

November 10, 2005

Ms. Leah R. Morrell
Licensing Officer
BWX Technologies, Inc.
Nuclear Products Division
P.O. Box 785
Lynchburg, Virginia 24505-0785

SUBJECT: BWX TECHNOLOGIES, INC. - REQUEST FOR ADDITIONAL INFORMATION
ON LICENSE RENEWAL APPLICATION FOR CRITICALITY SAFETY
(TAC L31836)

Dear Ms. Morrell:

This letter relates to the staff review of your license renewal application. The staffs review of this request has concluded that additional information is needed to address regulatory issues. This letter contains questions related to the criticality safety portion of your application only. The additional information, specified in the enclosure, should be provided within 60 days of the date of this letter. You have already received a request for additional information with regard to your Environmental Report, dated December 27, 2004, and security plans, dated August 3, 2005.

Please reference the above TAC No. in future correspondence related to this request.

If you have any questions regarding this matter, contact me at (301) 415-5848 or via e-mail to bcg@nrc.gov.

Respectfully,

/RA/

William Gleaves, Project Manager
Fuel Manufacturing Section
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Docket No.: 70-27
License No.: SNM-42

Enclosure: Request for Additional Information

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**Request for Additional Information on the
BWX Technologies, Inc.
License Renewal Request
Docket No.70-27
SNM-42**

1. Provide change pages to license application, Section 5.1, stating the nuclear criticality safety (NCS) program objectives which should include the following objectives, or justify not doing so:
 - (a) preventing an inadvertent nuclear criticality;
 - (b) protecting against the occurrence of an identified accident sequence in the ISA Summary that could lead to an inadvertent nuclear criticality;
 - (c) complying with the NCS performance requirements of 10 CFR 70.61,
 - (d) establishing and maintaining NCS safety parameters and procedures,
 - (e) establishing and maintaining NCS safety limits and NCS operating limits for IROFS;
 - (f) conducting NCS evaluations to assure that under normal and credible abnormal conditions, all nuclear processes will remain subcritical and maintain an approved margin of subcriticality for safety;
 - (g) establishing and maintaining NCS IROFS, based on current NCS determinations;
 - (h) providing training in emergency procedures in response to an inadvertent nuclear criticality;
 - (i) complying with NCS baseline design criteria requirements in 10 CFR 70.64(a),
 - (j) complying with the NCS ISA Summary requirements in 10 CFR 70.65(b), and
 - (k) complying with the NCS ISA Summary change process requirements in 10 CFR 70.72.

10 CFR 70.22(a)(7) states that the license application must contain a description of the equipment, and facilities which will be used by the applicant to protect health and minimize danger to life or property. 10 CFR 70.22(a)(8) states that the license application must contain proposed procedures to protect health and minimize danger to life or property. Additionally, NUREG-1520, "Standard Review Plan for the Review of a license Application for a Fuel Cycle Facility," Section 5.4.3.1, states that the applicant should commit to the above information.

Enclosure

[REDACTED]

2. Justify your continued commitment to Regulatory Guide 8.12 in Section 5.1.5 of the license application.

Regulatory Guide 3.71, "Nuclear Criticality Safety Standards for Fuels and Material Facilities," issued August 1998, consolidated and replaced a number of regulatory guides without altering any existing licensing commitments nor introducing any new requirements. One of the regulatory guides included in this consolidation was Regulatory Guide 8.12, "Criticality Accident Alarm Systems," Revision 2 dated October 1988 and was therefore withdrawn by Regulatory Guide 3.71. Thus, this commitment should be updated.

3. Provide change pages to Section 5.1.5 of the license application stating provisions for the Criticality Accident Alarm System (CAAS) [REDACTED]. Additionally, revise your commitment to the CAAS requirements in 10 CFR 70.24 to include the following, or justify not doing so:

- [REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

10 CFR 70.24 states that the licensee shall maintain emergency procedures for each area in which the licensed special nuclear material is handled, used, or stored to ensure that all personnel withdraw to an area of safety upon the sounding of the alarm. Section 5.4.3.4.3 of the Standard Review Plan (SRP) states that the applicant should commit to rendering operations safe, by shutdown and quarantine if necessary, in any area where CAAS coverage has not been lost and not restored within a specified number of hours [REDACTED]

[REDACTED]

[REDACTED]

- [REDACTED]
4. Provide change pages committing to the intent of the validation report statement in Regulatory Guide (RG) 3.71, or provide justification for not doing so. The RG states that the applicant should demonstrate: (1) the adequacy of the margin of safety for subcriticality by assuring that the margin is large compared to the uncertainty in the calculated value of k_{eff} ; (2) that the calculation of k_{eff} is based on a set of variables whose values lie in a range for which the methodology used to determine k_{eff} has been validated, and (3) that trends in the bias support the extension of the methodology to areas outside the area of applicability.

10 CFR 70.61(d) requires that nuclear processes be ensured to be subcritical under normal and credible abnormal conditions, including use of an approved margin of subcriticality for safety. This requires that any calculational methods used to determine subcritical limits be appropriately validated. NUREG-1520, Section 5.4.3.4.1, states that the applicant should commit to the above information. RG 3.71 conditions NRC's endorsement of ANSI/ANS-8.1-1983 IN providing the validation details to ensure that the above criteria are met.

5. Provide change pages including a reference to (including date and revision number), and summary description of, either a manual or a documented, reviewed, and approved validation report for each calculational methodology used. In particular, provide the following details of the validation methodology and results, or justify not doing so:
 - (a) A summary description of the theory of the methodology that is sufficiently detailed and clear to allow understanding of the methodology;
 - (b) A summary of the area or areas to which the reference manual or report applies;
 - (c) A commitment to apply the methodology only in the area or areas of applicability or provide justifications for applying the methodology outside the area or areas of applicability;
 - (d) A commitment to use pertinent computer codes, assumptions, and techniques in the methodology;
 - (e) A commitment to properly perform the mathematical operations in the methodology;
 - (f) A commitment to use data based upon reliable and reproducible experimental measurements;
 - (g) A commitment to use plant-specific benchmark experiments and data derived there from to validate the methodology;

[REDACTED]

- (h) A commitment to determine the bias, the uncertainty in the bias, the uncertainty in the methodology, the uncertainty in the data, the uncertainty in the benchmark experiments, and the margin of subcriticality for safety, when using the methodology;
- (i) A commitment to use controlled software and hardware, when using the methodology; AND
- (j) A commitment to use a verification process when using the methodology.

10 CFR 70.61(d) requires that nuclear processes be ensured to be subcritical under normal, and credible abnormal conditions, including use of an approved margin of subcriticality for safety. This requires that any calculational methods used to determine subcritical limits be appropriately validated. NUREG-1520, Section 5.4.3.4.1, states that the applicant should commit to the above information. This information is needed to provide assurance that the applicant is using an appropriately validated method that is commensurate with the approved margin of subcriticality for safety.

- 6. Provide change pages to Section 5.2.2 of the license application indicating a description of the referenced computer codes, or provide justification for not including these descriptions.

10 CFR 70.22(a)(7) states that the license application must contain a description of the equipment and facilities which will be used by the applicant to protect health and minimize danger to life or property and 10 CFR 70.22(a)(8) states that the license application must contain proposed procedures to protect health and minimize danger to life or property.

[REDACTED]

- 7. Provide change pages revising Section 5.2.3 of the license application which contains language relative to normal and abnormal condition k_{eff} limits for [REDACTED] that has not been approved.

[REDACTED]

[REDACTED]

[REDACTED]

8. Provide change pages revising Section 5.2.3 of the license application to contain an approved safety limit.

License Condition S-17 was added to the license by Amendment 108 with a safety limit (SL) of [REDACTED] for [REDACTED]. Although when the SL of [REDACTED] is combined with a bias term (in this case a bias term is not needed because bias was determined to be zero for the most applicable experiments) [REDACTED], the equivalent limit is [REDACTED], only an SL of [REDACTED] was approved.

9. State in the license whether the [REDACTED] theory code has been validated. Section 5.2.4. states that critical values in the license were computed using the [REDACTED] theory code, but doesn't indicate whether this code has been validated.

10 CFR 70.61(d) requires that nuclear processes be ensured to be subcritical under normal and credible abnormal conditions. This requires that any calculational methods used to determine subcritical limits be appropriately validated.

10. Either update your commitment to ANSI/ANS-8.5-1996 or justify your continued commitment to ANSI/ANS-8.5-1986 to the most recent version of the standard. Additionally, revise your exceptions to ANSI/ANS-8.5-1986 in Section 5.2.4 of the license application to reflect the changes to the standard in ANSI/ANS-8.5-1996.

RG 3.71 endorses ANSI/ANS-8.5-1996 which has the following changes to the exceptions noted in your license application:

- (a) Section 5.2.4 of the license application states, "In Paragraph 3.2 (Physical Environment) of the standard, tempered rings are not specified when glass rings are ordered." ANSI/ANS-8.5-1986, paragraph 3.2 states, "Thermally tempered rings shall be used where applications involve agitation of the rings or where the rings may be subjected to accidental agitation..." However, paragraph 3.1 of ANSI/ANS-8.5-1996 was revised to state, "Rings shall not be used in applications where credible agitation or movement of the rings can damage the rings sufficiently to compromise their effectiveness as a criticality control."
- (b) Section 5.2.4 of the license application states an exception to Paragraph 5.4 (Provision for Leakage of Solution) of ANSI/ANS-8.5-1986. However, this paragraph was deleted from ANSI/ANS-8.5-1996.

[REDACTED]

[REDACTED]

10 CFR 70.22(a)(8) states that the license application must contain proposed procedures to protect health and minimize danger to life or property. Additionally, SRP Section 5.4.3.4.2(15)(a) contains the acceptance criterion, "When using borosilicate glass rasching rings, the applicant commits to ANSI/ANS-8.5-1996."

11. State in the license whether heterogeneous effects are considered when evaluating a controlled parameter.

10 CFR 70.61(d) requires that nuclear processes be ensured to be subcritical under normal and credible abnormal conditions. Additionally, SRP Section 5.4.3.4.2(4) contains this acceptance criterion.

12. Provide a commitment that when reflection control is used, the controls to prevent the presence of the potential reflectors are identified as IROFS, or justify not doing so.

10 CFR 70.61(d) requires that nuclear processes be ensured to be subcritical under normal and credible abnormal conditions. Additionally, SRP 5.4.3.4.2(11)(b) states this acceptance criterion.

13. State whether you commit to ANSI/ANS-8.22-1997 with regard to moderator control.

10 CFR 70.61(d) requires that nuclear processes be ensured to be subcritical under normal and credible abnormal conditions. Additionally, SRP 5.4.3.4.2(12)(a) states the acceptance criterion, "When using moderation, the applicant commits to ANSI/ANS-8.22-1997."

14. Provide a commitment that when moderator control is used and process variables can affect the moderation, the process variables are shown in the ISA Summary to be controlled by IROFS or justify not doing so.

10 CFR 70.61(d) requires that nuclear processes be ensured to be subcritical under normal and credible abnormal conditions. Additionally, SRP 5.4.3.4.2(11)(b) states this acceptance criterion.

15. Commit that when process variables can affect concentration, the process variables are shown in the ISA Summary to be controlled by IROFS.

10 CFR 70.61(d) requires that nuclear processes be ensured to be subcritical under normal and credible abnormal conditions. Additionally, SRP 5.4.3.4.213(a) states this acceptance criterion.

- [REDACTED]
16. Provide a commitment to indicate that two-parameter control is preferred over two controls on one parameter.

10 CFR 70.61(d) requires that nuclear processes be ensured to be subcritical under normal and credible abnormal conditions. Additionally, SRP 5.4.3.4.47(a) states the acceptance criterion, "Double contingency protection may be provided by either: (I) at least two-parameter control (the control of at least two independent process parameters) or (ii) single-parameter control (a system of multiple independent controls on a single process parameter). The first method is the preferred approach because of the difficulty of preventing common-mode failure when controlling only one parameter."