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January 8, 2003

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Corporation
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
McGuire Nuclear Station, Units 1 and 2
Docket Numbers 50-369 and 50-370
Proposed Technical Specifications (TS) Amendments
Technical Specification 5.5.2 (Containment Leakage Rate Testing Program)
One-Time Extension of Integrated Leak Rate Testing (ILRT) Interval

References:

1. Letter from Duke Energy Corporation to NRC, same subject, dated May 29, 2002
2. Letter from Duke Energy Corporation to NRC, same subject, dated September 25, 2002
3. Letter from Duke Energy Corporation to NRC, same subject, dated November 12, 2002

In Reference 1, Duke Energy Corporation submitted a request for amendments to the Catawba and McGuire Nuclear Station Facility Operating Licenses and TS. These amendments will allow, on a one-time basis, extension of the interval governing the conduct of ILRT from ten to fifteen years.

On October 30, 2002, a conference call was held among various representatives of Duke Energy Corporation and the NRC to discuss the subject request. Reference 3 submitted a partial response to requests for additional information raised by the NRC during the conference call. This letter transmits the remainder of the response to the requests for additional information. Attachment 1 to this letter provides the response.

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The original conclusions of the No Significant Hazards Consideration Analysis and the Environmental Analysis as delineated in Reference 1 are unchanged as a result of this amendment request supplement.

Pursuant to 10 CFR 50.91, copies of this letter are being sent to the appropriate state officials.

There are no regulatory commitments contained in this letter or its attachment.

Inquiries on this matter should be directed to L.J. Rudy at (803) 831-3084.

Very truly yours,

M.S. Tuckman

M.S. Tuckman

LJR/s

Attachment

M.S. Tuckman affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

M.S. Tuckman
M.S. Tuckman, Executive Vice President

Subscribed and sworn to me: Jan 8, 2003
Date

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ELL-EC050

ATTACHMENT 1

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION (REMAINDER)

NRC Request:

During a conference call with the NRC on 10/30/2002, the NRC requested the following additional information:

1. The impact of all events (internal and external) on the LERF estimates.
2. The Person-Rem risk using the NUREG-1150 population dose data contained in the example problem in NEI ILRT Extension guidance.
3. A sensitivity study of the impact of corrosion in the uninspectable areas of containment. The NRC requested that a study similar to the Calvert Cliffs study be performed.

Duke's Response:

1. **Impact of Internal and External Events on LERF Estimates**

The increase in LERF for all events associated with extending the ILRT interval is estimated by multiplying the Class 3b (large leak, LERF) probability and the Non-LERF CDF. The Catawba and McGuire CDF and LERF for all events are provided in Table 1.

Table 1
Catawba and McGuire CDF and LERF Estimate
Internal and External Events

Plant	CDF	LERF	Non-LERF
Catawba	5.84E-05/yr	5.89E-06/yr	5.25E-05/yr
McGuire	4.88E-05/yr	4.00E-06/yr	4.48E-05/yr

The probability of Class 3b for the various ILRT intervals of interest is provided in Table 2.

Table 2
Class 3b Probability for Various ILRT Intervals

Test Interval	Probability of Class 3b
3 per 10 Years (Baseline)	2.80E-03
10 Years	8.40E-03
15 Years	1.26E-02
18 Years	1.51E-02
20 Years	1.68E-02

The estimated LERF for the ILRT intervals of interest is provided in Table 3.

Table 3
LERF Estimates for Various ILRT Intervals
Internal and External Events

Test Interval	Catawba		McGuire	
	LERF due to Type A Leakage (yr^{-1})	Total LERF (yr^{-1})	LERF due to Type A Leakage (yr^{-1})	Total LERF (yr^{-1})
3 per 10 Years (Baseline)	1.47E-07	6.04E-06	1.25E-07	4.13E-06
10 Years	4.41E-07	6.33E-06	3.76E-07	4.38E-06
15 Years	6.61E-07	6.55E-06	5.65E-07	4.57E-06
18 Years	7.93E-07	6.69E-06	6.77E-07	4.68E-06
20 Years	8.82E-07	6.78E-06	7.53E-07	4.76E-06

The increase in LERF is the difference between the LERF for the test interval of interest and the base case LERF. These values are presented in Table 4.

Table 4
ΔLERF for a Given Test Interval

Test Interval	Catawba		McGuire	
	ΔLERF Relative to the Baseline (yr^{-1})	ΔLERF Relative to the Current (yr^{-1})	ΔLERF Relative to the Baseline (yr^{-1})	ΔLERF Relative to the Current (yr^{-1})
3 per 10 Years (Baseline)	0.00E+00		0.00E+00	
10 Years	2.94E-07	0.00E+00	2.51E-07	0.00E+00
15 Years	5.14E-07	2.20E-07	4.39E-07	1.88E-07
18 Years	6.46E-07	3.52E-07	5.51E-07	3.00E-07
20 Years	7.35E-07	4.41E-07	6.27E-07	3.76E-07

The increase in LERF is greater than 1E-07/yr but less than 1E-06/yr. The total LERF is less than 1E-05/yr.

2. Person-Rem Risk using the NUREG-1150 Population Dose

2.1 Description of the Method

The NRC requested that the person-rem analysis be performed using the NUREG-1150 population dose data contained in the NEI guidance (reference 4.1). The original submittal uses plant specific dose data to determine both the magnitude of the release as well as the frequency of the release. Specifically, the frequency of the release is estimated by multiplying the probability of a Class 3a or Class 3b leak by the containment end-states that could be impacted by the leak (i.e., the containment end-state dose is less than the estimated Class 3a or Class 3b dose). The original submittal uses more plant specific detailed data concerning containment end-states than the NEI guidance. Consequently, a one for one substitution of population doses cannot be performed. To perform this sensitivity study, the NEI method to calculate the 3a and 3b frequencies will be used.

2.2 Analysis

2.2.1NUREG-1150 Population Dose Data

The NEI guidance provides the following dose data from NUREG-1150 for each EPRI accident class:

Table 5
Accident Class Data

Class No.	Frequency	Leakage	Population Dose, person-rem	EPRI/ NUREG-1150 dose person-rem
1	(PRA Class 1) minus (F3a+F3b)	La	EPRI/ NUREG-1150	8.97E+01
2	Plant PRA	Plant PRA	EPRI/ NUREG-1150	4.07E+06
3a	Prob 3a*CDF	10La	(Class 1 dose for La)*10La	8.97E+02
3b	Prob 3b*CDF	35La	(Class 1 dose for La)*35La	3.14E+03
4	NA	NA	NA	NA
5	NA	NA	NA	NA
6	NA	NA	NA	NA
7	Plant PRA	Plant PRA	EPRI/ NUREG-1150	2.16E+06
8	Plant PRA	Plant PRA	EPRI/ NUREG-1150	1.24E+07

2.2.2Accident Class Data

From the original submittal, the Catawba and McGuire containment end-states can be placed into the following EPRI classifications:

Table 6
Catawba and McGuire PRA Revision 2 Risk Results Summary with NUREG-1150 Dose Data

Accident Class	Catawba Frequency (yr^{-1})	McGuire Frequency (yr^{-1})	Person-Rem
1	2.23E-05	1.72E-05	8.97E+01
2	1.31E-07	5.33E-08	4.07E+06
3a			8.97E+02
3b			3.14E+03
4			NA
5			NA
6			NA
7	2.38E-05	1.06E-05	2.16E+06
8	3.02E-07	2.46E-07	1.24E+07
Total	4.64E-05	2.81E-05	

2.2.3Class 3a and 3b Probabilities

In the original analysis, the Class 3a and 3b probabilities were estimated to be:

Table 7
Class 3a and 3b Probabilities

Test Interval	Probability of Class 3a Leakage	Probability of Class 3b Leakage
3 per 10 Years (Baseline)	0.028	2.80E-03
10 Years	0.084	8.40E-03
15 Years	0.126	1.26E-02
18 Years	0.151	1.51E-02
20 Years	0.168	1.68E-02

2.2.4Class 3a and 3b Frequencies

The Class 3a and 3b frequencies can be obtained by multiplying the CDF by the Class

3a and 3b probabilities. The Class 1 frequency must be modified in order to maintain a constant CDF since the ILRT extension does not impact CDF. The new Class 1 frequency is obtained by subtracting the Class 3a and 3b frequencies from the Class 1 frequency. The results are presented in Tables 8 and 9:

Table 8
Class 3a and 3b Frequencies for Catawba

Test Interval	Class 3a Frequency	Class 3b Frequency	Revised Class 1 Frequency
3 per 10 Years (Baseline)	1.30E-06	1.30E-07	2.09E-05
10 Years	3.90E-06	3.90E-07	1.80E-05
15 Years	5.85E-06	5.85E-07	1.59E-05
18 Years	7.01E-06	7.01E-07	1.46E-05
20 Years	7.80E-06	7.80E-07	1.37E-05

Table 9
Class 3a and 3b Frequencies for McGuire

Test Interval	Class 3a Frequency	Class 3b Frequency	Revised Class 1 Frequency
3 per 10 Years (Baseline)	7.88E-07	7.88E-08	1.63E-05
10 Years	2.36E-06	2.36E-07	1.46E-05
15 Years	3.54E-06	3.54E-07	1.33E-05
18 Years	4.25E-06	4.25E-07	1.25E-05
20 Years	4.73E-06	4.73E-07	1.20E-05

The method used to estimate the Class 3a and 3b frequencies in Tables 8 and 9 is more conservative than the method used in the original Duke analysis. The original Duke analysis used only those containment end-states with a dose less than the Class 3a or Class 3b dose as opposed to using the entire CDF as in the NEI guidance. Accident classes with a higher conditional dose should not be included in Class 3a and 3b since these classes represent more severe containment end states than Classes 3a and 3b. However, the method used for this sensitivity study is consistent with the NEI guidance.

2.2.5Person-Rem Risk Estimate

The Person-Rem risk is estimated by multiplying the different accident class frequencies by their respective doses. An example is provided for the Catawba 1 in 15 year test interval in Table 10.

Table 10
Calculation of Person-Risk -
1 in 15 Years Test Interval for Catawba

Accident Class	Frequency (yr^{-1})	Person-Rem	Person-Rem Risk (yr^{-1})[a]
1	1.59E-05	8.97E+01	0.0014
2	1.31E-07	4.07E+06	0.5332
3a	5.85E-06	8.97E+02	0.0052
3b	5.85E-07	3.14E+03	0.0018
7	2.38E-05	2.16E+06	51.4080
8	3.02E-07	1.24E+07	3.7448
Total	4.64E-05		55.6945

a. Additional figures reported in order to show change

Tables 11 and 12 present the results for all the test interval cases.

Table 11
Estimated Person-Risk Associated with
Extending ILRT Interval for Catawba

Test Interval	Person-Rem Risk (yr^{-1})[a]	Increase Relative to Base		Increase Relative to Current	
		Person-Rem Risk (yr^{-1})	Percent Increase	Person-Rem Risk (yr^{-1})	Percent Increase
3 per 10 Years (Baseline)	55.6894				
10 Years	55.6923	0.0029	0.005%		
15 Years	55.6945	0.0051	0.009%	0.0022	0.004%
18 Years	55.6958	0.0063	0.011%	0.0035	0.006%
20 Years	55.6966	0.0072	0.013%	0.0043	0.008%

a. Additional figures reported in order to show change

Table 12
Estimated Person-Risk Associated with Extending ILRT Interval for McGuire

Test Interval	Person-Rem Risk (yr^{-1})[a]	Increase Relative to Base		Increase Relative to Current	
		Person-Rem Risk (yr^{-1})	Percent Increase	Person-Rem Risk (yr^{-1})	Percent Increase
3 per 10 Years (Baseline)	26.2586				
10 Years	26.2604	0.0018	0.007%		
15 Years	26.2617	0.0031	0.012%	0.0013	0.005%
18 Years	26.2625	0.0038	0.015%	0.0021	0.008%
20 Years	26.2630	0.0044	0.017%	0.0026	0.010%

a. Additional figures reported in order to show change

2.3 Discussion of Results

The overall person-rem risk results using the Catawba and McGuire data are lower than the results using NUREG-1150 data (Catawba - 21.3 person-rem/yr versus 55.7 person-rem/yr, McGuire - 6.14 person-rem/yr versus 26.3 person-rem/yr). However, the increase (delta) associated with extending the ILRT interval is higher using the Catawba and McGuire data versus using the NUREG-1150 data. While there are slight differences in method, the main reason for the differences in the additional dose associated with extending the ILRT is the conditional person-rem used for Class 3a and 3b. The Class 3a conditional person-rem is 1.72E+04 using the Catawba data and 1.97E+04 using the McGuire data versus 8.97E+02 using the NUREG-1150 data. The Class 3b conditional person-rem is 9.41E+04 using Catawba data and 8.92E+04 using McGuire data versus 3.14E+03 using the NUREG-1150 data. The plant specific conditional person-rem data for Classes 3a and 3b range from a factor of 20 to 30 times higher than the NUREG-1150 person-rem data. Consequently the delta person-rem associated with extending the ILRT is higher in the DEC analyses while the overall doses are lower.

The percentage increase in person-rem risk using the Catawba and McGuire plant specific data is higher than the increase found in NUREG-1493.

However the overall increase in person-rem risk is still small (less than 0.1 person-rem/yr).

3. Impact of Potential Corrosion in the Uninspectable Areas of Containment

An analysis using a technique generally consistent with the Calvert Cliffs method is provided below.

3.1 Description of the Method

The following is a summary of the method used to estimate corrosion risk:

3.1.1 Estimate the historical failure probability due to corrosion on the uninspectable portions of containment.

3.1.2 Adjust the failure probability to account for aging (assumes a doubling of the failure probability every five years).

3.1.3 Estimate the increase in the failure probability due to extending the ILRT frequency.

3.1.4 Estimate the conditional Large Early Release probability.

3.1.5 Determine the increase in LERF associated with extending the ILRT frequency.

3.2 Assumptions

The following assumptions are used in the analysis:

3.2.1 A half failure is assumed for basemat concealed liner corrosion due to the lack of identified failures. This assumption is the same as assuming 1 failure in the next equivalent time period.

3.2.2 The success data was limited to 5.5 years to reflect the years since September 1996 when 10 CFR 50.55a started requiring visual examinations in accordance with the ASME Boiler and Pressure Vessel Code, Section XI, Subsection IWE.

3.2.3 The failure rate is assumed to double every five years. This is based solely on judgment and is included in this analysis to address the increased likelihood of corrosion as the containment ages.

3.2.4A 5% visual inspection detection failure likelihood given the flaw is visible and a total detection failure likelihood of 10% is used. To date, all liner corrosion events have been detected through visual inspection.

3.2.5The containment pressure boundary consists of the following areas:

Dome - 28% (+/- 1%)

Cylinder - 54% (+/- 1%)

Embedded Liner Plate (Basemat) - 18% (+/- 1%).

The portion of these areas that are accessible for visual inspections from at least one side are:

Dome - 100% (+0%, -1%)

Cylinder - 97% (+/- 2%)

Basemat - 0%.

It should be noted that all accessible surfaces areas on interior and exterior sides of the containment are visually examined in accordance with the ASME Code, Section XI, Subsection IWE (1992 Edition with the 1992 Addenda) in accordance with Duke's Containment ISI Program.

3.2.6Catawba and McGuire have free standing steel containments. The containment shell is much thicker than the containment liners of steel and concrete containments associated with through wall corrosion events. These events are also associated with debris embedded in the concrete containment next to the steel liner. This mechanism does not apply to the free standing steel containment. To account for these differences, a factor of 0.1 is applied to the corrosion failure probability of the containment cylinder and dome.

3.2.7 Since the Catawba and McGuire ILRT are conducted at 15 psig, failures of the containment liner embedded in the basemat (i.e., concrete on both sides) are not detectable by ILRT.

3.2.8 ILRTs can detect very small leaks in containment. These leaks can be much smaller than leaks necessary for LERF. It is assumed that only 10% of ILRT failures will be large enough to result in LERF.

3.3 Analysis

3.3.1 Historical Failure Probability

There have been several cases of corrosion in nuclear power plant containments. In the time period of interest (since 1996) there have been three events where a through wall hole in the containment liner has been identified. These are Brunswick 2 - 4/27/99, North Anna 2 - 9/23/99, and D. C. Cook 2 - November 1999.

The corrosion associated with the Brunswick event is believed to have started from the coated side of the containment liner. Although Catawba and McGuire have a different containment type, this event could potentially occur at Catawba and McGuire (i.e., corrosion starting on the coated side of containment). Construction material embedded in the concrete may have contributed to the corrosion.

The corrosion at North Anna is believed to have started on the uninspectable side of containment due to wood imbedded in the concrete during construction. Catawba and McGuire have free standing steel containments and would not be subject to the same type of event. Therefore, this event does not apply to Catawba and McGuire.

The D. C. Cook event is associated with an inadequate repair of a hole drilled through the liner during construction. Since the hole was created during construction and not caused by corrosion, this event does not apply to this analysis.

Based on the above data, there is 1 corrosion event from the previous 5.5 years that applies to Catawba and McGuire. The Brunswick corrosion event could potentially occur in any containment. Considering approximately 100 plants, the likelihood of a containment corrosion event can be calculated as follows:

For the Containment Cylinder and Dome,

$$\frac{1}{(100 \times 5.5)} = 1.82\text{E-}03/\text{yr}$$

Assuming a half failure for the containment basemat, the likelihood of a containment corrosion event for the basemat is:

For the Containment Basemat,

$$\frac{0.5}{(100 \times 5.5)} = 9.10\text{E-}04/\text{yr}$$

The Catawba and McGuire containment shells are much thicker than the containment liners of steel and concrete containments. Since the steel containment is much thicker than the typical steel liner of a concrete containment, it will take longer for a through wall hole to develop due to corrosion. Additionally, construction material in the concrete containment next to the liner may have contributed to the Brunswick event. Therefore, to account for these differences, a factor of 0.1 will be applied to the containment cylinder and dome value. No additional credit will be given to the containment basemat since the portion of containment embedded in the basemat is more similar to other containment types compared to the containment cylinder and dome.

For the Containment Cylinder and Dome,

$$\frac{1}{(100 \times 5.5)} \times 0.1 = 1.82\text{E-}04/\text{yr}$$

3.3.2Adjust the Failure Probability for Aging

Consistent with the Calvert Cliffs analysis, the failure probability is assumed to double every five years (1.149 per year). The average for the 5th to 10th year is set at the historical failure rate of 1.82E-04 for the containment cylinder and 9.10E-04 for the containment basemat. Table 13 contains the failure rate associated with years 0 through 15. The failure probability for any year can be obtained by multiplying the success rates for year 1 to the year of interest. The failure probability is obtained by subtracting this value from 1. As was done for Calvert Cliffs, the "base case" is assumed to be the failure probability for years 1 through 3.

Table 13
Failure Rate and Success Rate for Years 0 through 15

Year	Containment Cylinder and Dome		Containment Basemat	
	Failure Rate	Success Rate (1-FR)	Failure Rate	Success Rate (1-FR)
0	6.26E-05	0.9999	3.13E-04	0.9997
1	7.19E-05	0.9999	3.59E-04	0.9996
2	8.26E-05	0.9999	4.13E-04	0.9996
3	9.49E-05	0.9999	4.74E-04	0.9995
4	1.09E-04	0.9999	5.45E-04	0.9995
5	1.25E-04	0.9999	6.26E-04	0.9994
6	1.44E-04	0.9999	7.19E-04	0.9993
7	1.65E-04	0.9998	8.26E-04	0.9992
8	1.90E-04	0.9998	9.49E-04	0.9991
9	2.18E-04	0.9998	1.09E-03	0.9989
10	2.50E-04	0.9997	1.25E-03	0.9987
11	2.88E-04	0.9997	1.44E-03	0.9986
12	3.30E-04	0.9997	1.65E-03	0.9983
13	3.79E-04	0.9996	1.90E-03	0.9981
14	4.36E-04	0.9996	2.18E-03	0.9978
15	5.01E-04	0.9995	2.50E-03	0.9975

Table 14
Corrosion Failure Probability over Period of Interest

Test Interval	Containment Cylinder and Dome		Containment Basemat	
	Success Probability	Failure Probability (1-SP)	Success Probability	Failure Probability (1-SP)
Base (3 in 10 yr)	0.999751	2.49E-04	0.998754	1.25E-03
1 in 10 yr	0.998551	1.45E-03	0.992772	7.23E-03
1 in 15 yr	0.996621	3.38E-03	0.983210	1.68E-02

3.3.3 Conditional Large Early Release Probability

At Catawba and McGuire the integrated leak rate test is performed at 15 psig. At this pressure, it is unlikely that a hole through containment inside the basemat would be detected. Any leakage would have to go through the concrete on the inside of containment, through the hole in the steel liner, and somehow out the other side. Therefore, the likelihood of an ILRT failure due to corrosion of the liner inside the basemat that contributes to LERF is assumed to be zero.

A hole through containment could result in a failure of an ILRT. However, very small holes through containment may not result in LERF. It is assumed that only 10% of containment leaks large enough to be detected by the ILRT are large enough to contribute to the LERF.

Table 15
Conditional Large Early Release Probability due to Extending the ILRT Interval

Test Interval	Containment Cylinder and Dome	Containment Basemat
3 Test in 10 Years	2.49E-04 x 0.1 = 2.49E-05	1.25E-03 x 0 = 0
1 Test in 10 Years	1.45E-03 x 0.1 = 1.45E-04	7.23E-03 x 0 = 0
1 Test in 15 Years	3.38E-03 x 0.1 = 3.38E-04	1.68E-02 x 0 = 0

An ILRT is not the only method available to detect a containment failure due to corrosion. Visual inspections of containment will still be performed. Free standing steel containments offer a better opportunity for detection of corrosion compared to a steel lined concrete containment since both sides of containment are visible. However, the visual inspection failure probability assumed in the Calvert Cliffs analysis is assumed here. There is a 5% failure to visually detect a failure and 5% likelihood that the flaw is not visible but could be detected by ILRT. The visual detection failure probability is applied to the fraction of containment that is accessible for visual inspection. For the cylinder and dome, this fraction is approximately 0.98.

$$\text{Visual Inspection Fraction} = \frac{\text{Dome Visable Area} + \text{Cylinder Visable Area}}{\text{Dome Area} + \text{Cylinder Area}}$$

$$\text{Visual Inspection Fraction} = \frac{(1.00 \times 0.28) + (0.97 \times 0.54)}{0.28 + 0.54} = 0.98$$

The overall visual detection failure probability is the sum of the fraction of containment not accessible for visual inspections and the accessible fraction times the visual inspection failure probability. The overall visual detection failure probability is 0.12.

Visual Detection Failure Probability
= 0.02 + (0.10 x 0.98)
= 0.12

Table 16
Conditional Large Early Release Probability with Consideration of Visual Inspections

Test Interval	Containment Cylinder and Dome
3 Test in 10 Years	2.49E-05 x 0.12 = 2.99E-06
1 Test in 10 Years	1.45E-04 x 0.12 = 1.74E-05
1 Test in 15 Years	3.38E-04 x 0.12 = 4.05E-05

3.3.4Estimate the Increase in LERF

The LERF can be estimated by multiplying the above probabilities by the non-LERF CDF. This data is presented in Tables 17 to 20.

Table 17
LERF (Internal Events) Associated with Corrosion Events for Catawba

Test Interval	Corrosion Failure Probability	Non-LERF CDF	LERF	Increase Relative to Base	Increase Relative to Current
3 Test in 10 Years	2.99E-06	4.31E-05/yr	1.29E-10		
1 Test in 10 Years	1.74E-05	4.31E-05/yr	7.50E-10	6.21E-10	
1 Test in 15 Years	4.05E-05	4.31E-05/yr	1.75E-09	1.62E-09	9.98E-10

Table 18
LERF (All Events) Associated with Corrosion Events for Catawba

Test Interval	Corrosion Failure Probability	Non-LERF CDF	LERF	Increase Relative to Base	Increase Relative to Current
3 Test in 10 Years	2.99E-06	5.25E-05/yr	1.57E-10		
1 Test in 10 Years	1.74E-05	5.25E-05/yr	9.13E-10	7.56E-10	
1 Test in 15 Years	4.05E-05	5.25E-05/yr	2.13E-09	1.97E-09	1.22E-09

Table 19
LERF (Internal Events) Associated with Corrosion Events for McGuire

Test Interval	Corrosion Failure Probability	Non-LERF CDF	LERF	Increase Relative to Base	Increase Relative to Current
3 Test in 10 Years	2.99E-06	2.71E-05/yr	8.11E-11		
1 Test in 10 Years	1.74E-05	2.71E-05/yr	4.71E-10	3.90E-10	
1 Test in 15 Years	4.05E-05	2.71E-05/yr	1.02E-09	9.39E-10	6.27E-10

Table 20
LERF (All Events) Associated with Corrosion Events for McGuire

Test Interval	Corrosion Failure Probability	Non-LERF CDF	LERF	Increase Relative to Base	Increase Relative to Current
3 Test in 10 Years	2.99E-06	4.48E-05/yr	1.34E-10		
1 Test in 10 Years	1.74E-05	4.48E-05/yr	7.79E-10	6.45E-09	
1 Test in 15 Years	4.05E-05	4.48E-05/yr	1.82E-09	1.68E-09	1.04E-09

The increase in LERF associated with corrosion events is estimated to be less than 1E-07/yr.

3.4 Discussion of Results

The results of this analysis for LERF (Class 3b) are lower than originally estimated by DEC. This result is consistent with our original conclusion that the increase in LERF as a result of the ILRT extension is small and acceptable.

4. References:

4.1 C.5.1. Haugh, Jack, et al, "Interim Guidance for Performing Risk Impact Assessments In Support of One-Time Extensions for Containment Integrated Leakage Rate Test Surveillance Intervals", NEI, November 2001.

4.2 Letter from Calvert Cliffs Nuclear Power Plant to NRC, March 27, 2002, "Calvert Cliffs Nuclear Power Plant Unit No. 1; Docket No. 50-317 Response to Request for Additional Information Concerning the License Amendment Request for a One-Time Integrated Leakage Rate Test Extension"