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U. S. Nuclear Regulatory Commission
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Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Arkansas Nuclear One - Unit 1 - Reply To Request For Additional Information
(RAI) RE: The Shutdown Electrical Requirement Proposed For The Improved
Technical Specification Conversion (TAC No. MA 8082)

Gentlemen:

By letter dated January 28, 2000 (1CAN010007), Entergy Operations submitted a license amendment request to convert the Arkansas Nuclear One - Unit 1 (ANO-1) current Technical Specifications (CTS) to an improved Technical Specification (ITS) format similar to NUREG-1430, "Standard Technical Specifications - Babcock and Wilcox Plants," Revision 1, dated April 1995. By letter dated April 24, 2000 (1CNA040009), the NRC identified questions pertaining to two related areas in which additional information would be required in order for the staff to conclude that the proposed change with respect to shutdown electrical requirements is acceptable. This April 24, 2000, letter established a target date of August 21, 2000, for the Entergy Operations response to the RAI.

This submittal provides the Entergy Operations response to the RAIs contained in the April 24, 2000, letter. The discussion of no significant hazards considerations contained in our letter dated January 28, 2000 is unchanged by the information presented in the attachment to this letter.

Very truly yours,

A handwritten signature in black ink, appearing to read "Jimmy D. Vandergrift".
Jimmy D. Vandergrift
Director, Nuclear Safety Assurance

JDV/cws
Attachments

A001

cc: Mr. Ellis W. Merschoff
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Additional Information Related to Shutdown Electrical Requirements

RAI 1.0-01

The licensee's proposal to modify the CTS 1.3 definition of OPERABILITY (see DOC A8) is not acceptable. The proposed revision, when coupled with the proposed changes to CTS LCO 3.0.5, would result in allowing plant operation in MODES 5 and 6 with only offsite power or diesel generators required to be OPERABLE. This constitutes a less restrictive change which has not been justified. The licensee should provide a detailed discussion of why this change is acceptable, or retain the CTS. See also RAI 3.8.1-01.

ANO-1 Response

In DOC A8, we stated:

" The CTS 1.3 definition of OPERABLE-OPERABILITY requires the capability of "necessary ... normal [(offsite)] AND emergency [(DG)] electrical power sources ... that are required for the system ... to perform its function(s)" (emphasis added). However, in MODES 1, 2, 3, and 4 CTS LCO 3.0.5 allows the features to be considered OPERABLE provided at least one source of power is still available and their redundant features are OPERABLE. In the ITS, the definition has been modified to require "normal OR emergency electrical power." For MODES 1, 2, 3, and 4, the CTS LCO 3.0.5 requirements are incorporated into the improved Technical Specification LCO 3.8.1 ACTIONS for when an emergency diesel generator or an offsite power source is inoperable. Thus, the ITS requirements are effectively the same as the current Technical Specification requirements.

For other than MODES 1, 2, 3, and 4 (i.e., "cold shutdown conditions"), the ANO-1 assumed and credited functions for safety related systems do not rely on offsite AND DG power. The "necessary ... power sources" are met with simply providing power from normal OR emergency sources. Therefore, the ITS presentation of the definition of OPERABLE-OPERABILITY fully captures the CTS definition for these shutdown conditions. Additionally, CTS 3.1.1.6 and 3.8.3.b and associated footnotes "***", explicitly reflected this assumption. This clarifying footnote is therefore deleted as it is consistent with the ITS definition. (Refer also to Section 3.8 of the ITS conversion submittal, Discussion of Difference #17 for related discussion on electrical power sources during shutdown conditions)."

Discussion of Difference (DOD) 17, referred to in DOC A8 above, states:

"NUREG LCO 3.8.2, LCO 3.8.5, LCO 3.8.8, & LCO 3.8.10: Electrical requirements during shutdown MODES are not included in the ANO ITS. This is consistent with the presentation of these support systems in the CTS. Rather than, in accordance with NUREG-1430, explicit electrical power source requirements, which are not completely tied to the supported equipment, the ITS (as well as the CTS) rely solely on the definition

of OPERABILITY for the necessary OPERABILITY of electrical power sources and distribution subsystems. This is consistent with the current licensing basis."

The ANO-1 current TS (CTS) related to the electrical power systems are paraphrased as follows:

CTS 3.7.1.A requires two sources of off-site power to be operable when the reactor is heated or maintained above 200°F,

CTS 3.7.1.B requires all 4160 V switchgear, 480 V load centers, 480 V motor control centers and 120 V AC distribution panels in both of the ESAS distribution systems are operable and are being powered from one of the offsite power sources when the reactor is heated or maintained above 200°F,

CTS 3.7.1.C requires both diesel generator sets to be operable when the reactor is heated or maintained above 200°F, and

CTS 3.7.3 requires that both 125 VDC electrical power subsystems shall be operable when the unit is above the cold shutdown condition.

The actions required in the event any of components required by these Limiting Conditions for Operation (LCOs) is inoperable and not restored within the appropriate Allowed Outage Time (AOT) (CTS 3.7.2.A or CTS 3.7.3.B, as appropriate) require the reactor to be placed in cold shutdown, thus exiting the mode of applicability. There are no explicit CTS requirements requiring operability of these components when the RCS is $\leq 200^\circ\text{F}$ (Cold Shutdown and Refueling Shutdown).

Since there are no explicit CTS requirements for electrical power system component operability when the reactor is $\leq 200^\circ\text{F}$, ANO-1 has determined that these components are to be treated as support components for equipment required to be operable in Cold Shutdown and Refueling Shutdown. A review of the current ANO-1 license basis has determined that the analyses for accidents that are assumed to occur in Cold Shutdown and Refueling Shutdown do not credit diesel generator operability (the ability to load within 15 seconds) in mitigation of these accidents (i.e., Loss of Offsite Power is not assumed to occur coincident with the accident).

The definition of OPERABLE-OPERABILITY in the CTS states: "all necessary attendant instrumentation, controls, normal and emergency electrical power sources ... are also capable of performing their design function." We stated that in Cold Shutdown and Refueling Shutdown the necessary power sources are met simply by providing power from normal *or* emergency power sources based on the credited functions for the safety related systems.

There are no ANO-1 accident analyses in Cold Shutdown or Refueling Shutdown that assume a loss of offsite power. This is because a loss of offsite power is an event related failure for accidents that involve a plant trip, but not for accidents that do not involve a plant trip. While

some design basis events may be initiated from modes of operation below the safe shutdown conditions (for ANO-1 the safe shutdown condition is hot shutdown as defined in the CTS), the consequences of those events are typically much less severe and the progression of those events is much slower than events initiated from higher modes of operation. Consequently, the equipment functions required to reach a stable end condition following a design basis event from lower modes of operation, are not considered safety-related per se.

The NRC Inspection Manual, Part 9900, Technical Guidance, "Operable/Operability: Ensuring The Functional Capability of a System or Component," Section 3.3 provides clarification of the definition of operability.

"The definition of operability refers to capability to perform the "specified functions. The specified function(s) of the system, subsystem, train, component, or device (hereafter referred to as system) is that specified safety function(s) in the current licensing basis for the facility."

Section 6.12 of the Part 9900, Technical Guidance, states:

"The definition of operability embodies the principle that a system can perform its function(s) only if all necessary support systems are capable of performing their related support functions. It is incumbent upon each licensee to understand which support systems are necessary to ensure operability of systems and components that perform specified safety functions."

In addition, Section 6.12 states:

"There are cases where judgment on the part of a licensee is appropriate in determining whether a support system is or is not required. One example is the case of a ventilation system. A ventilation system may be required to ensure that other safety-related equipment can perform its safety function in the summer, but may not be required in the winter. Similarly, the electrical power supply for heat tracing may be required in the winter to ensure that a safety-related system equipment can perform its safety function, but may not be required in the summer. The need for judgment in reviewing what individual licensees do in specific cases should be recognized. If a licensee determines that a Technical Specification (TS) system is capable of performing its specified function(s) with an inoperable support system that is not in the TS, then no additional action outside of restoring the inoperable support systems is needed. Furthermore, the licensee may modify the support function like any other change to the facility by use of the 10 CFR 50.59 process and FSAR update."

For some support systems, there are specific Allowed Outage Times (AOTs) specified in the TS. Ideally, the AOT contained in the TS for a support system

should be equal to or less than the AOT for any system for which that support system is required for system operability."

By letter dated August 3, 1993 (OCNA089304), NRC Region IV requested that ANO-1 inform them if ANO-1 plans to operate in a midloop or reduced inventory condition with fuel in the reactor vessel and only one operable onsite source of emergency AC power. By letter dated December 16, 1994 (OCAN129401), Entergy Operations informed the NRC that the Station Blackout (SBO) Diesel (installed in response to the SBO rule) would be credited as a third onsite source of emergency AC power during subsequent refueling outages in order to satisfy the provisions of the Shutdown Operations Protection Plan (SOPP). Please note that the SBO diesel does not have automatic tie-on capability. A detailed description of the SBO diesel was provided in a submittal dated August 14, 1992 (OCAN089203).

The ANO-1 SOPP provides a set of unit specific guidelines by which to conduct outages and thereby maintain nuclear safety during shutdown operations based on the defense-in-depth philosophy of outage management, consistent with NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management." The current SOPP requires off-site power and diesel generator availability as a defense-in-depth measure. Availability is defined as "The status of a system, structure or component that is in service or can be placed in service within a reasonably short period of time (consistent with its intended service) and can be reasonably expected to perform the intended functional need."

According to the current SOPP, one off-site power source and one diesel generator should be maintained available at all times. When fuel is in the reactor vessel two diesel generators should be available during any work that reduces the number of off-site power sources to less than two. During reduced inventory conditions, the current SOPP requires two diesel generators, two off-site power sources, and both electrical distribution trains to be maintained available. The current SOPP also requires a diesel generator with automatic tie-on capability to be available when there is fuel in the reactor vessel and the fuel transfer canal level is <23' above the core. The SOPP would allow the SBO diesel to fulfill the requirement for an available diesel generator when automatic tie-on capability is not specifically required.

During outage conditions, with RCS temperature $\leq 200^{\circ}\text{F}$, the plant must be placed in a wide variety of configurations in order to perform required maintenance and testing activities. Maintaining the required electrical requirements in the SOPP instead of the TS allows more effective control over these components. Placing these requirements in the TS would result in reduced flexibility and an unnecessary increase in outage burden due to the planning activities necessary to ensure compliance with the TS.

Although not explicitly required by the ANO-1 CTS, ANO-1 has controlled the electrical system components conservatively with respect to outage risk in accordance with the SOPP. NRC inspections conducted since the SOPP was implemented at ANO during refueling outage 1R10 have resulted in no adverse findings with respect to controls over electrical system components. The administrative controls required by the SOPP have proven to be adequate for past outages and should continue to be adequate in future outages. Therefore, the ANO-1

improved TS should not be required to contain these controls. Also, since this is an allowance of the CTS, this is considered to be an administrative change and should not be characterized as a less restrictive change.

RAI 3.8.1-01

The licensee's proposal to modify CTS Limiting Condition for Operation (LCO) 3.0.5 (see Discussion of Change (DOC) A3), including deletion of the last sentence, is not acceptable. The proposed changes to CTS LCO 3.0.5, when coupled with the proposed changes to the CTS definition of OPERABILITY, would allow plant operation in MODES 5 and 6 with only offsite power or diesel generators required to be OPERABLE. This is a less restrictive change which has not been justified. The licensee should provide a detailed discussion of why the change is acceptable, or retain the CTS. See also RAI 1.0-01.

ANO-1 Response

In DOC A3, we stated:

"CTS 3.0.5 provides guidance for supported system inoperabilities that result from loss of one of two required diverse electrical power sources (loss of DG or loss of normal {offsite} power). For other than MODES 1, 2, 3, and 4 (i.e., "Cold Shutdown conditions or Refueling Shutdown"), this guidance is not necessary since the ANO-1 assumed and credited functions for safety related systems do not rely on offsite AND DG power in these shutdown conditions. That is, during shutdown Modes the assumed and credited functions are not required to consider a concurrent loss of power source in order to perform their intended safety function. In accordance with the CTS definition of OPERABILITY, the "necessary ... power sources" that are required are met with simply providing power from normal OR emergency sources during shutdown Modes. Therefore, the CTS 3.0.5 reference to non-applicability in Cold Shutdown or Refueling Shutdown is simply a clarification of the natural intent. The ITS presentation that incorporated CTS 3.0.5 into ITS 3.8.1, captures the necessary and applicable limitations without the need for a specific reference to non-applicability in shutdown Modes. (Refer also to 3.8 Discussion of Difference (DOD) #17 for related discussion on electrical power sources during shutdown conditions)."

Discussion of Difference (DOD) 17, referred to in DOC A3 above, states:

"NUREG LCO 3.8.2, LCO 3.8.5, LCO 3.8.8, & LCO 3.8.10: Electrical requirements during shutdown MODES are not included in the ANO ITS. This is consistent with the presentation of these support systems in the CTS. Rather than, in accordance with NUREG-1430, explicit electrical power source requirements, which are not completely tied to the supported equipment, the ITS (as well as the CTS) rely solely on the definition of OPERABILITY for the necessary OPERABILITY of electrical power sources and distribution subsystems. This is consistent with the current licensing basis."

As we have stated in our response to RAI 1.0-01 above, Entergy Operations has determined that the electrical power system components should be treated as support components for equipment required to be operable in Cold Shutdown and Refueling Shutdown.

LCO 3.0.5 allows continued operation of the unit with an inoperable train of on-site or off-site power provided there are no inoperable components powered by the operable redundant train of electrical power. The LCO 3.0.5 Action statement requires a shutdown to at least Cold Shutdown if the requirements of LCO 3.0.5 cannot be met. LCO 3.0.5 also contains a statement that: "This Specification is not applicable in Cold Shutdown or Refueling Shutdown." The Bases for LCO 3.0.5 state that: "During Cold Shutdown and Refueling Shutdown, Specification 3.0.5 is not applicable and thus the individual Action statements for each applicable Limiting Condition for Operation in these MODES must be adhered to."

Allowing the deletion or requiring retention of the sentence describing applicability in Cold Shutdown and Refueling Shutdown would have no affect on operation in these modes since the Action statement requires placing the unit in Cold Shutdown if the LCO is not met. Once the unit is in Cold Shutdown, no further actions are specified and outage activities are allowed to continue subject to the determination that all necessary support systems are available to support the equipment required to be operable in these modes. Therefore, deletion of the last sentence of LCO 3.0.5 is an administrative change to the ANO-1 operating license.