March 1, 2006

Mr. James H. Lash
Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
P. O. Box 4
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 (BVPS-1 AND 2) - REQUEST FOR ADDITIONAL INFORMATION (RAI) - REGARDING THE STEAM GENERATOR (SG) TUBE INTEGRITY TECHNICAL SPECIFICATION (TS) LICENSE AMENDMENT REQUEST (LAR) (TAC NOS. MC8861 AND MC8862)

Dear Mr. Lash:

By letter dated November 7, 2005, FirstEnergy Nuclear Operating Company (FENOC or the licensee) submitted an LAR regarding BVPS-1 and 2 SG tube integrity TSs. The proposed amendment would revise the SG tube integrity TSs to be consistent with the Nuclear Regulatory Commission (NRC)-approved Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-449, "Steam Generator Tube Integrity," Revision 4.

The NRC staff has determined that the additional information contained in the enclosure to this letter is needed to complete its review. As discussed with your staff, we request your response within 45 days of receipt of this letter. If you have any questions, please contact me at 301-415-1402.

Sincerely,

/RA/

Timothy G. Colburn, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-334 and 50-412

Enclosure:
RAI

cc w/encl: See next page

March 1, 2006

Mr. James H. Lash
Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
P. O. Box 4
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 (BVPS-1 AND 2) - REQUEST FOR ADDITIONAL INFORMATION (RAI) - REGARDING THE STEAM GENERATOR (SG) TUBE INTEGRITY TECHNICAL SPECIFICATION (TS) LICENSE AMENDMENT REQUEST (LAR) (TAC NOS. MC8861 AND MC8862)

Dear Mr. Lash:

By letter dated November 7, 2005, FirstEnergy Nuclear Operating Company (FENOC or the licensee) submitted an LAR regarding BVPS-1 and 2 SG tube integrity TSs. The proposed amendment would revise the SG tube integrity TSs to be consistent with the Nuclear Regulatory Commission (NRC)-approved Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-449, "Steam Generator Tube Integrity," Revision 4.

The NRC staff has determined that the additional information contained in the enclosure to this letter is needed to complete its review. As discussed with your staff, we request your response within 45 days of receipt of this letter. If you have any questions, please contact me at 301-415-1402.

Sincerely,

/RA/
Timothy G. Colburn, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-334 and 50-412

Enclosure:
RAI

cc w/encl: See next page

DISTRIBUTION:

PUBLIC	RidsNrrLASLittle	BSingalDLPM/DPR	LPLI-1 R/F
RidsOGC	RidsACRS	RidsNrrDorlLpla	RidsNrrPMTColburn
RBellamy, RGN-I	RidsNrrDciCsgb		

ACCESSION: ML060540353

OFFICE	LPLI-1/PM	LPLI-1/LA	CSGB/BC	PDI-1/BC
NAME	TColburn	SLittle	AHiser	RLaufer
DATE	2/27/06	2/27/06	2/28/06	3/01/06

OFFICIAL RECORD COPY

REQUEST FOR ADDITIONAL INFORMATION

FIRSTENERGY NUCLEAR OPERATING COMPANY (FENOC)

BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 (BVPS-1 AND 2)

STEAM GENERATOR (SG) TUBE INTEGRITY TECHNICAL SPECIFICATION (TS)

LICENSE AMENDMENT REQUEST (LAR)

DOCKET NOS. 50-334 AND 50-412

By letter dated November 7, 2005 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML053140195), FirstEnergy Nuclear Operating Company (FENOC or the licensee) submitted an LAR regarding BVPS-1 and 2 SG tube integrity TSs. The proposed amendment would revise the SG tube integrity TSs to be consistent with the Nuclear Regulatory Commission (NRC)-approved Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-449, "Steam Generator Tube Integrity," Revision 4 (ADAMS Accession No. ML051090200).

The NRC staff has determined that the additional information contained in the enclosure to this letter is needed to complete its review.

1. Proposed Limiting Condition for Operation (LCO) 3.4.5.b for both BVPS-1 and 2 states, "With Action a not being completed within the specified completion time, be in HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours." TSTF-449 states the following for this specific LCO: "If the Required Actions and associated Completion Times of Condition A are not met or if steam generator (SG) tube integrity is not being maintained, the reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours." Please provide justification for removing the key requirement to shutdown the reactor if SG tube integrity is not being maintained or alternatively discuss your plans to modify your TS LCO to include this key requirement and be consistent with TSTF-449. Also, discuss why you elected to remove the modes for this specification but not for others (i.e., you specify HOT STANDBY rather than MODE 3).

2. Proposed Surveillance Requirement (SR) 4.4.5.1 for both BVPS-1 and 2 states that the SG Program is used to verify SG tube integrity at a SG tube inspection frequency specified in the SG Program. Given that the SG Program only provides maximum inspection intervals, this statement is not appropriate. In addition, the maximum intervals provided in the SG Program may not be sufficient to ensure SG tube integrity and therefore, it may be necessary to inspect more frequently to ensure that SG tube integrity is being maintained. Please discuss your plans to remove the statement regarding the SG tube inspection frequency.

Enclosure

3. On page 3 of your November 7, 2005, submittal (ADAMS Accession No. ML0531401950) you indicated that for BVPS-1 your current and proposed TS operational primary-to-secondary leakage limit is 150 gallons-per-day (gpd) per SG measured at room temperature conditions. This leak rate (i.e., 150 gpd) is also what is assumed in your design-basis accident (DBA) analysis.

   The NRC staff and the industry (through TSTF-449, Revision 4) have used the term accident-induced leakage to include any primary-to-secondary leakage existing prior to the accident plus the primary-to-secondary leakage induced during the accident. This was done, in part, because with today's technology it is not possible to distinguish whether the leakage during a DBA is coming from flaws that were leaking during normal operation or whether the leakage is coming from flaws that were not leaking during normal operation. Based on your proposed TS Bases Section 3/4.4.5, “Steam Generator (SG) Tube Integrity,” it appears that you have adopted this definition of accident-induced leakage.

   The NRC staff recognizes that plants have assumed that the leak rate during a DBA is the same as the leak rate during normal operation. However, it is important and required that neither of these limits are exceeded. As a result, it may be necessary to ensure that the operational leak rate is kept well below the operational leak rate limit since the leak rate experienced during a DBA may be higher than that observed during normal operation. This increase in leak rate can be a result of either, (1) the higher differential pressure associated with a DBA causing the leak rate from flaws leaking during normal operation to leak at higher rates or (2) the higher loadings associated with a DBA causing a flaw that was not leaking during normal operation to leak during the accident.

   Although BVPS-1 plans to replace the existing SGs with new SGs having a number of improved design and material changes in the spring of 2006, it is possible in the future that you will observe operating leakage and that you may also be postulating leakage during a DBA. From your submittal, it is not clear that you won't exceed the accident-induced leakage limit. For example, if you were projecting to observe an accident-induced primary-to-secondary leak rate of 40 gpd and you had a 60-gpd operational primary-to-secondary leak rate, the leak rate during DBAs could be greater than 150 gpd. This is because the operational primary-to-secondary leak rate may double to 120 gpd due to the increase in the differential pressure associated with the accident. When this leakage is combined with your projected accident-induced leak rate of 40 gpd, the total leak rate during the DBA would be 160 gpd which is greater than that assumed during your DBA analysis. The NRC staff notes that it is most likely not feasible (with today's technology) to ascertain whether the operating leak rate is a result of flaws also projected to leak during a DBA.

   Given the above, discuss whether your procedures recognize this potential leakage issue or discuss your plans to modify your procedures to ensure that you will not exceed the accident-induced leak rate limit as a result of the higher leak rates that may be observed during a DBA (as a result of inducing "new" leakage or as a result of the higher driving force for leakage). Alternatively, discuss your plans (and the technical basis) for modifying your normal operating and accident-induced leakage limit to address these effects.

4. Proposed TS Section 6.9.7, “Steam Generator Tube Inspection Report,” indicated that you use the Electric Power Research Institute (EPRI) Guidelines definition of active degradation. The NRC staff has found that the industry’s definition of active degradation is misleading since tubes could have degradation that is progressing (or present on the tubes) but the degradation could be classified as “not active” (refer to ADAMS Accession Nos. ML010320218 and ML012200349). As a result, please discuss your plans to modify your TSs to remove the reference to the EPRI guidelines.

5. Given that the new TSs provided in TSTF-449 do not allow operation when the accident-induced leakage criteria is exceeded, please discuss your plans to omit TS Section 6.9.7.1.

6. The accident-induced leakage performance criteria in TSTF-449 consists of 2 limits: (1) a limit established in your current design and licensing basis and (2) a limit of 1 gpm which is based on severe accident considerations. In your proposal, you replaced the 1-gpm limit with the limit listed in LCO 3.4.6.2.c of 150 gpd for both BVPS-1 and 2. Although the 150-gpd limit is acceptable (since it is less than 1 gpm), it is not clear why it is necessary to reference LCO 3.4.6.2.c. Discuss your plans to remove reference to LCO 3.4.6.2.c and to change the second part of the accident-induced leakage limit to 1 gpm, consistent with TSTF-449.

7. For BVPS-2, you proposed in TS Section 6.19.c that leakage would not exceed 150 gpd per SG except for specific types of degradation at specific locations. However, the actual alternate tube repair criteria that may be applied is described in TS Section 6.19.c.1. Please discuss your plans to modify your proposed TSs to more precisely reflect the location of the applicable alternate tube repair criteria. Since proposed TS Section 6.19.c.1 does not specify what sources of accident-induced leakage shall be limited to 150 gpd, discuss your plans to clarify the accident-induced leakage performance criterion. For example, one way to clarify the performance criterion might be to state, "Leakage from all sources, excluding the leakage attributed to the degradation described in TS Section 6.19.c.1, is not to exceed 150 gpd per SG."

8. One of the purposes of TSTF-449 is to allow licensees to update their TSs to accurately reflect their SG tube integrity program. TS Section 6.19.c indicated that flaws with a percent through-wall depth of 32 percent for ABB Combustion Engineering Tungsten Inert Gas (TIG) Welded Sleeves and 25 percent for Westinghouse Laser Welded Sleeves are to be plugged. It is the NRC staff’s understanding that you are plugging on detection, any flaws in sleeved tubes (refer to page 5 of your submittal). Plugging on detection is normally performed when flaws cannot be reliably sized or when the threshold of detection is near the repair limit. Please discuss your plans to modify your proposed TSs to reflect current industry practice of plugging on detection, flaws in sleeved tubes.

   In addition to the above, the original qualification of these sleeves assumed that there was no degradation in the parent tube at the sleeve joint (i.e., a flaw at the plugging limit of 40 percent through-wall was not assumed). As a result of this, it is the NRC staff's understanding that when degradation is detected in a parent tube at a joint between a tube and sleeve, that tube would be plugged. Please discuss your plans for modifying

your proposed TSs to clarify that plugging on detection is required when degradation of the parent tube is detected at a sleeve joint.

9. The level of detail provided in proposed TS Section 6.19.d.4, regarding sleeve inspections is no longer needed. This information is superceded by the requirement to inspect the tubes with eddy current techniques and equipment at intervals capable of detecting all possible flaw types and at intervals necessary to ensure SG tube integrity. Please discuss your plans to remove TS Section 6.19.d.4.

10. In order for your TSs to accurately reflect your SG tube integrity program, TS Section 6.19.d.5 should indicate that the tubes will be inspected full-length with a bobbin probe in accordance with the tube-to-tube support plate repair criteria amendment. Please discuss your plans to further clarify the inspection requirements in TS Section 6.19.d.5. The bobbin probe is specified in your current TSs.

11. A safety factor of 1.4 against burst applied to the DBA primary-to-secondary pressure differentials was indicated in TS Section 6.19.b.1. Generic Letter (GL) 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking," indicated that there is a possibility that a tube may have a burst pressure less than 1.4 times the steam line break pressure differential (given the uncertainties associated with the various correlations), therefore, the GL 95-05 alternate repair criteria (ARC) imposed a limit on the probability of burst (POB) of $1X10^{-2}$. As a result, it is not clear from your submittal that the structural integrity performance criteria is complete, since it does not fully address all the performance criteria for implementation of the voltage-based ARC. Please discuss your plans to modify the performance criteria to fully address the voltage-based ARC. For example, discuss your plans for modifying the structural integrity performance criteria to indicate that for predominately axially-oriented outside diameter stress-corrosion cracking (ODSCC) at the tube support plate elevations, the POB of one or more indications, given a steam line break, shall be less than $1X10^{-2}$.

12. For BVPS-2, you indicate on page 6 of your submittal that the main steam line break dose analysis assumes 2.8 gpm leakage (2.5 gpm from the faulted SG and 0.3 gpm from the non-faulted SG). You further indicate that other accidents (that assume primary-to-secondary leakage exists) assume there is 150 gpd leakage. Please clarify whether this is 150 gpd per SG or 150 gpd total from all 3 SGs. If the latter, please discuss what controls are in place to make sure the accident-induced leakage criteria is not exceeded as a result of having operating leakage from all 3 SGs at levels below their limit (e.g., all 3 SGs leaking at 60 gpd).

13. In proposed TS Section 6.9.7.a for BVPS-2, you indicate that you will also report the number and extent of sleeves examined. Since this should already be included in the "scope of inspections performed on each SG," it is not clear why this was added. Please discuss why this extra phrase is needed (i.e., not encompassed in the first part of the requirement) or discuss your plans for removing it.

14. The NRC staff has made several other observations regarding TS Section 6.19 for BVPS-2 and they are listed below.

a. TS Section 6.19.c.1 states that the plugging (repair) limit at tube support plate intersections is based on maintaining SG tube serviceability. Please discuss your plans to remove the phrase “maintaining SG tube serviceability” since serviceability is not defined in your proposed TSs.

b. Please discuss why the phrase “indications of potential degradation” was removed from TS Sections 6.19.c.1.c and 6.19.c.1.d or alternatively discuss your plans to modify your proposed TSs to be consistent with TSTF-449.

c. There are two TS Sections 6.19.c.1.d in your proposed TSs. The second TS Section 6.19.c.1.d should be 6.19.c.1.e. In addition, once the numbering is corrected, TS Section 6.19.c.1.e should state that during an unscheduled mid-cycle inspection, the mid-cycle repair limits apply instead of the limits specified in 6.19.c.1.a, 6.19.c.1.b, 6.19.c.1.c, and 6.19.c.1.d. Also, a statement such as, “implementation of these mid-cycle repair limits” should follow the same approach as in TS Sections 6.19.c.1.a through 6.19.c.1.d consistent with your current TSs.

d. In TS Section 6.19.d, it is stated that previous defects or imperfections in an area repaired by sleeving are not considered an area requiring re-inspection. Given that the terms “defect” and “imperfection” are not defined in TSTF-449, please discuss your plans to modify this proposed TS using terminology such as, “the portion of the original tube wall between a sleeve’s joint does not need to be inspected.”

e. TS Section 6.19.c.1.c should be referenced in TS Section 6.19.c.1.b.

15. In your proposed TS (and TSTF-449), a SG tube is defined as the entire length of the tube, including the tube wall and any repairs made to it, between the tube-to-tubesheet weld at the tube inlet and the tube-to-tubesheet weld at the tube outlet. Given this definition, the proposed repair criteria in TS 6.19.c could be misinterpreted. Please discuss your plans to modify your proposed TS 6.19.c to more clearly define the repair criteria for the sleeved portion of a tube. For example, the TS may be modified using the following:

a. The non-sleeved region of a tube found by inservice inspection to contain flaws with a depth equal to or exceeding 40 percent of the nominal tube wall thickness shall be plugged or repaired except when alternate tube repair criteria permitted by TSs are satisfied.

Tubes shall be plugged if the sleeved region of a tube is found by in-service inspection to contain flaws in the (a) sleeve or (b) pressure boundary portion of the original tube wall in the sleeve-tube assembly (i.e., the sleeve-to-tube joint).

b. The following alternate repair criteria may be applied as an alternative to the 40-percent depth-based criteria.

cc:

Gary R. Leidich
President and Chief Nuclear Officer
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-19
76 South Main Street
Akron, OH 44308

Joseph J. Hagan
Senior Vice Presdient of Operations
and Chief Operating Officer
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-14
76 South Main Street
Akron, OH 44308

Danny L. Pace
Senior Vice President, Fleet Engineering
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-14
76 South Main Street
Akron, OH 44308

Jeannie M. Rinckel
Vice President, Fleet Oversight
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-14
76 South Main Street
Akron, OH 44308

David W. Jenkins, Attorney
FirstEnergy Corporation
Mail Stop A-GO-18
76 South Main Street
Akron, OH 44308

Manager, Fleet Licensing
FirstEnergy Nuclear Operating Company
Mail Stop A-GHE-107
395 Ghent Road
Akron, OH 44333

Beaver Valley Power Station
Mail Stop A-BV-SEB1
P.O. Box 4, Route 168
Shippingport, PA 15077

Lew W. Myers
Executive Vice President, Special Projects
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Mail Stop A-BV-SGRP
P.O. Box 4, Route 168
Shippingport, PA 15077

Manager, Site Regulatory Compliance
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Mail Stop A-BV-A
P.O. Box 4, Route 168
Shippingport, PA 15077

Commissioner James R. Lewis
West Virginia Division of Labor
749-B, Building No. 6
Capitol Complex
Charleston, WV 25305

Director, Utilities Department
Public Utilities Commission
180 East Broad Street
Columbus, OH 43266-0573

Director, Pennsylvania Emergency
Management Agency
2605 Interstate Dr.
Harrisburg, PA 17110-9364

Ohio EPA-DERR
ATTN: Zack A. Clayton
P.O. Box 1049
Columbus, OH 43266-0149

James H. Lash
Vice President
FirstEnergy Nuclear Operating Company

Beaver Valley Power Station, Unit Nos. 1 and 2 (continued)

cc:

Dr. Judith Johnsrud
Environmental Coalition on Nuclear Power
Sierra Club
433 Orlando Avenue
State College, PA 16803

Director
Bureau of Radiation Protection
Pennsylvania Department of
Environmental Protection
Rachel Carson State Office Building
P.O. Box 8469
Harrisburg, PA 17105-8469

Mayor of the Borough of Shippingport
P.O. Box 3
Shippingport, PA 15077

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 298
Shippingport, PA 15077