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Constellation Nuclear

Calvert Cliffs
Nuclear Power Plant

A Member of the Constellation Energy Group

March 27, 2002

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: 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

REFERENCES:

(a) Telephone Conferences between Ms. D. J. Moeller, et al. (CCNPP) and Ms. D. M. Skay, et al., dated March 1, March 7, March 14, and March 19, 2002, same subject

(b) Letter from Mr. C. H. Cruse (CCNPP) to NRC Document Control Desk, dated January 31, 2002, "License Amendment Request: One-Time Integrated Leakage Rate Test Extension"

(c) Letter from Mr. C. H. Cruse (CCNPP) to NRC Document Control Desk, dated November 19, 2001, "License Amendment Request: Revision to the Containment Leakage Rate Testing Program Technical Specification to Support Steam Generator Replacement"

This letter provides the information requested in a series of teleconferences (Reference a) and supplements the information provided in Reference (b). Specifically, we were asked to provide information addressing how the potential leakage due to age-related degradation mechanisms were factored into the risk assessment for our requested Integrated Leakage Rate Test (ILRT) one-time extension. In addition, we are submitting a correction to the marked-up pages originally provided in Reference (b). This information does not change the conclusions of the significant hazards determination provided in Reference (b).

REQUESTED CHANGE

The final Technical Specification pages are included in Attachment (1). In Reference (b), the term "exempted" was used in the marked-up version of the Technical Specification pages. The correct term that should have been used was "excepted." The final Technical Specification pages reflect this correction. This correction should also be applied to the change requested in Reference (c).

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SUPPLEMENTAL INFORMATION

Structural Design

Walls

The Containment Structure is a post-tensioned, reinforced concrete cylinder and dome connected to and supported by a massive reinforced concrete slab (basemat). The liner plate is ¼-inch thick and is attached and anchored to the containment concrete structure. The concrete vertical wall thickness is 3-¾ feet. The concrete dome thickness is 3-¼ feet. Since the concealed side of the liner plate is in contact with the concrete, leakage requires a localized transmission path connecting a breach in the containment concrete with a flaw in the liner.

Floor

The containment basemat is a 10-foot thick base slab that was constructed monolithically with steel sections (H or W sections) laid out to match the liner plate joints and embedded such that one flange surface was flush with the finished concrete. The liner plates were then laid out on top of these sections and welded. The liner plates are full penetration welded to each other with a gap of sufficient thickness to allow the root of the weld to partially penetrate the embedded steel. This provides a segmented area under the floor liner plates where free communication from one area to the other is heavily constrained.

After welding was complete, the welds themselves were covered with channel sections (leak chases), seal welded to the plates, and ported to allow pressure testing of the liner welds. The floor liner plates were oiled and the interior slab was poured with the test connections left in place to provide for future weld testing during ILRTs.

The liner plates under the interior slab are in contact with the concrete on both sides except for a small area at the leak chases and at the edge of the concrete where an expansion material was used. Since concrete acts to protect steel in contact with it, we feel that there is little likelihood of corrosion occurring in the floor liner plates. During replacement of the moisture barrier, the area directly behind the old barrier material was determined to be the area most affected by corrosion. This area was evaluated on both units and has been incorporated into an augmented examination population required by the American Society of Mechanical Engineers (ASME) Code.

Inspectable Area

Approximately 85 percent of the interior surface of the liner is accessible for visual inspections. The 15 percent that is inaccessible for visual inspections includes the fuel transfer tube and area under the containment floor.

Liner Corrosion Events

Two events of corrosion that initiated from the non-visible (backside) portion of the containment liner have occurred in the industry. These events are summarized below:

- On September 22, 1999, during a coating inspection at North Anna Unit 2, a small paint blister was observed and noted for later inspection and repair. Preliminary analysis determined this to be a through-wall hole. On September 23, a local leak rate test was performed and was well below the allowable leakage. The corrosion appeared to have initiated from a 4"x4"x6' piece of lumber embedded in the concrete.

An external inspection of the North Anna Containment Structures was performed in September 2001. This inspection (using the naked eye, binoculars, and a tripod-mounted telescope) found several additional pieces of wood in both Unit 1 and Unit 2 Containments. No liner degradation associated with this wood was discovered.

- On April 27, 1999, during a visual inspection of the Brunswick 2 drywell liner, two through-wall holes and a cluster of five small defects (pits) in the drywell shell were discovered. The through-wall holes were believed to have been started from the coated (visible side). The cluster of defects was caused by a worker's glove embedded in the concrete.

Calvert Cliffs Inspection Program

To help assure continued containment integrity, the containment liners at Calvert Cliffs Nuclear Power Plant (CCNPP) are examined in accordance with the requirements of ASME Boiler and Pressure Vessel (B&PV) Code Section XI, Subsection IWE (as amended and modified by 10 CFR 50.55a) and the plant Protective Coatings Program, both as a natural consequence of maintenance activities and as planned events. Each will be discussed separately.

During the course of maintenance activities requiring repairs to the containment liner plate coatings, ASME XI Subsection IWE requires visual exams to evaluate the condition of the liner plate. Typically, these repairs are done to correct blisters, peeling, flaking, delamination, and mechanical damage of the coating system of the liner. To date, there have been over 500 exams of this nature (one repair generates multiple exams) performed at CCNPP since the requirements of Subsection IWE were imposed with no indication of liner base metal degradation.

The safety-related Protective Coatings Program at CCNPP requires a walkdown of the containment interior be performed at the beginning of each refueling outage to determine areas requiring repair. This walkdown, performed by engineering personnel, maintenance personnel, and National Association of Corrosion Engineers (NACE)-trained coatings examiners, looks at accessible coated structures in the Containment as well as the liner.

Repair of items found on these walkdowns is then planned, staged, and performed, with any postponement of repairs beyond the current outage requiring engineering approval. Liner coating repairs are witnessed and documented at the beginning stage and upon completion by a Certified Non-Destructive Examination (NDE) Examiner. This is to allow proper assessment of the cause of the damage prior to repair and to document the as-left condition. The specific goal of this approach is to identify any indication of liner damage. As stated above, over 500 documented exams have shown no evidence of liner degradation.

Scheduled inservice inspection (ISI) exams are performed in accordance with the scheduling requirements of the ASME Section XI, Subsection IWE, and 10 CFR 50.55a. These documents require visual examination of essentially 100% of the containment liner accessible surface area once per ISI period (three in ten years). This exam is performed and documented by Certified NDE Examiners during the outage and/or before an ILRT.

This exam is performed both directly and remotely, depending upon the accessibility to the various areas. Remote exams are performed with binoculars to provide a clear view of all areas. To date, this exam has been performed twice on Unit 1 and once on Unit 2 with no recordable indications of liner plate degradation.

Several areas were identified on both units as candidate areas for Augmented Examination, in accordance with IWE-1241. These included areas beneath the liner to floor slab moisture barriers, potential ponding areas at structural steel attachments, and several areas with photographic evidence of dark areas. Further evaluation of these areas yielded the following conclusions:

- No ponding areas were evident either as being presently wet or by the presence of watermarks.
- The dark areas were identified in both cases to be insulation at a penetration.
- The area beneath the moisture barrier on both units showed degradation that required engineering evaluation. The area beneath the moisture barrier was found to suffer from scaling, rust, and pitting. Areas visually representative of the worst of these were selected for detailed examination and documented using a combination of ultrasonic thickness measurement, pit depth measurement, and detailed visual examination. These areas are now designated as Augmented Examination in accordance with Subsection IWE, and are subject to repeat examination once per ISI period as required by Subsection IWE.

The bolting examinations required by Table IWE-2500-1, Category E8.10 and E8.20, are performed during preventive maintenance activities of certain components. These maintenance activities are scheduled to support replacement of the seals and gaskets used in the component connections. Additionally, some of these connections are routinely used during outages, and the examination and testing of these connections is performed to re-establish containment integrity at the end of the outage. Any parts (except for seals and gaskets, which are exempt) that are replaced are subject to compliance with our Repair and Replacement Program and receive the appropriate inspections at that time.

Non-destructive examination examiner qualifications are governed by Calvert Cliffs procedure MP-3-105, "Qualification of Non-Destructive Examination Personnel and Procedures." This procedure requires documenting the necessary experience, training, visual acuity, and certifications in accordance with American National Standards Institute/American Society for Nondestructive Testing CP-189. Additionally the CCNPP coating examiners are NACE trained.

Effectiveness of the CCNPP inspection programs is judged to be high. This is based on the use of both NACE and CP-189-certified examiners for the different exams that are conducted. The depth that is provided by this approach yields a level of redundancy due to the differing focus of each examination.

Rigor of the examinations is provided by compliance with our Protective Coatings, NDE, and ISI programs. The coatings program controls the initial walkdown and focuses on the condition of the safety-related Level 1 coatings. This effort provides an initial assessment of the gross liner condition. In addition, the NDE Program provides a CP-189 certified examiner when preparation is started on each area to be repaired. This is done to verify the condition of the base metal as the defective coating is removed. As noted previously, this activity has resulted in over 500 documented examinations with no indications of liner deterioration.

Further, the ISI Program for Subsections IWE and IWL requires examination of the accessible portions of the liner once per period. This exam is conducted using a mixture of direct and remote examination techniques. Both units have been examined completely through these joint programs at least one time each with no defects noted. We will perform an additional Subsection IWE visual exam during the 2004 Unit 1 refueling outage.

Liner Corrosion Analysis

The following approach was used to determine the change in likelihood, due to extending the ILRT, of detecting liner corrosion. This likelihood was then used to determine the resulting change in risk. The following issues are addressed:

- Differences between the containment basemat and the containment cylinder and dome;
- The historical liner flaw likelihood due to concealed corrosion;
- The impact of aging;
- The liner corrosion leakage dependency on containment pressure; and
- The likelihood that visual inspections will be effective at detecting a flaw.

Assumptions

A. A half failure is assumed for basemat concealed liner corrosion due to the lack of identified failures. (See Table 1, Step 1.)

B. The success data was limited to 5.5 years to reflect the years since September 1996 when 10 CFR 50.55a started requiring visual inspection. Additional success data was not used to limit the aging impact of this corrosion issue, even though inspections were being performed prior to this date and there is no evidence that liner corrosion issues were identified. (See Table 1, Step 1.)

C. The liner flaw likelihood is assumed to double every five years. This is based solely on judgment and is included in this analysis to address the increase likelihood of corrosion as the liner ages. Sensitivity studies are included that address doubling this rate every 10 years and every two years. (See Table 1, Steps 2 and 3, and Tables 5 and 6.)

D. The likelihood of the containment atmosphere reaching the outside atmosphere given a liner flaw exists is a function of the pressure inside the Containment. Even without the liner, the Containment is an excellent barrier. But as the pressure in Containment increases, cracks will form. If a crack occurs in the same region as a liner flaw, then the containment atmosphere can communicate to the outside atmosphere. At low pressures, this crack formation is extremely unlikely. Near the point of containment failure, crack formation is virtually guaranteed. Anchored points of 0.1% at 20 psia and 100% at 150 psia were selected. Intermediate failure likelihoods are determined through logarithmic interpolation. Sensitivity studies are included that decrease and increase the 20 psia anchor point by a factor of 10. (See Table 4 for sensitivity studies.)

E. The likelihood of leakage escape (due to crack formation) in the basemat region is considered to be 10 times less likely than the containment cylinder and dome region. (See Table 1, Step 4.)

F. A 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. (See Table 1, Step 5.) Sensitivity studies are included that evaluate total detection failure likelihoods of 5% and 15%. (See Table 4 for sensitivity studies.)

G. All non-detectable containment over-pressurization failures are assumed to be large early releases. This approach avoids a detailed analysis of containment failure timing and operator recovery actions.

Analysis

Table 1

Liner Corrosion Base Case

Step	Description	Containment Cylinder and Dome 85%		Containment Basemat 15%	
1	**Historical Liner Flaw Likelihood** Failure Data: Containment location specific Success Data: Based on 70 steel-lined Containments and 5.5 years since the 10 CFR 50.55a requirement for periodic visual inspections of containment surfaces.	Events: 2 (Brunswick 2 and North Anna 2) 2/(70 * 5.5) = **5.2E-3**		Events: 0 Assume half a failure 0.5/(70 * 5.5) = **1.3E-3**	
2	**Aged Adjusted Liner Flaw Likelihood** During 15-year interval, assumed failure rate doubles every five years (14.9% increase per year). The average for 5^{th} to 10^{th} year was set to the historical failure rate. (See Table-5 for an example.)	Year	Failure Rate	Year	Failure Rate
		1	2.1E-3	1	5.0E-4
		avg 5 – 10	5.2E-3	avg 5 – 10	1.3E-3
		15	1.4E-2	15	3.5E-3
		15 year avg = 6.27E-3		**15 year avg = 1.57E-3**	
3	**Increase in Flaw Likelihood Between 3 and 15 years** Uses aged adjusted liner flaw likelihood (Step 2), assuming failure rate doubles every five years. See Tables 5 and 6.	**8.7%**		**2.2%**	
4	**Likelihood of Breach in Containment given Liner Flaw** The upper end pressure is consistent with the Calvert Cliffs Probabilistic Risk Assessment (PRA) Level 2 analysis. 0.1% is assumed for the lower end. Intermediate failure likelihoods are determined through logarithmically interpolation. The basemat is assumed to be 1/10 of the cylinder/dome analysis	Pressure (psia)	Likelihood of Breach	Pressure (psia)	Likelihood of Breach
		20	0.1%	20	0.01%
		64.7 (ILRT)	**1.1%**	64.7 (ILRT)	**0.11%**
		100	7.02%	100	0.7%
		120	20.3%	120	2.0%
		150	100%	150	10.0%
5	**Visual Inspection Detection Failure Likelihood**	**10%** 5% failure to identify visual flaws plus 5% likelihood that the flaw is not visible (not through-cylinder but could be detected by ILRT) All events have been detected through visual inspection. 5% visible failure detection is a conservative assumption.		**100%** Cannot be visually inspected.	

Table 1

Liner Corrosion Base Case

Step	Description	Containment Cylinder and Dome 85%	Containment Basemat 15%
6	**Likelihood of Non-Detected Containment Leakage** (Steps 3 * 4* 5)	**0.0096%** 8.7% * 1.1% * 10%	**0.0024%** 2.2% * 0.11% * 100%

The total likelihood of the corrosion-induced, non-detected containment leakage is the sum of Step 6 for the containment cylinder and dome and the containment basemat.

Total Likelihood of Non-Detected Containment Leakage = 0.0096% + 0.0024% = 0.012%

The non-large early release frequency (LERF) containment over-pressurization failures for CCNPP Unit 1 are estimated at 8.6E-5 per year. This is based on the Revision 0 Unit 1 Model. This model includes both internal and external events. The external events portion of the model was recently finalized. External events represents 55% of the total core damage frequency (CDF) with fire being by far the largest external event contributor. The total CDF is 8.9E-5. This current CDF is used to re-generate the delta LERF/rem impacts for both the Crystal River (CR) method and Combustion Engineering Owners Group (CEOG) method. If all non-detectable containment leakage events are considered to be LERF, then the increase in LERF associated with the liner corrosion issue is:

Increase in LERF (ILRT 3 to 15 years) = 0.012% * 8.6E-5 = 1E-8 per year.

Change in Risk

The risk of extending the ILRT from 3 in 10 years to 1 in 15 years is small and estimated as being less than 1E-7. It is evaluated by considering the following elements:

1. The risk associated with the failure of the Containment due to a pre-existing containment breach at the time of core damage (Class 3 events).
2. The risk associated with liner corrosion that could result in an increased likelihood that containment over-pressurization events become LERF events.
3. The likelihood that improved visual inspections (frequency and quality) will be effective in discovering liner flaws that could lead to LERF.

These elements are discussed in detail below.

Pre-existing Containment Breach

The original submittal addressed Item 1. The submittal calculated the increase risk using a new CEOG methodology and a previously NRC-approved methodology. This supplement modifies, in Table 2, these values to reflect the recent update of the CCNPP Unit 1 PRA.

Table 2

Original Submitted with Updated Values

Method	LERF Increase	Person-rem/yr increase	Percentage Increase in Person-rem/yr
CEOG Method	5.4E-8	236	0.36%
NRC Approved Method	2.9E-7	19.4	0.24%

The numerical results for the previously-approved methodology shows an LERF increase that is greater than 1E-7. However, as noted in the original submittal, the calculated LERF would likely be lower than 1E-7 if conservatisms associated with the modeling of the steam generator tube rupture sequences were removed (note that this improvement was not incorporated into the modified values). In addition, the steam generators for Unit 1 are being replaced and should further reduce this likelihood.

Liner Corrosion

The original submittal also did not fully address the risk associated with liner corrosion. This supplement shows an additional small increase in LERF of 1E-8. Table 2 would be modified as follows:

Table 3

Updated Values with Corrosion Impact

Method	LERF Increase	Person-rem/yr increase	Percentage Increase in Person-rem/yr
CEOG Method	5.4E-8	236	0.36%
CEOG Method with Liner Corrosion	6.4E-8	250	0.38%
NRC-Approved Method	2.9E-7	19.4	0.24%
NRC-Approved Method with Liner Corrosion	3.0E-7	20.3	0.25%

Visual Inspections

The original submittal did not fully address the benefit of the Subsection IWE visual inspections. Visual inspections following the 1996 change in the ASME Code are believed to be more effective in detecting flaws. In addition, the flaws that are of concern for LERF are considerably larger than those of concern for successfully passing the ILRT. Integrated leakage rate test failures have occurred even though visual inspections have been performed. However, the recorded ILRT flaw sizes for these failed tests are much smaller than that for LERF. Therefore, it is likely that future inspections would be effective in detecting the larger flaws associated with a LERF.

An additional visual inspection is now planned for 2004 to further increase the likelihood for flaw detection.

Impact of Improved Visual Inspections

The raw data for both the CEOG method and the NRC-approved method is contained in NUREG-1493. This containment performance data is pre-1994. An amendment to 10 CFR 50.55a became effective September 9, 1996. This amendment, by endorsing the use of Subsections IWE and IWL of Section XI of the ASME B&PV Code, provides detailed requirements for ISI of Containment Structures. Inspection (which includes examination, evaluation, repair, and replacement) of the concrete containment liner plate, in accordance with the 10 CFR 50.55a requirements, involves consideration of the potential corrosion areas. Although the improvement gained by this requirement varies from plant to plant, it is believed that this requirement makes the detection of flaws post-September 1996 much more likely than pre-September 1996 using visual inspections.

Visual inspection improvements directly reduce the delta LERF increases as calculated in the CEOG method and NRC-approved method. The CCNPP Unit 1 Containment was visually inspected in 2000 and 2002. The Unit 1 containment is scheduled for inspection in 2004. This increased inspection frequency further reduces the delta LERF as calculated by both the CEOG and NRC-approved methods.

Table 7 illustrates the benefit of visual inspection improvements on the delta LERF calculations:

If the improved inspections (additional inspection, improved effectiveness, and larger flaw size) were 90% effective in detecting the flaws in the visible regions of the containment (5% for failure to detect and 5% for flaw not detectable [not-through-wall]), then the increase ILRT LERF frequency could be reduced by 23.5%. See Table 7 for additional sensitivity cases. This would result in a LERF increase of less than 1E-7 (without consideration of the LERF reduction due to PRA model improvements).

Sensitivity Studies

The following cases were developed to gain an understanding of the sensitivity of this analysis to the various key parameters.

Table 4

Liner Corrosion Sensitivity Cases

Age (Step 2)	Containment Breach (Step 4)	Visual Inspection & Non-Visual Flaws (Step 5)	Likelihood Flaw is LERF	LERF Increase
Base Case Doubles every 5 years	**Base Case** 1.1/0.11	**Base Case** 10%	**Base Case** 100%	**Base Case** 1E-8
Doubles every 2 years	Base	Base	Base	8E-8
Doubles every 10 years	Base	Base	Base	5E-9
Base	Base point 10 times lower (0.24/0.02)	Base	Base	2E-9
Base	Base point 10 times higher (4.9/0.49)	Base	Base	5E-8
Base	Base	5%	Base	6E-9
Base	Base	15%	Base	1E-8
Lower Bound				
Doubles every 10 years	Base point 10 times lower (0.24/0.02)	5%	10%	7E-11
Upper Bound				
Double every 2 years	Base point 10 times higher (4.9/0.49)	15%	100%	5E-7

Table 5

Flaw Failure Rate as a Function of Time

Year	Failure Rate (FR)	Success Rate (1-FR)
0	1.79E-03	9.98E-01
1	2.05E-03	9.98E-01
2	2.36E-03	9.98E-01
3	2.71E-03	9.97E-01
4	3.11E-03	9.97E-01
5	3.57E-03	9.96E-01
6	4.10E-03	9.96E-01
7	4.71E-03	9.95E-01
8	5.41E-03	9.95E-01
9	6.22E-03	9.94E-01
10	7.14E-03	9.93E-01
11	8.20E-03	9.92E-01
12	9.42E-03	9.91E-01
13	1.08E-02	9.89E-01
14	1.24E-02	9.88E-01
15	1.43E-02	9.86E-01

Table 6

Average Failure Rate

Years	Average Success Rate (SR)	Average Failure Rate (1-SR)
1 to 3	9.93E-1	0.71%
1 to 10	9.59E-1	4.06%
1 to 15	9.06E-1	9.40%

Δ = 9.40% - 0.71% = 8.7% (delta between 1 in 3 years to 1 in 15 years)

Table 7

Benefit of Visual Inspection Improvements

Factor Improvement due to Visual Inspections	Reduction in Delta LERF	NRC Approved Method Delta LERF	NRC Approved Method w/Liner Corrosion Considered Delta LERF	CEOG Method Delta LERF	CEOG Method w/Liner Corrosion Considered Delta LERF
Pre-1996 Inspection Approach (Base Case)	0%	3E-07	3E-07	5E-08	6E-08
Post-1996 with Visual Inspections Perfectly Accurate	85%	4E-08	5E-08	8E-09	2E-08
Post-1996 with Visual Inspections 95% Accurate	80.8%	6E-08	7E-08	1E-08	2E-08
Post-1996 with Visual Inspections 95% Accurate and 5% chance of Undetectable Leakage	76.5%	7E-08	8E-08	1E-08	2E-08
Post-1996 with Visual Inspections 80% accurate and a 5% Chance of Undetectable Leakage	63.8%	1E-07	1E-07	2E-08	3E-08

Conclusion

Considering increased frequency of visual inspections and the benefit of improved visual inspections post-1996, the increase in risk is considered to be less than 1E-7 for LERF. Changes less than 1E-7 are considered small per Regulatory Guide 1.174. The one-time extension of the ILRT interval from 3-in-10 years to 1-in-15 years is considered an acceptable risk increase.

Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,

STATE OF MARYLAND :
: **TO WIT:**
COUNTY OF CALVERT :

I, Charles H. Cruse, being duly sworn, state that I am Vice President - Nuclear Energy, Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP), and that I am duly authorized to execute and file this License Amendment Request on behalf of CCNPP. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other CCNPP employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

Subscribed and sworn before me, a Notary Public in and for the State of Maryland and County of Calvert, this 27th day of March, 2002.

WITNESS my Hand and Notarial Seal: Denise D. Inukis
Notary Public

My Commission Expires: 02/02/06
Date

CHC/DJM/dlm

Attachment: (1) Final Technical Specification Pages

cc: R. S. Fleishman, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
D. M. Skay, NRC
H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR

ATTACHMENT (1)

FINAL TECHNICAL SPECIFICATION PAGES

Pages

5.0-30

5.0-31

5.5 Programs and Manuals

c. Provisions to ensure that an inoperable supported system's Completion Time is not inappropriately extended as a result of multiple support system inoperabilities; and

d. Other appropriate limitations and remedial or compensatory actions.

A loss of safety function exists when, assuming no concurrent single failure, a safety function assumed in the accident analysis cannot be performed. For the purpose of this program, a loss of safety function may exist when a support system is inoperable, and:

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

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

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

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.

5.5.16 <u>Containment Leakage Rate Testing Program</u>

A program shall be established to implement the leakage testing of the containment as required by 10 CFR 50.54(o) and 10 CFR Part 50, Appendix J, Option B. This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995, including errata, as modified by the following exceptions:

a. Nuclear Energy Institute (NEI) 94-01 – 1995, Section 9.2.3: The first Unit 1 Type A test performed after the June 15, 5.5 Programs and Manuals

1992 Type A test shall be performed no later than June 14, 2007.

b. Unit 1 is excepted from post-modification integrated leakage rate testing requirements associated with steam generator replacement.

The peak calculated containment internal pressure for the design basis loss-of-coolant accident, P_a, is 49.4 psig. The containment design pressure is 50 psig.

The maximum allowable containment leakage rate, L_a, shall be 0.20 percent of containment air weight per day at P_a.

Leakage rate acceptance criteria are:

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

b. Air lock testing acceptance criteria are:

   1. Overall air lock leakage rate is $\leq$ 0.05 L_a when tested at $\geq P_a$.

   2. For each door, leakage rate is $\leq$ 0.0002 L_a when pressurized to $\geq$ 15 psig.

The provisions of SR 3.0.2 do not apply to the test frequencies specified in the Containment Leakage Rate Testing Program.

The provisions of SR 3.0.3 are applicable to the Containment Leakage Rate Testing Program.