Exelon Nuclear
200 Exelon Way
Kennett Square, PA 19348

www.exeloncorp.com

Exelon Nuclear

10 CFR 50.90

July 24, 2001

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Peach Bottom Atomic Power Station, Unit 3
Facility Operating License No. DPR-56
NRC Docket No. 50-278
License Amendment Request (LAR) 01-00430

Dear Sir/Madam:

In a letter dated May 30, 2001, Exelon Generation Company, LLC, submitted License Amendment Request 01-00430, in accordance with 10 CFR 50.90, requesting an amendment to the Technical Specifications (Appendix A) of Operating License No. DPR-56, for Peach Bottom Atomic Power Station (PBAPS), Unit 3. This proposed change will revise Technical Specifications (TS) Section 5.5.12 ("Primary Containment Leakage Rate Testing Program") to reflect a one-time deferral of the Type A Containment Integrated Leak Rate Test (ILRT). Additionally, in a separate letter also dated May 30, 2001, Exelon Generation Company, LLC, submitted detailed performance based, risk-informed information to support this License Amendment Request.

In response to a meeting between Exelon Generation Company, LLC, and the U. S. Nuclear Regulatory Commission staff on June 21, 2001, attached is an additional sensitivity analysis titled "Sensitivity Calculation for the ILRT Extension Risk Assessment" in support of our request. Also, attached is a revised Technical Specifications page, which will reflect a one-time deferral of the Type A Containment Integrated Leak Rate Test (ILRT) to no later than December 2006, rather than the originally requested extension to December 2007. These changes are bounded by the conclusions of the three responses to the No Significant Hazards Consideration. Additionally, these changes do not alter the Conclusions, or the Information Supporting an Environmental Impact Assessment in LAR 01-00430.

If you have any questions, please do not hesitate to contact us.

Very truly yours,

D. G. Helker /For

James A. Hutton
Director - Licensing

Enclosures: Affidavit, Attachments

cc: H. J. Miller, Administrator, Region I, USNRC
A. C. McMurtray, USNRC Senior Resident Inspector, PBAPS
R. R. Janati, Commonwealth of Pennsylvania

A001

COMMONWEALTH OF PENNSYLVANIA:

: ss.

COUNTY OF CHESTER :

J. J. Hagan, being first duly sworn, deposes and says:

That he is Senior Vice President of Exelon Generation Company, LLC; the Applicant herein; that he has read the attached information concerning License Amendment Request 01-00430, for Peach Bottom Facility Operating License DPR-56, and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

J J Hagan

Senior Vice President

Subscribed and sworn to

before me this 24th day

of July 2001.

Vivia V. Gallimore

Notary Public

Notarial Seal
Vivia V. Gallimore, Notary Public
Tredyffrin Twp., Chester County
My Commission Expires Oct. 6, 2003
Member, Pennsylvania Association of Notaries

ATTACHMENT 1

PEACH BOTTOM ATOMIC POWER STATION
UNIT 3

Docket No. 50-278

License No. DPR-56

LICENSE AMENDMENT REQUEST
01-00430

ADDITIONAL SENSITIVITY ANALYSIS

PEACH BOTTOM ATOMIC POWER STATION

SENSITIVITY CALCULATION FOR THE ILRT EXTENSION RISK ASSESSMENT

P1050001-1811

Prepared by: Donald E. Vanover Date: June 25, 2001

Reviewed by: [signature] Date: June 25, 2001

Accepted by: [signature] Date: June 25, 2001

Approved by: [signature] Date: June 27, 2001

Revisions:

Rev.	Description	Preparer/Date	Reviewer/Date	Approver/Date
1	Include additional discussion.	Donald E. Vanover 7/17/01	[signature] 7/17/01	[signature] 7/17/01

In response to discussions between the NRC and Exelon at a public meeting on June 21, 2001, an additional sensitivity was performed assuming similar boundary conditions to those from a previously submitted request for an ILRT interval extension. This sensitivity is being performed to allow for a more direct comparison with other submittals and to illustrate that the ILRT Type A interval extension is non-risk significant. The sensitivity includes an assumed change in extension time from 16 years to 15 years and includes an alternate characterization of the EPRI methodology Class 1 and Class 3 release bins used in the evaluation.

The table below summarizes the treatment of each of the EPRI Release Scenario Types performed in the Peach Bottom ILRT extension risk assessment [1] and provides a comparison with the Indian Point 3 submittal [2].

Table 1
Treatment of EPRI Release Types in the ILRT Extension Assessments

Release Type [(1)]	Description	IP3 Submittal [2]	PB Submittal [1]
1	No Containment Failure	Frequency is reduced as Type 3 releases increase, and also assumes that leakage magnitudes increase to $2L_a$ and higher	Frequency is reduced as Type 3 releases increase, but assumes no increase above $1L_a$
2	Large Isolation Failures (Failure to Close)	No change from baseline consequence measures	Represented by "Large" isolation failures (Base case failure rate = 3E-6). Release assumed to be of sufficient magnitude for LERF. Sensitivity cases explored changes in this value up to 3E-4.
3, 4, 5	Small Isolation Failures (Failure to Seal)	Categorized as Release Types 3a ("Small", ~$10L_a$, non-LERF) and 3b ("Large", ~$35L_a$, assumed to be LERF). Small and Large Failure probabilities developed from 95th percentile of the χ^2 distribution of data from NUREG-1493. (0.064 and 0.021, respectively)	Represented by "Small" isolation failures (Base case failure probability = 4E-5 from the NUREG/CR-4220 mean reported value of 5E-3 assuming a 3-day detection time). Release assumed to be of sufficient magnitude for LERF. Sensitivity cases explored changes in this value up to 4E-3.
6	Other Isolation Failures	No change from baseline consequence measures	No change from baseline consequence measures
7	Failures Induced by Phenomena (Early and Late)	No change from baseline consequence measures	No change from baseline consequence measures
8	Bypass	Characterized by SGTR scenarios – not impacted by ILRT extension	Characterized by ISLOCA scenarios – not impacted by ILRT extension

(1) EPRI TR-104285 Containment Response Class

It is our understanding that a subsequent submittal by another utility made the same assumptions in performing their analysis as shown in Table 1 with the exception of the $2L_a$ release magnitude assumption for the Release Type 1 scenarios. To investigate the use of this approach for Peach Bottom, an additional sensitivity calculation was performed. This included the development of revised baseline mean consequence measures, and then assuming that an ILRT extension to a fifteen year interval would lead to a 15% increase in the probability of the Type 3a and Type 3b pre-existing isolation failures compared to the values obtained from data obtained when the test interval was 3 in 10 years.

Table 2 provides the revised baseline consequence measures using the Peach Bottom data in the manner utilized in the subsequent submittal described above. In addition, in this case, Accident Progression Bin 8 from the NUREG/CR-4551 results for Peach Bottom is assumed to provide the representative $1L_a$ release magnitude (obtained from Table 5-2 from the original submittal for Peach Bottom). Additionally, a further breakdown of Release Type 1 compared to the original submittal is necessary for this calculation: (1) Type 1a that represents the true no containment failure sequences; and (2) Type 1b that represents the other scenarios (i.e., venting and no vessel breach) that had previously been grouped in the EPRI Type 1 category in the original submittal for Peach Bottom. The revised baseline calculated population dose of 6.29 person-rem/yr is slightly higher than the calculated baseline population dose of 6.21 person-rem/yr shown in the original submittal for Peach Bottom that was obtained from the default assumptions utilized in the current Level 2 model.

Table 2
Revised Base Case Mean Frequencies and Consequence Measures
Using a Type 3a ($10L_a$) Failure Probability of 0.064
and a Type 3b ($35L_a$) Failure Probability of 0.021

Release Type	Description	Frequency (per Rx-yr)	Person-rem (50-miles)	Person-rem/yr (50-miles)
1a	No Containment Failure ($1L_a$ Release Magnitude Assumed)	1.79E-6	8.30E3	1.49E-2
1b	Other (Including Successful Venting and No VB)	2.25E-8 7.38E-7	3.28E6 3.44E5	7.38E-2 2.54E-1
2	Large Isolation Failures (Failure to Close)	Negligible	4.98E6	Negligible
3a	Small Isolation Failures (Type A Test, $10L_a$ Release Magnitude)	0.064 * CDF = 2.90E-7	8.30E4	2.41E-2
3b	Large Isolation Failures (Type A Test, $35L_a$ Release Magnitude)	0.021 * CDF = 9.52E-8	2.91E5	2.76E-2
6	Other Isolation Failures (e.g., dependent failures)	Negligible	4.98E6	Negligible
7	Failures Induced by Phenomena (Early and Late)	1.59E-6	3.70E6	5.88
8	Bypass (Interfacing System LOCA)	2.30E-9	3.78E6	8.70E-3
CDF	All CET End states	4.53E-6		6.286

Table 3 provides the revised calculated consequence measures using the Peach Bottom data to break out the Type 3a and 3b releases, and by assuming that the ILRT interval extension to fifteen years results in a 15% increase in the probability of pre-existing failures that lead to Type 3a or Type 3b scenarios.

Table 3
Updated Mean Frequencies and Consequence Measures Assuming That the ILRT interval Extension Leads to a 15% Increase in the Type 3a and Type 3b Failure Probabilities

Release Type	Description	Frequency (per yr)	Person-rem (50-miles)	Person-rem/yr (50-miles)
1a	No Containment Failure ($1L_a$ Release Magnitude Assumed)	1.74E-6	8.30E3	1.44E-2
1b	Other (Including Successful Venting and No VB)	2.25E-8 7.38E-7	3.28E6 3.44E5	7.38E-2 2.54E-1
2	Large Isolation Failures (Failure to Close)	Negligible	4.98E6	Negligible
3a	Small Isolation Failures (Type A Test, $10L_a$ Release Magnitude)	1.15*0.064*CDF = 3.34E-7	8.30E4	2.77E-2
3b	Large Isolation Failures (Type A Test, $35L_a$ Release Magnitude)	1.15*0.021*CDF = 1.09E-7	2.91E5	3.18E-2
6	Other Isolation Failures (e.g., dependent failures)	Negligible	4.98E6	Negligible
7	Failures Induced by Phenomena (Early and Late)	1.59E-6	3.70E6	5.88
8	Bypass (Interfacing System LOCA)	2.30E-9	3.78E6	8.70E-3
CDF	All CET End states	4.53E-6		6.293

In this case, the total Person-rem/yr at 50-miles is increased to 6.293 from the revised baseline value of 6.286. With the data provided in this fashion, it can also be assumed that the change in LERF is represented by the change in the Type 3b frequency. Applying this assumption leads to a calculated increase in LERF of 1.42E-8/yr. These calculated increases are consistent with the calculated increases from the pessimistic upper bound sensitivity case from the original submittal for Peach Bottom. A summary of the results from the previously calculated submittal cases and from this additional sensitivity case (expanded to also include conditional containment failure probabilities for each case) is included in Table 4.

Table 4
PBAPS ILRT Extension Summary of Results

Case: Description	LERF(1) Increase (per yr)	Increase in Person-Rem/yr (50 miles-2000)	Increase in CCFP(2) (%)
Case 1: Best Estimate (ILRT Extension to sixteen years leads to a 16% increase in the probability of a pre-existing undetected leak)	1.0E-11	2.0E-4	1.0E-2
Case 2: Best Estimate Upper Bound (Probability of pre-existing leak is at upper bound value of 1.0E-2 instead of 5.0E-3)	6.0E-11	4.3E-4	2.0E-2
Case 3: Pessimistic Upper Bound (ILRT extension leads to a hundred fold increase in the probability of a pre-existing undetected leak)	9.6E-9	0.06	2.6E-1
Additional Sensitivity Case: Type 3a and Type 3b release probabilities calculated in same approach/assumptions as a previous submittal	1.4E-8	0.007	3.1E-1

(1) Large Early Release Frequency
(2) Conditional Containment Failure Probability

Note that while the additional sensitivity case leads to a slightly higher increase in LERF when compared to the previous pessimistic upper bound case, there is not a similar increase in the calculated population dose. This difference is due to the assumptions used in the various analyses for the representative population doses in each case. The original submittal focused on large isolation failures and assumed that all isolation failures would be characterized by a population dose obtained from the updated Bin 3 dose from NUREG/CR-4551 (4.98E6 person-rem/yr from Table 5-2 of the original submittal) which is about an order of magnitude higher than that obtained using the methodology employed here based on $35L_a$ (2.91E5 person-rem/yr). The original focus on large isolation failures neglected the potential impact from increases to the population dose from small isolation failures. The assumption in the original submittal to focus only on large isolation failures was partially based on the NUREG-1493 [3] conclusion for Peach Bottom that "Increasing the containment leakage rate from the nominal 0.5 percent per day to 5 percent per day leads to a barely perceptible increase in the population exposure." The revised analysis explored here, however, provides an estimate of the potential increase in population dose if the ILRT deferral leads to increases in probabilities of smaller isolation failures rather than to the less probable larger isolation failures.

As a point of reference, Table 4.7.4.2-1 from the PBAPS IPE [4] provides the release severity and classification scheme used in the PBAPS Level 2 model. A High release is associated with those scenarios that can be characterized by a CsI release fraction of greater than 10%, and an early release is one that occurs in less than 6 hours. The combination of the High and Early categories is then what is typically used when reporting Large Early Release Frequencies for Peach Bottom. The reported LERF values in the original submittal were based on a full quantification of the Level 2 model and included all end states that were assigned to this category where all containment isolation failure events represented one contribution to this category. It should be noted that the full quantification of the model includes truncation of sequences that fall below a certain minimum cutoff value. Because of this truncation process and since the full quantification process does not include the questioning of containment isolation failures for those sequences where containment failure or bypass occurs before core damage (e.g., loss of containment heat removal or interfacing system LOCA sequences), the contribution from the individual basic event values cannot be obtained directly by multiplying the core damage frequency from the Level 1 analysis by the value utilized in the Level 2 analysis.

Based on the LERF criteria in the PBAPS Level 2 model, it appears that the characterization of the Type 3b release scenario as a LERF scenario when compared to other LERF scenarios may be conservative from a release magnitude perspective. In any event, the methodology employed here in this additional sensitivity case provides an estimated increase in LERF of 1.42E-8/yr (using the increase in the Type 3b release scenario frequency as a surrogate for LERF).

The risk-informed treatment of regulatory issues is addressed by a series of Regulatory Guides. These Regulatory Guides use CDF or LERF as two of the quantitative parameters that are compared with acceptance guidelines to assess the magnitude of the changes in the risk profiles. Regulatory Guide 1.174 provides acceptance guidelines for determining the risk impact of plant-specific changes to the licensing basis. In that Regulatory Guide, a very small increase in risk (non-risk significant) is defined as a core damage frequency (CDF) change below 10^{-6}/yr and a large early release frequency (LERF) change below 10^{-7}/yr. For the ILRT extension, the calculated CDF does not change and only LERF is impacted. Because the guidance in Regulatory Guide 1.174 defines very small changes in LERF as below 1.0E-7/yr, increasing the ILRT interval to fifteen years can be seen to have very low risk significance.

SUMMARY AND CONCLUSIONS

This analysis provides a comparison of the treatment of the EPRI release types between the PBAPS submittal for the ILRT extension request compared to what was done in other submittals. If the approach from the other submittals for the failure probabilities is used instead of the default values used by PBAPS, a slightly different measured potential impact on LERF, population dose, and CCFP from the proposed ILRT extension is calculated compared to the original analysis, but it does not change the conclusions. The results from the original submittal and from the additional sensitivity case explored here lead to the conclusion that the ILRT extension is of very low risk significance based on the criteria in Regulatory Guide 1.174.

REFERENCES

[1] *Peach Bottom Atomic Power Station Risk Impact Assessment Of Extending The Containment Type A Test Interval,* ERIN P1050001-1792, May 2001.

[2] *Risk Impact Assessment of Extending Containment Type A Test Interval,* IP3-CALC-VC-03357, Revision 0, January 2001.

[3] *Performance-Based Containment Leak-Test Program,* NUREG-1493, September 1995.

[4] *Peach Bottom Atomic Power Station Units 2 and 3 Response to NRC Generic Letter 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities,"* Philadelphia Electric Company, August 26, 1992.

ATTACHMENT 2

PEACH BOTTOM ATOMIC POWER STATION
UNIT 3

Docket No. 50-278

License No. DPR-56

FINAL TECHNICAL SPECIFICATIONS PAGE

Attached Page

TS Page 5.0-17

5.5 Programs and Manuals

5.5.11 Safety Function Determination Program (SFDP) (continued)

1. A required system redundant to system(s) supported by the inoperable support system is also inoperable; or

2. A required system redundant to system(s) in turn supported by the inoperable supported system is also inoperable; or

3. A required system redundant to support system(s) for the supported systems (b.1) and (b.2) above is also inoperable.

c. The SFDP identifies where a loss of safety function exists. If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

5.5.12 Primary Containment Leakage Rate Testing Program

A program shall be established to implement the leakage rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions. This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995, as modified by the following exceptions to NEI 94-01, Rev. 0, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J":

a. Section 10.2: MSIV leakage is excluded from the combined total of 0.6 L_a for the Type B and C tests.

b. Section 9.2.3: The first Type A test performed after the December, 1991 Type A test shall be performed no later than December, 2006.

The peak calculated containment internal pressure for the design basis loss of coolant accident, P_a, is 49.1 psig.

The maximum allowable primary containment leakage rate, L_a, at P_a, shall be 0.5% of primary containment air weight per day.

Leakage Rate acceptance criteria are:

a. Primary Containment leakage rate acceptance criterion is ≤ 1.0 L_a. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are ≤ 0.60 L_a for the Type B and Type C tests and ≤ 0.75 L_a for Type A tests;

(continued)