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1CAN010201

January 31, 2002

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555-0001

SUBJECT: Arkansas Nuclear One, Unit 1  
Docket No. 50-313  
License Amendment Request  
One-time Extension of the Integrated Leak Rate Test Interval

Dear Sir or Madam:

Pursuant to 10CFR50.90, Entergy Operations, Inc. (Entergy) requests an amendment for Arkansas Nuclear One, Unit 1 (ANO-1) to change administrative Technical Specification 5.5.16 regarding Containment Integrated Leak Rate Testing (ILRT). The change clarifies the statement that the ILRT Program is in accordance with Regulatory Guide 1.163 by noting an exception based on NEI 94-01-1995. The effect of this change will be the allowance of an extended interval (15 years) for performance of the next ILRT. In accordance with recent practice for similar submittals, this request is made for a one-time extension of the interval.

This request is made on a risk-informed basis as described in Regulatory Guide 1.174. The attached technical justification for this request provides a risk evaluation using a methodology that has been found acceptable for other similar requests.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c) and it has been determined that this change involves no significant hazards considerations. The basis for this determination is included in the attached submittal.

Entergy Operations, Inc. requests that the effective date for this Technical Specification change to be within 30 days of approval. Although this request is neither exigent nor emergency, your prompt review is requested. ANO-1 has identified this change as affecting activities planned during the upcoming refueling outage (1R17) and on that basis requests approval of this proposed change by September 4, 2002. The requested approval date and implementation period will enable ANO-1 to optimize refueling outage activities. This request will save critical path time in the 1R17 outage and permit the deferral of the ILRT until a subsequent outage. Deferral of the ILRT is expected to result in savings of more than \$1,500,000.

The proposed change does not include any new commitments. If you have any questions or comments concerning this request, please contact Jerry Burford at (601) 368-5755.

A017

I declare under penalty of perjury that the foregoing is true and correct. Executed on January 31, 2002.

Sincerely,



CGA/FGB

Attachments:           1.     Analysis of Proposed Technical Specification Change  
                              2.     Proposed Technical Specification Changes (mark-up)

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**Attachment 1**

**1CAN010201**

**Analysis of Proposed Technical Specification Change**

## 1.0 DESCRIPTION

This letter is a request to amend Operating License DPR-51 for Arkansas Nuclear One, Unit 1 (ANO-1).

The proposed change will revise the ANO-1 Administrative Technical Specification for the Reactor Building Leak Rate Testing Program to add an exception to the commitment to follow the guidelines of Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program." The exception is based on information in NEI 94-01, Revision 0, "Industry Guideline for Implementing Performance-Based Option of 10CFR50, Appendix J." The effect of this request will be an extension of the interval since the last ILRT from 10 years to 15 years.

## 2.0 PROPOSED CHANGE

The proposed change will revise the ANO-1 Administrative Technical Specification 5.5.16 to add an exception to the commitment to follow the guidelines of Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program." The exception is based on information in NEI 94-01, Revision 0, "Industry Guideline for Implementing Performance-Based Option of 10CFR50, Appendix J." The effect of this request will be an extension of the test interval from 10 years to 15 years.

ANO-1 proposes to revise TS 5.5.16 of the improved Technical Specifications by revising the second sentence from:

This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program, " dated September 1995.

to:

This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program, " dated September 1995, except that the next Type A test performed after the April 16, 1992 Type A test shall be performed no later than April 15, 2007.

Regulatory Guide 1.163 endorses NEI 94-01 (1995), which in turn references ANSI/ANS-56.8-1994, "Containment System Leakage Testing Requirements." However, as stated in NEI 94-01, the test intervals in ANSI/ANS 56.8-1994 are not performance-based. Therefore, licensees intending to comply with Option B in the amendment to Appendix J should establish test intervals based upon the criteria in Section 11.0 of NEI 94-01, rather than using the test intervals specified in ANSI/ANS-56.8-1994.

ANO-1 has received approval of their request to convert their current Technical Specifications to the format of the Improved Standard Technical Specifications (ITS) as presented in NUREG 1430. Implementation of the improved TS is expected prior to the scheduled fall 2002 refueling outage. Improved TS 5.5.16 addresses the Reactor Building Leakage Rate Testing Program. A mark-up of the improved TS page is provided in Attachment 2.

In summary, the proposed change would represent a one-time deferral of the ILRT of up to five additional years. There are no changes required to the Technical Specification Bases associated with this change.

### 3.0 BACKGROUND

A Type A test is an overall (integrated) leakage rate test of the containment structure. NEI 94-01 specifies an initial test interval of 48 months, but allows an extended interval of 10 years, based upon two consecutive successful tests. There is also a provision for extending the test interval an additional 15 months consistent with standard scheduling practices for Technical Specification surveillance requirements. The two most recent Type A tests at ANO-1 have been successful, so the current test interval is 10 years. There have been no modifications since the last ILRT test that would change the conclusions of the leak tightness of the ANO-1 reactor building.

Integrated Leak Rate Tests (ILRTs) have been required of operating nuclear plants to ensure the public health and safety in the event of an accident that would release radioactivity into the containment. Conservative design and construction practices have led to very few ILRTs exceeding their required acceptance criteria. The NRC has extended the allowable test frequency from three times in ten years to once in ten years on a performance basis. This change was based on NUREG 1493, "Performance Based Containment Leak-Test Program," dated September 1995. The NUREG stated that an interval between tests of up to twenty years would contribute an imperceptible increase in risk.

ANO-1 has performed five ILRTs during the period of its Operating License. The two most recent ILRTs were performed in 1992 and 1988. These tests were successful and on this basis, ANO-1 currently has a ten-year interval in which to perform the next ILRT. ANO-1, utilizing the NEI 94-01 provision allowing an interval extension of up to 15 months, is planning to perform the next ILRT during the upcoming outage in October 2002. Structural degradation of containment is a gradual process that occurs due to the effects of pressure, temperature, radiation, chemical, or other factors. Such effects are identified and corrected when the containment is periodically inspected to verify structural integrity under the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI (ASME XI), Subsection IWE.

Entergy is also aware of the discussion between the NRC and NEI concerning a possible permanent extension of the ILRT test interval. The basis for the discussions derives not only from the discussion in NUREG 1493, but also from that in EPRI TR-104285, "Risk Impact Assessment of Revised Containment Leak Rate Test Intervals." The one-time change requested here will defer the immediate need for the test and should permit consideration of any agreements reached on the generic change through a revision of NEI 94-01.

#### 4.0 TECHNICAL ANALYSIS

The proposed change to extend the current ILRT interval is justified based on a combination of risk-informed analysis and a history of successful Type A tests. The risk aspects of the justification have been evaluated as presented below.

The results of the risk evaluation demonstrate that the increase in risk of extending the ILRT interval from 10 to 15 years is insignificant. That analysis, done in accordance with Regulatory Guide (RG) 1.174, shows that the increase in total plant risk due to the extended ILRT interval is well under one-half of one per-cent. The change in the Large Early Release Frequency (LERF) is only  $5.15E-8$  for an increase from 10 years to 15 years. This is consistent with the findings of NUREG-1493, "Performance-Based Containment Leak-Test Program," September, 1995. However, this submittal requests only a one-time interval extension from 10 years to 15 years.

In summary, the risk assessment demonstrates:

1. The risk of extending the ILRT interval for Type A tests from its current interval of 10 years to 15 years was evaluated for potential public exposure impact (as measured in person-rem/year). The risk assessment predicts a slight increase in risk when compared to that estimated from current requirements. For the change from a 10-year test interval to a 15-year test interval, the increase in the risk (person-rem/year within 50 miles) was found to be 0.16 percent. Note that the cumulative increase in risk, given the change from the original frequency of three tests in 10 years to a 15-year test interval, was found to be 0.49 percent. This is just slightly greater than the range of risk increase, 0.02 to 0.14 percent, estimated in NUREG-1493 when going from the three tests in 10 years test frequency to a 10-year test interval. NUREG-1493 concluded this represents an imperceptible increase in risk. Therefore, the increase in the risk for the proposed change is considered small.
2. RG 1.174 provides guidance for determining the risk impact of plant-specific changes to the licensing basis. RG 1.174 defines very small changes in the risk guidelines as increases in CDF less than  $1E-6$  per reactor year and increases in LERF less than  $1E-7$  per reactor year. Since the Type A test does not impact CDF, the relevant criterion in evaluating this proposed change is LERF. The increase in LERF resulting from a change in the Type A test frequency from the current one test in 10 years to one test in 15 years is estimated to be  $5.15E-8$ /year. The cumulative increase in LERF resulting from a change in the Type A test interval from the original three tests in 10 years to one test in 15 years is estimated to be  $1.5E-7$ /year. Increasing the Type A interval to 15 years is considered to be a very small change in LERF.
3. RG 1.174 also encourages the use of risk analysis techniques to help ensure and show that the proposed change is consistent with the defense-in-depth philosophy. Consistency with the defense-in-depth philosophy is maintained if a reasonable balance is preserved among prevention of core damage, prevention of containment failure, and consequence mitigation. The change in the conditional containment failure probability was estimated to be 0.08 percent for the proposed change and 0.27 percent for the cumulative change of going from a test frequency of three tests in 10 years to one test in 15 years. ANO-1 concludes that the very small impact on

the conditional containment failure probability demonstrates that consistency with the defense-in-depth philosophy is maintained for the proposed change.

### Discussion of Containment In-Service Inspection Program

Containment leak-tight integrity is also verified through periodic in-service inspections conducted in accordance with the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI. More specifically, Subsection IWE provides the rules and requirements for in-service inspection of Class MC pressure-retaining components and their integral attachments in light-water cooled plants. Furthermore, NRC regulation 10CFR50.55a(b)(2)(ix)(E) requires licensees to conduct a general visual inspection of the containment in accordance with ASME XI during each 10-year interval. And, inspections required by the Maintenance Rule (10CFR50.65) may also identify containment degradation that could affect leaktightness. These requirements will not be changed as a result of the extended ILRT interval. In addition, Appendix J, Type B local leak rate tests performed to verify the leak-tight integrity of containment penetration bellows, airlocks, seals, and gaskets are not affected by this proposed change to the Type A test frequency. The NRC has requested additional information regarding containment in-service inspection from previous applicants for similar changes. The requested information is addressed below.

1. None of the references describe (or summarize) the containment ISI program being implemented at [ANO-1]. Please provide a description of the ISI methods that provide assurance that in the absence of an ILRT for 15 years, the containment structural and leak tight integrity will be maintained.

Response for ANO-1 –

The Containment Inservice Inspection (CII) program at ANO-1 is described in plant procedures. The program requirements include a general visual examination of the containment surfaces each inspection period. The general visual examinations are conducted in accordance with plant procedures. Any indications exceeding the screening criteria are provided to a qualified containment engineer who compares the indication to the design requirements of the containment vessel. Any indications that exceed the design requirements are documented in the Corrective Action Program and are dispositioned in accordance with the ASME code requirements. The program currently requires VT examinations of bolted connections and moisture barriers.

2. IWE-1240 requires licensees to identify the surface areas requiring augmented examinations. Please provide the locations of the containment liner surfaces that have been identified as requiring augmented examination and a summary of the findings of the examinations performed.

Response for ANO-1 –

There are currently no augmented examinations required for ANO-1.

3. For the examination of seals and gaskets, and examination and testing of bolts associated with the primary containment pressure boundary (Examination Categories E-D and E-G), relief from the requirements of the Code had been requested. As an alternative, it was proposed to examine them during the leak rate testing of the primary

containment. However, Option B of Appendix J for Type B and Type C testing (as per Nuclear Energy Institute 94-01 and Regulatory Guide 1.163), and the ILRT extension requested in this amendment for Type A testing provide flexibility in the scheduling of these inspections. Please provide your schedule for examination and testing of seals, gaskets, and bolts that provide assurance regarding the integrity of the containment pressure boundary.

Response for ANO-1 -

The NRC issued relief authorization for alternatives to the requirements of ASME Section XI, as endorsed by 10CFR50.55a for Containment Inspections for Arkansas Nuclear One, Units 1 & 2, Grand Gulf Nuclear Station, River Bend Station, and Waterford Steam Electric Station, Unit 3 on January 13, 2000. The relief authorization approved the use of existing 10CFR50, Appendix J Type B testing as a verification of containment integrity, rather than disassembling the subject components for the sole purpose of examination. As stated in the relief authorization, the alternate examinations of Appendix J Type B testing will be performed at least once during each Containment Inspection interval. The proposed interval extension for the Type A test (ILRT) does not affect the frequency of these alternate examinations since they will be performed once in each ten-year inspection interval.

NEI 94-01 describes the Type B testing frequency in paragraphs 10.2.1 and 10.2.2. The extended test interval for Type B penetrations (except containment airlocks) is a minimum of 120 months. The test frequency for airlocks, door seals, and penetrations with resilient seals is once per 30 months.

ANO Unit 1 Improved Technical Specification 5.5.16 states that the Appendix J program will be implemented in accordance with Regulatory Guide 1.163, which endorses NEI 94-01. The extension of the interval for conducting the Type A test (ILRT) will not modify the schedule for completion of any other examination or test.

4. The stainless steel bellows have been found to be susceptible to trans-granular stress corrosion cracking, and the leakage through them are not readily detectable by Type B testing (see Information Notice 92-20). If applicable, please provide information regarding inspection and testing of the bellows, and how such behavior has been factored into the risk assessment.

Response for ANO-1 –

ANO-1 does not have bellows in any of the containment penetration configurations.

5. Inspections of some reinforced concrete and steel containment structures have found degradation on the uninspectable (embedded) side of the drywell steel shell and steel liner of the primary containment. These degradations cannot be found by visual (i.e., VT-1 or VT-3) examinations unless they are through the thickness of the shell or liner, or, 100% of the uninspectable surfaces are periodically examined by ultrasonic testing. Please provide information addressing how potential leakage under high pressure during core damage accidents is factored into the risk assessment related to the extension of the ILRT.

Response for ANO-1 –

The potential for containment leakage is explicitly included in the risk assessment. By definition, the intact containment cases, EPRI Containment Failure Class 1, include a leakage term that is independent of the source of the leak. Similarly, the Containment Failure Class 3a and 3b cases model the potential leakage impact of the ILRT interval extension. These cases include the potential that the leakage is due to a containment shell failure. The assessment shows that even with the increased potential to have an undetected containment flaw or leak path, the increase in risk is insignificant.

### Discussion of Risk Impact Evaluation

Entergy recognizes that the NRC Staff has indicated a preference for the risk analysis to utilize a methodology similar to that now approved for the Crystal River 3 application. The evaluation described below utilized that methodology. ANO-1 has also performed a sensitivity analysis to compare the results using the previously approved methodology with those performed consistent with our typical PSA practices. The previously approved methodology utilizes a 95<sup>th</sup> percentile estimate of the probability of the containment failures of interest and a simplifying assumption for the impact of the extended interval. The sensitivity analysis uses a more reasonable assessment of the frequency of the Class 3 containment failure states and a more conservative treatment of the impact of the extended interval. The change is demonstrated to be risk insignificant in both methodologies.

Both of the methodologies followed the same general approach to the evaluation of the risk of the interval extension. The methodologies:

- both utilize the EPRI TR-104285 release classes to categorize the various containment failure scenarios.
- both establish the plant-specific frequencies for each EPRI release class.
- both define estimated leakage for each release class.
- both quantify the risk for each release class by multiplying the class frequency times the assumed leakage.
- both evaluated three ILRT intervals: a baseline case (3 tests in 10 years), a current case (1 test in 10 years), and the proposed case (1 test in 15 years).

### **Evaluation Methodology**

The plant-specific risk impact for each ILRT interval was evaluated using the previously approved methodology. The following steps have been used to analyze the risk impact of extending the ILRT test interval.

1. Obtain the containment endstate quantification from the IPE model and classify the existing containment endstates into the EPRI failure classes.
2. Calculate the frequency for the endstates affected by new ILRT frequency – i.e., Class 3a, Class 3b, and Class 1.
3. Calculate the man-rem/yr values for all of the endstates
4. Calculate the increase in undetected leakage frequencies attributable to the extension in ILRT test interval.
5. Using the new frequencies calculate the change in risk, LERF, and Conditional Containment Failure Probability.

Table 1 summarizes the treatment of each of the EPRI Release Classes and provides a summary of some of the differences between the Entergy and the previously approved methodologies. Table 2 presents a summary listing of the Containment Endstates taken from the ANO-1 Individual Plant Examination (IPE), the frequencies associated with each of the sequences, and categorizes each IPE endstate into its appropriate EPRI release class.

**Table 1  
 EPRI Release Class Summary**

Release Class	Description	Previously Approved Approach	Entergy Method
1	No containment failure	Frequency reduced as Class 3 increases; considered leakage of $L_a$	Frequency reduced as Class 3 increases; considered leakage of $L_a$
2	Dependent or common cause failures	No change from baseline consequence measures; dose values derived from ANO-1 Level 3 PSA	No change from baseline consequence measures; dose values derived from ANO-1 Level 3 PSA
3	Independent isolation failures (detected by Type A test)	3a: small leaks, 10 $L_a$ , non-LERF (Large Early Release Frequency) 3b: large leaks, 35 $L_a$ , LERF probability derived using 95 <sup>th</sup> %-ile $\chi^2$ distribution of NUREG 1493	3a: small leaks, 10 $L_a$ , non-LERF 3b: large leaks, 100 $L_a$ , LERF probability derived using log-normal distribution of NUREG 1493 data
4,5	Independent isolation failures (detected by Type B or C test)	No change from baseline consequence measures; not analyzed	No change from baseline consequence measures; not analyzed
6	Other isolation failures not in Category 2	No change from baseline consequence measures; dose values derived from ANO-1 Level 3 PSA	No change from baseline consequence measures; dose values derived from ANO-1 Level 3 PSA
7	Induced failures	No change from baseline consequence measures; dose values derived from ANO-1 Level 3 PSA	No change from baseline consequence measures; dose values derived from ANO-1 Level 3 PSA
8	Bypass	characterized by the steam generator tube rupture (SGTR) scenario – not impacted by ILRT extension; dose values derived from ANO-1 Level 3 PSA	characterized by SGTR – not impacted by ILRT extension; dose values derived from ANO-1 Level 3 PSA

Note – The description of the release classes above are based on the definitions provided in EPRI TR-104285.

**Table 2**  
**ANO Containment Endstate (CET) Summary**

	CET Endstate Description**	Frequency	EPRI Class
NCF (A0)	Recovered In-vessel, low RCS pressure, no containment failure		1
A1	Recovered In-vessel, low RCS pressure, late containment failure, in-vessel release mitigated	4.73E-09	7
A2	Recovered In-vessel, low RCS pressure, late containment failure, in-vessel release not mitigated	2.46E-11	7
A3	Recovered In-vessel, low RCS pressure, early containment failure, in-vessel release mitigated	1.34E-08	2,6
A4	Recovered In-vessel, low RCS pressure, early containment failure, in-vessel release not mitigated	2.40E-08	2,6
NCF (B0)	Recovered Ex-vessel, no CCI, low RCS pressure, no containment failure		1
B1	Recovered Ex-vessel, no CCI, low RCS pressure, late containment failure, in-vessel release mitigated	1.85E-10	7
B2	Recovered Ex-vessel, no CCI, low RCS pressure, late containment failure, in-vessel release not mitigated	2.76E-11	7
B3	No CCI, low RCS pressure, late containment failure, in-vessel release mitigated	3.25E-8	7
B4	No CCI, low RCS pressure, late containment failure, in-vessel release not mitigated	9.34E-9	7
B5	No CCI, high RCS pressure, late containment failure, in-vessel and late release mitigated by sprays	1.72E-7	7
B6	No CCI, high RCS pressure, late containment failure, in-vessel and late release not mitigated	9.31E-8	7
NCF (C0)	CCI occurs, low RCS pressure, no containment failure		1
C1	Recovered ex-vessel, CCI occurs, low RCS pressure, late containment failure, in- and ex-vessel release mitigated by sprays, overlying pool	2.45E-8	7
C2	Recovered ex-vessel, CCI occurs, low RCS pressure, late containment failure, in-vessel release not mitigated, overlying pool	3.78E-10	7
C3	CCI occurs, low RCS pressure, late containment failure, in- and ex-vessel release mitigated by sprays, overlying pool	4.45E-7	7
C4	CCI occurs, low RCS pressure, late containment failure, in- and ex-vessel release not mitigated	1.33E-6	7
C5	CCI occurs, high RCS pressure, late containment failure, in- and ex-vessel release mitigated by sprays, overlying pool	3.47E-7	7
C6	CCI occurs, high RCS pressure, late containment failure, in- and ex-vessel release not mitigated	3.51E-6	7
D1	Recovered ex-vessel, no CCI, low RCS pressure, early containment failure, in-vessel release mitigated	1.38E-7	2,6,7*

D2	Recovered ex-vessel, no CCI, low RCS pressure, early containment failure, in-vessel release not mitigated	2.52E-7	2,6,7*
D3	No CCI, high RCS pressure, early containment failure, in-vessel and late release mitigated	3.61E-7	2,6,7*
D4	No CCI, high RCS pressure, early containment failure, in-vessel and late release not mitigated	1.05E-6	2,6,7*
E1	Recovered ex-vessel, CCI occurs, low RCS pressure, early containment failure, in- and ex-vessel release mitigated, overlying pool	7.16E-10	2,6,7*
E2	Recovered ex-vessel, CCI occurs, low RCS pressure, early containment failure, in-vessel release not mitigated, overlying pool	1.10E-9	2,6,7*
E3	CCI occurs, low RCS pressure, early containment failure, in- and ex-vessel release mitigated by sprays, overlying pool	1.01E-8	2,6,7*
E4	CCI occurs, low RCS pressure, early containment failure, in- and ex- vessel release not mitigated	7.02E-7	2,6,7*
E5	CCI occurs, high RCS pressure, early containment failure, in- and ex-vessel release mitigated by sprays, overlying pool	9.04E-8	2,6,7*
E6	CCI occurs, high RCS pressure, early containment failure, in- and ex-vessel release not mitigated	3.26E-7	2,6,7*
BP-D3A	SGTR and Bypass release mitigated with secondary side relief valve cycling or scrubbing, no CCI, ex-vessel release mitigated	2.32E-8	8
BP-D3B	SGTR and Bypass release unmitigated, no CCI, ex-vessel release mitigated	2.32E-8	8
BP-D4A	SGTR and Bypass release mitigated with secondary side relief valve cycling or scrubbing, no CCI, ex-vessel release not mitigated	negligible	8
BP-D4B	SGTR and Bypass release unmitigated, no CCI, ex-vessel release not mitigated	negligible	8
BP-E5A	SGTR and Bypass release mitigated, CCI occurs, ex-vessel release mitigated, overlying pool	5.79E-9	8
BP-E5B	SGTR and Bypass release unmitigated, CCI occurs, ex-vessel release mitigated, overlying pool	5.79E-9	8
BP-E6A	SGTR and Bypass release mitigated, CCI occurs, ex-vessel release not mitigated	2.06E-8	8
BP-E6B	SGTR and Bypass release unmitigated, CCI occurs, ex-vessel release not mitigated	1.29E-7	8

\* For the C and D endstates it can be seen from the IPE that the containment isolation failures make up less than 7% of the total frequency. Therefore these endstates will be placed in their entirety into class 7. This leaves only the A3 and A4 endstates for 2 and 6.

\*\* This information from the ANO-1 Individual Plant Examination, which was submitted to the NRC by letter dated April 29, 1993 (1CAN049301).

**Evaluation of Baseline ILRT Interval**

The risk results of this evaluation for the baseline case are presented in Table 3. The release frequencies for the Class 2, 6, 7, and 8 bins are taken from the ANO-1 IPE. As noted in Table 1, the risk associated with the Class 4 and 5 bins is not impacted by the ILRT interval and is not analyzed here. The release frequencies for the Class 3a and 3b bins are determined based on the previously approved methodology (see next paragraph). The release frequency for Class 1 is the value of core damage frequency (CDF) reduced by the frequencies of the Class 3a and 3b scenarios.

The Class 3a and 3b frequencies in the previously approved methodology were determined based on a 95<sup>th</sup> percentile  $\chi^2$  distribution of the NUREG-1493 data. For the baseline ILRT interval (3 tests in 10 years), this resulted in a frequency for Class 3a of 0.064 times CDF and a frequency for Class 3b of 0.021 times CDF. These frequencies are used in the ANO-1 sensitivity analysis presented in Table 3.

**Table 3  
 ANO-1 Risk Evaluation  
 of Baseline ILRT Interval**

Class	Frequency (per reactor-year)	Release (person-rem)	Risk (person-rem/year)
1	CDF intact - freq(3a)-freq(3b) = 3.54E-05	$L_a = 1.10E+03$	0.0390
2, 6	3.74E-08	Note 1	0.00625
3a	0.064 x CDF = 3.13E-06	10 $L_a = 1.10E+04$	0.0344
3b	0.021 x CDF = 1.03E-06	35 $L_a = 3.85E+04$	0.0395
7	8.98E-06	Note 1	1.87
8	2.08E-07	Note 1	0.113
<b>Total Risk</b>			<b>2.102</b>

Note 1 – The frequency, release, and risk information above is derived from the ANO-1 Level 3 PSA calculation. The frequency data represents the sum of the frequencies of the appropriate containment end state sequences. The Release data is not tabulated in this table because the releases for each of the sequences were individually multiplied by the frequency to arrive at the risk for that sequence. The risk information was then summed based on the binning of the sequences into the appropriate EPRI Failure Class.

Using the previously approved methodology, the risk contribution due to the ILRT Type A testing is considered to be due to the Class 3a and 3b scenarios. From Table 3, it can be seen that the risk contribution associated with the ILRT testing interval considering Classes 3a and 3b is:

$$\begin{aligned}
 \% \text{ Risk} &= [(Risk_{\text{Class 3a}} + Risk_{\text{Class 3b}}) / \text{Total Risk}] \times 100 \\
 &= [(0.0344 + 0.0395) / 2.102] \times 100 \\
 &= 3.52\%
 \end{aligned}$$

Since the Type A test does not impact CDF, the relevant criterion in evaluating this proposed change is LERF. In the determination of the impact of the change in the ILRT test interval on

the Large Early Release Frequency (LERF), the previously approved methodology focuses only on the Class 3b scenario, which is the only LERF contributor affected by the consideration of the ILRT interval. Thus, for this analysis, the baseline LERF is the Class 3b frequency, or 1.03E-06.

**Risk Evaluation of the Current ILRT Interval (1 in 10 years)**

This analysis of the current 'once in 10 years' interval is performed using the same approach taken above for the baseline case. The frequencies for all release classes, except Class 1, 3a, and 3b, are unaffected by the change in the interval and remain as in Table 3. And the releases for all of the classes are the same as those shown in Table 3 for the baseline case.

The increased probability of not detecting excessive leakage in a Type A test directly impacts the frequencies of the Class 3 events. In the previously approved methodology, the Class 3a and 3b frequencies are determined by multiplying the baseline frequency by a factor of 1.1. This same factor is used in this analysis to be consistent with the previously approved methodology. With this change in the Class 3 frequencies, the Class 1 frequency is also adjusted to preserve the total CDF. The evaluation of the current interval is presented in Table 4.

**Table 4  
 ANO-1 Risk Evaluation  
 of Current ILRT Interval**

Class	Frequency (per reactor-year)	Release (person-rem)	Risk (person-rem/year)
1	CDF intact - freq(3a)-freq(3b) = 3.50E-05	$L_a = 1.10E+03$	0.0385
2, 6	3.74E-08	Note 1 to table 2	0.00625
3a	$1.1 \times 0.064 \times \text{CDF} = 3.44E-06$	$10 L_a = 1.10E+04$	0.0379
3b	$1.1 \times 0.021 \times \text{CDF} = 1.13E-06$	$35 L_a = 3.85E+04$	0.0435
7	8.98E-06	Note 1 to Table 2	1.87
8	2.08E-07	Note 1 to Table 2	0.113
Total Risk			2.109

As was noted above for the baseline evaluation:

- the risk contribution due to the Type A test interval is  $[(0.0379 + 0.0435) / 2.109] \times 100$ , or 3.86%.
- the LERF for the current interval evaluation is the Class 3b frequency, or 1.13E-06.

**Risk Evaluation of the Proposed ILRT Interval (1 in 15 years, one-time)**

This analysis of the proposed 'once in 15 years' interval utilized the same approach as taken above for the baseline case. The frequencies for all release classes, except Class 1, 3a, and 3b, are unaffected by the change in the interval and remain as in Table 3. The releases for all of the classes are the same as those shown in Table 3 for the baseline case.

The increased probability of not detecting excessive leakage in a Type A test directly impacts the frequencies of the Class 3 events. Based on the previously approved methodology, the Class 3a and 3b frequencies are determined by simply multiplying the baseline frequency by a factor of 1.15. With this change in the Class 3 frequencies, the Class 1 frequency is also adjusted to preserve the total CDF. The evaluation of the proposed interval is presented in Table 5.

**Table 5**  
**ANO-1 Risk Evaluation**  
**of Proposed ILRT Interval**

Class	Frequency (per reactor-year)	Release (person-rem)	Risk (person-rem/year)
1	CDF intact - freq(3a)-freq(3b) = 3.48E-05	$L_a = 1.10E+03$	0.0383
2, 6	3.74E-08	Note 1 to table 2	0.00625
3a	$1.15 \times 0.064 \times \text{CDF} = 3.60E-06$	$10 L_a = 1.10E+04$	0.0396
3b	$1.15 \times 0.021 \times \text{CDF} = 1.18E-06$	$35 L_a = 3.85E+04$	0.0455
7	8.98E-06	Note 1 to Table 2	1.87
8	2.08E-07	Note 1 to Table 2	0.113
Total Risk			2.113

As was noted above for the baseline evaluation:

- the risk contribution due to the Type A test interval is  $[(0.0396 + 0.0455) / 2.113] \times 100$ , or 4.03%.
- the LERF for the current interval evaluation is the Class 3b frequency, or  $1.18E-06$ .

### Conditional Containment Failure Probability

Another parameter of interest in evaluating the risk impact of a change to the ILRT interval is the conditional containment failure probability (CCFP). Based on the previously approved methodology used in this sensitivity risk analysis, CCFP is defined as:

$$\text{CCFP} = 1 - (\text{frequency of no containment failure sequences} / \text{CDF})$$

Further, the sequences representing no containment failure were considered to be the Class 1 and 3a events. Thus, using this approach and the information from Tables 3, 4, and 5, the  $\Delta\text{CCFP}$  for ANO-1 may be derived as shown below. (note – the subscripts used represent the interval: b-baseline, c-current, p-proposed)

$$\begin{aligned} \Delta\text{CCFP}_{c \text{ to } p} &= \{[\text{freq}(\text{CI}1) + \text{freq}(\text{CI}3a)]_c - [\text{freq}(\text{CI}1) + \text{freq}(\text{CI}3a)]_p\} / \text{CDF} \\ &= \{[3.50E-05 + 3.44E-06] - [3.48E-05 + 3.60E-06]\} / 4.89E-05 \\ &= 0.0008, \text{ or } 0.08\% \end{aligned}$$

Similarly, the impact of the proposed interval compared to the baseline case is given by:

$$\begin{aligned} \Delta\text{CCFP}_{b\text{ to }p} &= \{[\text{freq (CI1)} + \text{freq (CI3a)}]_b - [\text{freq (CI1)} + \text{freq (CI3a)}]_p\} / \text{CDF} \\ &= \{[3.54\text{E-}05 + 3.13\text{E-}06] - [3.48\text{E-}05 + 3.60\text{E-}06]\} / 4.89\text{E-}05 \\ &= 0.0027, \text{ or } 0.27\% \end{aligned}$$

**Summary**

A summary of the sensitivity risk analysis of the ILRT interval changes using the previously approved methodology is presented in Table 6.

Regulatory Guide (RG) 1.174 provides guidance for determining the risk impact of plant-specific changes to the licensing basis. RG 1.174 defines very small changes in risk as resulting in increases of core damage frequency (CDF) below 1E-06/year and increases in LERF below 1E-07/year. Since the ILRT does not impact CDF, the relevant metric is LERF. Calculating the increase in LERF involves determining the impact of the ILRT interval on the leakage probability.

**Table 6  
 Summary of Results of ILRT Interval  
 Risk Evaluation**

ILRT Interval	ILRT Risk Contribution	LERF	ΔLERF from baseline	ΔLERF from current
baseline (3 in 10 years)	3.52%	1.03E-06	—	—
current (1 in 10 years)	3.86%	1.13E-06	1.0E-7	—
proposed (1 in 15 years)	4.03%	1.18E-06	1.5E-7	5.0E-08

Based on the RG 1.174 guidance, the extension of the ILRT interval from 10 years to 15 years is risk-insignificant.

For comparison purposes, the evaluation results using an alternate analysis methodology by ANO-1, derived using different assumptions and methodology, are presented in Table 7. This sensitivity analysis utilized a more realistic estimate of the probability of the Class 3 containment failure states and also a more conservative estimate of the impact of the extended interval.

**Table 7  
 Summary of Results of ILRT Interval  
 Risk Evaluation (using ANO-1 approach)**

ILRT Interval	ILRT Risk Contribution	LERF	ΔLERF from baseline	ΔLERF from current
baseline (3 in 10 years)	0.92%	3.58E-08	—	—
current (1 in 10 years)	2.73%	1.07E-07	7.1E-08	—
proposed (1 in 15 years)	4.04%	1.61E-07	1.3E-07	5.4E-08

## Technical Analysis and Risk Evaluation Conclusion

The risk associated with extending the ILRT interval is quantifiable. Entergy has utilized two alternate methodologies to quantify the risk and evaluate the proposed change in the ILRT interval to 15 years. The comparison developed above demonstrates that both methodologies demonstrate the risk associated with the extension of the interval is small and acceptable. On this basis, Entergy requests approval of a one-time extension of the ANO-1 ILRT interval to 15 years.

### 5.0 REGULATORY ANALYSIS

#### 5.1 Applicable Regulatory Requirements/Criteria

The proposed change has been evaluated to determine whether applicable regulations and requirements continue to be met. The requirements to perform an integrated leak rate test (ILRT) of the containment are set forth in 10CFR50.54(o) and 10CFR50 Appendix J. Both of these sections address criteria established in 10CFR50 Appendix A in General Design Criteria 50, 51, 52, and 53. A discussion of the ANO-1 conformance with these General Design Criteria (GDC) is provided in the Safety Analysis Report (SAR) Chapter 1, Sections 1.4.43 through 1.4.46. Entergy has determined that the proposed change does not require any exemptions or relief from regulatory requirements and does not affect conformance with any GDC as described in the SAR. This change does involve a relaxation, on a one-time basis, to guidance on NEI 94-01, which is endorsed by Regulatory Guide 1.163.

As the proposed change is for a test interval extension, Entergy is justifying the request on a risk-informed basis in accordance with RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis." The proposed change has been found to satisfy the key principles identified in RG1.174 for risk-informed changes. Those principles are:

- ◆ the change satisfies current regulations
- ◆ the change is consistent with the defense-in-depth philosophy
- ◆ the change maintains sufficient safety margins
- ◆ the increase in risk is small and is consistent with the NRC Safety Goal Policy Statement
- ◆ the impact of the proposed change will be monitored using performance measurement strategies (as a part of the current performance-based testing program).

## 5.2 No Significant Hazards Consideration

Entergy Operations, Inc. is proposing to revise the ANO-1 Administrative Technical Specifications regarding containment leak rate testing. The proposed change will revise the improved ANO-1 Administrative Technical Specification 5.5.16 to add an exception to the commitment to follow the guidelines of Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program." The exception is based on information in NEI 94-01, Revision 0, "Industry Guideline for Implementing Performance-Based Option of 10CFR50, Appendix J." The effect of this request will be an extension of the interval between tests from 10 years to 15 years.

Entergy Operations, Inc. has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10CFR50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

10CFR50, Appendix J was amended to incorporate provisions for performance-based testing in 1995. The proposed amendment to Technical Specification (TS) 5.5.16 adds a one-time extension to the current interval for Type A testing (i.e., the integrated leak rate test). The current interval of ten years, based on past performance, would be extended on a one-time basis to 15-years from the date of the last test. The proposed extension to the Type A test cannot increase the probability of an accident since there are no design or operating changes involved and the test is not an accident initiator. The proposed extension of the test interval does not involve a significant increase in the consequences since research documented in NUREG-1493, "Performance Based Containment Leak Rate Test Program," has found that, generically, fewer than 3% of the potential containment leak paths are not identified by Type B and C testing. In addition, at ANO-1 the testing and containment inspections also provide a high degree of assurance that the containment will not degrade in a manner detectable only by a Type A test. Inspections required by the Maintenance Rule (10CFR50.65) and by the American Society of Mechanical Engineers Boiler and Pressure Vessel Code are performed to identify containment degradation that could affect leaktightness.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed extension to the interval for the Type A test does not involve any design or operational changes that could lead to a new or different kind of accident from any accidents previously evaluated. The test itself is not being modified, but is only intended to be performed after a longer interval. The proposed change does not involve a

physical alteration of the plant (no new or different type of equipment will be installed) or a change in the methods governing normal plant operation.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The generic study of the increase in the Type A test interval, NUREG-1493, concluded there is an imperceptible increase in the plant risk associated with extending the test interval out to twenty years. Further, the extended test interval would have a minimal effect on this risk since Type B and C testing detect 97% of potential leakage paths. For the requested change in the ANO-1 ILRT interval, it was determined that the risk contribution of leakage will increase 0.19%. This change is considered very small and does not represent a significant reduction in the margin of safety.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, Entergy concludes that the proposed amendment presents no significant hazards considerations under the standards set forth in 10CFR50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

### 5.3 Environmental Considerations

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10CFR51.22(c)(9). Therefore, pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

### 6.0 PRECEDENCE

Similar amendment requests have been approved for:

Facility	Amendment #(s)	Approval Date	Accession #
Indian Point 3	206	April 17, 2001	ML011020315
Crystal River 3	197	August 30, 2001	ML012190219
Peach Bottom 3	244	October 4, 2001	ML012210108

In addition, similar requests from Waterford 3 and Indian Point 2 (both Entergy facilities) are currently under review by the NRC.

**Attachment 2**

**1CAN010201**

**Proposed Technical Specification Changes (mark-up)**

(Note – mark-up of improved TS page 5.0-25)

5.5.16 Reactor Building Leakage Rate Testing Program

A program shall be established to implement the leakage rate testing of the reactor building 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, except that the next Type A test performed after the April 16, 1992 Type A test shall be performed no later than April 15, 2007.

In addition, the reactor building purge supply and exhaust isolation valves shall be leakage rate tested once prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days.

The peak calculated reactor building internal pressure for the design basis loss of coolant accident,  $P_a$ , is 54 psig.

The maximum allowable reactor building leakage rate,  $L_a$ , shall be 0.20% of containment air weight per day at  $P_a$ .

Reactor Building leakage rate acceptance criteria is  $\leq 1.0L_a$ . During the first unit startup following each test performed in accordance with this program, the leakage rate acceptance criteria are  $< 0.60L_a$  for the Type B and Type C tests and  $< 0.75L_a$  for Type A tests.

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

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

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