SAFETY EVALUATION REPORT

DOCKET NO.: 70-27

LICENSE NO.: SNM-42

LICENSEE: BWXT Nuclear Operations Group, Inc. – Lynchburg

SUBJECT: Request to Amend Chapter 5, Nuclear Criticality Safety, of the License Application for Materials License SNM-42 – Enterprise Project Identifier L-2021-LLA-0118

BACKGROUND

By letter dated June 11, 2021, BWXT Nuclear Operations Group, Inc. – Lynchburg (BWXT NOG-L) submitted to the Nuclear Regulatory Commission (NRC) a request to amend Chapter 5.0, "Nuclear Criticality Safety," of its License Application for Materials License SNM-42 (Reference 1). The submittal included a list of requested changes to Chapter 5.0, a revised version of Chapter 5.0, and a justification for each change.

On September 10, 2021, NRC staff issued a request for additional information (Reference 2) to obtain information necessary to facilitate the staff's technical review of the amendment request. The licensee provided a response to the staff's request for additional information in a letter dated October 8, 2021 (Reference 3), and subsequently provided supplementary information via correspondence dated October 20, 2021 (Reference 4).

DISCUSSION

Chapter 5.0 of the License Application for Materials License SNM-42 contains the licensee's programmatic commitments for management of its nuclear criticality safety (NCS) program. The license amendment request included administrative changes, clarifications, and the restructuring of various sections within Chapter 5.0 and its appendix, as well as several technical changes. Major technical changes included the following:

- a revision to the licensee's commitments regarding the double contingency principle;
- a revision to the licensee's commitments regarding k_{eff} values corresponding to Failure Limits, Safety Limits, Limiting Conditions for Operation, and Routine Operating Limits;
- a revision to the licensee's commitments regarding NCS methodology;
- the elimination of License Conditions S-3, S-4, and S-11;
- the elimination of the Appendix to Chapter 5.0 with key concepts incorporated into the body of Chapter 5.0; and
- the addition of text to allow the use of experimental and historical operational data to set the bounds of credible ranges on NCS parameters and upset conditions.

STAFF REVIEW AND ANALYSIS

The staff conducted its review of the licensee's request to ensure that the requested changes are consistent with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 70, "Domestic Licensing of Special Nuclear Material," including:

- Section 70.24, "Criticality accident requirements;"
- Section 70.50, "Reporting requirements;"
- Section 70.52, "Reports of accidental criticality;"
- Section 70.61, "Performance requirements;"
- Section 70.62, "Safety program and integrated safety analysis;"
- Section 70.64, "Requirements for new facilities or new processes at existing facilities;" and
- Appendix A to Part 70, "Reportable Safety Events."

The staff's review was performed in accordance with NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," (Reference 6) and NUREG/CR-6698, "Guide for Validation of Nuclear Criticality Safety Calculational Methodology," (Reference 7).

Major Technical Changes to Chapter 5.0

The license amendment request included several major technical changes. For each technical change, a justification and technical basis was provided. The staff's review and analysis for each technical change is provided below.

Double Contingency Principle Commitments. In accordance with the performance requirements of Section 70.61, the risk of criticality accidents must be limited. Compliance with Paragraph 70.61(b) necessitates that the risk of all credible high consequence events (e.g., criticality) be highly unlikely, and compliance with Paragraph 70.61(d) necessitates that subcriticality be assured under normal and all credible abnormal conditions, with an approved margin of subcriticality for safety. In addition to the requirements of Section 70.61, new facilities and new processes at existing facilities are also subject to Paragraph 70.64(a)(9), which requires adherence to the double contingency principle. Although existing facilities may not be subject to the requirements of Paragraph 70.64(a)(9), licensees have historically committed to adhere to the double contingency principle as stated in American National Standards Institute/American Nuclear Society (ANSI/ANS)-8.1, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors" (Reference 7), as it is a long-practiced, staple principle in the control of criticality hazards and the practice of NCS. The double contingency principle as stated in ANSI/ANS-8.1 is not a requirement; it is a strong recommendation. Likewise, the double contingency principle as it is defined in Section 70.4 is not a requirement, but rather a recommendation.

Section 5.1.1 of the License Application for Materials License SNM-42 provides the licensee's commitments to the double contingency principle. Section 5.1.1 currently states that process designs *shall* incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible. This is a modified version of the double contingency principle as stated in ANSI/ANS-8.1, which states that process designs *should* incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident

is possible. Requested changes to this section would revise the licensee's commitments to state the double contingency principle as a recommendation (i.e., a "should" statement) as opposed to its current state as a requirement via regulatory commitments in the License Application (i.e., a "shall" statement in the License Application).

The staff reviewed Regulatory Guide (RG) 3.71, "Nuclear Criticality Safety Standards for Nuclear Materials Outside Reactor Cores," Revision 3 (Reference 8). The staff determined that the NRC fully endorses ANSI/ANS-8.1 (with one unrelated clarification) and therefore, fully endorses the double contingency principle as stated in ANSI/ANS-8.1. Since the licensee's request is fully consistent with the double contingency principle as stated in ANSI/ANS-8.1, the staff determined that the licensee's request is supported by the NRC's endorsement of ANSI/ANS-8.1 in RG-3.71.

The staff also reviewed the guidance provided in Chapter 5.0 of NUREG-1520. Chapter 5.0 of NUREG-1520 states that the double contingency principle implicitly recognizes that there may be some cases in which a strict adherence is not practicable, and that it should be treated as a general design principle rather than expecting that it be met in every case. Appendix A to Chapter 5.0 of NUREG-1520 further states that compliance with the double contingency principle represents one acceptable method, but not necessarily the only acceptable method, to demonstrate compliance with the performance requirements of Section 70.61. The staff determined that these statements support the licensee's request since both inherently acknowledge there are cases in which compliance with the double contingency principle may not be possible.

The staff determined that the licensee's request is supported by the NRC's endorsement of ANSI/ANS-8.1 in RG-3.71, as well as the guidance provided in Chapter 5.0 of NUREG-1520. The staff also noted that the double contingency principle as defined in Section 70.4 is a recommendation, not a requirement, which further supports the licensee's request. Given that the licensee's request is consistent with, and supported by, the double contingency principle as defined in Section 70.4, ANSI/ANS-8.1 as endorsed by RG-3.71, and Chapter 5.0 of NUREG-1520, the staff determined that the licensee's requested changes are acceptable.

Section 5.1.1 of the License Application for Materials License SNM-42 currently states that control over two independent NCS parameters is preferred over multiple controls on a single parameter, but for systems in which two parameters cannot feasibly be controlled two or more reliable controls will be utilized. Proposed changes to this section would remove this commitment.

The staff reviewed the guidance provided in Chapter 5.0 of NUREG-1520. Chapter 5.0 of NUREG-1520 states that the term "process conditions" (as it appears in the double contingency principle) is not synonymous with "NCS controlled parameter" and that double contingency protection may be provided by either: (1) control of two independent NCS parameters; or(2) control of a single NCS parameter such that at least two independent failures or events involving the parameter would have to happen before a criticality accident is possible. Likewise, "two independent failures or events" does not necessitate the presence of two or more controls as "failures or events" involving a given NCS parameter do not necessarily involve the failure of a control, such as external initiating events (e.g., earthquake). As stated in Appendix A to Chapter 5.0 of NUREG-1520, compliance with the double contingency principle does not necessitate any specific number of controls: "The presence of two controls may not be necessary, or may not be sufficient, to meet the double contingency principle. The double contingency principle does not necessarily require two controls; it requires 'at least

two…changes in process conditions' be needed before criticality is possible. Meeting this may necessitate one, two, or more than two controls depending on the possible conditions that can lead to criticality." Similarly, compliance with the double contingency principle may not require any controls at all. The staff determined that the licensee's current commitment to utilize two or more reliable controls is not necessary to meet the double contingency principle and is inconsistent with the intent and scope of the double contingency principle as discussed in Chapter 5.0 of NUREG-1520. The staff also determined that the licensee's request would not dilute or negate the licensee's commitment to comply with the double contingency principle where practicable. Therefore, the staff determined that the requested changes are acceptable.

Section 5.1.1 of the License Application for Materials License SNM-42 currently states that NRC approval via a license amendment is required for: (1) any deviation from the double contingency principle; and (2) any case involving a system in which two parameters cannot feasibly be controlled and two or more reliable controls are not utilized. Proposed changes to this section would remove this commitment.

As previously discussed, the double contingency principle may not always be practicable, represents only one acceptable method to meeting the requirements of Section 70.61, and should be treated as a general design principle rather than expecting it to be met in every case. Therefore, the staff determined that there is not a compelling basis for which deviations from the double contingency principle would require NRC approval. Similarly, because the commitment to utilize two or more reliable controls is not necessary to meet the double contingency principle, and is inconsistent with the intent and scope of the double contingency principle as discussed in Chapter 5.0 of NUREG-1520, the staff determined that there is not a compelling basis for which such cases would require NRC approval. As stated in Chapter 5.0 to NUREG-1520, "the more important requirement is the subcriticality requirement incorporated in 10 CFR 70.61(d) ('all nuclear processes are subcritical' under both 'normal and credible abnormal conditions'). Thus, as long as the applicant meets this 10 CFR 70.61(d) provision, an exception to following the double contingency principle may be justified if the criticality risk is shown to be sufficiently low." As a facility licensed under 10 CFR Part 70, the licensee is required to comply with Paragraph 70.61(d). With respect to whether the risk of criticality is "sufficiently low," the licensee is likewise required to comply with Paragraph 70.61(b) as a facility licensed under 10 CFR Part 70, which necessitates that all credible high consequence events (e.g., criticality) be highly unlikely. The staff determined that the requirements of Paragraph 70.61(b) and Paragraph 70.61(d) are sufficient to limit the risk of criticality to an acceptable level and that the double contingency principle, while an important concept and defense-in-depth measure, does not necessitate NRC approval for cases in which the double contingency principle cannot be met. Therefore, the staff determined that the licensee's requested changes are acceptable.

Failure Limits, Safety Limits, and the Limiting Condition for Operation. Section 5.2.3 of the License Application for Materials License SNM-42 currently describes the use of k_{eff} values corresponding to Failure Limits, Safety Limits, Limiting Conditions for Operation, and Routine Operating Limits. Proposed changes to this section would replace the use of individual k_{eff} values for each type of Limit with a single upper subcritical limit.

The staff reviewed Section 5.2.3 of the current License Application for Materials License SNM-42. Section 5.2.3 discusses the use of four different types of Parameter Limits: (1) Failure Limits, (2) Safety Limits, (3) Limiting Conditions for Operation (LCOs), and (4) Routine Operating Limits (ROLs). Each type of Parameter Limit is expressed in terms of an NCS-controlled parameter (e.g., mass, concentration, etc.) and has a corresponding k_{eff} limit as follows:

System	Failure Limit	Safety Limit	LCO	ROL
LEU	1.00	0.97	0.94	≤0.94
Welded Naval Reactor Clusters		0.975	0.94	≤0.94
All other HEU		0.95	0.92	≤0.92

The staff evaluated the licensee's request with respect to risk. The approach to using different types of Parameter Limits with corresponding k_{eff} limits was originally intended to provide subcritical margin (i.e., margin in k_{eff}) by applying safety margin (i.e., margin in an NCS parameter). However, while safety margin can indirectly provide subcritical margin and subcritical margin can likewise provide safety margin, margin in k_{eff} and margin in safety do not correspond linearly. An example of this would be an under-moderated system where a 2 percent change in moderation results in a 5 percent change in k_{eff}, or a 1 percent change in a geometrical dimension that results in an 8 percent change in k_{eff}. Additionally, this approach neglects the sensitivity of k_{eff} to changes in process conditions. The 2 percent change in moderation that resulted in a 5 percent change in k_{eff} in the previous example could also have a <1 percent change in k_{eff} if the system consisted of a different neutron energy spectrum, such as an over-moderated system. More importantly, k_{eff} values do not necessarily provide reliable information in the assessment of risk. An example of this can be illustrated by the following:

> *System A is a high-enriched uranium (HEU) metal sphere suspended above a pool of water by a single string, $k_{eff} = 0.80$.*
>
> *System B is a natural assay uranium sphere fully submerged in a pool of water, $k_{eff} = 0.98$.*

Assessing the k_{eff} of the two systems in isolation would suggest that System A poses less risk than System B; however, this is patently false. There is no credible mechanism through which System B can become critical. Conversely, System A can become supercritical in the likely event that the single string supporting the HEU sphere were to break. Thus, the margin in k_{eff} does not provide reliable information in the assessment of risk, and the staff determined that this supports the licensee's request.

The staff also reviewed the licensee's request with respect to subcritical margin. In accordance with Paragraph 70.61(d), subcriticality must be assured under normal and all credible abnormal conditions, with an approved margin of subcriticality for safety. Because computational methods used to calculate k_{eff} are subject to multiple sources of uncertainty (e.g., uncertainty related to mathematical approach, errors in cross-section data, etc.), certain penalties are imposed to k_{eff} calculations to ensure that systems calculated to be subcritical are actually subcritical. Computational methods are validated against experimental benchmark data to quantify the degree to which the method over-predicts or under-predicts reality in its calculation of k_{eff}, and a direct penalty to k_{eff} is assessed (bias*).* Additional penalties may be applied, as appropriate, for extensions beyond the method's areas of applicability. Administrative margin, commonly referred to as the minimum margin of subcriticality (MMS), is also applied to bound unknown or difficult to quantify uncertainties beyond those identified by validation. The MMS must be justified, and although many different methods exist for justifying the MMS, the appropriateness of the MMS is, in general, largely based on the quality of the validation methodology and whether it provides a level of assurance that the estimated bias is accurate

and bounding to its various potential sources. The MMS represents the "approved margin of subcriticality for safety" as it appears in Paragraph 70.61(d), is reviewed and approved by the NRC, and represents the minimum (i.e., least conservative) allowable margin in k_{eff} for a licensee. Although the License Application for Materials License SNM-42 specifies various k_{eff} limits corresponding to the different types of Parameter Limits, margins in k_{eff} more conservative than the MMS are beyond what is required by Paragraph 70.61(d). Therefore, the staff determined that margins in k_{eff} more conservative than the MMS (i.e., k_{eff} limits corresponding to the LCO and ROL) are not necessary to satisfy the requirements of Paragraph 70.61(d). The staff noted that the MMS was not affected by the requested changes.

As previously discussed, the staff determined that k_{eff} does not provide reliable risk information, the use of k_{eff} limits more conservative than the MMS are not necessary to comply with Paragraph 70.61(d), the MMS is not impacted by the requested changes, and the requirements of Paragraph 70.61(b) and Paragraph 70.61(d) are sufficient to limit the risk of criticality to an acceptable level. Therefore, the staff determined that the requested changes are acceptable.

NCS Methodology. The licensee's request included the removal of several specific commitments with reference to the over-arching requirements of Paragraph 70.61(b) and Paragraph 70.61(d). The staff reviewed the following proposed changes:

- **Limits for Low Enriched Uranium Systems.** Section 5.2.3 of the License Application for Materials License SNM-42 currently states that k_{eff} limits for low enriched uranium systems are less sensitive to changes in parameters affecting reactivity than are high-enriched systems. Proposed changes to this section would remove this statement.

- **Solid Angle, Lattice Density, and Water Box Techniques.** Sections 5.2.2.1, 5.2.2.2, and 5.2.2.4 of the License Application for Materials License SNM-42 currently discusses the use of the Solid Angle, Lattice Density, and Water Box techniques, respectively, in conducting NCS analyses. Proposed changes to these sections would remove the discussion of these techniques.

- **Liquid Effluent Processing and Dry Low-Level Waste Handling.** Sections 5.1.6, 5.1.2, and 5.2.13 of the License Application for Materials License SNM-42 currently provide limits and commitments regarding the processing of liquid effluent and handling of dry low-level waste, respectively. Proposed changes to these sections would remove these limits and commitments.

- **Moderation, Absorption, and Structural Integrity.** Section 5.2.5 of the License Application for Materials License SNM-42 currently discusses the analysis of systems involving moderation upsets. Proposed changes to this section would remove this discussion. Section 5.2.5 of the License Application for Materials License SNM-42 also currently discusses the safety factors associated with systems relying on neutron absorption and structural integrity. Proposed changes to this section would remove these discussions.

- **Appendix to Chapter 5.0.** The Appendix to Chapter 5.0 of the License Application for Materials License SNM-42 currently discusses the design criteria for NCS. Proposed changes would remove the Appendix while maintaining key concepts via incorporation into the body of Chapter 5.0.

The staff reviewed the requested changes and determined that all statements and commitments necessary to provide reasonable assurance of adequate protection against the risk of criticality were maintained, despite some statements and commitments being moved to different sections within the License Application for Materials License SNM-42. For the statements and commitments requested to be removed, the staff determined that the statements and commitments are not necessary to provide reasonable assurance of adequate protection against the risk of criticality. Many of the statements and commitments requested to be removed predate the performance requirements of Section 70.61 and are no longer necessary to ensure adequate protection against the risk of criticality now that the performance requirements of Section 70.61 apply. As previously discussed, the licensee must limit the risk of criticality such that its likelihood of occurrence is highly unlikely in accordance with Paragraph 70.61(b), and the licensee must assure subcriticality under normal and all credible abnormal conditions in accordance with Paragraph 70.61(d). This is required for all processes that pose a credible criticality risk. The staff determined that the requirements of Paragraph 70.61(b) and Paragraph 70.61(d) are sufficient to limit the risk of criticality to an acceptable level and that the requested changes do not dilute, alter, or negate the licensee's obligation to meet these requirements. Therefore, the staff determined that the requested changes are acceptable.

License Conditions S-3, S-4, and S-11. In addition to the proposed changes to Chapter 5.0 of the License Application for Materials License SNM-42, the licensee requested to remove the following License Conditions:

License Condition S-3
The volume [[ ]] in the [[ ]] Vault shall be no larger than [[ ]]. [[ ]] shall be specifically shown to be critically safe by the licensee.

License Condition S-4
In [[ ]], no more than [[ ]] may be in transit within each cubicle at any one time.

In its request dated June 11, 2021, BWXT NOG-L stated that License Conditions S-3 and S-4 were imposed as part of the approval to construct a new storage vault in 1989, and that both conditions predate the requirements of Section 70.61. The licensee further stated that these conditions are no longer necessary now that the requirements of Section 70.61 must be met.

The staff reviewed the requested change and determined that License Conditions S-3 and S-4 are not necessary to provide reasonable assurance of adequate protection against the risk of criticality. As previously discussed, the licensee must limit the risk of criticality such that its likelihood of occurrence is highly unlikely in accordance with Paragraph 70.61(b), and the licensee must assure subcriticality under normal and all credible abnormal conditions in accordance with Paragraph 70.61(d). This is required for all processes that pose a credible criticality risk, including those that involve vault storage. The staff determined that the requirements of Paragraph 70.61(b) and Paragraph 70.61(d) are sufficient to limit the risk of criticality to an acceptable level and that the requested change does not dilute, alter, or negate these requirements. Therefore, the staff determined that the requested change is acceptable.

License Condition S-11
Systems involving [[ ]] clusters shall be deemed to include only workstations containing one or more machined and assembled [[ ]] clusters by themselves or in conjunction with other components that are not [[ ]] clusters. This shall apply to clad operations only.

Proposed changes would replace License Condition S-11 with expanded criteria in Section 5.3.1.3 of the License Application for Materials License SNM-42 for systems involving welded clusters. Section 5.3.1.3 of the License Application for Materials License SNM-42 currently provides the following criteria for systems involving welded clusters in which the welded cluster is the reactivity driver of the system:

1) the system must be fueled by HEU (>90 weight percent ^{235}U);
2) the system must have a thermal neutron spectrum when fully flooded;
3) the system must be constructed of the same geometric style elements as those in the applicable critical experiments; and
4) any significant absorbers in the system must have been included in the applicable critical experiments.

The licensee's request would remove License Condition S-11 and add the following criterion to Section 5.3.1.3:

5) the workstations shall be in an area where clusters or subcomponents of clusters are handled.

Destructive evaluation of preassemblies, subassemblies, and clusters takes place in the Sectioning Facility, which is attached to the uranium recovery area (Recovery). Recovery is an unclad area, and given its proximity to the Sectioning Facility, License Condition S-11 was established to prevent the modeling of a cluster in Recovery in order to justify a higher k_{eff} limit (Recovery is limited to k_{eff} = 0.95 as an HEU system per Section 5.2.3 of the License Application for Materials License SNM-42; whereas, clusters are limited to k_{eff} = 0.975).

The staff reviewed the licensee's requested changes and determined that the criterion added to Section 5.3.1.3 of the License Application for Materials License SNM-42, "the workstations shall be in an area where clusters or subcomponents of clusters are handled," is sufficient to ensure that clusters will not be modeled in Recovery or any other inappropriate area as clusters are not handled in Recovery, chemical process areas, or other areas where the modeling of a cluster would be inappropriate (e.g., the filler area). Furthermore, the staff determined that the criteria provided in Section 5.3.1.3 of the License Application for Materials License SNM-42 for systems involving welded clusters is sufficient to ensure that the appropriate k_{eff} limit will be applied as the only systems capable of satisfying the criteria are those that are appropriately considered systems involving welded clusters. Therefore, the staff determined that the requested changes are acceptable.

Use of Historical Operational Data. Section IV of the Appendix to Chapter 5.0 of the License Application for Materials License SNM-42 currently states that credit may be taken for certain manufacturing or process parameters as controls (e.g., physical process, chemical properties, etc.) if the bounding assumptions are defined and limits established based upon established physical, chemical, or scientific principles and/or facility-specific experimental data supported by operational history. Proposed changes to this section would move this statement to Section 5.2 of the License Application for Materials License SNM-42 and modify its text to state the following:

> *Controlled parameters for a system are established in an analysis. The bounding assumptions for controlled parameters are established based on engineering judgment and experience using physical properties and behaviors, experimental data, and historical operational data. When physical properties result in*

excessively conservative parameter bounds, experimental data and historical operational data may be used to establish more realistic, but still conservative bounding assumptions. Parameters that are not controlled shall be considered at their most reactive, credible values.

In its license amendment request dated June 11, 2021 (Reference 1), BWXT NOG-L stated that this change was requested to allow the use of historical operational data, with proper consideration for the data applicability, to establish conservative bounding assumptions. BWXT NOG-L stated that the current version of this statement only allows for historical operational data to be used as a supplement to experimental data, and that it is often not possible to conduct experiments to establish ranges of a parameter in its manufacturing environment. BWXT NOG-L further stated that although operational data collected from its process does not have the controls and design necessary to be considered "experimental," it is representative of the system and its conditions.

The staff reviewed the guidance in Chapter 5.0 of NUREG-1520. Section 5.4.3.1.7.2 of NUREG-1520 states that the reviewer should consider the applicant's commitments with regard to performing NCS evaluations acceptable, in part, if the applicant commits to establish NCS safety limits "based on analyses assuming optimum or the most reactive credible values of NCS parameters (e.g., the most reactive conditions physically possible or bounding values limited by regulatory requirements) unless specified controls are implemented to limit parameters to a particular range of values. If less than the optimum values are used, and corresponding controls are not identified, the basis will be justified in the [NCS evaluation]." The purpose of this criterion is to ensure that unjustified assumptions are not made with respect to uncontrolled NCS parameters.

The staff determined that the requested change is consistent with Section 5.4.3.1.7.2 of NUREG-1520 as the commitment to consider parameters that are not controlled "at their most reactive, credible values" is maintained. In establishing what constitutes the "most reactive, credible value" of an NCS parameter, the licensee's request would allow experimental and historical operational data to be considered. This is consistent with Section 5.4.3.1.7.2 of NUREG-1520 which states, "If less than optimum values are used, and corresponding controls are not identified, the basis will be justified in the [NCS evaluation]." In this context, experimental and historical operational data would serve as part of the basis for using less than optimum values. Given that the licensee's request is consistent with Section 5.4.3.1.7.2 of NUREG-1520, the staff determined that the requested changes are acceptable.

Other Non-Administrative Changes to Chapter 5.0

Section 5.1.4. Section 5.1.4 of the License Application for Materials License SNM-42 currently provides the licensee's commitments regarding NCS training. Proposed changes would move Section 5.1.4.1 to Section 5.5.1, Section 5.1.4.2 to Section 5.5.2, and Section 5.1.4.3 to Section 5.5.3. Proposed changes would also revise the commitments in Sections 5.1.4.1 and 5.1.4.2 regarding training development and reduce the items included in General Employee Safety Training.

The staff reviewed the requested changes to move Section 5.1.4.1 to Section 5.5.1, Section 5.1.4.2 to Section 5.5.2, and Section 5.1.4.3 to Section 5.5.3 and determined that the changes were administrative in nature and do not dilute, alter, or negate any commitments or requirements necessary to ensure the adequate control of criticality risk. Therefore, the staff determined that the requested changes are acceptable.

The staff reviewed the requested changes to alter commitments in Section 5.1.4.1 and 5.1.4.2 regarding NCS training development. Proposed changes to these sections would remove the commitment for NCS training to be developed by a Training Specialist. In its request dated June 11, 2021 (Reference 1), BWXT NOG-L stated that specifying who must develop NCS training does not add any value as the training is required to be developed under the oversight of NCS personnel. The staff determined that NCS oversight of the development of NCS training is sufficient to ensure that the training is consistent with, and accomplishes the objectives of, the NCS program. Therefore, the staff determined that the commitment to develop NCS training by a training specialist is not necessary, and the requested changes are acceptable.

The staff reviewed the requested changes to reduce the items included in the licensee's general employee safety training (GEST). Prior to being granted unescorted access to the Restricted Areas as defined by 10 CFR Part 20, all individuals are given NCS training that includes the following:

- a discussion about the fission process and criticality;
- a brief history of criticality accidents
- the effects and consequences of a criticality; and
- the importance of an immediate evacuation in case of a criticality accident.

In addition to the bullet points above, the current version of the License Application for Materials License SNM-42 states that GEST will include the following items that the licensee has requested to remove:

- a discussion about the basic NCS controls used at BWXT NOG-L together with appropriate examples of the various controls;
- a discussion about NCS postings; and
- a discussion about nuclear safety violations and the impact they have on the NCS program.

In its request dated June 11, 2021 (Reference 1), BWXT NOG-L stated that GEST provides general safety basics for facility access and that the items requested to be removed are only applicable to those individuals that handle special nuclear material (SNM). In addition to GEST, individuals that handle SNM receive annual specialized NCS training.

The staff reviewed the requested changes and determined that the items to be removed from GEST are not necessary for the general unescorted access of individuals who do not handle SNM. Individuals who do not handle SNM do not necessarily require training on NCS controls, NCS postings, and nuclear safety violations as these items would generally only be of interest to individuals that do handle SNM. Therefore, the staff determined that the requested changes are acceptable.

Administrative Changes to Chapter 5.0

The staff reviewed the requested changes to the following sections of the License Application for Materials License SNM-42 and determined that they are generally administrative changes to align with requested changes to other sections, do not dilute or negate any significant commitments necessary for the reasonable assurance of adequate protection against criticality, and are acceptable.

- Section 5.1
- Section 5.1.1
- Section 5.1.2
- Section 5.1.3
- Section 5.1.5
- Section 5.2
- Section 5.2.1
- Section 5.2.2.1
- Section 5.2.2.2
- Section 5.2.2.3
- Section 5.2.6
- Section 5.2.7
- Section 5.2.7.5
- Section 5.2.8
- Section 5.2.9.1
- Section 5.2.10
- Section 5.2.11.1
- Section 5.2.11.2
- Section 5.2.11.3
- Section 5.2.11.4
- Section 5.2.12.1
- Section 5.2.12.2
- Section 5.2.7.5
- Section 5.3.1

ENVIRONMENTAL REVIEW

The NRC staff determined that the proposed changes to the License Application for Materials License SNM-42 are administrative, organizational, or procedural in nature. The changes will not impact any effluents, will not result in any changes to radiation exposures, do not have constructions impacts, and do not increase the potential for radiological accidents. Therefore, the amendment to Chapter 5.0, "Nuclear Criticality Safety," of the License Application for Materials License SNM-42 is categorically excluded from the requirements to prepare a site-specific environmental assessment consistent with 10 CFR 51.22(c)(11). In accordance with 10 CFR 51.22(b), neither an environmental assessment nor an environmental impact statement is warranted for this action.

CONCLUSIONS

Based on the review discussed in this report, the staff concluded that the licensee's request provides reasonable assurance of subcriticality under normal and all credible abnormal conditions, provides reasonable assurance that the risk of criticality is limited such that its likelihood of occurrence is highly unlikely, provides reasonable assurance of adequate protection against the risk of criticality accidents, and otherwise satisfies the requirements of 10 CFR Part 70. Therefore, the staff recommends that this license amendment request be approved.

Principal Contributor:
Jeremy W. Munson

REFERENCES

1. BWXT NOG-L, "Request to Amend License SNM-42, Chapter 5, Nuclear Criticality Safety," dated June 11, 2021 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML21175A119).

2. NRC, "Request for Additional Information Regarding Proposed Changes to License Application Chapter 5, Nuclear Criticality Safety – Enterprise Project Identifier L-2021-LLA-0118," dated September 10, 2021 (ADAMS Accession No. ML21250A388).

3. BWXT NOG-L, "Response to Request for Additional Information to Amend License SNM-42, Chapter 5, Nuclear Criticality Safety," dated October 8, 2021 (ADAMS Accession No. ML21286A152).

4. BWXT NOG-L, "Submittal of Page Change Updates to Chapter 5 of the SNM-42 License Application," dated October 20, 2021 (ADAMS Accession No. ML21298A081).

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