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1CAN080601

August 31, 2006

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

SUBJECT: License Amendment Request
Relocation of Inverter Y-28 and Panel C-540 Requirements from TSs to TRM
Arkansas Nuclear One, Unit 1
Docket No. 50-313
License No. DPR-51

REFERENCES: 1. NRC letter to Craig Anderson dated October 29, 2001, "Issuance of
Amendment RE: The Conversion to Improved Technical
Specifications (TAC No. MA8082)" (1CNA100102)

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests the following amendment for Arkansas Nuclear One, Unit 1 (ANO-1). Entergy proposes to relocate the Technical Specification (TS) 3.8.7 requirements associated with 120 Volt Inverter Y-28 and TS 3.8.9 requirements associated with 120 VAC electrical power distribution subsystem panel C-540 to the Technical Requirements Manual (TRM). These components were adopted in the TSs during the conversion of the ANO-1 TSs to the improved standard version of NUREG-1430, Revision 1, as approved by the NRC on October 29, 2001 (Reference 1). Previous to the conversion, neither the inverter nor 120 VAC panel C-540 had been included in the TSs.

Inverter Y-28 provides uninterruptible power to C-540 which, in turn, powers components or portions of systems important to unit operation, such as the Diverse Reactor Overpressure Protection System (DROPS) and one channel of Emergency Feedwater Initiation and Control (EFIC) vector/flow control program. The loss of C-540 components do not result in the loss of safety function. In addition, C-540 components important to safety are governed by other TSs. A detailed list of components and their impact on plant operation is included in Attachment 1.

Entergy has concluded that Inverter Y-28 and panel C-540 do not support critical functions and do not meet the criteria of 10 CFR 50.36 for inclusion in the TSs. Currently, if the inverter were to be rendered inoperable, the TSs require the inverter to be restored to an operable status within 72 hours or a plant shutdown commenced. Loss of C-540 requires entry into the

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respective TS Actions associated with components lost that are powered by C-540. To support inverter and/or panel maintenance and future modifications, Entergy proposes to relocate the current TS requirements associated with Y-28 and C-540 to the TRM.

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 the attached submittal.

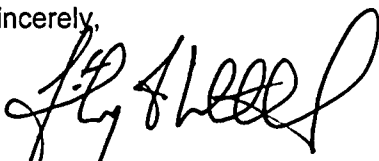
The proposed change includes no new commitments.

Once approved, the amendment shall be implemented within 60 days. Although this request is neither exigent nor emergency, your prompt review is requested. Entergy requests approval of this amendment by October 1, 2007.

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 August 31, 2006.

Sincerely,

A handwritten signature in black ink, appearing to read 'TGM/dbb', is written over the 'Sincerely,' line.

TGM/dbb

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Proposed Technical Specification Changes (mark-up)
3. Draft Technical Requirements Manual Pages (for information only)

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Attachment to

1CAN080601

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 Technical Specification (TS) 3.8.7, *Inverters – Operating*, and TS 3.8.9, *Distribution Systems – Operating*, to relocate the requirements for 120 Volt Inverter Y-28 and associated panel C-540 to the Technical Requirements Manual (TRM).

2.0 PROPOSED CHANGE

The proposed change will relocate Inverter Y-28 and panel C-540 requirements from the TS to the TRM. These components were adopted into the TSs during the conversion of the ANO-1 TSs to the improved standard version of NUREG 1430, Revision 1, as approved via NRC letter dated October 29, 2001, (Reference 1). TS 3.8.7 requirements for Inverter Y-28 will be relocated to the TRM with the exception of the restoration requirements of ACTION B, the requirements of ACTION C, and the plant shutdown requirements of ACTION D, which are eliminated. ACTION B and C were developed specifically for ANO-1 under the consideration that Y-28 provided power to green train Emergency Feedwater Initiation and Control (EFIC) components. However, Entergy has determined that those components lost upon failure of Y-28 (assuming a subsequent loss of C-540) will not result in the loss of safety function nor place the EFIC system in a single failure vulnerable mode of operation (see Section 3.0 and 4.0 for further discussion). TS 3.8.9 requirements for panel C-540 will be relocated to the TRM with the exception of the plant shutdown requirements of ACTION E, which is eliminated. Once relocated to the TRM, extended Y-28 or C-540 out-of-service periods will be evaluated against continued plant operation commensurate with the requirements of 10 CFR 50, Appendix B, Criterion XVI. A markup of the proposed TS change is included in Attachment 2. A proposed TRM (for information only) is included in Attachment 3.

3.0 BACKGROUND

Vital inverters provide uninterruptible power to vital instrument buses that support initiation of reactor trip and actuation of safety systems to prevent or mitigate design basis accidents. The inverters are normally designed to be powered from vital station batteries and convert this DC power source to a square-wave AC source used to power vital instrumentation. When the inverter or DC power source is unavailable, the vital instrument buses can be fed directly from the station vital AC sources (offsite power backed by diesel generators).

In July 1991, the NRC issued Generic Letter (GL) 91-11 associated with vital instrument power supplies. At the time, there were no ANO-1 TS requirements for vital inverters. Licensees could remove inverters from service for an indefinite period of time, placing the associated vital instrument bus on normal vital AC power. This became a concern because, if more than one inverter were removed from service at the same time, a loss of offsite power would result in the temporary de-energization of the vital instrument panels until the corresponding diesel generators started and re-energized the respective buses. The loss of more than one vital instrument bus for this short period of time would result, in most cases, in the full actuation of all Emergency Safeguard Features (ESF) systems. Although full ESF

actuation appears fail-safe, many plants contained an automatic ESF function (Recirculation Actuation Signal) to transfer Emergency Core Cooling System (ECCS) suction to the containment building sump. Because the sump would be virtually empty during such inadvertent actuations, a loss of net positive suction head (NPSH) to all ECCS components could occur. Therefore, GL 91-11 recommended that the time in which vital inverters be removed from service be limited.

ANO-1 has seven vital inverters. Four of these inverters support the four-channel Plant Protective System (PPS) features that act to trip the reactor and auto-initiate standby safety equipment for prevention and mitigation of accidents. These inverters are backed by two additional swing inverters. The time in which these four inverters can be removed from service is controlled by TS 3.8.7. ANO-1 does not have the aforementioned automatic recirculation actuation function (manual operator action is required to transfer ECCS pump suction to the containment building sump). However, some ANO-1 ESF systems are energized-to-actuate. Because of this latter feature, it is important to control the amount of time an inverter is out of service and the number of inverters that can be removed from service simultaneously.

The seventh inverter, Y-28, supplies power only to distribution panel C-540. This panel is the 120 VAC power source to instrumentation that affects the following major components:

- Some Alternate Shutdown Instrumentation
- One Subcooling Margin channel
- One Diverse Reactor Overpressure Protection System (DROPS) channels (non-TS)
- Decay Heat Removal (DHR) Automatic Closure Interlock (ACI)
- One channel of Pressurizer level/pressure control
- One channel (green train) of Emergency Feedwater Initiation and Control (EFIC)

Upon failure of Y-28 or when removing Y-28 from service, panel C-540 is placed on "Alternate Source to Load," effectively bypassing the inverter. Other than an internal short that may render C-540 inoperable, loss of the panel would require both the loss of Y-28 and the green train vital AC bus. Therefore, the loss of Y-28 alone does not render any of the above listed equipment inoperable. Nevertheless, a description of the above components and other less-important components, including their relationship to plant operation, is provided below to evaluate plant impact should panel C-540 de-energize for any reason.

Alternate Shutdown Instrumentation

The preceding list and the discussion that follows include the major Alternate Shutdown indications that are powered from C-540. The degradation of this instrumentation requires an evaluation of compliance with 10 CFR 50, Appendix R and the station Fire Hazards Analysis. Non-compliance with Appendix R warrants the establishment of compensatory measures until compliance is re-established. Operations procedure OP-1107.003, Attachment B, establishes fire-related compensatory measures upon loss of C-540 to reduce the risk of fire in areas that could threaten safe shutdown instrumentation. These actions are maintained outside of TSs and governed by other regulatory requirements.

Wide Range RCS Pressure Indication

Reactor Coolant System (RCS) pressure PT-1041 input to DROPS is powered from C-540. DROPS is a non-TS system designed to backup normal reactor trip and EFW initiation in accordance with the ATWS rule (Anticipated Transient Without A Scram). The loss of DROPS does not interfere with any PPS function. Although only one DROPS channel is affected by the loss of this input, both channels of DROPS are required to be bypassed when this condition exists. This action prevents spurious DROPS actuation upon a spike or failure of a redundant input or a spike that could occur upon re-energization of panel C-540.

In addition, the loss of this RCS pressure transmitter will result in the loss of wide range RCS pressure indication on the Safety Parameter Display System (SPDS) computer Alternate Shutdown display and on control room panel C-04. In either case, redundant indication remains available on both the SPDS and panel C-04.

Finally, the loss of the RCS pressure input will result in the loss of one of two Subcooling Margin channels, which input into the Inadequate Core Cooling Monitoring and Display System (ICCMDS). Operations personnel can quickly determine subcooling margin, if necessary, using available RCS pressure and temperature indications should the redundant monitor be lost.

Loss of PT-1041 will result in entry into TS 3.3.15, *Post Accident Monitoring Instrumentation*, and subsequent entry into the associated 30-day allowed restoration period.

Green Train Inputs to EFIC

Loss of C-540 results in the loss of the following SG pressure and level instruments: LI-2622, LI-2624, LI-2671, LI-2673, PR-2618B, and PI-2667B. Where EFIC is concerned, the preceding indications have failed to zero, resulting in a half-leg trip of Channel B EFIC Emergency Feedwater (EFW) and Main Steam Line Isolation (MSLI) functions. The other three EFIC channels remain unaffected by this loss. In this condition, Channel B may be placed in "bypass" to minimize the possibility of inadvertent EFIC actuation in accordance with TS 3.3.11, *EFIC System Instrumentation*.

With the aforementioned level and pressure instruments failed low, EFW valves CV-2645 and CV-2647 (EFW pump "A" feed to each steam generator) will receive a full open signal (the valves are normally open) and remain open if a valid EFIC actuation were to be received. This continues to meet the steam generator (SG) feed safety function for the EFIC system on low SG level. Neither valve will travel close to isolate an affected SG (SG with a feed or steam line break) or travel close to limit SG feed when SG levels have been restored to post-trip levels. However, each of the lines has a redundant valve that will travel close to isolate an affected SG depending on SG pressures. Therefore, the MSLI function of the EFW system will be maintained. The flow control function, which acts to limit feed when SG levels have reached post-trip values, will not be achieved automatically. Manual operator action (available from the control room) will be required to modulate the affected valves as necessary to control SG level once post-trip levels are achieved. In addition, if for any reason condenser vacuum is lost, manual control of SG B pressure will also be required post-trip. Manual SG level and pressure control, when required, is established in station Emergency Operating Procedures (EOPs). Because the affected valves will not act to control SG pressure or level based on SG pressure or post-trip SG level setpoints, the plant must be placed in a 72-hour Action to restore function in accordance with TS 3.3.11 (vector valve control function has been lost).

Affected instrumentation will also require entry into TS 3.3.15, *Post Accident Monitoring Instrumentation*, and subsequent entry into the associated 30-day allowed restoration period.

The green train "A" EFW pump (steam-driven) speed signal input to the plant computer will also be lost, but indication on control room panel C09 will remain unaffected. This loss will not prevent the turbine from operating on a valid EFIC signal. With respect to Alternate Shutdown considerations, this pump is overridden and controlled locally at the turbine.

DHR ACI

The DHR system ACI function will be lost to suction valve CV-1410. This valve is de-energized and locked closed during normal operation. The redundant valve, CV-1050, is unaffected by the loss of C-540. The ACI function is not required when the DHR system is in service in Modes 4, 5, or 6. In Modes 1 - 4 (when the DHR system is not in service), the ACI function is governed by TS 3.4.14, *RCS Pressure Isolation Valve (PIV) Leakage*.

Gamma Metrics Source Range Instrument

The loss of C-540 will result in the loss of one of two source range neutron flux indications. The loss of the neutron flux indication will result in the subsequent loss of one DROPS channel, although both DROPS channels will be bypassed in this event to preclude spurious actuation.

One source range channel is required to be operable in Modes 2-5 for continuous assessment of the shutdown state of the reactor or to support the approach to criticality. Loss of the remaining redundant channel will require reactor shutdown in accordance with TS 3.3.9, *Source Range Neutron Flux*.

The only time both channels of source range instruments are required to be operable is during core alterations during Mode 6 operations. Loss of this instrument during core alterations is governed by TS 3.9.2, *Nuclear Instrumentation*.

In Modes 1, 2, and 3, loss of source range neutron flux channel will also result in entry into TS 3.3.15, *Post Accident Monitoring Instrumentation*, and subsequent entry into the associated 30-day allowed restoration period.

Pressurizer Pressure/Level Control

Temperature input TE-1002A and level input LT-1002 are lost to the Pressurizer control system. This control system is a non-TS system utilized to maintain Pressurizer pressure and level during normal operation, and normal heatup and cooldown. Upon loss of these instruments, Operations procedures require that the redundant control channel be verified in service. With the redundant channel in service, automatic Pressurizer level and pressure control is maintained. In addition, manual control is available from the control room should the redundant channel fail. Loss of LT-1002 (Pressurizer level) will result in entry to TS 3.3.15, *Post Accident Monitoring Instrumentation*, and subsequent entry into the associated 30-day allowed restoration period.

Q-CST Level

The loss of C-540 will result in the loss of Q-CST (Condensate Storage Tank) level indication in the ANO-1 control room. Level may be monitored from the ANO – Unit 2 (ANO-2) control room or locally. The tank is the normal supply source to the EFW pumps. The loss of this instrument will not impact the ability for the EFW system to automatically actuate and control SG level. Loss of this indication will result in entry into TS 3.3.15, *Post Accident Monitoring Instrumentation*, and subsequent entry into the associated 30-day allowed restoration period.

RCS Temperature Indications

Four RCS temperature indications will be lost. None of these indicators has a control function and only one (T1139) is associated with TS 3.3.15, *Post Accident Monitoring Instrumentation*, and would require subsequent entry into the associated 30-day allowed restoration period. Many other indicators of RCS temperature remain available.

4.0 TECHNICAL ANALYSIS

In order to justify relocation of Inverter Y-28 and panel C-540 requirements from the TSs to the TRM, the overall impact on unit operation must be evaluated considering the loss of either of these components. The result of this assessment is discussed below and compared to the criteria set forth in 10 CFR 50.36 to determine if the component operability requirements must be maintained in the TSs.

The loss of Y-28 has no significant impact on unit operation or safety. The inverter is bypassed when out-of-service, maintaining C-540 energized. Single failure criterion is also maintained since a loss of C-540 (by fault or loss of green train vital AC sources) AND a loss of redundant equipment must occur to adversely impact any safety function. In addition, Y-28 and its associated 120 VAC instrument panel C-540 do not support “energize-to-actuate” ESF components. Therefore, it is not necessary to control Y-28 operability requirements within the TSs.

A loss of C-540 requires entry into Operations procedure 1107.003, Attachment B. This attachment lists the components lost and describes the impact of each. Reference to applicable TSs is provided where appropriate. The current TS for C-540 only refers to other TSs that need to be assessed for impact based on the loss of C-540 components. Such referral-type TSs are unusual and unnecessary since station procedures are the primary means for directing operator actions upon the receipt of alarms or upon the loss of plant equipment. Although the current C-540 TS is unnecessary in this respect, the assessment of affected components is presented below in order to describe the connection between C-540 supplied components and other related TSs.

As illustrated in the Background Section above, the loss of C-540 does not result in the loss of safety function. The loss of certain indications has an impact with respect to Alternate Shutdown methods, but such is controlled by other regulation, namely 10 CFR 50, Appendix R. Compensatory actions are proceduralized in this respect to enhance the protection of other safe shutdown indications until C-540 is restored. Therefore, the TSs need not address C-540 operability requirements solely due to Appendix R concerns.

No significant safety function or plant operational impact results from the non-TS related or non-critical indications or functions lost upon de-energization of C-540. This includes the loss of one channel of Pressurizer pressure/level control function, various RCS temperature indications, the control room Q-CST level indication, "A" EFW pump speed input to the plant computer, and the loss of one DROPS channel. As stated previously, many of these instruments are associated with TS 3.3.15, *Post Accident Monitoring Instrumentation*, and would require subsequent entry into a 30-day Action upon their loss.

Although the loss of a single Subcooled Margin channel is not directly TS-related, the cause of its loss, i.e., the loss of RCS pressure input PT-1041, does result in 30-day Action in accordance with TS 3.3.15, *Post Accident Monitoring Instrumentation*. As discussed previously, operators can quickly determine subcooled margin using available RCS temperature and pressure indications if necessary. Because the loss of PT-1041 is governed by other TS action, it is not necessary to control C-540 operability requirements within the TSs in this respect.

The loss of a single source range flux monitor will prevent core alterations in Mode 6 in accordance with TS 3.9.2, *Nuclear Instrumentation*. Loss of the remaining monitor in Modes 2-5 will prevent Operations from performing an approach to criticality and will require all control rods to be inserted in accordance with TS 3.3.9, *Source Range Neutron Flux*. In addition, entry into the 30-day Action of TS 3.3.15, *Post Accident Monitoring Instrumentation*, is required. Therefore, an additional TS governing C-540 operability requirements is not necessary with respect to the loss of the source range flux monitor.

The loss of the DHR ACI function has no impact on safety or unit operation during normal operations when DHR is not in service because station procedures require the affected valve to be de-energized and locked closed. The associated valve positions are also controlled by TS 3.4.14, *RCS Pressure Isolation Valve (PIV) Leakage*, should the ACI function be rendered inoperable in Modes 1 - 4 (when DHR is not in service). During shutdown conditions when DHR is in service, a loss of the ACI function has no impact on DHR system operation. Therefore, an additional TS governing C-540 operability requirements is not necessary with respect to the loss of the DHR ACI function.

The half-leg trip of the Channel 'B' EFW and MSLI functions that occurs upon loss of C-540 is addressed by TS 3.3.11, *EFIC System Instrumentation*. The loss of Channel 'B' SG level and pressure inputs to the EFIC system will not prevent system actuation and feeding of both SGs or isolation of an affected SG with a feedwater or steam line break. The flow control function that acts to modulate feed once post-trip SG levels are restored will not be available. Therefore, Operations personnel will be required to manually control SG level and pressure once SG levels have been restored, all of which are proceduralized. The loss of the aforementioned inputs will prevent compliance with single failure criteria. Therefore, in addition to TS 3.3.11 entry above, Action C of TS 3.3.11, associated with EFIC vector control, must also be entered, requiring restoration within 72 hours or commencement of a plant shutdown. Therefore, an additional TS governing C-540 operability requirements is not necessary with respect to the loss of the aforementioned SG level/pressure inputs to the EFIC system. Affected EFIC instrumentation will also require entry into TS 3.3.15, *Post Accident Monitoring Instrumentation*, and subsequent entry into the associated 30-day allowed restoration period.

The following provides a review of the criteria set forth in 10 CFR 50.36 for TS Limiting Conditions for Operation (LCO) to justify the relocation of Inverter Y-28 and panel C-540 requirements from the TSs to the TRM.

Criterion 1 – Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

The loss of Inverter Y-28 does not result in the loss of any installed instrumentation. The instrumentation lost upon de-energization of C-540 is considered "Alternate Shutdown" instrumentation and is not the primary means for detecting a significant abnormal degradation of the reactor coolant pressure boundary from the control room. During an Alternate Shutdown, the control room is evacuated and plant control is maintained at local stations. The instrumentation associated with an Alternate Shutdown is monitored outside the control room. Where required instrumentation redundancy is lost, other TS actions govern such loss; therefore, maintaining an additional TS associated with C-540 operability is not necessary.

Criterion 2 – A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

The sole loss of Inverter Y-28 does not result in the loss of additional plant equipment and is not associated with the accident analysis. A review of the Safety Analysis Report (SAR) Chapter 14 accident analysis concluded that the components lost upon de-energization of C-540 are not required with respect to the initiation or prevention of an accident and, therefore, do not meet the criteria set forth in 10 CFR 50.36(c)(2)(ii), Criterion 2, for inclusion in the TSs.

Criterion 3 – A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

The sole loss of Inverter Y-28 does not result in the loss of additional plant equipment and is not credited in accident mitigation strategy. The TS Bases associated with TS 3.8.7 states that the ANO-1 vital inverters meet Criterion 3 of 10 CFR 50.36 since, with a vital inverter removed from service, the subsequent loss of offsite power would result in the temporary loss of the associated vital instrument buses. Because ANO-1 is designed with some ESF-related systems as "energized-to-actuate," the loss of vital instrument buses could prevent the automatic actuation of some systems. This applies to the four vital inverters providing power to vital instrument panels RS-1, RS-2, RS-3, and RS-4. Y-28 vital instrument panel C-540, however, has no "energize-to-actuate" ESF systems. A review of the Safety Analysis Report (SAR) Chapter 14 accident analysis concluded that the components lost upon de-energization of C-540, with the exception of EFIC-related components, are not credited in the mitigation or prevention of any accidents and, therefore, do not meet the criteria set forth in 10 CFR 50.36(c)(2)(ii), Criterion 2, for inclusion in the TSs.

The loss of EFIC-related components do not prevent the ability to meet a safety function, but do reduce the design redundancy of the EFIC-related systems. Because single failure criteria is not met, other TS actions address such loss and limit the time the affected components can be out-of-service. Therefore, maintaining a separate TS associated with C-540 operability is not necessary.

Criterion 4 – A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

The sole loss of Inverter Y-28 does not result in the loss of additional plant equipment and, therefore, is not a significant risk contributor to plant operation or safe shutdown when not in service.

With regard to components lost upon de-energization of C-540, the risk associated with the loss of redundancy of various non-TS or non-critical components is negligible. In all cases, compensatory measures are established by station procedure to enhance the protection of redundant components, thus limiting the overall risk impact.

The loss of TS-required components such as the wide range RCS pressure indication, DHR ACI function, and one source range flux monitor have little impact on overall plant risk. Nevertheless, each require entry into an associated TS that will limit the time in the current configuration or provide compensatory action to lower the safety significance of the configuration. Therefore, maintaining a separate TS associated with C-540 operability is not necessary in this respect.

The significant risk contributor associated with the loss of C-540 is the loss of EFIC SG level and pressure inputs. Although the components lost do not prevent the fulfillment of the RCS cooling safety function, redundancy has been lost and single failure criteria is not met. However, such loss results in entry to TS 3.3.11, *EFIC System Instrumentation*, which limits the time in this configuration to 72 hours. Because the inputs must be restored in a relatively short period of time, the increase in risk is appropriately limited. The TS associated with C-540 does not, in itself, limit the time of de-energization. Therefore, relocating the C-540 operability requirements to the TRM will have no additional impact on plant risk.

Summary

Y-28 and its associated distribution panel C-540 differ from other inverters and vital panels in that components powered from C-540, if failed due to the loss of C-540, will not interfere with a reactor trip signal or automatic actuation of any TS-required safety system. Relocation of Inverter Y-28 and panel C-540 operability requirements from the TSs to the TRM is acceptable based on the existence of other controlling regulation (10 CFR 50, Appendix R) or TSs, and/or due to the low risk-significance of the component lost. Applicable TSs remain bounding for risk-significant equipment associated with panel C-540. In addition, inclusion of these requirements within the TSs is not warranted under the criteria of 10 CFR 50.36. The TRM is part of the SAR and controlled under 10 CFR 50.59.

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 do not affect conformance with any General Design Criterion (GDC) differently than described in the Safety Analysis Report (SAR).

5.2 No Significant Hazards Consideration

Entergy proposes to relocate the Arkansas Nuclear One, Unit 1 (ANO-1) Technical Specification (TS) operability requirements for Inverter Y-28 and panel C-540 to the Technical Requirements Manual (TRM).

Entergy Operations, Inc. has evaluated whether or not 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.

The proposed change does not physically alter any plant structures, systems, or components and does not affect or create new accident initiators or precursors. The loss of Y-28, in itself, has no significant impact on station operation because its associated instrument panel, C-540, remains energized from an Emergency Diesel Generator (EDG) backed vital AC source. A potential loss of vital instrument panel C-540 does not prevent the fulfillment of a safety function and does not cause Emergency Safeguard Features (ESF) systems actuations that could render multiple ESF-related trains incapable of performing their intended safety function. Therefore, there is no effect on probability of accidents previously evaluated.

The proposed change relocates operability requirements for Y-28 and C-540 to the TRM. The TRM is part of the Safety Analysis Report (SAR) and is controlled under 10 CFR 50.59. In addition, TS-related components powered by C-540 continue to be governed by other TSs that limit the time in which the components can be out of service or provide compensatory measures during the out-of-service period.

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 change does not physically alter any structures, systems, or components, and does not affect or create new accident initiators or precursors. The accident analysis assumptions and results are unchanged. No new failures or interactions have been created. In addition, the proposed change does not introduce new failure modes or mechanisms associated with plant operation and will not create a new accident type.

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 applicable margin of safety is the period of time that equipment important to safety is inoperable. There is no increase in risk that is a result of the proposed change because (1) affected non-TS components are not safety significant, (2) compensatory measures are procedurally established for those components governed by other regulation (i.e., 10 CFR 50, Appendix R), and (3) TS-related component out-of-service time or related compensatory actions are governed by other existing TSs. The proposed change does not affect any safety limits, other operational parameters, or setpoints in the TS, nor does it affect any margins assumed in the accident analyses. In addition, Y-28 and C-540 operability requirements will be relocated to the TRM, which is part of the Safety Analysis Report (SAR) and controlled by 10 CFR 50.59.

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 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 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

None.

7.0 REFERENCES

1. NRC letter to Craig G. Anderson dated October 29, 2001, "Issuance of Amendment RE: The Conversion to Improved Technical Specifications (TAC No. MA8082)" (1CNA100102)
2. 10 CFR Part 50.36, *Technical Specifications*
3. 10 CFR 50, Appendix R, *Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979*
4. ANO-1 Safety Analysis Report
5. Generic Letter 91-11, *Resolution of Generic Issues 48, "LCOs for Class 1E Vital Instrument Buses," and 49, "Interlocks and LCOs for Class 1E Tie Breakers" pursuant to 10 CFR 50.54(f)*

Attachment 2 to

1CAN080601

Proposed Technical Specification Changes (mark-up)

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters - Operating

LCO 3.8.7 The following inverters shall be OPERABLE.

- a. Two Red Train inverters (Y11 and Y13, Y11 and Y15, or Y13 and Y15),
and
- b. Two Green Train inverters (Y22 and Y24, Y22 and Y25, or Y24 and Y25),
and
- c. ~~Inverter Y28~~

-----NOTE-----
One of the four inverters required by LCO 3.8.7.a and LCO 3.8.7.b may be disconnected from its associated DC bus for ≤ 2 hours to perform load transfer to or from the swing inverter, provided:

- a. The associated 120 VAC bus is energized from its alternate AC source;
and
 - b. The other three 120 VAC buses are energized from their associated
OPERABLE inverters.
-

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One of the four inverters required by LCO 3.8.7.a and LCO 3.8.7.b inoperable.	<p>A.1 -----NOTE----- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any of the 120 VAC buses RS1, RS2, RS3, or RS4 de-energized.</p> <p>-----</p> <p>Restore inverter to OPERABLE status.</p>	<p>24 hours</p> <p><u>AND</u></p> <p>96 hours from discovery of failure to meet LCO</p>

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Inverter Y28 inoperable.	B.1 NOTE Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems Operating" with 120 VAC bus C540 de-energized. Restore inverter to OPERABLE status.	72 hours <u>AND</u> 96 hours from discovery of failure to meet LCO
C. Inverter Y28 inoperable. <u>AND</u> One of the two Red Train inverters required by LCO 3.8.7.a inoperable.	C.1 Restore one inverter to OPERABLE status.	2 hours
<u>BD.</u> Required Action and associated Completion Time not met. <u>OR</u> Two or more of the four inverters required by LCO 3.8.7.a and LCO 3.8.7.b inoperable.	<u>BD.1</u> Be in MODE 3. <u>AND</u> <u>BD.2</u> Be in MODE 5.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify correct inverter voltage, frequency, and alignment to associated 120 VAC buses RS1, RS2, RS3, <u>and</u> RS4, and C540.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Two AC, DC, and 120 VAC electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more AC electrical power distribution subsystem(s) inoperable.	A.1 Restore AC electrical power distribution subsystem(s) to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
B. One or more 120 VAC electrical power distribution subsystem(s) (RS1, RS2, RS3, RS4) inoperable.	B.1 Restore 120 VAC electrical power distribution subsystem(s) to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
C. 120 VAC electrical power distribution subsystem G540 inoperable.	C.1 Enter applicable Conditions and Required Actions of LCO 3.3.11, "Emergency Feedwater Initiation and Control (EFIC) System Instrumentation," LCO 3.3.15, "Post Accident Monitoring (PAM) Instrumentation," and LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage."	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
<u>CD</u> . One or more DC electrical power distribution subsystem(s) inoperable.	<u>CD.1</u> Restore DC electrical power distribution subsystem(s) to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
<u>DE</u> . Required Action and associated Completion Time not met.	<u>DE.1</u> Be in MODE 3. <u>AND</u> <u>DE.2</u> Be in MODE 5.	12 hours 36 hours
<u>EF</u> . Two or more electrical power distribution subsystems inoperable that result in a loss of function.	<u>EF.1</u> Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.9.1 Verify correct breaker alignments to required AC, DC, and 120 VAC bus electrical power distribution subsystems.	7 days

Attachment 3 to

1CAN080601

Draft Technical Requirements Manual Pages (for information only)

TRM 3.8 ELECTRICAL POWER SYSTEMS

TRM 3.8.7 Inverter and Distribution Systems - Operating

TRO 3.8.7 The following inverter and distribution panel shall be OPERABLE.

- a. Inverter Y-28
- b. Distribution Panel C-540

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Y-28 and/or C-540 inoperable.	A.1 With C-540 energized, restore Y-28 and C-540 to OPERABLE status.	7 days
	<u>OR</u>	
	A.2 With C-540 de-energized, restore C-540 to OPERABLE status <u>AND</u> Restore Y-28 to OPERABLE status.	72 hours 7 days
B. Required Action and associated Completion Time not met.	B.1 Initiate a condition report to document the condition and determine any limitations for continued operation of the plant.	Immediately

TEST REQUIREMENTS

SURVEILLANCE		FREQUENCY
TR 3.8.7.1	Verify correct inverter voltage, frequency, and breaker alignment to associated 120 VAC bus C-540.	7 days

TRM B 3.8 ELECTRICAL POWER SYSTEMS

TRM B 3.8.7 Inverters and Distribution Systems - Operating

BASES

BACKGROUND

The inverter is the preferred source of power for the 120 VAC bus because of the stability and reliability it provides. The function of the inverter is to provide AC electrical power to the bus. The inverter is normally powered from the 125 VDC Electrical Power System. The inverter provides an uninterruptible power source for the instrumentation and controls important to safety, including the Emergency Feedwater Initiation and Control (EFIC) system. Green train inverter Y-28 supports some post accident monitoring instrumentation, decay heat removal system interlocks, and control circuitry for systems such as emergency feedwater (EFW) and pressurizer pressure control. The 120 VAC distribution panel C-540 is normally powered from inverter Y-28. Upon loss of the DC supply, or in the event of an inverter failure, a static transfer switch automatically transfers the 120 VAC load to an ES motor control center.

TRO

Inverter Y-28 ensures an uninterruptible supply of AC electrical power to the 120 VAC C-540 bus even if the associated 4.16 kV safety buses is de-energized.

OPERABLE inverters require the associated 120 VAC vital bus to be powered by the inverter with output voltage within tolerances, and power input to the inverter from a 125 VDC Electrical Power System with associated OPERABLE station battery.

Maintaining the 120 VAC bus electrical power distribution subsystem OPERABLE ensures that the redundancy incorporated into the design of ES is not defeated. An OPERABLE 120 VAC electrical power distribution subsystem requires the associated distribution panel to be energized to its proper voltage from the associated inverter via inverted DC voltage or from its alternate AC source.

ACTIONS

With inverter Y-28 inoperable, the associated 120 VAC bus C-540 is automatically transferred to its alternate AC source and remains OPERABLE. In the event the automatic transfer fails and the associated 120 VAC bus is de-energized, the 120 VAC bus is considered to be inoperable. With 120 VAC panel C540 inoperable, a portion of the instrumentation associated with green train equipment is lost. Because C540 is not a RPS or ESAS related panel and is limited in its effect on various system/component operabilities, it is not necessary to impose an 8-hour Completion Time for panel restoration as is the case for TS-related vital inverters. However, it is important to ensure that equipment affected by the loss of C540 is quickly identified and appropriate corrective actions taken.

The Required Actions allow 7 days to repair the inoperable inverter and return it to service. The 7-day limit takes into consideration the time required to repair an inverter, the fact that Y-28/C-540 does not have a swing inverter, and the minimal risk to which the unit is exposed because of the inverter inoperability. When the 120 VAC bus is powered from its alternate AC source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the 120 VAC bus is the preferred source for powering instrumentation and controls.

Required Action A.2 allows 72 hours to return the 120 VAC bus to service. The 72-hour limit is consistent with the 72-hour Completion Time associated with EFIC vector logic inoperability of TS 3.3.11. As indicated below, this TS is applicable, among others, during the period in which C-540 is de-energized.

TS 3.3.11, Emergency Feedwater Initiation and Control (EFIC) System Instrumentation

This LCO is applicable due to the loss of SG-related instruments LI-2622, LI-2624, LI-2671, LI-2673, PR-2618B, and PI-2667B. Where EFIC is concerned, the preceding indications have failed to zero, resulting in a half-leg trip of Channel B EFIC Emergency Feedwater (EFW) and Main Steam Line Isolation (MSLI) functions. In this condition, Channel B may be placed in "bypass" to minimize the possibility of inadvertent EFIC actuation in accordance with TS 3.3.11, *EFIC System Instrumentation*. With the aforementioned level and pressure instruments failed low, EFW valves CV-2645 and CV-2647 (EFW pump "A" feed to each steam generator) will receive a full open signal (the valves are normally open) and remain open if a valid EFIC actuation were to be received. This continues to meet the steam generator (SG) feed safety function for the EFIC system on low SG level. Neither valve will travel close to isolate an affected SG (SG with a feed or steam line break) or travel close to limit SG feed when SG levels have been restored to post-trip levels. However, each of the lines has a redundant valve that will travel close to isolate an affected SG depending on SG pressures. Therefore, the MSLI function of the EFW system will be maintained. The flow control function, which acts to limit feed when SG levels have reached post-trip values, will not be achieved automatically. Manual operator action (available from the control room) will be required to modulate the affected valves as necessary to control SG level once post-trip levels are achieved. In addition, if for any reason condenser vacuum is lost, manual control of SG B pressure will also be required post-trip. Manual SG level and pressure control, when required, is established in station Emergency Operations Procedures (EOPs). Because the affected valves will not act to control SG pressure or level based on SG pressure or post-trip SG level setpoints, the plant must be placed in a 72-hour Action to restore function in accordance with TS 3.3.11 (vector valve control function has been lost). In addition to the above, the green train "A" EFW pump (steam-driven) speed signal will also be lost. This loss will not prevent the turbine from operating on a valid EFIC signal. With respect to Alternate Shutdown considerations, this pump is overridden and controlled locally at the turbine.

TS 3.3.15, Post Accident Monitoring Instrumentation

The loss of the following instruments will result in entry into TS 3.3.15: RCS Pressure PT-1041, RCS Temperature T1139, Q-CST Level LT-4205, Source (wide) Range Flux Channel NI-502, SG Instruments LI-2622, LI-2624, LI-2671, LI-2673, PR-2618B, PI-2667B, and Pressurizer Level LT-1002.

TS 3.3.9, Source Range Neutron Flux and TS 3.9.2, Nuclear Instrumentation

The loss of one Source Range Neutron Flux channel may result in entry into TS 3.3.9 or TS 3.9.2 depending on current plant conditions and mode of operation.

TS 3.4.14, RCS Pressure Isolation Valve (PIV) Leakage.

The DHR system ACI function will be lost to suction valve CV-1410. This valve is de-energized and locked closed during normal operation. The redundant valve, CV-1050, is unaffected by the loss of C-540. With the plant in Modes 1, 2, 3, or 4 and the DHR system not in service, entry into TS 3.4.14 may be required.

Additional Considerations

Some Alternate Shutdown instrumentation is lost when C-540 is de-energized. The loss of this instrumentation requires an evaluation of compliance with 10 CFR 50, Appendix R and the station Fire Hazards Analysis. Non-compliance with Appendix R warrants the establishment of compensatory measures until compliance is re-established.

RCS pressure instrument PT-1041 (above) is an input to DROPS and will result in the loss of wide range RCS pressure indication on the SPDS computer Alternate Shutdown display and on control room panel C-04. In addition, the loss of the RCS pressure input will result in the loss of one of two Subcooling Margin channels, which input into the Inadequate Core Cooling Monitoring and Display System (ICCMDS).

The loss of a Gamma Metrics Source Range instrument is also an input to DROPS.

RCS temperature input TE-1002A and level input LT-1002 are lost to the Pressurizer control system. This control system is a non-TS system utilized to maintain Pressurizer pressure and level during normal operation, and normal heatup and cooldown. Upon loss of these instruments, procedures direct that the redundant control channel be verified in service. With the redundant channel in service, automatic Pressurizer level and pressure control is maintained. In addition, manual control is available from the control room should the redundant channel fail.

Q-CST (Condensate Storage Tank) level indication will be unavailable in the control room. Level may be verified locally. The loss of this instrument will not impact the ability for the EFW system to automatically actuate and control SG level.

If Y-28 and/or C-540 are not returned to service within the allowable restoration periods, a condition report must be initiated to document the condition and determine any limitations for continued operation of the plant. This action may be assigned under an open condition report, if applicable.

TEST REQUIREMENTS

TR 3.8.7.1

This Surveillance verifies that the inverter is functioning properly with all required circuit breakers closed and 120 VAC bus energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the 120 VAC buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.
