ENERGY NORTHWEST

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July 11, 2022

GO2-22-075 10 CFR 50.90

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 RELATED TO REVISED PRESSURE-TEMPERATURE LIMIT CURVES**

References:
1. Letter from Energy Northwest to NRC, dated October 13, 2021 (ADAMS Accession Number ML21299A182)
2. Email from NRC to Energy Northwest, dated May 18, 2022 (ADAMS Accession Number ML22144A034)

Dear Sir or Madam:

By Reference 1 Energy Northwest submitted a license amendment request to revise the Columbia Generating Station (Columbia) Technical Specification (TS) 3.4.11 Reactor Coolant System (RCS) Pressure and Temperature (P/T) Limits. By Reference 2 the Nuclear Regulatory Commission (NRC) requested additional information (RAI) related to Reference 1.

Enclosure 1 to this letter contains the requested information which includes a non-proprietary response to RAI-1. Enclosure 3 contains the proprietary response and Enclosure 2 contains the affidavit requesting the information in Enclosure 3 to be withheld from public disclosure. When Enclosure 3 is removed from this letter, the letter and remaining Enclosures are non-proprietary.

The No Significant Hazards Consideration Determination provided in the original submittal is not altered by this submittal. No new commitments are being made by this letter or the enclosure. If there are any questions or if additional information is needed, please contact Mr. R. M. Garcia, Licensing Supervisor, at 509-377-8463.

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

Executed this 11th day of July, 2022.

Respectfully,

DocuSigned by:
Jeremy Hauger
B3D71514C4434A3...

Jeremy S. Hauger
Vice President Engineering

Enclosures: As stated

cc: NRC RIV Regional Administrator
NRC Senior Resident Inspector
NRC NRR Project Manager
CD Sonoda – BPA
EFSECutc.wa.gov – EFSEC
E Fordham – WDOH
R Brice – WDOH
L Albin – WDOH

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

NRC REQUEST RAI-1:

Issue

(1) Section 3.3 of NEDO-33929, "Energy Northwest/Columbia Generating Station Pressure and Temperature Limits Report (PTLR) up to 54 effective full-power years," in the license amendment request discusses initial reference nil ductility transition temperature (RT_{NDT}). Appendix B of NEDO-33929 presents the initial RT_{NDT} of various RPV materials. TS figures 3.4.11-1 and 3.4.11-3 show the initial RT_{NDT} for the upper vessel and bottom head. The NRC staff is not clear how the initial RT_{NDT} was derived because section 3.3 and appendix B (Tables B-1 to B-4) of NEDO-33929 do not show the initial RT_{NDT} of the upper vessel and bottom head.
(2) The initial RT_{NDT} for the bottom head in TS figures 3.4.11-1 and 3.4.11-3 is different from that of TS figure 3.4.11-2. The NRC staff is not clear why the initial RT_{NDT} for the same bottom head is different in these figures.
(3) Section 3.3 of NEDO-33929 indicates that the initial RT_{NDT} values for various RPV materials, such as the bottom head, used in the P/T curves are proprietary information. However, TS figures 3.4.11-1, 3.4.11-2, and 3.4.11-3 present the initial RT_{NDT} values for the same RPV materials as non-proprietary. The NRC staff is not clear why two different proprietary information classifications exist for the same RT_{NDT} values of the same RPV materials.

Request

(1) Discuss how the initial RT_{NDT} of the upper vessel and bottom head is derived.

(2) Clarify the discrepancy in the initial RT_{NDT} value for the bottom head between figures 3.4.11-1/3.4.11-3 and figure 3.4.11-2.

(3) Clarify the discrepancy in the proprietary information classifications.

ENERGY NORTHWEST RESPONSE TO RAI-1:

The references specific to RAI-1 and RAI-2 are listed at the end of the response to RAI-2.

1. The Pressure Temperature Limits Report (PTLR), Reference 3 was prepared in accordance with the Licensing Topical Report (LTR) for developing Pressure Temperature Curves (Reference 4). From Section 4.3.2.1 of Reference 4, the P-T Curves for non-beltline regions were developed for the limiting components; feedwater nozzle (upper vessel) and the Control Rod Drive (CRD) penetration

(bottom head). All other components in the non-beltline regions are categorized under one of these two components as described in Table 4-4a and Table 4-5a of Reference 4. From Table B-2 of Reference 3, the highest RT_{NDT} for the feedwater nozzle (upper vessel) is 0°F. However, Section 4.3.2.1.3 of Reference 4 requires an adjustment to assure that all discontinuities are bounded (Table 4-4a of Reference 4). [[ ]] (Table 4-4a of Reference 4) and the limiting initial RT_{NDT} for the feedwater nozzle is 0°F (Table B-2 of Reference 3). The resulting hydrotest temperature is [[ ]]. However, at the same pressure the [[ ]] (Table 4-4a of Reference 4) and the limiting initial RT_{NDT} for the core spray nozzle is 40°F (the limiting RT_{NDT} of N5 Core Spray Nozzle (Low Pressure, -20°F) and N16 Core Spray Nozzle (High Pressure, 40°F), Table B-2 of Reference 3). [[ ]] As can be seen, the hydrotest temperature for the feedwater nozzle does not bound the core spray nozzle, therefore the initial RT_{NDT} for the feedwater nozzle is adjusted to [[ ]]

Because there is a linear relationship between stress and pressure, the discontinuity comparison for the hydrotest condition of [[ ]] psig will yield the same or conservative results for other pressures. Therefore, the adjusted RT_{NDT} was calculated as 34°F and is used for initial RT_{NDT} for the upper vessel.

From Tables B-1 through B-3 of the Reference 3, the highest RT_{NDT} for the bottom head and welds (bottom head) is 20°F. However, Section 4.3.2.1.1 of Reference 4 requires an adjustment to assure that all discontinuities are bounded (Table 4-5a of Reference 4). For example, [[ ]] and the limiting initial RT_{NDT} for the CRD and bottom head is 20°F, representing the CRD penetrations in the bottom head dollar plate. The resulting hydrotest temperature is [[ ]] (Table 4-5a of Reference 4) and the limiting initial RT_{NDT} for the recirculation outlet nozzle is 30°F. The resulting hydrotest temperature is [[ ]] As can be seen, the hydrotest temperature for the CRD and bottom head does not bound the recirculation outlet nozzle, so the initial RT_{NDT} for the CRD and bottom head hydrotest temperature is adjusted to [[ ]] Because there is a linear relationship between stress and pressure, the discontinuity comparison for the hydrotest condition of [[ ]] psig will yield the same or more conservative results for other pressures. Therefore, the adjusted RT_{NDT} was calculated as 34°F and used for initial RT_{NDT} for bottom head.

2. In Section 4.3.2.1.2 of Reference 4, the emergent events were considered for the calculation of non-beltline Curve B (Bottom Head) to provide additional flexibility

in operation. It is adjusted by adding [[ ]] applied for Curve B. The initial RT_{NDT} for Bottom Head is 34°F. Therefore, the adjusted RT_{NDT} for non-beltline Curve B (Bottom Head) is [[ ]]

3. The RT_{NDT} values were inadvertently incorrectly marked as proprietary in Section 3.3 of in NEDC-33929P and then redacted in NEDO-33929. The RT_{NDT} values are public information.

   The revised pages are provided in the attachment to this enclosure.

NRC REQUEST RAI-2:

<u>Issue</u>

(1) Note 2 to 10 CFR Part 50, appendix G, table 1 specifies that the RPV minimum temperature requirement under several operating conditions is “The highest reference temperature of the material in the closure flange region that is highly stressed by the bolt preload….” Table B-1 of NEDO-33929 shows a RT_{NDT} for the RPV head flange, and TS figures 3.4.11-1, 3.4.11-2, and 3.4.11-3 show a different initial RT_{NDT} for the upper vessel. The NRC staff is not clear on what is the highest reference temperature in the closure flange region that is used in TS figures 3.4.11-1, 3.4.11-2, and 3.4.11-3. In addition, the NRC staff is not clear whether the initial RT_{NDT} for the upper vessel in the three TS figures is applicable to the RPV head flange (i.e., is the initial RT_{NDT} for the upper vessel to be used for the RPV head flange?)

(2) The nuclear heating and cooldown curve in proposed TS figure 3.4.11-3 shows the minimum vessel temperature as 80 °F at 60 pounds per square inch gauge (psig). The NRC staff is not clear whether the 80 degrees Fahrenheit (°F) temperature satisfies the minimum temperature requirements of 10 CFR Part 50, appendix G.

(3) Appendix G to 10 CFR Part 50, table 1, item 2.d requires that when the reactor internal pressure is > 20 percent of the preservice system hydrostatic test pressure, the minimum temperature must be larger than the minimum permissible temperature for the inservice system hydrostatic pressure test or closure flange RT_{NDT} plus 160 °F. The NRC staff is not clear the proposed TS figure 3.4.11-3 satisfies this requirement.

(4) The NRC staff is not clear whether TS figures 3.4.11-1, 3.4.11-2, and 3.4.11-3 satisfy the minimum temperature requirements of 10 CFR Part 50, appendix G, table 1.

Request

(1) Discuss the highest reference temperature of the material in the closure flange region that is highly stressed by the bolt preload used in the proposed P/T curves. Clarify whether the initial RT_{NDT} for the upper vessel in the three TS figures is applicable to the RT_{NDT} of the RPV closure flange as specified in table 1 of 10 CFR Part 50, appendix G.

(2) Discuss the minimum permissible temperature for the inservice system hydrostatic pressure test.

(3) Discuss how TS figures 3.4.11-1, 3.4.11-2, and 3.4.11-3 satisfy the minimum temperature requirements in item numbers 1a, 1b, 2a, 2b, 2c, 2d, and 2e of 10 CFR Part 50, appendix G, table 1.

ENERGY NORTHWEST RESPONSE TO RAI-2:

1. The Table 1 requirements of 10 CFR50 Appendix G are implemented in Table 4-3 of Reference 4. According to Table 4-3 of Reference 4, the limiting temperature for flange region is based on the greater of the conservatively adjusted RT_{NDT} value (RT_{NDT} + 60°F), or the lowest service temperature (LST) of the bolting materials. Note that '+ 60°F' adder considered in the conservatively adjusted RT_{NDT} value is included by GEH as an additional conservatism (see Section 4.3.2.3 of Reference 4 for details). As shown in Tables B-1, B-2, and B-3 of Reference 3, the highest initial RT_{NDT} for the closure region flange is represented by Shell #4 at 20°F. The LST of closure stud is 10°F (as shown in Table B-4 of Reference 3). Therefore, the greater of 80°F (= 20°F + 60°F) and 10°F (LST) is 80°F which is used for the limiting temperature for flange region.
2. The Table 1, item 2.d requirement of 10 CFR50 Appendix G is implemented in Table 4-3, item II.b.2 of (Reference 4). As shown in Tables B-1, B-2, and B-3 of Reference 3, the highest initial RT_{NDT} for the closure region flange is represented by Shell #4 at 20°F. Therefore, the closure flange RT_{NDT} plus 160°F is 180°F (= 20°F + 160°F). From Table 1 of Reference 3, the limiting temperature for the in-service system hydrostatic pressure test (test pressure = 1020 psig, Section 3.0 of Reference 5) is 116.2°F. The greater temperature of these two values, 180°F (maximum of 116.2°F and 180°F) is considered. This temperature is shown in Figure 3 of Reference 3, while the pressure is between 312 psig (20% of the preservice system hydrostatic test pressure) and 790 psig. At pressures above 790 psig, the temperature determined by ASME Limits + 40°F is governing.
3. The Pressure Temperature Limits Report (PTLR, Reference 3) was prepared in accordance with the Licensing Topical Report (LTR) for developing Pressure Temperature Curves (Reference 4). The Table 1 requirements of 10 CFR 50 Appendix G are implemented in Table 4-3 of Reference 4. Safety Evaluation (Section 3.0 Technical Evaluation – GL 96-03 Attachment 1 Methodology

Criterion 6) attached to Reference 4 states that LTR meets the minimum temperature requirements of Appendix G to 10 CFR 50.

REFERENCES

1. "Request for Additional Information License Amendment Request Revised Pressure Temperature Limit Curves in Technical Specifications Columbia Generating Station Energy Northwest", USNRC, Docket No. 50-397, EPID L-2021-LLA-0191
2. "Columbia Generating Station, Docket No. 50-397 License Amendment Request to Change Technical Specification 3.4.11 Reactor Coolant System (RCS) Pressure and Temperature (P/T) Limits", Energy Northwest, GO2-21-016, 2021
3. "Energy Northwest/Columbia Generating Station Pressure and Temperature Limits Report (PTLR) up to 54 Effective Full-Power Years", GEH, NEDO-33929 Revision 0 (Non-Proprietary Information), NEDC-33929P Revision 0 (Proprietary Information), November 2020
4. "GE Hitachi Nuclear Energy Methodology for Development for Reactor Pressure Vessel Pressure-Temperature Curves", GEH, NEDC-33178P-A, Revision 1, June 2009. (GEH Proprietary)
5. "Pressure-Temperature Curves Report for Energy Northwest Columbia Generating Station 60 Year Plant License Extension", GEH, 005N4603, Revision 0, November 2020. (GEH Proprietary)

NRC REQUEST RAI-3:

Issue

TS figures 3.4.11-1 and 3.4.11-2 contain a P/T curve for the bottom head and a minimum temperature for the bottom head. The NRC staff is not clear how the bottom head P/T curve is monitored and whether the minimum temperature value shown in TS figures 3.4.11-1 and 3.4.11-2 satisfies the minimum temperature requirements of 10 CFR Part 50, appendix G.

Request

(1) Discuss whether the pressure and temperature at the bottom head region are not exceeded during the inservice leak and hydrostatic testing and non-nuclear heat-up and cool-down operation.

(2) Discuss how the minimum temperature for the bottom head curves in TS figures 3.4.11-1 and 3.4.11-2 satisfies requirements in item numbers 1a, 1b, 2a, and 2b of 10 CFR Part 50, appendix G, table 1.

<u>ENERGY NORTHWEST RESPONSE TO RAI-3</u>:

1. Columbia follows Service Information Letter, SIL 430, recommendations to not exceed the pressure and temperature limits at the bottom head region. A copy of SIL 430, is included in Appendix D of NEDC-33178P-A, Revision 1, *GE Hitachi Nuclear Energy Methodology for Development of Reactor Pressure Vessel Pressure-Temperature Curves*, dated June 2009. Columbia does not have bottom head outside surface thermocouples and relies on bottom head drain line temperature with drain line flow established.

2. The solid lines on proposed Technical Specification Figures 3.4.11-1 and 3.4.11-2 depict the upper vessel and beltline pressure-temperature limits, including the closure flange. 10 CFR 50, Appendix G, paragraph IV.A.2.c and footnote 2 of Table 1 clarify that Table 1 requires a minimum temperature for the controlling material, either the closure flange or the beltline region.

   As provided in our June 9, 2004 submittal attachments of GE Nuclear Energy proprietary and non-proprietary versions of report NEDO-33144, "Pressure-Temperature Curves for Energy Northwest Columbia," April 2004, Section 4.3.2.3 Closure Flange Region, contains the following explanation.

   > The approach used for Columbia for the bolt-up temperature was based on the conservative value of (RT_{NDT}+ 60), or the LST of the bolting materials, whichever is greater. The 60°F adder is included by GE for two reasons: 1) the pre-1971 requirements of the ASME Code Section III, Subsection NA, Appendix G included the 60°F adder, and 2) inclusion of the additional 60°F requirement above the RT_{NDT} provides the additional assurance that a 1/4T flaw size is acceptable. As shown in Tables 4-1, 4-2, and 4-3, the limiting initial RT_{NDT} for the closure flange region is represented by Shell #4 at 20°F, and the LST of the closure studs is 10°F; therefore, the bolt-up temperature value used is the more conservative value of 80°F. This conservatism is appropriate because bolt-up is one of the more limiting operating conditions (high stress and low temperature) for brittle fracture.
   >
   > 10 CFR 50 Appendix G, paragraph IV.A.2 including Table 1, sets minimum temperature requirements for pressure above 20% hydrotest pressure based on the RT_{NDT} of the closure region. Curve A temperature must be no less than (RT_{NDT} + 90°F) and Curve B temperature no less than (RT_{NDT} + 120°F).
   >
   > For pressures below 20% of preservice hydrostatic test pressure (312 psig) and with full bolt preload, the closure flange region metal temperature is required to be at RT_{NDT} or greater as described above. At low pressure, the ASME Code allows the bottom head regions to experience even lower metal temperatures than the flange region RT_{NDT}. However, temperatures should not be permitted to be lower than 68°F for the reason discussed below.
   >
   > The shutdown margin, provided in the Columbia Technical Specification, is calculated for a water temperature of 68°F. Shutdown margin is the quantity of reactivity needed for a reactor core to reach criticality with the strongest-worth control rod fully withdrawn and all other control rods fully inserted. Although it may be possible to safely allow the water temperature to fall below this 68°F limit, further extensive calculations would be required to justify a lower temperature. The 80°F limit for the upper vessel and beltline region and the 68°F limit for the bottom head curve apply

when the head is on and tensioned and when the head is off while fuel is in the vessel. When the head is not tensioned and fuel is not in the vessel, the requirements of 10 CFR 50 Appendix G do not apply, and there are no limits on the vessel temperatures.

NRC REQUEST RAI-4:

Issue

Section 3.6 of the licensee's report NEDC-33929P in the license amendment request states that CGS has two indications in a reactor vessel beltline weld and that these indications were not reviewed in the NEDO-33929P report. The NRC staff notes that the purpose of the P/T limit curve is to protect the structural integrity of the reactor vessel. Therefore, the existence of these two indications cannot be ignored when generating new P/T limit curves. The NRC staff is not clear whether the two indications affect the P/T limit curves and reactor vessel structural integrity.

Request

Discuss why the two indications do not affect the construction of the P/T limit curves. In the discussion, include the following information: (a) the length, depth, and orientation of the two indications, (b) discuss whether the indications are located in a longitudinal or circumferential weld, (c) discuss the location of the indications with respect to the wall thickness of the beltline weld, and (d) discuss whether the two indications are embedded in the weld or are connected to the inside diameter surface of the RPV.

ENERGY NORTHWEST RESPONSE TO RAI-4:

The two indications are located near reactor pressure vessel (RPV) welds BG and BM. The indication near weld BG was last examined in 2015. The indication is a sub-surface flaw that measured 2.4 inches in length, and 0.39 inches through wall. The indication is located in the base material next to RPV longitudinal weld BG, 2.64 inches clockwise from the weld centerline and 26.82 inches above the intersection of the circumferential weld AB. Both welds are considered beltline welds and the nominal RPV wall thickness at the location is 6.4 inches.

The original examination of the indication adjacent to the BM weld was performed in 2005. At that time the indication was determined to be a subsurface flaw, 3.75 inches in length, and 0.38 inches through wall. However, the 2015 re-examination determined it to be an acceptable reflector and not a laminar flaw as first reported. As such the indication is not considered recordable and no further evaluation is necessary.

Columbia considered the potential impact of the indication near the BG weld on the P-T Limit Curves as they were extended out to 54 effective full power years (EFPY). To address this, a separate evaluation was performed which concluded that there is no

effect of the axial flaw when considering the changes in operating P-T limits for Columbia for 54 EFPY.

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Enclosure 1 Attachment

[[ ]] was met, resulting in a drop weight NDT temperature of [[ ]]. Considering that the acceptance criteria for the impact temperature was met, the drop weight NDT temperature was updated to -20°F. This drop weight NDT temperature produces the updated N12 WLI forging material (Heat #219972 Lot 1) initial RT_{NDT} of -20°F, as shown in Table B-2. In addition, this methodology applies to the instrumentation nozzles N13 and N14 (Heat #219972 Lot 1) and are updated in Table B-2 to have an initial RT_{NDT} of -20°F.

3.4 Adjusted Reference Temperature (ART)

The ART values for 54 EFPY included in Appendix B are developed considering the latest BWRVIP Integrated Surveillance Program (ISP) published surveillance data available that is representative of the applicable materials in the CGS RPV (Reference 3). As the ISP plate material, heat B0673-1, is not identical to the target vessel material, the ISP data is not considered in the development of P-T curves. The ISP weld material, heat 5P6756, is identical to the target vessel material (5P6756). Therefore, the ISP weld data is considered in the development of P-T curves. The CF value for weld is updated with ISP data and used for the determination of ART. This ART is not limiting with respect to the ART.

3.5 Surveillance Program

As discussed in Appendix A, CGS participates in the ISP. Two of the surveillance capsules, installed at plant startup, remain in the vessel, while the third capsule's holder was found failed in refueling outage R23 (2017) and removed. As CGS is not a host plant, the three (3) surveillance capsules have an ISP status designation of deferred per Reference 4.

BWRVIP-135 (Reference 3) provides the representative surveillance data considered in determining the chemistry and any fitted or adjusted CFs for the beltline materials for CGS.

Excerpt from Reference 3:

Target Vessel Materials and ISP Representative Materials for Columbia

Target Vessel Materials		ISP Representative Materials
Weld	5P6756	5P6756
Plate	C1272-1	B0673-1

T_{30} Shift Results for Weld Heat 5P6756

Capsule	Cu (wt%)	Ni (wt%)	Fluence (10^{17} n/cm^2, E > 1 MeV)	ΔT_{30} (°F)
River Bend 183°	0.06	0.93	11.6	53.7
SSP F			19.364	61.9
SSP H			15.766	63.7
SSP C			2.93	23.6

$$K_I \propto \sigma\sqrt{\pi a} \qquad (2)$$

The stress is proportional to R/t (R = bottom head radius and t = bottom head thickness) and, for the P-T curves, crack depth, a, is t/4. Thus, K_I is proportional to $R/\sqrt{t}$. The generic curve value of $R/\sqrt{t}$, based on the generic BWR/6 bottom head dimensions, is:

Generic: [[ ]]

The CGS-specific bottom head dimensions are R = 130.25 inches and t = 7.3125 inches minimum, resulting in:

$$\text{CGS-specific:} \quad R/\sqrt{t} = 130.25/\sqrt{7.3125} = 48\sqrt{in}$$

Because the generic value of $R/\sqrt{t}$ is [[ ]], the generic P-T curve [[ ]] when applied to the CGS bottom head.

The P-T curves for the heatup and cooldown operating conditions at a given EFPY apply for both the 1/4T and 3/4T locations. When combining pressure and thermal stresses, it is usually necessary to evaluate stresses at the 1/4T location (inside surface flaw) and the 3/4T location (outside surface flaw). This is because the thermal gradient tensile stress of interest is in the inner wall during cooldown and the outer wall during heatup. However, as a conservative simplification, the thermal gradient stress at the 1/4T location is assumed to be tensile for both heatup and cooldown. This results in the approach of applying the maximum tensile stress at the 1/4T location. This approach is conservative because irradiation effects cause the allowable toughness, K_{Ic}, at 1/4T to be less than at 3/4T for a given metal temperature. This approach causes no operational difficulties, because the BWR is at steam saturation conditions during normal operation, well above the heatup/cooldown temperature curve limits.

For the core not critical curve (Curve B) and the core critical curve (Curve C), the P-T curves specify a coolant heatup and cooldown temperature rate of ≤ 100°F/hr for which the curves are applicable. However, the core not critical and the core critical curves were also developed to bound transients defined on the RPV thermal cycle diagram and the nozzle thermal cycle diagrams. The P-T limits and corresponding heatup/cooldown rates of either Curve A or Curve B may be applied while achieving or recovering from hydrostatic pressure and leak test conditions. Curve A may be used for the hydrostatic pressure and leak test if a coolant heatup and cooldown rate of ≤ 20°F/hr is maintained. Otherwise, the limits of Curve B apply when performing the hydrostatic pressure and leak test.

The CGS P-T curves are based upon an initial RT_{NDT} of 34°F for the bottom head, 34°F for the upper vessel, an ART of [[ ]] for the plates and welds, [[ ]] for the N6 LPCI nozzle, and [[ ]] for the N12 WLI nozzle. For Curve B, the N6 LPCI and N12 WLI nozzle requirements [[ ]] by the beltline limited curves.

GEH Affidavit Requesting Withholding of the Information contained in the Following Response to RAI-1 Contained in Enclosure 3

GE Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, Kent Halac, state as follows:

(1) I am the Senior Engineer, GE Hitachi Nuclear Energy Americas LLC (GEH), and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in GEH proprietary report 007N1548P, Revision 0, "Energy Northwest Columbia Generating Station Responses to NRC RAIs for Revised Pressure Temperature Limit Curves," dated June 2022. GEH proprietary information in 007N1548P Revision 0 is identified by a dotted underline inside double square brackets. [[This sentence is an example {3}]]. GEH proprietary information in figures and large objects is identified by double square brackets before and after the object. In each case, the superscript notation {3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GEH relies upon the exemption from disclosure set forth in the *Freedom of Information Act* ("FOIA"), 5 U.S.C. §552(b)(4), and the *Trade Secrets Act*, 18 U.S.C. §1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for trade secrets (Exemption 4). The material for which exemption from disclosure is here sought also qualifies under the narrower definition of trade secret, within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975 F.2d 871 (D.C. Cir. 1992), and Public Citizen Health Research Group v. FDA, 704 F.2d 1280 (D.C. Cir. 1983).

(4) The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a and (4)b. Some examples of categories of information that fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GEH's competitors without a license from GEHA constitutes a competitive economic advantage over other companies;

b. Information that, if used by a competitor, would reduce its expenditure of resources or improve its competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information that reveals aspects of past, present, or future GEH customer-funded development plans and programs, resulting in potential products to GEH;

d. Information that discloses trade secret or potentially patentable subject matter for which it may be desirable to obtain patent protection.

(5) To address 10 CFR 2.390(b)(4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GEH and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GEH, not been disclosed publicly, and not been made available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions for proprietary or confidentiality agreements or both that provide for maintaining the information in confidence. The initial designation of this information as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in the following paragraphs (6) and (7).

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, who is the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or who is the person most likely to be subject to the terms under which it was licensed to GEH.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist, or other equivalent authority for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GEH are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary and/or confidentiality agreements.

(8) The information identified in paragraph (2) is classified as proprietary because it contains the detailed GEH methodology for analyses of the GEH Boiling Water Reactor (BWR) pressure vessel. These methods, techniques, and data along with their application to the design, modification, and analyses associated with the analyses were achieved at a significant cost to GEH.

The development of the evaluation processes along with the interpretation and application of the analytical results is derived from the extensive experience databases that constitute a major GEH asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

GE Hitachi Nuclear Energy Americas LLC

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GEH. The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial. GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GEH would be lost if the information were disclosed to the public. Making such information available to competitors without there having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall and deprive GEH of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

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

Executed on this 30th day of June 2022.

Kent Halac
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