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2CAN010506

January 31, 2005

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

SUBJECT: License Amendment Request
One-Time Technical Specification Change for Penetration Overcurrent Protection Devices
Arkansas Nuclear One, Unit 2
Docket No. 50-368
License No. NPF-6

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests the following amendment for Arkansas Nuclear One, Unit 2 (ANO-2). Entergy proposes to maintain a finite group of potentially oversized or otherwise potentially inoperable containment overcurrent protection devices in the energized state through the remainder of ANO-2 operating Cycle 17, currently scheduled to end on March 15, 2005. No inoperable devices that cannot be de-energized have been found to date. However, Entergy is currently performing an engineering assessment of containment electrical penetration protective devices and believes it is possible such an inoperability may be detected during this assessment. By maintaining inoperable protective devices in the energized state, the Actions associated with Technical Specification (TS) 3.8.2.5, Containment Penetration Overcurrent Protective Devices, will not be met. The TS requires two overcurrent protection devices for each circuit penetrating the containment building.

A risk-informed approach has been developed in support of the above proposal. For any given inoperability, risk will continue to managed and controlled in accordance with NRC guidance and verified to remain within Region III (very small risk significance) of Regulatory Guide 1.174 guidance.

Entergy requests approval of the proposed amendment as soon as practical. Once approved, the amendment shall be implemented immediately. Although this request is neither exigent nor emergency, your prompt review is requested.

A001

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and it has been determined that this change involves no significant hazards consideration. The bases for these determinations are included in Attachment 1. A markup of the affected TS page is included in Attachment 2.

The proposed change includes no new commitments.

If you have any questions or require additional information, please contact David Bice at 479-858-5338.

I declare under penalty of perjury that the foregoing is true and correct. Executed on January 31, 2005.

Sincerely,

JSF/dbb

Attachments:

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

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Attachment 1

2CAN010506

Analysis of Proposed Technical Specification Change

1.0 DESCRIPTION

This letter is a request to amend Operating License NPF-6 for Arkansas Nuclear One, Unit 2 (ANO-2).

The proposed change will revise Technical Specification (TS) 3.8.2.5, Containment Penetration Overcurrent Protective Devices, to allow continued operation through the end of ANO-2 operating Cycle 17 with 480 VAC (Volts – Alternating Current), 240 VAC, 120 VAC, and/or 125 VDC (Volts – Direct Current) containment penetration circuits inoperable provided operational risk is assessed and verified to remain below acceptable limits. ANO-2 Cycle 17 is currently scheduled to end on March 15, 2005.

2.0 PROPOSED CHANGE

The Action of Limiting Condition for Operation (LCO) 3.8.2.5 is modified by a note which states the following:

Note 1: **For ANO-2 Cycle 17, 480 VAC, 240 VAC, 120 VAC, and 125 VDC containment penetration overcurrent protective devices may be inoperable and compliance with Actions 'a' and 'b' above delayed, provided that upon discovery of one or more inoperable containment penetration overcurrent protective devices, risk is assessed within 72 hours and the risk increase verified to remain within Region III of Regulatory Guide 1.174.**

A Core Damage Frequency (CDF) of < 1.0×10^{-6}/rx-yr and a Large Early Release Frequency (LERF) of < 1.0×10^{-7}/rx-yr is considered acceptable in accordance with Regulatory Guide (RG) 1.174 guidance. Values within the aforementioned ranges are considered to be of small operational risk significance. The assessment of risk relevant to this submittal is discussed in detail in Section 4.0 of this submittal.

3.0 BACKGROUND

ANO-2 electric penetration assemblies are not equipped with self-fusing characteristics. Penetration conductors which are not de-energized during reactor operation and have sufficient credible fault currents that could exceed the design rating of the electrical penetration are protected by TS-required external circuit breakers and/or fuses that provide primary and secondary short circuit protection. The primary and backup protective devices protect the penetration conductors against maximum short circuit conditions as defined by IEEE 317-1971 conductor damage curves. In addition, at least one of the series protective devices provides reasonable protection from overload conditions. The TSs require that the trip setpoints of the primary and backup breakers be checked periodically. Plant procedures are to include a list of all the applicable breakers and their setpoints.

480 VAC load center electric penetrations supply non-Class 1E loads in the containment. All load center circuit breakers were originally qualified for Class 1E service, but may be housed in non-Category 1 structures. The electrical penetration conductors are the same size or larger than the cables supplying the power circuits. The load center main bus circuit breaker is equipped with current transformers, phase and ground fault relays. This provides complete protection against ground faults and limited protection for phase-to-phase and 3-phase faults.

Backup protection for circuits fed from 480 VAC load centers is provided by a series breaker located in the respective load center. Diversity of DC (Direct Current) control power has been provided by supplying the primary and the backup breakers from separate DC control centers. Both primary and backup breakers are located outside the containment.

480 VAC Class 1E and non-class 1E motor control centers (MCC) supply all circuits of this type that penetrate the containment. In general, one of the two series breakers for these circuits is a thermal-magnetic breaker. Whether a thermal-magnetic or a magnetic-only breaker is utilized, at least one of the two series breakers provides reasonable overload protection, and both provide maximum short circuit protection. Both breakers are located within the source MCC (outside the containment).

480 VAC lighting panel electric penetrations supply non-class 1E loads in the containment. The electrical penetrations are the same size or one size larger than the cables supplying the power circuits. Primary protection is provided by thermal magnetic breakers. Backup protection is provided by a magnetic-only breaker. The primary and backup breakers are non-class 1E breakers which are located outside containment.

All 120 VAC control circuits from MCCs are fed by Number 14 AWG conductors or larger. Circuits of this type penetrating the containment are fed from control transformers located within individual MCC starter cubicles. There are six different sizes of transformers used: 50 VA (Volt-Amps), 100 VA, 150 VA, 200 VA, 250 VA, and 300 VA. The maximum short circuit currents available to the circuits supplied by the transformers listed below are as follows:

Transformer	% Impedance	Maximum Short Circuit Current	Fuse Rating
100 VA	8.02%	10.39 A (Amp)	1 A
150 VA	5.50%	22.73 A	2 A
200 VA	5.17%	32.24 A	3 A
250 VA	3.64%	57.23 A	3 A
300 VA	3.61%	69.25 A	3 or 4 A

The impedance values provided above are nominal and are provided to demonstrate adequate protection on typical circuits with fuses listed above. Short circuit currents listed above were conservatively calculated assuming an infinite bus. Primary protection for these circuits is provided by a fuse in the hot leg secondary of the transformer. These fuses are sized as indicated above.

As the maximum available short circuit current from a 50 VA transformer is much less than the continuous current rating of the conductor, no backup protection is required for these circuits. Backup protection is provided for the 100 VA, 150 VA, 200 VA, 250 VA, and 300 VA transformer circuits in the form of an additional fuse identical to, and in series with, the primary fuse. These additional fuses are located within the MCC starter cubicles. The control circuit overcurrent protection provided will assure adequate protection for all current ranges, limiting the penetration conductor's temperature in short circuit conditions to below its 250 °C short circuit rating.

120 VAC electric penetrations supply Class 1E and non-Class 1E loads in the containment. In all cases the primary protective device is a fuse located in control panels and terminal boxes. The fuses will blow in less than one-half cycle at the maximum available fault current

of 5,000 amps at the penetration. The penetration conductors can withstand 5,000 amps for 1 ½ cycles. The backup protective device is a molded case circuit breaker or fuse. Either the circuit breaker or fuse will interrupt the current in less than one-half cycle at the maximum available fault current of 5,000 amps at the penetration. Both provide maximum fault protection and at least one provides reasonable overload protection.

In all cases the 125 VDC circuits are ungrounded. Each polarity of the DC circuit is fused. A DC short circuit would only have to blow one fuse to clear the fault. Either fuse could be considered the primary protective device and the other fuse could be considered the backup protective device. The fuses will blow in less than one-half cycle at the maximum available fault current of 5,000 amps at the penetrations. The penetration conductors can withstand 5,000 amps for 1½ cycles.

Motors and lighting circuits are fed from two series connected 2-pole circuit breakers located at class 1E and non-class 1E DC control centers. At least one of the two series breakers provides overload protection and both provide maximum short circuit protection. These circuit breakers will trip in less than one-half cycle at a fault current of considerably less than the 5,000-amp short-circuit rating of the penetration conductors. Both provide maximum fault protection and at least one provides reasonable overload protection.

The maximum short circuit currents available from the instrumentation circuits are well below the damage threshold of the penetration conductors for these circuits and are not addressed further in this letter.

Each Control Element Drive Mechanism's (CEDMs) set of coils is fed from a non-Class 1E 240 VAC 4-pole circuit breaker rated at 10 amps for phases A, B, and C, and 30 amps for the neutral and located outside of containment. Backup protection is provided by 3-pole, non-Class 1E, 40-amp subgroup circuit breakers also located outside of containment. The maximum available short circuit current at the penetration is 1,732 amps. For this short circuit current the primary and backup breakers will trip in one-third cycle. The penetration conductors can withstand 5,000 amps for 1 ½ cycles and 1,732 amps for approximately 13 cycles (interpolated by use of I^2t).

Further description of the ANO-2 containment overcurrent protection devices is found in the ANO-2 Safety Analysis Report (SAR) Section 8.3.1.2.4.

During a review of 120 VAC containment penetration circuits in mid-January 2005, a discrepancy was noted with regard to surveillance testing of a 120 VAC molded case circuit breaker that meets the TS criterion as a backup containment overcurrent protective device. Subsequent investigation determined the breaker was not included in the procedure listing of containment overcurrent protective devices and, therefore, had not been surveillance tested in accordance with TS frequencies. TS 4.0.3 (missed surveillances) was entered and a risk assessment performed to determine the overall risk associated with failure to perform testing of this breaker in accordance with TS requirements. The risk evaluation indicated that operation may continue up to the next refueling outage, if necessary, with no resulting significant plant risk. Therefore, in accordance with TS 4.0.3, the affected breaker was considered to remain operable and operation may continue until the test can reasonably be performed, or up to the next surveillance interval, whichever is shorter. As a result of this finding, Entergy Operations, Inc. (Entergy) determined that other containment penetration circuits should be reviewed for compliance with TS testing requirements.

In the course of investigation, five other 120 VAC circuit breakers were found to meet the same condition as described above. These breakers were evaluated as above and were also found to meet the requirements of TS 4.0.3 for continued operation. As a result of further design documentation review associated with the missed surveillances, three 480 VAC circuit breakers that were included in the TS testing program were found to be oversized in that they would not act to guard the electrical penetration over the full range of faulted conditions in which they were designed to protect. The discovery of inoperable 480 VAC breakers resulted in immediate entry into TS 3.8.2.5, which requires at least one of the two breakers in the penetration circuit to be opened within 72 hours. Because these three breakers were the backup breakers for three separate, normally de-energized components, compliance with the actions of TS 3.8.2.5 was met upon entry.

Results of an immediate assessment with regard to the above oversized breakers indicated that during penetration module upgrades in the mid 1990s, the penetration feed-through conductor for the three affected components was changed from a 2 gauge to a 12 gauge wire. Although this had no impact on the primary overcurrent protection device (480 VAC 25 amp breaker), the backup overcurrent device no longer afforded the same level of protection (480 VAC 50 amp breaker). Therefore, review scope was increased to include all electrical penetrations, focusing on those that had been replaced during the previous upgrade project.

Of important note is that in all cases to date at least one of the primary and backup protective devices has been found to be properly sized. Therefore, at least one breaker remains operable for fault current protection in each penetration. Entergy believes it is unlikely a condition will be found where both the primary and backup breakers are inoperable in a single circuit; however, it is possible. Therefore, the proposed TS is modeled to include such future findings and to ensure continued operational risks are controlled and maintained within NRC guidance limits.

4.0 TECHNICAL ANALYSIS

4.1 <u>Discussion</u>

As discussed above, continued investigations being performed to verify compliance with TS containment overcurrent protection device requirements could result in additional findings of inoperable containment penetration breakers. However, there is no evidence to suggest both required breakers in a single penetration circuit will be found to be inoperable. Therefore, it is expected that penetration protection will remain afforded by the remaining operable penetration protection breaker. Nevertheless, because the possibility of finding both breakers in a given circuit inoperable exists, the TSs are proposed to be revised to provide for continued plant operation through the remainder of ANO-2 Cycle 17 in either event, provided plant risk is managed and maintained within acceptable values.

A portion of the components that fall under the investigations involve containment isolation valves (CIVs). In some cases, the CIV may be de-energized in the closed position without affecting plant operation or safety. Such action would comply with the existing TS requirements. However, other CIVs are required to remain open to support plant operation and normal plant shutdown, such as cooling water supply/return to the Reactor Coolant Pump (RCP) motor and seal packages and cooling water supply/return to the CEDM coolers. Closure of these valves at power would result in a reactor trip. Closure of RCP cooling valves prior to reaching shutdown cooling system conditions would require a natural circulation cooldown. De-energizing the valves in the open position would render the valves inoperable in relation to containment integrity and require entry into a 4-hour action to close the valves in accordance with TS 3.6.3.1, Containment Isolation Valves. Therefore, with one or more containment penetration overcurrent devices inoperable supporting one or more electrical penetrations, a one-time TS change is proposed to allow continued operation through the end of ANO-2 operating Cycle 17, currently scheduled to end March 15, 2005.

Because the number and type of components affected cannot be identified until investigations are complete, specific plant risk cannot be quantitatively assessed for a given circuit inoperability. Therefore, Entergy has outlined a method of assessing risk on a case-by-case basis (below) to ensure overall plant risk remains acceptable for all expected failure modes, including the failure of both breakers in a single circuit and the failure of the main bus that feeds the breakers. The aforementioned investigation is currently estimated to conclude by Friday, February 4, 2005.

4.2 Probabilistic Safety Assessment Modeling Approach

The ANO-2 Probabilistic Safety Analysis (PSA) Model was initially developed to address the Generic Letter 88-20 requirements for an Individual Plant Examination (IPE) for Severe Accident Vulnerabilities. This model was developed by ANO Safety Analysis Design Engineering personnel with support from SAIC (now DS&S), other Design Engineering groups, and Operations. As part of the IPE development process, an expert panel review was performed on the results. This panel was composed of experienced personnel from these groups. In addition, ERIN Engineering performed an independent review of the IPE model and results.

The ANO-2 PSA model has been updated several times since the IPE to maintain it consistent with the as-built/as-operated plant, to incorporate improved thermal hydraulic results, and to incorporate PSA methodology improvements. Entergy continues to maintain this model as a living model. Updates have involved a cooperative effort involving both Entergy personnel and PSA consultant support. In each of the updates, an independent review of the revisions to the PSA model was performed. The PSA model and results have been maintained as engineering calculations or reports. As part of each major update, in order to ensure adequacy of the updated model, an internal review of PSA model results is performed by utilizing an expert panel. The panel is typically composed of experienced personnel from various plant organizations, including Operations, System Engineering, Design Engineering, Safety Analysis, and PSA.

In addition, a Combustion Engineering Owners Group (CEOG) PSA peer review, which followed a process adapted from the industry peer review process in Nuclear Energy Institute Report NEI-00-02, "Probabilistic Risk Assessment (PRA) Peer Review Guidance," was conducted on the ANO-2 PSA model during the week of February 11, 2003. This report identified five (5) facts and observations (F&Os) in the ANO-2 PSA model that were graded with an "A" level of significance. The "A" level F&Os are defined as extremely important and necessary to assure the technical adequacy of the PSA, the quality of PSA, or the quality of the PSA update process. Since each of these "A" level F&Os has the potential of uniquely affecting the model results for a given issue, it is not possible to provide a generic assessment of the effect of each on a risk assessment associated with discoveries that may be made regarding oversized breakers. However, a review and qualitative accounting of the impact on the results generated in the process described below will be performed for each of the five (5) Level "A" F&Os reported in the Combustion Engineering Owners Group (CEOG) PSA peer review report on ANO-2.

Each discovery of an oversized electrical penetration circuit breaker has the potential of increasing both the Core Damage Frequency (CDF) and the Large Early Release Frequency (LERF). For each oversized circuit breaker discovered, the CDF will be increased if a short occurs on the affected circuit and remaining protective devices (including circuit breakers, fuses, etc.) fail to protect the circuit for the resulting overcurrent condition. All protective devices actually present in the affected circuit will be credited.

If a short occurs in the affected circuit and the secondary overcurrent protective device fails to open, one of two outcomes is possible. Each is assessed below:

(1) The initial short may not overheat its electrical penetration feed-through module sufficiently to damage the penetration integrity and the fault eventually causes only the affected circuit to open. This may be the case for many circuits passing through electrical penetrations since the portion of the circuit in the penetration feed-through may be of heavier gage than for other portions of the circuit, and due to the penetration design as discussed later in this submittal (large destruction length required for breach). This event type has no impact on the CDF or LERF.

(2) The initial short may overheat its electrical penetration feed-through module. In this case it is conservatively assumed that this overheating will cause the loss of electrical continuity of all other circuits that pass though the same electrical penetration feed-through. The loss of electrical continuity on these other circuits is assumed to result in the loss of the associated equipment downstream of the penetration. If the affected circuits provide control or power to core damage mitigating equipment, then their loss will result in an increase in the CDF. In addition, it will be assumed that overheating an electrical penetration feed-through module will result in a breach large enough to allow a large and early release of fission products during a core damage event. Thus an increase in the LERF will result. Therefore, for each discovery of this type, an increase in the CDF and LERF will be assessed.

Depending on the event and the above engineering assessment, the risk impact of each discovery will be assessed quantitatively and qualitatively. The CDF associated with each condition (i.e., the conditional CDF) will be assessed by setting all affected components to TRUE (i.e., failed) in the current ANO-2 internal events risk model. External events contributors will be assumed to be a multiplier to the internal events CDF. The increase in the CDF is the difference between the conditional CDF and the current nominal ANO-2 CDF.

Since Entergy has not developed a quantitative ANO-2 LERF model to date, the LERF impact will be assessed qualitatively. The qualitative estimate will be performed by establishing a nominal estimate for the fraction of the ANO-2 LERF. This estimate will be assumed to be the product of the two terms: 1) the LERF Factor (LF), which is the ratio of the ANO-2 IPE CDF that results in a large early release over the total ANO-2 IPE CDF and, 2) the current ANO-2 Probabilistic Safety Assessment (PSA) Model CDF. The LERF associated with each condition (i.e., the conditional LERF) will be assessed by increasing the nominal LF to account for the increased probability of containment integrity failure and multiplying this adjusted factor by the conditional CDF. Increases in LF associated with each discovery will be equated to the increase in the probability of containment integrity failure associated with each discovery. This is conservative, since it assumes that all electrical penetration failures associated with each discovery will result in a large and early release of fission products given a core damage event. The increase in the LERF will be estimated as the difference between the conditional LERF and the current nominal ANO-2 LERF.

The above process provides estimates for the increase in the CDF and LERF with respect to the "instantaneous" increases in these parameters. Since the condition is expected to be corrected in the upcoming ANO-2 refueling outage, 2R17, it is appropriate to estimate the annual average risk impact of the condition and to compare these annual average results (ΔCDF and ΔLERF) with the guidance risk criteria provided in RG 1.174. This estimation will be completed in each case and determined to remain within the very small risk significance threshold of RG 1.74.

A review and qualitative accounting of the impact of the results generated in the above process will be performed for each of the five (5) Level "A" Facts and Observations (F&Os) reported in the Combustion Engineering Owners Group (CEOG) PSA peer review report for ANO-2.

For illustrative purposes, an example application of the PSA modeling approach described above is provided below for the discovery of an oversized 480VAC breaker 2B51H8. The oversized 480VAC circuit breaker 2B51H8 supplies power through Penetration 2WR40-1 feed-through Module C a Safety Injection Tank (SIT) isolation valve. The properly sized 480 VAC breaker 2B51F2 is in series with breaker 2B51H8 and is expected to function as designed to break any fault on the subject cable.

Other cables that pass through this module were identified and the impact of either a loss in continuity or a short between one conductor and any other in the module was evaluated for resulting adverse component failure modes. In this example, such an engineering assessment is expected to result in no increase in the plant CDF, since the only outcome expected is the postulated loss of containment integrity of Penetration 2WR40-1 feed-through Module C. This is outcome (2) with no increase in CDF, as described in the methodology section above.

An estimate for the increase in LERF can be calculated via this methodology. The following results were generated:

CDF0	=	ANO-2 Core Damage Frequency (Nominal with T&M) (Instantaneous)
	=	6.18E-06 /rx-yr
CDF1	=	ANO-2 Core Damage Frequency (Conditional with T&M) (Instantaneous)
	=	CDF0
	=	6.18E-06 /rx-yr
ΔCDF	=	Change in Core Damage Frequency (Instantaneous)
	=	0 /rx-y
LF0	=	LERF Factor (Nominal)
	=	0.07664 (Frac LRF/Total CDF, nominal)
LERF0	=	Large Early Release Frequency (Nominal) (Instantaneous)
	=	LF0 * CDF0
	=	0.07664 * 6.18E-06
	=	4.74E-07 /rx-yr
PLF0	=	Probability of Load Fault on a Single 480 VAC Circuit (Nominal)
	=	1.00E-07 /hr (per generic database)
	=	8.77E-04 /yr

PCBFTO0	=	Probability of 480VAC Circuit Breaker Failure to Open (Nominal)
	=	5.75E-04 /demand (per generic database)
T	=	Exposure Time Interval (hours)
	=	64 days (Time from 1/11/05 0001 16:04 to 3/15/05 2359 (beg of 2R17))
	=	0.1752 year
PCPF0	=	Containment Penetration Integrity Failure Probability due to Load Fault induced failure (Nominal)
	=	(Short on power cable to 2CV-5003-1) * (2B51H8 FT Open on Overcurrent) * (2B51F2 FT Open on Overcurrent)
	=	(PLF0 * T) * (PCBFTO0) * (PCBFTO0)
	=	(8.77E-04 /yr) * (0.1752 year) * (5.75E-04) * (5.75E-04)
	=	5.08E-11
PCPF1	=	Containment Penetration Integrity Failure Probability due to Load Fault induced failure (Conditional)
	=	(Short on power cable to 2CV-5003-1) * (2B51H8 FT Open on Overcurrent) * (2B51F2 FT Open on Overcurrent)
	=	(PLF0 * T) * (1) * (PCBFTO0)
	=	(8.77E-04 /yr) * (0.1752 year) * (1) * (5.75E-04)
	=	8.83E-08
ΔPCPF	=	PCPF1 – PCPF0
	=	8.83E-08
LF1	=	LERF Factor (Conditional)
	=	LF0 + ΔPCPF
	=	0.07664 + 8.83E-08
	=	0.07664
LERF1	=	Large Early Release Frequency (Conditional) (Instantaneous)
	=	LF1 * CDF0
	=	0.07664 * 6.18E-06
	=	4.74E-07 /rx-yr
ΔLERF	=	Change in Large Early Release Frequency (Instantaneous)
	=	LERF1 – LERF0
	=	5.46E-13

The annual average ΔCDF and ΔLERF values are

ΔCDF	=	Change in Core Damage Frequency (Annual Average)
	=	ΔCDF * T
	=	(0 /rx-yr) * (0.1752 year)
	=	0 /rx-yr
ΔLERF	=	Change in Large Early Release Frequency (Annual Average)
	=	ΔLERF * T
	=	(5.46E-13 /rx-yr) * (0.1752)
	=	9.56E-14 /rx-yr

Both the annual average ΔCDF and the annual average ΔLERF are well within the RG 1.174 limits. This conclusion would not be changed even if the CDF and LERF values are doubled to account for external events risk contributors.

4.3 ANO-2 Defense in Depth

For components required to fulfill a safety function during or following an accident, two trains of such systems are required to be operable in accordance with the TSs. Therefore, in the unlikely event an overcurrent protective device fails to operate and results in the loss of one or more TS-required components, the safety function may still be fulfilled by the remaining train of equipment. In addition, any such loss would be readily detected and action taken commensurate with the safety significance of the equipment and in accordance with TSs.

The containment penetration modules that are most likely to be subject to not having full breaker coordination are those associated with new Conax designed modules. These modules are more robust than the previous modules and are less subject to failure. The likelihood of an electrical fault or overload condition that could result in a breach of containment is minimal for the older model penetration modules and improbable for the upgraded modules.

Entergy believes any findings of oversized or otherwise inoperable containment overcurrent protection devices will be associated with a penetration module that was upgraded in the mid-1990s. The feed-through conductor transverses approximately 5.5 feet of stainless steel tubing and is sealed for a distance of approximately six inches on either side of the penetration module. Nitrogen gas is ported into the seal module to maintain the conductors as dry as possible. Approximately one foot of conductor would need to be at least partially destroyed on both sides of the module to provide a leak path from the containment building to the penetration rooms. However, such a failure would result in the loss of nitrogen pressure at the module, which will activate a local alarm. In addition, the o-ring seals at the penetration barrier are outside the steel tubing. Failure of the o-ring seals would be precluded since the faulted condition would be required to burn through the stainless steel tubing and damage the o-ring seals prior to conductor failure (fault isolation). Such an event is considered incredible. U-cup failure of the older type penetration modules would likewise be unlikely, although the length of conductor destruction required to create a containment leak is only approximately six inches. Regardless of the destruction length required, it is much more likely that the fault will be isolated at high resistance points (such as connections and contacts) prior to destruction of any significant length of cabling.

ANO-2 SAR Section 8.3.1.2.4 states, in part, "The electric penetrations were purchased in 1972 and meet the intent of the requirements of IEEE 317-1971." Also stated is, "The primary and backup protective devices protect the penetration conductors against maximum short circuit conditions as defined by IEEE 317 conductor damage curves." These curves demonstrate the I^2t damage characteristic for various size conductors, where I = amperes and t = time in seconds. Therefore, assuming either of the two protective devices in any specific penetration circuit is operable, the feed-through conductor will still be protected for fault current.

With reference to the Background Section above, both breakers in a protective circuit are designed to isolate (open) on fault conditions. One of the two breakers also affords protection against sustained overload conditions. In several cases, the penetration circuit also contains a thermal overload protection device which, although not tested in accordance with TSs, will act to provide overload protection.

4.4 Operations Assessment and Actions

Operations personnel typically tour each penetration room at least once per shift (12 hours). As described above, failure of the penetration will result in the loss of nitrogen pressure and subsequently provide local alarm of the condition. Furthermore, it is likely that any failure of a conductor within a penetration would result in the loss of control room indication for the related component. Such an indication loss would be readily detected by control room personnel. Therefore, any fault or overload condition that occurs would likely not remain unrecognized for greater than a 12-hour period. Once identified, such failures would often result in the entry into other TS actions either for the component which was lost, the TS for containment isolation valves, or the TS for containment integrity. Regardless, prompt identification will ensure appropriate corrective action will be taken in a timely manner. Because the aforementioned identification probabilities are built into ANO processes, no new commitment is proposed to ensure prompt detection of electrical penetration failures.

4.5 Penetration Room Availability to Monitor and Limit Releases

In the very unlikely event an electrical penetration fails during an accident, ANO-2 employs a penetration room ventilation system consisting of two redundant trains, to ensure that post-LOCA (Loss of Coolant Accident) leakage is collected, filtered, and monitored prior to release to the environment. Upon receipt of a containment isolation signal, the penetration room ventilation system functions to maintain a slight vacuum in the penetration rooms. The design basis for the in-line charcoal adsorber is to have a capability of removing 25% of the core iodine inventory. The 25% was derived using the standard assumption that during an accident 50% of the halogens are released from the core and that 50% of the iodine that is released plates out within the containment. Although these assumptions were part of the design basis of the Penetration Room Ventilation System, the system is not credited for iodine removal in the accident analyses. In-line roughing and High Efficiency Particulate Absorber (HEPA) filters act to remove particulates prior to discharge. Radiation monitoring is also provided to ensure any release of activity is monitored and evaluated in accordance with emergency plan recommendations. The two trains of filtration and exhaust would significantly mitigate the consequences of a penetration failure during an accident.

4.6 Summary

Based on the above risk-based arguments, the installed penetration room exhaust system, and the prompt detection capabilities of failed penetrations, Entergy believes ANO-2 may continue power operation through the remainder of Cycle 17 with continued reasonable assurance of nuclear, plant, and public safety with one or more overcurrent protective devices supporting one or more containment electrical penetrations inoperable. Nevertheless, where possible, Entergy will repair/replace circuits or, de-energize circuits in accordance with TS 3.8.5.2, whenever doing so will not jeopardize steady-state operations or equipment important to the mitigation of an accident.

The proposed amendment results in TS surveillance 4.8.2.5 items 2 and (a) be relocated to the following TS page. As the relocation is administrative in nature, no further discussion is included in this submittal with regard to this change.

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. Entergy has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the Technical Specifications (TS), and does not affect conformance with any General Design Criterion differently than described in the Safety Analysis Report (SAR). The design basis of the containment overcurrent protection devices is unchanged by the proposed amendment.

5.2 No Significant Hazards Consideration

Entergy proposes to modify the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specification (TS) 3.8.2.5, Containment Penetration Overcurrent Protective Devices to allow continued operation through the end of ANO-2 operating Cycle 17 with 480 VAC (Volts – Alternating Current), 240 VAC, 120 VAC, and/or 125 VDC (Volts – Direct Current) containment penetration circuits inoperable provided operational risk is assessed and verified to remain below acceptable limits. ANO-2 Cycle 17 is currently scheduled to end on March 15, 2005.

Entergy has evaluated whether a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "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.

   Containment penetration overcurrent protective devices are not considered in the accident analysis as an accident initiator. Therefore, no increase in the probability of an accident previously evaluated will result from continued operation with one or more protective devices supporting one or more containment electrical penetrations inoperable.

   For components required to fulfill a safety function during or following an accident, two trains of such systems are required to be operable in accordance with the TSs. No single fault will result in the loss of more than one train of equipment. Therefore, in the unlikely event an overcurrent protective device fails to operate and results in the loss of one or more TS-required components, the safety function may still be fulfilled by the remaining train of equipment. In addition, any such loss would be readily detected and action taken commensurate with the safety significance of the equipment and in accordance with TSs. Therefore, no significant impact on Core Damage Frequency (CDF) results from periods when one or more protective devices supporting one or more containment electrical penetrations is inoperable.

   When considering Large Early Release Frequency (LERF), failure of containment penetration overcurrent protective devices is not likely to result in catastrophic penetration failure. In addition, approximately one foot of penetration conductor would need to be destroyed before a breach of containment could occur. Furthermore, any leakage would be monitored for radioactivity and filtered through charcoal beds and other filtering mechanisms during discharge to the atmosphere. The likelihood of a fault or overload condition occurring in any affected penetration over the next two months is improbable and of low risk consequence. Therefore, the consequences of an accident previously evaluated are not significantly increased with respect to changes in LERF.

   In addition to the above, Entergy will ensure that risk associated with operation when one or more protective devices inoperable supporting one or more containment electrical penetrations is within Region III (very small risk category) of Regulatory Guide 1.174.

   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.

   Containment penetration overcurrent protective devices are not considered accident initiators nor is this function credited in any safety analyses for the prevention of an accident. Given the low risk of continued operation with one or more protective devices supporting one or more containment electrical penetrations and considering the likelihood of prompt identification of a failed conductor or penetration associated with a failed conductor, reasonable assurance is provided that a penetration failure is unlikely and any resulting consequences would be minimal.

   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 containment overcurrent protective devices are not credited in analyses for any accident previously evaluated. The likelihood of an electrical fault or overload occurring that would require actuation of the protective device is minimal. The likelihood of an electrical fault or overload condition that could result in a breach of containment is minimal for the older model penetration modules and improbable for the upgraded modules. All electrical penetrations, whether or not associated with an inoperable protective device, will continue to be monitored and appropriate corrective action taken in the event of any noted failure mechanisms. Such action ensures timely resolution of potential issues and acts to minimize any impact the degradation could have with regard to the mitigation of accidents. All identified conditions will be evaluated individually and in aggregate for the risk impact on overall unit operation.

   In addition to the above, Entergy will ensure that risk associated with operation when one or more protective devices inoperable supporting one or more containment electrical penetrations is within Region III (very small risk category) of Regulatory Guide 1.174.

   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 consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

5.3 <u>Environmental Considerations</u>

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 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 PRECEDENCE

Numerous examples of NRC relief, TS changes, etc. are available with respect to operations largely dependent on the managing of controlling of risk. The above proposal has no specific precedence. However, the proposal is consistent with the improved standard TSs risk-informed initiatives currently being evaluated by the industry and the NRC staff.

7.0 REFERENCES

1. 10 CFR 50.36, Technical Specifications

2. NUREG 1432, Rev. 3, Revised Standard Technical Specifications for Combustion Engineering Plants

Attachment 2

2CAN010506

Proposed Technical Specification Changes (mark-up)

ELECTRICAL POWER SYSTEMS

CONTAINMENT PENETRATION CONDUCTOR OVERCURRENT PROTECTIVE DEVICES

LIMITING CONDITION FOR OPERATION

3.8.2.5 Primary and backup containment penetration conductor overcurrent protective devices associated with each containment electrical penetration circuit shall be OPERABLE. The scope of these protective devices excludes those circuits for which credible fault currents would not exceed the electrical penetration design rating.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one or more of the containment penetration conductor overcurrent protective devices inoperable: (Note 1)

a. De-energize the circuit(s) by tripping the associated backup circuit breaker within 72 hours and verifying the backup circuit breaker to be tripped at least once per 7 days thereafter, or

b. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.8.2.5 All containment penetration conductor overcurrent protective devices shall be demonstrated OPERABLE in accordance with the manufacturers' recommendations:

a. At least once per 18 months:

1. For at least one 6.9 kv reactor coolant pump circuit, such that all reactor coolant pump circuits and their associated backup circuits are demonstrated OPERABLE at least each 72 months, by performance of:

(a) A CHANNEL CALIBRATION of the associated protective relays, and

(b) An integrated system functional test which includes simulated automatic actuation of the system and verifying that each relay and associated circuit breakers and control circuits function as designed.

Note 1: For ANO-2 Cycle 17, 480 VAC, 240 VAC, 120 VAC, and 125 VDC containment penetration overcurrent protective devices may be inoperable and compliance with Actions 'a' and 'b' above delayed, provided that upon discovery of one or more inoperable containment penetration overcurrent protective devices, risk is assessed within 72 hours and the risk increase verified to remain within Region III of Regulatory Guide 1.174.

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2. For each type of 480 volt air frame protective device, such that all 480 volt air frame protective devices are demonstrated OPERABLE at least once each N x 18 months, where N is the number of devices of each type, by performance of:

   (a) A calibration of the protective relays for devices that are actuated by protective relays which includes verification of the range, accuracy, and alarm/trip capability, and

SURVEILLANCE REQUIREMENTS (Continued)

2. For each type of 480 volt air frame protective device, such that all 480 volt air frame protective devices are demonstrated OPERABLE at least once each N x 18 months, where N is the number of devices of each type, by performance of:

   (a) A calibration of the protective relays for devices that are actuated by protective relays which includes verification of the range, accuracy, and alarm/trip capability, and

   (b) A functional test of protective devices that are actuated by protective relays which verifies that the protective device trips when its associated protective relays actuate, and

   (c) A functional test which consists of injecting primary current in each overcurrent element mounted on the protective device at the specified setpoint and verifying that the protective device trips when each overcurrent element actuates. If any protective device fails to function as designed, all other protective devices of the same type shall be tested.

3. For molded case protective devices, such that all protective devices of each type are demonstrated OPERABLE at least once each N x 18 months, where N is the number of devices of each type, by performance of:

   (a) A functional test of at least one protective device of each type which consists of injection of primary current at the specified setpoint to the protective device and verifying that the protective device trips when the overcurrent elements are actuated. If any protective device fails to function as designed, all other protective devices of the same type shall be tested.

b. At least once per 60 months, by performing inspections and preventive maintenance on each protective device in accordance with procedures prepared in conjunction with its manufacturer's recommendations.