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LICENSE NO: SNM-42

LICENSEE: BWX Technologies, Inc.
Nuclear Products Division
Lynchburg, VA

SUBJECT: SAFETY EVALUATION REPORT FOR BWX TECHNOLOGIES, INC.
AMENDMENT 113, REFORMATTED LICENSE

BACKGROUND

On September 18, 2000 (65 FR 56211), the NRC revised a rule titled, "Domestic Licensing of Special Nuclear Material; Possession of a Critical Mass of Special Nuclear Material," (Part 70 of Title 10 of the Code of Federal Regulations (CFR) or 10 CFR Part 70). The revised rule required NRC licensees to, in part, complete an ISA and submit a summary of the ISA, including a description of management measures, to the NRC by October 18, 2004. BWX Technologies, Inc. (BWXT) completed its ISA and submitted a summary including a description of management measures, by two letters dated December 16, 2002, designated as "Official Use Only" and "Confidential," respectively. Those letters were supplemented by letter dated January 28, 2004 and updated by letters dated January 28, February 17, April 13, and May 23, 2005.

By letter dated December 1, 2002, BWXT submitted an amendment request to reformat their existing license to include the addition of an Integrated Safety Analysis (ISA) section to its license application. In the transmittal letter, BWXT indicated that Chapter 3, "ISA," was a new chapter created from the existing license application Sections 15.1-15.3, and requested a Nuclear Regulatory Commission (NRC) review. In revised submittals dated June 10, 2003; November 4, 2004; April 15, July 11, November 10, November 18, December 22, 2005; and June 14, 2006, BWXT made changes to the new Chapter 3, and to other chapters of its proposed license reformat application. These changes were a result of BWXT's commitments during the License Reformat and ISA Summary reviews, responses to Requests for Additional Information (RAI), and BWXT-identified clarifications and corrections.

Enclosure 3

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DISCUSSION

The changes proposed by BWXT in its amendment request, as supplemented, included:

Reformat of License Application

In response to the new requirements in the revised 10 CFR Part 70, BWXT submitted changes to its license by letter dated December 1, 2002. In that letter, BWXT requested a reformatting of its license to accommodate the new ISA. These changes included adding new chapters, modifying selected chapters, and renaming some chapters. On November 4, 2004, due to license changes and, in response to an NRC RAI dated November 4, 2004, BWXT submitted its revised license reformat request in its entirety. These proposed changes would eliminate the current two-part license (License Chapters 1 through 8, and License Demonstrations - Chapters 9 through 17), for an 11-chapter license following the format in the NRC's NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility." These changes would appear in the reformatted license application as follows:

- Chapter 1, "General Information," of the reformatted license is based on the current Chapter 1, but Section 1.9 on fire protection was moved to the proposed Chapter 7, "Fire Safety," and the site plan was moved out of the application to the ISA Summary.
- The proposed Chapter 2, "Organization and Administration," is identical to the current license application Sections 2.1 - 2.4 with the exception of an administrative change, and Sections 2.5 - 2.10 was moved to proposed Chapter 11, "Management Measures."
- The proposed Chapter 3, "Integrated Safety Analysis," is new and was created from the current Sections 15.1 - 15.3, located in Part 2 of its license application.
- The proposed Chapter 4, "Radiation Safety," is identical to the current Chapter 3.
- The proposed Chapter 5, "Nuclear Criticality Safety," is technically identical to current Chapter 4, and contains three administrative changes.
- The proposed Chapter 6, "Chemical Process Safety," was created by extensively modifying the current Chapter 17 on fire protection and chemical safety.
- The proposed Chapter 7, "Fire Safety," was created from the current Chapter 17 on fire protection, chemical safety, and Section 1.9 on the fire protection program.
- The proposed Chapter 8, "Emergency Management," is identical to the current Chapter 8 on the site emergency plan.
- The proposed Chapter 9, "Environmental Protection," is identical to the current Chapter 5.
- The proposed Chapter 10, "Decommissioning," is identical to the current Chapter 7.
- The proposed Chapter 11, "Management Measures," was created from the current Chapter 2, Sections 2.5 - 2.10, as previously mentioned.
- The current Chapter 6 was deleted because BWXT has no special processes.

[REDACTED]

In order for the reformatted license to follow the structure of the SRP, chapters and sections of the current license application (Part 2), were moved to the new reformatted license application or other licensee documents, available on-site for NRC review. The chapters and sections moved or deleted were:

- Chapter 9, "General Information," that described corporate information, financial qualification, site description, and location and maps of the site. This information was either redundant to proposed Chapter 1 or was located in the BWXT Environmental Report, in the Certification of Financial Assurance, or in the ISA.
- Chapter 10, "Facility Description," that described in very general terms the facility, utilities, ventilation systems, and radioactive waste handling. This information was moved to the ISA.
- Chapter 11, "Organization," that described the organizational responsibility and authority for various technical, audit, and managerial positions at BWXT and included resumé. This information was more specific than currently appears in the license application, Chapter 2, so it was deleted. There is no regulatory requirement for this information.
- Chapter 12, "Radiation Protection," that provided the license demonstration for the radiation protection program. This information was not necessary because the radiation protection program is presented in proposed license Chapter 4.
- Chapter 13, "Radiological Environmental Safety," that described the environmental monitoring program, including environmental sampling locations and action levels. This information is contained in the proposed Chapter 9.
- Chapter 14, "Nuclear Criticality Safety," that described the administrative and technical procedures, design approach, and computer codes. This information is described in proposed Chapter 5.
- Chapter 15, "Process Description and Integrated Safety Analysis Introduction and Scope," Sections 15.1 - 15.3 were moved to the new Chapter 3 as noted above while Sections 15.4 - 15.26 were incorporated into the ISA that is maintained on-site by BWXT.
- Chapter 16, "Accident Analysis," that discussed the [REDACTED] postulated accidents at BWXT. This information is maintained in the Environmental Report, Emergency Plan, and ISA.
- Chapter 17, "Fire Protection & Chemical Safety," was moved into proposed Chapters 6 and 7 as previously mentioned.

The NRC staff concludes that all commitments contained in Parts 1 and 2 of the license application were appropriately moved to the proposed one-part license application. In addition to the re-numbering of current license application chapters and the necessary technical changes required to accommodate the ISA and ISA Summary, numerous administrative changes and typographical errors were corrected in this submittal.

[REDACTED]

Safety Program

In addition, the staff reviewed BWXT's safety program as required by 10 CFR 70.65(a). 10 CFR 70.62(a) requires the licensee to establish and maintain a safety program that demonstrates compliance with the performance requirements of 10 CFR 70.61 and to establish and maintain records as required by 10 CFR 70.62(b), (c), and (d). The three elements of a safety program are: process safety information, ISA, and management measures. The adequacy of the licensee's safety program related to the safety program's three required elements has been evaluated by the staff as follows:

1. Process Safety Information

10 CFR 70.62(b) requires the licensee to maintain process safety information regarding the performance and maintenance of an ISA. This information must include process hazards, the technology employed, and the equipment used.

In Section 3.1 of the License Reformat application, BWXT stated that the process safety information was obtained and used to form the basis of the ISA. This information included discipline-specific safety analyses containing details of accident scenarios and the availability and reliability of controls. Hazard information pertaining to the process, materials used in the process, and equipment is also included. This process safety information is used by BWXT as a baseline for effective configuration management.

The staff finds the information provided in the License Reformat application adequate to meet the requirements of 10 CFR 70.62(b).

2. ISA

10 CFR 70.62(c) requires the licensee to conduct and maintain an integrated safety analysis of appropriate detail and complexity for the process that identifies:

- (i) radiological hazards related to possessing or processing licensed material;
- (ii) chemical hazards of licensed material and hazardous chemicals produced from licensed material;
- (iii) facility hazards that could affect the safety of licensed materials and thus present an increased radiological risk;
- (iv) potential accident sequences caused by process deviations or other events internal to the facility and credible external events, including natural phenomena;
- (v) the consequences and likelihoods of each potential accident sequence and the methods used to determine those consequences and likelihoods; and
- (vi) each IROFS identified, the characteristics of its preventive, mitigative, or other safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements.

[REDACTED]

Section 3.2 of the reformatted license application stated that the ISA documents include facility, description, process description, summary of applicable ISA methodology, and ISA results. The process description includes narrative descriptions, process flow diagrams, plant diagrams, operating procedures, and other documents needed to adequately describe the process under review. The results of the ISA include identification of hazards and accident scenarios, evaluation of consequences, and determination of likelihood.

Specifically, in Section 3.2.1, BWXT stated that [REDACTED]

[REDACTED]

[REDACTED]. These descriptions include a discussion of the process, facility siting review, discipline-specific analyses, and a general description of the types of accident sequences for high and intermediate consequence scenarios and engineered and administrative controls to prevent or mitigate the postulated accidents. During the ISA, hazards, such as chemicals, radiological and fissile materials, ignition sources and explosive hazards are identified. Chemical interaction matrices are developed and operating procedures are evaluated. Where appropriate, lists of maximum intended inventories are created. A process hazards analysis (PHA) is performed to identify potential accident scenarios and to analyze the hazards. Credible internal and external hazards (including natural phenomena) are included in the identification and analysis. The analysis results are evaluated against the ISA threshold criteria listed in Section 3.0 of the license. IROFS are identified as required to meet performance requirements in 10 CFR Part 70.

In proposed Section 3.2.2, BWXT provided a general discussion of the qualifications of the ISA teams. These teams have broad experience in engineering and process operations and consist of members with criticality safety, radiation safety, fire protection, and chemical process safety expertise. At least one member of the team will be knowledgeable in the ISA methodology being utilized. BWXT also described the hazard methodologies used in the ISA. These methodologies were: [REDACTED]

[REDACTED]

[REDACTED] The ISA team leader selects methodologies as appropriate.

Section 3.3 of the proposed license, BWXT stated that [REDACTED]

[REDACTED]

Section 11.1.3 of the proposed license states, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] The ISA process will be used to identify accident scenarios and IROFS/controls required for safe operation, specify the limits for controlled parameters, and assure technical bases for changes are recorded.

Proposed license Section 11.1.4 states that the ISA Summary and supporting documentation are maintained up-to-date. Further, the ISA Summary is updated after a change to the facility, a process or the equipment is made. The licensee will submit, on an annual basis, a brief summary of all changes that do not require pre-approval by the staff.

Based on the staff's review of the ISA Summary and supporting documentation and the proposed license changes, the staff finds the information provided in proposed Chapters 3 and 11 of the proposed license adequate to meet the requirements of 10 CFR 70.62(c).

3. Management Measures.

The staff evaluation and conclusions regarding BWXT's management measures can be found in the Technical Evaluation Report associated with this license amendment.

Changes to Safety and Safeguards Conditions in the License

The staff recommends that Safety Condition S-1 be updated to reflect the license reformat submittals, dated December 1, 2002; June 10, 2003; November 4, 2004; April 15, July 11, November 10, November 18, and December 22, 2005, and June 14, 2006, and to reflect the approval of your ISA Summary. As part of NRC's process improvements, we recommend adding text to Safety Condition S-1 noting the applications listed in S-1 may be revised pursuant to 10 CFR 70.32 or 10 CFR 70.72.

Safety Condition S-1 would read as follows:

Authorized use: For use in accordance with the statements, representations, and conditions in Chapters 1 through 11 of the application submitted on the following dates, or as revised pursuant to 10 CFR 70.32 or 10 CFR 70.72: Application dated July 14, 1995; and supplements dated August 4, August 9, August 21, August 29, and November 9, 1995; February 1, March 15, March 20, April 15, May 1 (two letters), September 23, and December 4, 1996; January 31; June 30, July 23, September 26, and October 2, 1997; February 5, March 12, April 15, April 24, May 5, August 27, September 8, October 15, and November 23, 1998; January 7, February 22, March 31, April 8, April 29, May 5, May 10, May 13, May 24, August 18, August 25, October 8, November 18, and November 24, 1999; February 8, February 15, February 28, April 28, June 6, October 11, December 5, December 14, and December 22, 2000; January 5, February 20, March 19, March 22, April 10, June 4, July 5, July 10, August 14, September 12, and December 18, 2001; January 2, May 24, June 11, July 16, August 7, August 30, December 1, December 10, December 19, and December 20, 2002;

[REDACTED]

June 10, October 9, October 30, December 3, and December 16, 2003, February 18, March 8, April 13, May 5, June 10, July 22, August 9, August 13, August 19, November 4, 2004; and April 15, July 11, November 10, November 18, and December 22, 2005; and June 14, 2006.

The staff recommends that Safety Condition S-5 be updated to reflect the NRC staff review of BWXT's June 4, 2001, Integrated Safety Analysis Plan. The staff concluded that the ISA Plan was acceptable. As a result of this conclusion, the NRC amended BWXT's Materials License SNM-42 to include the date of June 4, 2001, in Safety Condition S-1 of License SNM-42.

The TER associated with this license amendment discusses the staff's review and conclusions regarding the ISA Summary. The evaluation can be found in the TER, which is Enclosure 2 of this package.

Based on the recommended approval of the ISA Summary in the TER for the ISA Summary, the previous commitments to perform an ISA to identify hazards and accident sequences and identify controls to reduce or eliminate risk, the staff recommends deletion of Safety Condition S-5. Therefore, Safety Condition S-5 is recommended to read as follows:

S-5 Deleted by Amendment 113, June 2006.

The staff recommends that Safety Condition S-18 be updated to reflect a commitment, in BWXT letters dated April 13, and May 23, 2005, and by email dated April 20, 2006, that the link between individual IROFS and individual accident sequences will be provided by the licensee, and maintained at the facility site to further support the correlation between IROFS and accident sequences, and to support timely evaluation of IROFS failures and re-evaluation of accident sequences if necessary. Based on the staff's review of the ISA Summary, as documented in the TER associated with this action, and as committed by the licensee in letters dated April 13, and May 23, 2005, and email dated April 20, 2006, Safety Condition S-18 is recommended to read as follows:

S-18 The licensee shall develop a cross-reference between the individual IROFS and the accident scenarios. This cross-reference shall be completed by September 1, 2006. The completed cross-reference shall be maintained on file for inspection.

In addition to the changes to Safety Conditions S-1, S-5, and the addition of S-18, discussed above, related to the ISA Summary and reformat of the license and as a result of license actions requested and reviewed concurrently with the ISA Summary and license reformat request, the following changes to Safety and Safeguards Conditions are recommended:

The staff recommends that Safety Condition S-2 be updated based on NRC's letter dated August 2, 2005, that identified that the licensee's changes did not decrease the effectiveness of the Emergency Plan, Safety Condition S-2 is recommended to read as follows:

[REDACTED]

S-2 The licensee shall maintain and execute the response measures in the Emergency Plan, Revision 17, dated March 5, 2005, or as further revised by the licensee consistent with 10 CFR 70.32(i).

The staff recommends that Safety Condition S-13 be updated based on NRC's letter dated September 20, 2005, that approved the Final Status Survey Report (FSSR) for Industrial Waste Landfill 1. Therefore, the NRC staff recommends that Safety Condition S-13 be changed to read as follows:

S-13 The Final Status Survey Report (FSSR) for the Industrial Waste Landfill 1, submitted by application dated August 10, 2005, has been determined, by the NRC staff to meet the requirements of 10 CFR 70.38 in that the landfill has been remediated in accordance with the decommissioning plan approved on November 21, 2003. At the time of license termination, however, the results of the FSSR may be re-assessed in order to include any dose from this landfill in the site dose assessment. BWXT shall also control licensed material which could migrate and impact the area and keep records of all work done in the area.

The staff recommends that Safety Condition S-17 be updated based on the NRC staff approval of the license reformat amendment request that changes the current Chapter 4 (NCS) in the license application to Chapter 5. The chapter and section number changes in the proposed license reformat amendment require changes to Safety Condition S-17 of the BWXT License. Section 4.2.3, referenced in the current S-17, is changed to proposed Section 5.2.3. Therefore, the NRC staff recommends that Safety Condition S-17 be changed to read as follows:

S-17 Notwithstanding the commitments in Section 5.2.3 of the License Application, (1) a 0.94 Limiting Condition of Operation and a 0.96 Safety Limit (equivalent to a limit of 0.975 when combined with a bias term of 0.015) shall only apply to systems involving [REDACTED] in which the [REDACTED] is the reactivity driver of the system; and (2) [REDACTED] designs subsequent to [REDACTED] meet the 0.92 Limiting Condition of Operation and 0.95 Safety Limit.

"Systems involving [REDACTED]" shall be deemed to include only workstations containing one or more machined and assembled [REDACTED] by themselves or in conjunction with other components that are not [REDACTED]. This shall apply to [REDACTED] areas only.

The staff recommends that Safeguard Condition SG-6.1 be updated based on the NRC's letter dated March 23, 2005, that confirmed the acceptability of changes to the Physical Protection Plan. Therefore, the NRC staff recommends that Safeguard Condition SG-6.1 be changed to read as follows:

SG-6.1 The licensee shall follow the measures described in the physical protection plan titled, "BWXT Technologies Nuclear Products Division, Physical Protection Plan," dated

[REDACTED]

December 16, 2004, submitted as Revision 5, and security procedures that are used to comply with the plan as it may be further revised in accordance with the provisions of 10 CFR 70.32(e).

The staff recommends that Safeguard Condition SG-6.7 be updated based on the NRC's letter dated March 23, 2005, that confirmed the acceptability of changes to the Physical Protection Plan for Special Nuclear Material of Moderate and Low Strategic Significance. Therefore, the NRC staff recommends that Safeguard Condition SG-6.7 be changed to read as follows:

SG-6.7 The licensee shall follow the measures described in the physical protection plan titled, "Physical Protection Plan for Special Nuclear Material of Moderate and Low Strategic Significance," dated December 16, 2004, for the BWXT [REDACTED], submitted as Revision 2, and security procedures that are used to comply with the plan as it may be further revised in accordance with the provisions of 10 CFR 70.32(e).

All other conditions of this license shall remain the same.

ENVIRONMENTAL REVIEW

The staff has determined that the license reformat is administrative in nature. Section 51.22(c)(11) of 10 CFR allows a categorical exclusion if the following requirements have been satisfied:

1. There is no significant change in the types or significant increase in the amounts of any effluents that may be released off-site.
2. There is no significant increase in individual or cumulative occupational radiation exposure.
3. There is no significant construction impact.
4. There is no significant increase in the potential for consequences from radiological accidents.

The changes made to the license are administrative, and comply with criteria 1, 2, and 4 discussed above. Also, the changes do not have a construction component, therefore, comply with criterion 3 identified above. Based on this evaluation, there is no significant impact to the environment, and the implementation of the administrative changes to the license is eligible for a categorical exclusion. Therefore, neither an Environmental Assessment nor an Environmental Impact Statement is required for this action.

CONCLUSION

The NRC staff have reviewed the proposed changes in the license reformat amendment request and found that those change were administrative or editorial. The NRC staff finds that this amendment poses no change in the types or amounts of effluents released offsite and no



increase in the individual or cumulative occupational radiation exposure. The amendment poses no significant impact from construction activities and no increase in the potential for or consequences from radiological accidents. The staff concluded that the reformatted license meets the applicable requirements of 10 CFR Part 70.

The NRC staff have reviewed the commitments related to the safety program, including the ISA, as presented in the license amendment request, and has concluded that the applicant's safety program, if established and maintained pursuant to 10 CFR 70.62, is adequate to provide reasonable assurance that IROFS will be available and reliable to perform their intended safety functions when needed and in the context of the performance requirements of 10 CFR 70.61.

Based on the above discussion, the staff concludes that BWXT license reformat amendment request can be approved as proposed and that the license conditions be revised in the license to read as previously discussed. The staff recommends approval of the license amendment request.

The Region II inspection staff have no objections to the proposed action.

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