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GO2-14-176
DEC 23 2014

10 CFR 50.90

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 TO REVISE TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENT FOR THE ULTIMATE HEAT SINK**

References:
1) Letter, GO2-14-126, dated August 22, 2014, WG Hettel (Energy Northwest) to NRC, License Amendment Request to Revise Technical Specification Surveillance Requirement for the Ultimate Heat Sink (ADAMS Accession No. ML14251A032)
2) Email, dated November 25, 2014, A George (NRC) to LL Williams, Energy Northwest, Requests for Additional Information Revision to Ultimate Heat Sink Level Surveillance Requirement, Energy Northwest, Columbia Generating Station, Docket No. 50-397

Dear Sir or Madam:

By Reference 1, Energy Northwest submitted a License Amendment Request (LAR) to change the Columbia Generating Station (Columbia) Technical Specification (TS) Surveillance Requirement (SR) for the ultimate heat sink (UHS). 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.

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

A001
NRR

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

Executed on 12/22/14.

Respectfully,

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
MA Jones- BPA/1399 (email)
WA Horin - Winston & Strawn (email)
RR Cowley - WDOH (email)
EFSEC (email)

Response to Request for Additional Information

BOP-RAI-1-1 NRC Request:

Describe the high pressure core spray (HPCS) SW pump and any interactions with the UHS TS minimum water level or basin overflow when the HPCS SW pump is operating during testing.

Energy Northwest Response:

Section 9.2.5.2 of the Final Safety Analysis Report (FSAR) states, "SW loop A draws water from pond A, cools the Division 1 equipment required for safe shutdown, and discharges into pond B for heat dissipation. Similarly, SW loop B draws water from pond B, cools Division 2 equipment, and discharges into pond A. A siphon between the ponds allows for water flow from one pond to the other." The characteristics of the siphon line create the differential level between the two spray ponds when only one of the Division 1 or 2 SW pumps is running. The FSAR goes on to state that "the HPCS SW system draws water from pond A, cools Division 3, and discharges into pond A." Since the discharge of the HPCS SW is into the same pond as the suction for HPCS SW, there is no change in UHS spray pond level during testing of the HPCS SW pump.

BOP-RAI-1-2 NRC Request:

Describe, given an automatic start of all three SW divisional pumps (and assuming a single failure), any interactions with the UHS water level or basin overflow.

Energy Northwest Response:

If all three SW pumps are running, a single failure of either a Division 1 or 2 SW pump results in a differential level of 18 to 22 inches between the two spray ponds due to the characteristics of the siphon line. System operating procedures limit average spray pond level to a range of 433.0 to 433.5 feet. Thus, minimum average pond level is 433.0 feet, which is above the TS minimum pond level (432.75 feet). As long as the average level is greater than the TS minimum value, the ponds have adequate water inventory to meet thermal performance and cooling inventory requirements for 30 days. Maximum average pond level is maintained less than 433.5 feet. Even at a starting level of 433.5 feet, the level in the pond with the non-operating pump will remain less than 434.5 feet and no water will overflow the pond. Again, since the average level in the two ponds is greater than 432.75 feet, there is adequate water inventory. Water levels greater than 432.75 feet provide additional margin not credited in the analysis. A single failure of the HPCS SW pump will not have any effect on UHS spray pond level.

BOP-RAI-1-3 NRC Request:

During operational testing of the HPCS SW pump, are there are conditions that would cause an overflow condition with the possibility of substantial loss of UHS water volume? If so, please describe.

Energy Northwest Response:

There are no conditions that would cause an overflow of the spray ponds during operational testing of the HPCS SW pump as described in BOP-RAI-1-1 above.

BOP-RAI-2-1 NRC Request:

Discuss why GDC 2 and 4 are not addressed in the application, or, provide information to address the regulatory requirements in GDC 2 and 4.

Energy Northwest Response:

GDC 2 requires that structures, systems, and components important to safety be designed to withstand the effects of natural phenomena without loss of capability to perform their safety functions. As documented in the section 9.2.5 of the Safety Evaluation Report, NUREG-0892, supporting Columbia's initial operating license, the NRC concluded that the concrete spray ponds are designed to Seismic Category I requirements and are designed to withstand the effects of floods and tornadoes and meet the requirements of GDC 2. The requested change to Surveillance Requirement (SR) 3.7.1.1 to average the levels in both ponds does not impact the conclusions in NUREG-0892 since the design of the ponds is not being changed.

GDC 4 requires that all structures, systems, and components essential to the safety of the plant be protected from the effects of externally generated missiles. As documented in section 3.5.2 of NUREG-0892, the NRC concluded that all safety related structures "including ... spray ponds except for spray trees" are designed to withstand postulated tornado-generated missiles without damage to safety-related equipment and meet the requirements of GDC 4. The requested change to SR 3.7.1.1 to average the levels in both ponds does not impact the conclusions in NUREG-0892 since the design of the ponds is not being changed. A discussion of the spray trees is presented in FSAR section 3.3.2.4 and is not impacted by the requested change.

BOP-RAI-2-2

GDC 44 states that suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

Please address the loss of the 30" diameter siphon line as it relates to GDC 44 and single failure with the potential loss of UHS water level.

Energy Northwest Response:

GDC 44 requires that a system to transfer heat from structures, systems, and components important to safety to an ultimate heat sink be provided. The system safety function shall be to transfer the combined heat load of these structures, systems, and components under normal operating and accident conditions. The standby service water system meets the requirements of GDC 44 by transferring heat from components to the UHS.

Section 2.4.5 of NUREG-0892 states that "the safety-related water supply for the plant is provided by two Seismic Category I spray ponds designed to contain a 30 day supply of cooling water." This section also states, "There are two redundant SW loops, each serving an independent division of systems and equipment. Each loop takes water from one pond and returns it through the spray system in the alternate pond. If only one loop is in operation, water is transferred between the ponds through a siphon." This ensures that the inventory in both ponds is available to each SW train to meet the 30 day supply of cooling water. Thus, the UHS is comprised of both ponds and the siphon line. There is no redundancy in the UHS. A failure of the siphon line is bounded by the failure of one spray pond.

During initial licensing the following question and response were provided in Amendment 5 of the FSAR:

> Q. 010.26 (9.2.5): In 9.2.5 of the FSAR, you state that the two ponds which comprise the ultimate heat sink are connected by a siphon that allows water to flow from one pond to the other. Demonstrate that a failure in this siphon line, or in one of the ponds, will not result in draining of both ponds.
>
> Response: The siphon between the two ponds is a Seismic Category I, Quality Group C, 30 inch pipe, whose centerline is 4 feet 6 inches below the normal water level of the spray ponds. Therefore, a siphon line failure would be considered a passive failure. Applying single failure criteria indicates that if the siphon failed then both SW loops would be operating, thus keeping them at the same level. If one of the SW loops fails, then an additional failure of the passive siphon is not considered credible. The spray ponds are Seismic Category I structures located below grade with continuous waterstops in all joints and bounded with Quality Class I high density backfill. Both ponds together form the Ultimate Heat Sink, a concept which has been accepted on other plants that only have a single pond which contains the redundant spray networks. Failure of either Pond A or Pond B will result in drainage of the other pond, which results in the same consequence if the WNP-2 UHS were a single pond design.

Section 2.4.5 of NUREG-0892 concludes that, "Based on its review of the information provided by the applicant and its own independent analyses using both conservative and reasonable parameters, the staff concludes that the WNP-2 ultimate heat sink ... hydrologic and thermal performance meets the requirements of GDC 44." The requested change makes no changes to the design or operation of the siphon.

BOP-RAI-3-1 NRC Request:

During testing as stated above, what water volume (in gallons) can be lost in the overflow? Provide any strip-chart data that may be available.

Energy Northwest Response:

No water volume would be lost during testing. As stated in response to BOP-RAI-1-2 above, system operating procedures limit spray pond level to a range of 433.0 to 433.5 feet. Thus, pond level is normally less than 433.5 feet. The differential level observed when one pump is running is 18 inches between the two ponds. However, a differential level of 22 inches was observed at one time and calculations were revised to address this condition. Assuming the worst case differential level of 22 inches and a starting pond level of 433.5 feet, the level in the pond with the non-operating pump will remain below the overflow. The level in the pond with the operating pump will be 432.58 feet. The average level in the two ponds is greater than 432.75 feet. As long as the average level is greater than this value, the ponds have adequate water inventory to meet thermal performance and cooling inventory requirements for 30 days. Assuming a starting pond level at the TS minimum and a differential level of 22 inches, the highest pond level would be 433.67 feet and an overflow would not occur. An overflow condition would only occur if average pond level is greater than the TS minimum level. Any water level above the TS minimum represents extra water not assumed in the analysis. As such, there would be no impact on the ability to meet the 30 day cooling requirement due to pond overflow.

BOP-RAI-3-2 NRC Request:

During automatic SW pump starts, what water volume (in gallons) can be lost in the overflow? Provide any strip-chart data that may be available.

Energy Northwest Response:

No water volume would be lost during automatic SW pump starts. If both pumps start, there will be no differential in level between the two ponds. See response to RAI-BOP-1-2 for a discussion of single failure.

BOP-RAI-3-3 NRC Request:

Based on the response to questions 1 and 2, describe any TS Limiting Condition for Operations (LCOs) that are to be entered during any UHS basin overflow condition and describe any past Licensee Event Reports (LERs) that addresses degraded UHS basin level during pump starts.

Energy Northwest Response:

An overflow of the spray ponds may impact the backfill surrounding the ponds. Therefore, the impact of any overflow condition on the operability of the UHS would be assessed to determine if the specified safety function could be performed within the required range of physical conditions in the current licensing basis. However, as stated previously, the water level in the spray ponds is administratively controlled so that an overflow condition does not occur.

Energy Northwest submitted LER 2014-004-00 to document that the current SR requirement to maintain level in each pond greater than 432.75 feet was not met in the past three years. This was reported as a condition prohibited by TS since the literal SR requirements were not met.

BOP-RAI-3-4 NRC Request:

Describe the controls that are in place (for example, operating procedures or alarms) to maintain the UHS TS water level requirements (in standby) knowing that an overflow condition is likely if the initial UHS water level is above 433 feet 6 inches and normal UHS water level is at 433 feet 6 inches.

Energy Northwest Response:

The spray ponds are equipped with redundant level sensors which are alarmed and indicated in the control room. The normal UHS water level is less than 433.5 feet. An overflow condition will not occur at this level.

BOP-RAI-4-1 NRC Request:

Describe the purpose of the siphon line water tight boot and the consequences of its failure.

Energy Northwest Response:

The purpose of a water tight boot is to provide a water tight seal. The siphon line sleeve has two water tight boots in series for each of the two wall penetrations, one water tight boot on the inside of the wall and one on the outside of the wall. Therefore, single failure of any one water tight boot does not defeat the barrier function.

BOP-RAI-4-2 NRC Request:

Describe if the siphon line watertight boot needs to be periodically inspected as part of the inspection plan related to a possible UHS water inventory loss.

Energy Northwest Response:

No, a direct inspection of the water tight boots is not required. In order to prevent the spray ponds from meeting their 30 day mission time, the leakage rate from the water tight boots would be such that the leakage would be detectable by other means. Specifically, the flow rate would cause a sink hole and flooded area downstream of the boot. Even a small leak would cause the fines in the surrounding soil to be carried away from the larger particles (stones/rocks, etc.) which would result in voids in that area of the backfill and then 'settling' of the backfill to compensate for these voids. Sink holes/soil displacement is a parameter monitored as part of Energy Northwest's Water Control Structures Inspection Program which is performed as part of the Maintenance Rule Structural Inspection.

BOP-RAI-4-3 NRC Request:

Depending on the response to RAIs 1 and 2 of this section, describe the last inspections performed on the siphon line watertight boots.

Energy Northwest Response:

The last inspection of the spray ponds under the Water Control Structures Inspection Program was conducted in October 2013. No settling in the backfill adjacent to the spray ponds was observed.

BOP-RAI-4-4 NRC Request:

Describe if there are other water tight boots within the UHS pond which are located below the UHS water line and if so, the consequences of the boot failure(s).

Energy Northwest Response:

There are no other water tight boots within the UHS that are located below the water line. There are two water tight boots on the 18 inches return lines to the spray headers, located just outside the pump houses, downstream of SW-V-12A (B). These water tight boots are only partially underwater, with centerline of the horizontal section of pipe at elevation 433.17 feet, and the (TS) minimum water level 432.75 feet. The purpose of these water tight boots is to keep insulation dry. The consequence of boot failure would be accelerated degrading of the insulation material.