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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 RELATED TO LICENSE AMENDMENT REQUEST FOR ADOPTION OF TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF-423, REVISION 1 (TAC NO. MF4616)**

References:

1) Letter, GO2-14-112, dated August 12, 2014, WG Hettel (Energy Northwest) to NRC, License Amendment Request for Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-423, Revision 1, Using the Consolidated Line Item Improvement Process (ADAMS Accession No. ML14234A457)

2) NRC email dated March 9, 2015, A George (NRC) to LL Williams (Energy Northwest), "Request for Additional Information: Columbia Generating Station – LAR to Revise Technical Specifications End States (TSTF-423, Revision 1) (TAC No.MF4616)

Dear Sir or Madam:

By Reference 1, Energy Northwest submitted a License Amendment Request (LAR) for adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-423, Revision 1. By 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 the request for additional information.

No new regulatory commitments are being made in this submittal.

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NRR

Should you have any questions or require additional information regarding this matter, please contact Ms. L. L. Williams, Licensing Supervisor, at (509)377-8148.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 3, 2015.

Respectfully,

W. G. Hettel

WG Hettel
Vice President, Operations

Attachment: 1) Response to Request for Additional Information

cc: NRC Region IV Administrator
NRC NRR Project Manager
NRC Sr. Resident Inspector - 988C
CD Sonada - BPA – 1399 (email)
WA Horin - Winston & Strawn (email)
RR Cowley - WDOH (email)
JO Luce - EFSEC (email)

Response to Request for Additional Information

RAI-STSB-1

Section 6.0 of the NRC staff's Safety Evaluation (SE) for Topical Report (TR) NEDC-32988, "Technical Justification to Support Risk-Informed Modification to Selected Required Action End States for BWR Plants," Revision 2 (ADAMS Accession No. ML022700603), provides justification for the approved end-states related changes for the BWR/4 and BWR/6 standard TS.

In its LAR, the licensee proposes changes to the TS end states associated with several of its TS limiting conditions for operation (LCOs), as listed in the *application. The licensee states in Section 2.2 of its LAR:*

> "The proposed TS changes are consistent with TSTF-423, Revision 1. The TSTF traveler is based on NUREG-1433 Revision 3.0, "Standard Technical Specifications General Electric Plants, BWR/4," and NUREG-1434 Revision 3.0, "Standard Technical Specifications General Electric Plants, BWR/6." While Columbia's TS are based primarily on NUREG-1434, a few Columbia TS are based on NUREG-1433. Therefore, adaption of the TS markups contained in TSTF-423, Revision 1 is required. The proposed *variations/deviations are described in Table 1 of this document."*

Since CGS is a BWR/5 facility, the NRC staff requests the licensee to review the NRC staff's SE for TR NEDC-32988, Revision 2 (ADAMS Accession No. ML022700603), to determine whether Columbia's plant-specific systems, functions and nomenclature for the proposed changes in TSTF-423 are equivalent to those addressed in the Staff's SE. Please provide the results of that review, including a discussion of any differences. Table 1 of the LAR does not provide this level of detail.

Energy Northwest Response:

A clarifying phone call was conducted with NRC on March 6, 2015. The NRC clarified that the response should focus on Section 6.0 of the SE for TR NEDC-32988, specifically the Assessment discussion related to each Limiting Condition for Operation (LCO) for which Energy Northwest proposes to modify the end state. Energy Northwest has reviewed the requested SE and confirms that while the nomenclature may vary in a few instances, Columbia's plant-specific systems and functions are equivalent to those addressed in the SE. Additional information is provided in the table below.

Columbia LCO	SE Location of Assessment	RAI Response
3.3.8.2 Reactor Protection System (RPS) Electric Power Monitoring	Section 6.0.5 page 34	The SE Assessment is applicable to the Columbia design because Columbia has equivalent systems with the following clarifications: Going to Mode 4 would cause loss of the high-pressure steam-driven injection system – reactor core isolation and cooling (RCIC) system. Columbia's high pressure core spray (HPCS) system is motor driven. Columbia does not have a steam driven high pressure core injection (HPCI) system. This aspect of the BWR-5 configuration is addressed on page 25 of the SE for TR NEDC-32988, Revision 2.
3.4.4 Safety/Relief Valves (SRVs) - < 25% RTP	Section 6.0.1 page 30	Columbia has 18 SRVs. The SRVs can actuate by either of two modes: the safety mode or the relief mode. In the safety mode (or spring operation), the direct action of the steam pressure in the main steam line will act against a spring loaded disk that will pop open when the valve inlet pressure exceeds the spring force. In the relief mode (or power actuated mode of operation), a pneumatic piston/cylinder and mechanical linkage assembly are used to open the valve by overcoming the spring force, even with the valve inlet pressure equal to 0 psig. Seven of the SRVs that provide the safety and relief function are part of the Automatic Depressurization System specified in LCO 3.5.1, "ECCS - Operating." In the Columbia severe over pressurization event, only 4 SRVs with the highest setpoints are assumed to operate in the safety mode to mitigate the event. While the number of SRVs (4) at Columbia is less than what is discussed in the SE, the Assessment remains applicable to the Columbia design with the following clarification: Going to Mode 4 would cause loss of the high-pressure steam-driven injection system (RCIC). Columbia's HPCS system is motor driven. Columbia does not have a steam driven HPCI system. This aspect of the BWR-5 configuration is addressed on page 25 of the SE. The variability among BWR plants regarding the number of SRVs is also addressed on page 25 of the SE. Note that Columbia is taken to cold shutdown when two or more required SRVs are inoperable.

Columbia LCO	SE Location of Assessment	RAI Response
3.5.1 Emergency Core Cooling System (ECCS) - Operating	Section 6.0.2 pages 31-32	The Columbia design is based on the BWR-6 design as described in NUREG-1434. Columbia has a low pressure coolant injection (LPCI) system; a low pressure core spray (LPCS) system and a high pressure core spray (HPCS) system. The Columbia automatic depressurization system (ADS) consists of 7 of the 18 SRVs. The number of SRVs which serve the ADS function is different but the function is the same as the BWR-6 design. While the number of SRVs (7) which perform the ADS function at Columbia is less than what is discussed in the SE, the Assessment remains applicable to the Columbia design with the following clarification: Going to Mode 4 would cause loss of the high-pressure steam-driven injection system (RCIC). Columbia's HPCS system is motor driven. Columbia does not have a steam driven HPCI system. This aspect of the BWR-5 configuration is addressed on page 25 of the SE. The variability among BWR plants regarding the number of ADS valves is also addressed on page 25 of the SE.
3.6.1.5 Residual Heat Removal (RHR) Drywell Spray	Section 6.0.22 pages 51-52	Although the Columbia design is based on the BWR-6 design described in NUREG-1434, the Columbia nomenclature uses "Drywell Spray" instead of "Containment Spray". The RHR Drywell Spray system at Columbia is also used to scrub inorganic iodines and particulates from the primary containment atmosphere in addition to suppressing steam released through a bypass leakage pathway. The SE Assessment is applicable to the Columbia design. The Assessment for this LCO also references Sections 5.1 and 5.2 of the SE for the TR. These sections remain applicable to Columbia as well.

Columbia LCO	SE Location of Assessment	RAI Response
3.6.1.6 Reactor Building-to-Suppression Chamber Vacuum Breakers	Section 6.0.11 page 40	The Columbia design for suppression chamber vacuum breakers consists of two vacuum breakers (a mechanical vacuum breaker and an air operated butterfly valve), located in series in each of three 24 inch lines from the reactor building to the suppression chamber airspace. The butterfly valve is actuated by a differential pressure switch. The mechanical vacuum breaker is self-actuating similar to a check valve. Both can be remotely operated for testing purposes. The two vacuum breakers in series must be closed to maintain a leak tight primary containment boundary. The Columbia design is similar to the BWR-4 design as described in NUREG-1433. The BWR-4 design has two vacuum breakers in series in each of two lines from the reactor building from the suppression chamber. While the of number lines with vacuum breakers at Columbia is more than what is discussed in the SE, the Assessment remains applicable to the Columbia design with the following clarification: Going to Mode 4 would cause loss of the high-pressure steam-driven injection system (RCIC). Columbia's HPCS system is motor driven. Columbia does not have a steam driven HPCI system. This aspect of the BWR-5 configuration is addressed on page 25 of the SE.

Columbia LCO	SE Location of Assessment	RAI Response
3.6.1.7 Suppression Chamber-to-Drywell Vacuum Breakers	Section 6.0.12 page 41	The Columbia design for suppression chamber to drywell vacuum breakers consists of 9 internal vacuum breakers located on the vent header of the vent system between the drywell and the suppression chamber, which allow air and steam flow from the suppression chamber to the drywell when the drywell is at a negative pressure with respect to the suppression chamber. The Columbia design is similar to the BWR-4 design as described in NUREG-1433. The BWR-4 design has 12 internal vacuum breakers located on the vent header of the vent system between the drywell and the suppression chamber. While the number of internal vacuum breakers at Columbia is less than what is discussed in the SE, the Assessment remains applicable to the Columbia design because Columbia has equivalent systems with the following clarification: Going to Mode 4 would cause loss of the high-pressure steam-driven injection system (RCIC). Columbia's HPCS system is motor driven. Columbia does not have a steam driven HPCI system. This aspect of the BWR-5 configuration is addressed on page 25 of the SE.
3.6.2.3 RHR Suppression Pool Cooling	Section 6.0.24 page 54	The SE Assessment is applicable to the Columbia design because Columbia has equivalent systems.
3.6.4.1 Secondary Containment	Section 6.0.15 page 44	The SE Assessment is applicable to the Columbia design because Columbia has equivalent systems with the following clarification: Going to Mode 4 would cause loss of the high-pressure steam-driven injection system (RCIC). Columbia's HPCS system is motor driven. Columbia does not have a steam driven HPCI system. This aspect of the BWR-5 configuration is addressed on page 25 of the SE.
3.6.4.3 Standby Gas Treatment (SGT) System	Section 6.0.16 page 45	The SE Assessment is applicable to the Columbia design because Columbia has equivalent systems. The Assessment for this LCO also references Sections 5.1 and 5.2 of the SE for the TR. These sections are applicable to Columbia.

Columbia LCO	SE Location of Assessment	RAI Response
3.7.1 Standby Service Water (SW) System and Ultimate Heat Sink (UHS)	Section 6.0.26 pages 55-56	The Columbia design for UHS consists of two concrete spray ponds with redundant pumping and sprays facilities. A siphon between the ponds allows for water flow from one pond to the other. The combined volume of the two ponds is sized such that sufficient water inventory is available for all SW System post-accident cooling requirements for a 30 day period with no external makeup water source available. The BWR-6 UHS design described in NUREG-1434 uses two concrete makeup water basins, each containing one cooling tower with two fan cells per basin. The combined basin volume is sized such that sufficient water inventory is available for all SW System post-accident cooling requirements for a 30 day period with no external makeup water source available. Columbia's SW System consists of two independent cooling water headers (subsystems A and B), and their associated pumps, piping, valves, and instrumentation which provides cooling water to the diesel generators, the RHR heat exchangers, RCIC, LPCI, LPCS auxiliary equipment (room cooler, pump cooler), and the essential chillers. The BWR-6 SW System design described in NUREG-1434 uses subsystems A and B to supply cooling water to redundant equipment required for a safe reactor shutdown. Energy Northwest did not propose modifications to the End State requirements for an inoperable UHS. The design of the Columbia SW System is similar to the BWR-6 design and the function it satisfies is the same. The SE Assessment remains applicable to the Columbia design.

Columbia LCO	SE Location of Assessment	RAI Response
3.7.3 Control Room Emergency Filtration (CREF) System	Section 6.0.27 pages 56-57	The Columbia design is similar to the BWR-6 design as described in NUREG-1434. The Columbia nomenclature uses "Control Room Emergency Filtration (CREF) System" instead of "Control Room Fresh Air (CRFA) System" used in the BWR-6 TS. The Columbia design consists of two independent subsystems. Each subsystem consists of an electric heater, a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section, a filter unit fan, a control room recirculation fan, and the associated ductwork, valves or dampers, doors, barriers, and instrumentation. The electric heater is used to limit the relative humidity of the air entering the filter train. Prefilters and HEPA filters remove particulate matter which may be radioactive. The charcoal adsorbers provide a holdup period for gaseous iodine, allowing time for decay. The BWR-6 design as described in NUREG-1434 consists of two independent subsystems. Each CRFA subsystem consists of a demister, an electric heater, a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section, a second HEPA filter, a fan, and the associated ductwork, valves or dampers, doors, barriers, and instrumentation. Demisters remove water droplets from the airstream. Prefilters and HEPA filters remove particulate matter, which may be radioactive. The charcoal adsorbers provide a holdup period for gaseous iodine, allowing time for decay. While the Columbia design is slightly different than the BWR-6 design, the function it satisfies is the same and the SE Assessment remains applicable to the Columbia design. The Assessment for this LCO also references Sections 5.1 and 5.2 of the SE for the TR. These sections are applicable to Columbia as well.

Columbia LCO	SE Location of Assessment	RAI Response
3.7.4 Control Room Air Conditioning (AC) System	Section 6.0.28 pages 57-58	The Columbia design is similar to the BWR-6 design as described in NUREG-1434. The Columbia design consists of two independent, redundant subsystems that provide cooling of recirculated control room air. Each subsystem consists of an air filter, two cooling coils (one normal and one emergency), a control room recirculation fan, ductwork, dampers, and instrumentation and controls to provide for control room temperature control. The BWR-6 design as described in NUREG-1434 consists of two independent, redundant subsystems that provide cooling and heating of recirculated control room air. Each subsystem consists of heating coils, cooling coils, fans, chillers, compressors, ductwork, dampers, and instrumentation and controls to provide for control room temperature control. While the Columbia design is slightly different than the BWR-6 design, the function it satisfies is the same and the SE Assessment remains applicable to the Columbia design. The Assessment for this LCO also references Sections 5.1 and 5.2 of the SE for the TR. These sections are applicable to Columbia as well.
3.7.5 Main Condenser Offgas	Section 6.0.29 page 59	The SE Assessment is applicable to the Columbia design because Columbia has equivalent systems. The Assessment for this LCO also references Sections 5.1 and 5.2 of the SE for the TR. These sections are applicable to Columbia as well.

Columbia LCO	SE Location of Assessment	RAI Response
3.8.1 AC Sources - Operating	Section 6.0.6 page 35	The Columbia design consists of offsite power sources and the onsite standby power sources. As required by 10 CFR 50, Appendix A, GDC 17, the design of the AC electrical power system provides independence and redundancy to ensure an available source of power to the Engineered Safety Feature (ESF) systems. From the switchyard two qualified, electrically and physically separated circuits provide AC power to the Divisions 1 and 2 4.16 kV ESF buses, while only one qualified circuit provides AC power to the Division 3 4.16 kV ESF bus. One qualified circuit to Divisions 1, 2 and 3 4.16 kV ESF buses is from the 230 kV Ashe substation. The other qualified circuit to Divisions 1 and 2 4.16 kV ESF buses is from the 115 kV Benton substation. Each 4.16 kV ESF bus has connections to a respective diesel generator. The Columbia design uses relay timing to load the emergency diesel generators rather than an automatic sequencer. While the Columbia design is slightly different than that described for BWR-4 as described in NUREG-1433 and BWR-6 as described in NUREG-1434, the function it satisfies is the same and the SE Assessment is applicable to the Columbia design with the following clarifications: The steam driven cooling system is RCIC. The main feedwater pumps at Columbia are also steam-driven. This aspect of the BWR-5 configuration is addressed on page 25 of the SE. The variability among BWR plants regarding supports systems is addressed on pages 25 and 26 of the SE.

Columbia LCO	SE Location of Assessment	RAI Response
3.8.4 DC Sources - Operating	Section 6.0.7 pages 36-37	The Columbia design for DC sources has 3 divisions. Two of the divisions consist of a 125 V DC battery and charger. One division consists of one 250 V DC battery and charger subsystem and one 125 V DC battery and charger subsystem. This is consistent with the number of subsystems for the BWR-6 design as described in NUREG-1434. While the Columbia design is slightly different than that described for BWR-4 as described in NUREG-1433 and BWR-6 as described in NUREG-1434, the SE Assessment is applicable to the Columbia design with the following clarifications: The steam driven cooling system is RCIC. The main feedwater pumps at Columbia are also steam-driven. This aspect of the BWR-5 configuration is addressed on page 25 of the SE. The variability among BWR plants regarding supports systems is addressed on pages 25 and 26 of the SE.
3.8.7 Distribution Systems - Operating	Section 6.0.9 pages 38-39	Columbia design for distribution systems consists of three divisions. There are Division 1 and 2 AC electrical power distribution subsystems, Division 1 and 2 125 V DC electrical power distribution subsystems, a Division 1 250 V DC electrical power distribution subsystem and a Division 3 AC and DC electrical distribution subsystems. The Columbia design is similar to the BWR-6 design as described in NUREG-1434 which has 2 divisions of AC, DC and AC vital bus electrical power distribution. Columbia TS do not contain the vital AC buses. While the Columbia design is slightly different than that described for BWR-4 as described in NUREG-1433 and BWR-6 as described in NUREG-1434, the SE Assessment is applicable to the Columbia design with the following clarifications: The steam driven cooling system is RCIC. The main feedwater pumps at Columbia are also steam-driven. This aspect of the BWR-5 configuration is addressed on page 25 of the SE. The variability among BWR plants regarding supports systems is addressed on pages 25 and 26 of the SE.