of license renewal. This discrepancy in the LRA was entered into the corrective action program.

Following the scoping and screening audit, a walkdown was performed by the LR NSSS Mechanical Lead and the LR Civil Lead to review all drains in the diesel generator building. The main rooms, muffler galleries, fuel transfer pump rooms, day tank rooms, and mezzanines for all three diesel generators were included in the walkdown. The layout of the DG building allows adequate access to all the drain lines to perform this review. License Renewal (LR) drawing LR-M852 rev 0 was highlighted to show all exposed drain piping in the DG building as in the scope of license renewal.

An extent of condition review was performed for other LR boundary drawings that used embedment drawings. No other scoping problems were found.

The marked up copy of LR-M852 revision 1 was submitted as part of LRA Amendment 1 (Reference 3).

RAI 2.1.1.2.2-2

Background

Section 2.1.1.2.2 of the Columbia Generating Station LRA, "Spatial Failures of Non-safety Related SSCs," describes the methodology used for scoping SSCs for spatial interaction per the criteria of 10 CFR 54.4 (a)(2). As described, all fluid-containing components within an entire structure were included in the scope of license renewal if that building also contained safety related SCCs.

Issue

During plant walkdowns for the scoping and screening audit, several components were chosen to spot check the scoping results. In the DG-1 room, the scoping of two drain lines from air handlers DMA-AH-11 and 12 were questioned. It was found that the scoping of these lines was not depicted on the license renewal boundary drawings or discussed in the application. However, a reference to the drain lines was discovered in the support material for AMP B.2.14, "Cooling Units Inspection."

Request

The NRC staff requests that the licensee provide additional information to confirm that these drain lines and drain lines from other air handlers in the diesel generator building are included in the scope of license renewal.

Energy Northwest Response

There is no system flow diagram depicting the Diesel Building Mixed Air (DMA) air handler drain piping. However, as shown in LRA Table 3.3.2-14 row 33, the DMA air handler drain piping is within the scope of license renewal and is subject to aging management review. The subject drain piping is identified as steel piping subject to a condensation (internal) environment. The Cooling Units Inspection Program explicitly includes the subject DMA drain piping within the scope of the inspection. Furthermore, the Diesel Building HVAC aging management review report provides the following description of the subject drain piping as included in the scope of license renewal.

> "Although they are not shown explicitly on the system flow diagrams, one-piece drain pans are described in certain reference materials as being installed under cooling coils for the collection and drainage of condensation for the coils when they are in operation. For conservatism, all cooling coils within the evaluation boundaries of the HVAC systems are assumed to have drain pans associated with them and **their respective drain lines**, which are in scope only for NSAS considerations."