Entergy

Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72801
Tel 501-858-4888

Craig Anderson
Vice President
Operations ANO

October 2, 2001

2CAN100103

U. S. Nuclear Regulatory Commission
Document Control Desk
Mail Station OP1-17
Washington, DC 20555

Subject: Arkansas Nuclear One – Unit 2
Docket No. 50-368
License No. NPF-6
Technical Specification Change Request
ESFAS/RPS Sensor Response Time Testing

Gentlemen:

In accordance with 10CFR50.90, Arkansas Nuclear One-Unit 2 (ANO-2) proposes to change the Technical Specification (TS) definitions of "response time" for the reactor trip system and for engineered safety features. The proposed change is based on a Combustion Engineering Owners Group topical report, "*Pressure Sensor Response Time Testing*" (CE NPSD-1167, Revision 2) and is consistent with the *"Standard Technical Specifications Combustion Engineering Plants"* (NUREG-1432, Revision 2). The change will allow use of either an allocated or a measured response time for select sensors in these two systems. Attachment 1 provides the discussion for the proposed change to the TS while Attachment 2 and 3 provide proposed markups of the TS sections and their associated Bases, respectively.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c) and it has been determined that this change involves no significant hazards considerations.

The proposed change includes new commitments as summarized in Attachment 4.

Entergy Operations requests that the effective date for this TS change be within 60 days of approval. Although this request is neither exigent nor emergency, your prompt review is requested. ANO-2 desires to implement this change to support the upcoming spring 2002 refueling outage.

A001

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 2, 2001.

Very truly yours,

CGA/dm
Attachments

cc: Mr. Ellis W. Merschoff
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

NRC Senior Resident Inspector
Arkansas Nuclear One
P. O. Box 310
London, AR 72847

Mr. Thomas W. Alexion
NRR Project Manager Region IV/ANO-2
U. S. Nuclear Regulatory Commission
NRR Mail Stop 04-D-03
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Mr. David D. Snellings
Director Division of Radiation
Control and Emergency Management
Arkansas Department of Health
4815 West Markham Street
Little Rock, AR 72205

ATTACHMENT 1

TO

2CAN100103

PROPOSED TECHNICAL SPECIFICATION

AND

RESPECTIVE SAFETY ANALYSES

IN THE MATTER OF AMENDING

LICENSE NO. NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 2

DOCKET NO. 50-368

DESCRIPTION OF PROPOSED CHANGES

Arkansas Nuclear One, Unit 2 (ANO-2) proposes to change the Technical Specification (TS) definitions for "reactor trip system response time" and "engineered safety features (ESF) response time." These definitions are contained in the definition section of the TS as definitions 1.23 and 1.24, respectively.

The following will be added to the current definitions of response time for the reactor trip system and the engineered safety features:

> "The response time may be verified by any sequence of sequential, overlapping, or total steps such that the entire response time is measured, or by the summation of allocated sensor response times with the results of actual measured response times for the remainder of the channel."

The above wording is consistent with the words contained in Combustion Engineering Owners Group (CEOG) topical report, *"Pressure Sensor Response Time Testing"* (CE NPSD-1167, Revision 2). The NRC approved this CEOG topical report on July 24, 2000 with a corrected safety evaluation (SE) on December 5, 2000. The results of the topical report and SE have since been incorporated into revision 2 of the *"Standard Technical Specifications Combustion Engineering Plants"* (NUREG-1432) using Technical Specification Task Force (TSTF) Traveler 368, Revision 0.

Due to the additional wording proposed to the two definitions, the definitions of Member(s) of the Public and Purge-Purging will be moved to the top of the next page of the TS definitions. No change to either definition is proposed. This change is administrative and will not be discussed any further in this request.

The TS Bases for Protective and Engineered Safety Features (ESF) Instrumentation (TS 3/4.3.1 and 3/4.3.2) will also be modified to reflect the change in definitions and to reference the CEOG topical report.

BACKGROUND

The Reactor Protection System (RPS) functions to protect the fuel, the fuel cladding, and the reactor coolant system (RCS) pressure boundary. The RPS serves its safety function by monitoring specific plant process parameters or process inputs in order to provide a reactor trip whenever the process input parameters exceed predetermined setpoints.

The Engineered Safety Features Actuation System (ESFAS) is an instrumentation and control system that monitors reactor coolant system pressure, steam generator (S/G) (both S/G A and B) pressures and levels, containment pressure, and refueling water tank (RWT) level. Whenever the appropriate monitored parameters deviate from the pre-selected trip setpoint, the affected ESFAS responds in a trip condition. Based on two channels tripping, various components actuate to assist in mitigating the condition.

TS surveillance requirements 4.3.1.1.3 and 4.3.2.1.3 require that the response time for the reactor trip system and ESFAS, respectively, be demonstrated to be within the time limit required by plant accident analysis. The response time is the time interval from when the monitored parameter exceeds its trip setpoint at the channel sensor until either electrical power is interrupted to the control element drive mechanism (CEDM) or ESF equipment is capable of performing its safety function. Currently, ANO-2 performs response time testing using a series of sequential, overlapping, or total channel test measurements.

The NRC issued a SE for the CEOG Topical Report CE NPSD-1167, Revision 2 in July 2000 with a corrected SE on December 5, 2000. The topical report justifies the substitution of an allocated response time for selected ESF and RPS sensors. To incorporate this change, the definitions of Reactor Trip System Response Time and ESF Response Time will be revised. The proposed change applies to select sensors, which have previously been reviewed and approved by the NRC as reflected in the SE. Table 1 contains a list of the transmitters for which ANO-2 plans to utilize allocated response times. Changes to the transmitters listed in this table will be controlled under the site administrative processes and will continue to meet the same criteria included in Table 1. Plant procedures will be modified as recommended in TSTF 368 to allow the use of allocated response times as specified in Table 1 for the sensors and measurement of the remainder of the channel response time to ensure the entire channel response time is measured.

Table 1

Function	Instrument	ANO Model #	NRC Approved Make / Model	Allocated Response Times
RPS Transmitters	Containment Pressure 2PT-5601-1, 2PT-5602-2, 2PT-5603-3, 2PT-5604-4	1153AD5RB	Rosemount Model 1153 Range Code 5	.200 second
	SG Level 2LT-1031-1, 2, 3, & 4 2LT-1131-1, 2, 3, & 4	1154DP4RBN0026	Rosemount Model 1154 Range Code 4	.500 second
	Pressurizer Pressure Low 2PT-4624-1, 2, 3, & 4	1154GP9RB	Rosemount Model 1154 Range Code 9	.200 second

Table 1 continued

Function	Instrument	ANO Model #	NRC Approved Make / Model	Allocated Response Time
RPS Transmitters	Pressurizer Pressure High 2PT-4601-1, 2, 3, & 4	1154SH9RB	Rosemount Model 1154 Range Code 9	.200 second
	S/G Pressure 2PT-1041-1, 2, 3, & 4 2PT-1141-1, 2, 3, & 4	1154GP9RB	Rosemount Model 1154 Range Code 9	.200 second
ESFAS Transmitters	Containment Pressure 2PT-5601-1, 2PT-5602-2, 2PT-5603-3, 2PT-5604-4	1153AD5RB	Rosemount Model 1153 Range Code 5	.200 second
	SG Level 2LT-1031-1, 2, 3, & 4 2LT-1131-1, 2, 3, & 4	1154DP4RBN0026	Rosemount Model 1154 Range Code 4	.500 second
	S/G Pressure 2PT-1041-1, 2, 3, & 4 2PT-1141-1, 2, 3, & 4	1154GP9RB	Rosemount Model 1154 Range Code 9	.200 second
	RWT Level 2LT-5636-1 2LT-5637-2 2LT-5639-3 2LT-5640-4	1153DD5PB	Rosemount Model 1153 Range Code 5	.200 second
	Pressurizer Pressure 2PT-4624-1, 2, 3, & 4	1154GP9RB	Rosemount Model 1154 Range Code 9	.200 second

BASIS FOR PROPOSED CHANGE

The basis for the proposed change is contained in CE NPSD-1167. As described in the report, ANO-2 has TSs that require response time testing for safety systems to ensure the system response times are within the limits assumed in our safety analysis. Revision 2 to EPRI report NP-7243, *"Investigation of Response Time Testing Requirements,"* serves as the technical basis that was used in CE NPSD-1167 for elimination of the response time testing. NP-7243 provided an evaluation of response time data from various pressure sensors to determine whether such testing is needed to justify assumptions used in the plant's safety analysis. The conclusion of NP-7243 was "response time testing is not a concern but that overall sensor degradation is important. In reviewing approximately 4200 response time testing data points, the EPRI researchers did not identify any response time failures." The sensors, which apply to this submittal for ANO-2, were included in the EPRI report.

The EPRI report contains several recommendations to ensure sensors are operating correctly and that calibration or other surveillances will provide indication that the dynamic characteristics of the instrument will be accurately reflected in a static calibration. These recommendations and the ANO-2 approach are as follows:

1. Perform a hydraulic RTT prior to installation of a new transmitter/switch or following refurbishment of the transmitter/switch (e.g., sensor cell or variable damping components) to determine an initial sensor-specific response time value. The power interrupt test is an alternate method to use on force-balance transmitters; the purpose of this test is to verify sensor response time is within the limits of the allocated value for the transmitter function.

   ANO-2 Approach:

   Currently, ANO-2 does not have specific procedures that require performance of a RTT prior to installation of a new transmitter. However, the currently installed sensors have had a response time measurement test performed. A procedure will be developed so that before implementation of this approach, a hydraulic RTT will be performed prior to the installation of any new transmitters or following refurbishment of any transmitter.

2. For transmitters and switches that use capillary tubes, RTT should be performed after initial installation and after any maintenance or modification activity that could damage the capillary tubes.

   ANO-2 Approach:

   The Rosemount transmitters, for which use of an allocated time is proposed, do not have capillary tubes.

3. Perform periodic drift monitoring on all Rosemount pressure and differential pressure transmitters, models 1151, 1152, 1153, and 1154. Guidance on drift monitoring can be found in EPRI NP-7121 and Rosemount Technical Bulletins. Drift monitoring intervals should be based on utility response to NRC Bulletin 90-01.

   ANO-2 Approach:

   On March 9, 1990 the NRC issued NRC bulletin 90-01, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount." The NRC issued Supplement 1 to the bulletin on December 22, 1992. ANO responded on July 19, 1990 (0CAN079003), March 5, 1993 (0CAN039302) and June 22, 1994 (2CAN069402) detailing actions taken in reply to the bulletin and supplement. Drift monitoring is currently performed at ANO on instrumentation that was subject to the problem identified in the bulletin. Four of the pressurizer pressure transmitters (2PT-4601) and the four refueling water tank level transmitters included in this request are monitored for drifting.

4. If variable damping is used, implement a method to ensure that the potentiometer is set at the required setting and cannot be inadvertently changed. This approach should eliminate the need for RTT to detect a variable damping failure mode. Otherwise, RTT each transmitter by hydraulic or electronic white noise analysis methods, at a minimum, following each transmitter calibration.

   ANO-2 Approach:

   None of the transmitters for which ANO is proposing to apply an allocated time have the variable damping feature.

The proposed change is based on the identified CEOG topical report, which includes the review and guidance contained in EPRI NP-7243, and the CEOG TSTF traveler 368, Revision 0. These documents provide adequate justification and guidance for determining allocated sensor response time as well as adequate justification that failed sensors will be identified by other surveillance testing that is not affected by this amendment request. As a result, the proposed change does not alter, degrade, or prevent actions described or assumed in any accident analysis. It will not change any assumptions previously made in evaluating radiological consequences or affect any fission product barriers. It does not increase any challenges to safety systems. Therefore, the proposed change does not increase or have any impact on the consequences of events described and evaluated in Chapter 6 or 15 of the ANO-2 UFSAR.

PRECEDENTS

Similar amendment requests have been approved for the following facilities:

Facility	Amendment #(s)	Approval Date	Accession #
Sequoyah 1,2	251, 242	February 29, 2000	ML003687946
Summer	146	August 29, 2000	ML003746060
Millstone 3	187	November 03, 2000	ML003755285
Palo Verde 1,2,3	135	April 19, 2001	ML011130056

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Entergy Operations, Inc. is proposing that the Arkansas Nuclear One, Unit 2 (ANO-2) Operating License be amended to revise the Technical Specification (TS) definitions for Reactor Trip System (RTS) Response Time (definition 1.23) and Engineered Safety Feature (ESF) Response Time (definition 1.24). The definition of response time will be modified to allow substitution of an allocated time for selected sensors. The sensor response time, which can be allocated based on a vendor supplied response time value as allowed by the proposed change, is used in confirming that the overall system response time is within the limits contained in the ANO-2 safety analysis. If an allocated time is utilized for sensor response time it can be obtained from the sensor manufacturer or derived from plant data obtained from previous response time testing. The proposed change is consistent with NUREG-1432, *"Standard Technical Specifications Combustion Engineering Plants,"* as amended by approved Technical Specification Task Force (TSTF) Traveler 368.

An evaluation of the proposed change has been performed in accordance with 10CFR50.91(a)(1) regarding no significant hazards considerations using the standards in 10CFR50.92(c). A discussion of these standards as they relate to this amendment request follows:

1. **Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?**

   Response time testing is not an initiator of any previously evaluated accident. The proposed change to the definition of RTS and ESF response time allows substitution of an allocated response time for selected sensors in lieu of measuring the sensor response time. The allocated response times adequately represent the response time of the components such that the safety systems utilizing these components will continue to perform their accident mitigation function as assumed in the safety analysis. Response time testing for the non-sensor portions of the channels will continue to use a series of sequential or overlapping test measurements.

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

2. **Will operation of the facility in accordance with this proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?**

   The proposed change does not involve a physical change to the plant. Modifications will not be made to existing components nor will any new or different types of equipment be installed. The proposed change modifies the definitions for RTS and ESF response time and allows the substitution of an allocated response time in lieu of measured sensor response time for selected sensors. The response time assumed in the accident analysis for the non-sensor portions of the channels will continue to be verified using a series of sequential or overlapping test measurements. Appropriate actions will be taken to ensure overall channel response time remains within the times specified in the accident analysis.

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

3. **Will operation of the facility in accordance with this proposed change involve a significant reduction in a margin of safety?**

   The proposed change modifies the definitions of RTS and ESF response time to allow a substitution of an allocated response time for selected sensors in lieu of measuring the response time. The allocated time adequately represents the actual measured time for the associated sensors. The overall response time of each channel will continue to be measured using a series of sequential, overlapping or entire channel measurements to ensure the components actuated by each channel perform their accident mitigation function within the response time assumed in the safety analysis.

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

Therefore, based on the reasoning presented above and the previous discussion of the amendment request, Entergy Operations has determined that the requested change does not involve a significant hazards consideration.

ENVIRONMENTAL IMPACT EVALUATION

Pursuant to 10CFR51.22(b), an evaluation of the proposed amendment has been performed to determine whether or not it meets the criteria for categorical exclusion set forth in 10CFR 51.22 (c) (9) of the regulations. The basis for this determination is as follows:

1. The proposed license amendment does not involve a significant hazards consideration as described previously in the evaluation.

2. As discussed in the significant hazards evaluation, this change does not result in a significant change or significant increase in the radiological doses for any Design Basis Accident. The proposed license amendment does not result in a significant change in the types or a significant increase in the amounts of any effluents that may be released off-site.

3. The proposed license amendment does not result in a significant increase to the individual or cumulative occupational radiation exposure because this change does not modify any systems or the manner in which the system is operated.

ATTACHMENT 2

MARKUP OF CURRENT TECHNICAL SPECIFICATIONS

AXIAL SHAPE INDEX

1.22 The AXIAL SHAPE INDEX shall be the power generated in the lower half of the core less the power generated in the upper half of the core divided by the sum of these powers.

REACTOR TRIP SYSTEM RESPONSE TIME

1.23 The REACTOR TRIP SYSTEM RESPONSE TIME shall be the time interval from when the monitored parameter exceeds its trip setpoint at the channel sensor until electrical power is interrupted to the CEA drive mechanism. The response time may be verified by any sequence of sequential, overlapping, or total steps such that the entire response time is measured, or by the summation of allocated sensor response times with the results of actual measured response times for the remainder of the channel.

ENGINEERED SAFETY FEATURE RESPONSE TIME

1.24 The ENGINEERED SAFETY FEATURE RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays where applicable. The response time may be verified by any sequence of sequential, overlapping, or total steps such that the entire response time is measured, or by the summation of allocated sensor response times with the results of actual measured response times for the remainder of the channel.

PHYSICS TESTS

1.25 PHYSICS TESTS shall be those tests performed to measure the fundamental nuclear characteristics of the reactor core and related instrumentation and 1) described in Chapter 14.0 of the FSAR, 2) authorized under the provisions of 10 CFR 50.59, or 3) otherwise approved by the Commission.

SOFTWARE

1.26 The digital computer SOFTWARE for the reactor protection system shall be the program codes including their associated data, documentation and procedures.

PLANAR RADIAL PEAKING FACTOR F_{xy}

1.27 The PLANAR RADIAL PEAKING FACTOR is the ratio of the peak to plane average power density of the individual fuel rods in a given horizontal plane, excluding the effects of azimuthal tilt.

LIQUID RADWASTE TREATMENT SYSTEM

1.28 A LIQUID RADWASTE TREATMENT SYSTEM is a system designed and installed to reduce radioactive liquid effluents from the unit. This is accomplished by providing for holdup, filtration, and/or demineralization of radioactive liquid effluents prior to their release to the environment.

MEMBER(S) OF THE PUBLIC

1.29 MEMBER(S) OF THE PUBLIC shall include all persons who are not occupationally associated with the plant. This category does not include employees of the utility, its contractors or vendors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational or other purposes not associated with the plant.

PURGE-PURGING

1.30 PURGE or PURGING is the controlled process of discharging air or gas from a confinement to reduce airborne radioactive concentrations in such a manner that replacement air or gas is required to purify the confinement.

EXCLUSION AREA

1.31 The EXCLUSION AREA is that area surrounding ANO within a minimum radius of .65 miles of the reactor buildings and controlled to the extent necessary by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials.

UNRESTRICTED AREA

1.32 An UNRESTRICTED AREA shall be any area at or beyond the exclusion area boundary.

CORE OPERATING LIMITS REPORT

1.33 The CORE OPERATING LIMITS REPORT is the ANO-2 specific document that provides core operating limits for the current operating reload cycle. These cycle-specific core operating limits shall be determined for each reload cycle in accordance with Technical Specification 6.9.5 Plant operation within these operating limits is addressed in individual specifications.

ATTACHMENT 3

MARKUP OF TECHNICAL SPECIFICATION BASES

Response time may be demonstrated by any series of sequential, overlapping or total channel test measurements, provided that such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by ~~either~~ 1) in place, onsite or offsite test measurements or 2) utilizing replacement sensors with certified response times or 3) utilizing allocated response time for selected sensors. Topical Report CE NPSD-1167-A, "Elimination of Pressure Sensor Response Time Testing Requirements," provides the basis and methodology for using allocated response times for selected sensors in the overall verification of the channel response time. Response time verification for sensor types not included in the topical report must be demonstrated by test. The allocation of sensor response times must be 1) verified prior to placing a new component in operation and 2) re-verified after maintenance, which may adversely affect the sensor response time.

Plant Protective System (PPS) logic is designed for operation as a 2-out-of-3 logic, although normally it is operated in a 2-out-of-4 mode.

The RPS Logic consists of everything downstream of the bistable relays and upstream of the Reactor Trip Circuit Breakers. The RPS Logic is divided into two parts, Matrix Logic, and Initiation Logic. Failures of individual bistables and their relays are considered measurement channel failures.

The ESFAS Logic consists of everything downstream of the bistable relays and upstream of the subgroup relays. The ESFAS Logic is divided into three parts, Matrix Logic, Initiation Logic, and Actuation Logic. Failures of individual bistables and their relays are considered measurement channel failures.

Matrix Logic refers to the matrix power supplies, trip channel bypass contacts, and interconnecting matrix wiring between bistable relay cards, up to, but not including the matrix relays. Matrix contacts on the bistable relay cards are excluded from the Matrix Logic definition since they are addressed as part of the measurement channel.

Initiation Logic consists of the trip path power source, matrix relays and their associated contacts, all interconnecting wiring, and the initiation relays (including contacts).

ESFAS Actuation Logic consists of all circuitry housed within the Auxiliary Relay Cabinets (ARCs) used to house the ESF Function; excluding the subgroup relays, and interconnecting wiring to the initiation relay contacts mounted in the PPS cabinet.

For the purposes of this LCO, de-energization of up to three matrix power supplies due to a single failure, such as loss of a vital instrument bus, is to be treated as a single matrix channel failure, providing the affected matrix relays de-energize as designed to produce a half-trip. Although each of the six matrices within an ESFAS Function (e.g., SIAS, MSIS, CSAS, etc.) uses separate power supplies, the matrices for the different ESFAS Functions share power supplies. Thus, failure of a matrix power supply may force entry into the Condition specified for each of the associated ESFAS Functional Units.

Table 3.3-3 Action 10 allows for continued operation in the applicable MODES with the number of channels OPERABLE one less than the Total Number of Channels provided the inoperable channel is placed in the bypassed or tripped condition within 1 hour.

ATTACHMENT 4

COMMITMENTS

COMMITMENT SUMMARY

COMMITMENT	TYPE		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
Modify or develop new procedures to perform a hydraulic response time test prior to installation of any new pressure sensor or following maintenance activities that could adversely affect sensor response time.	X		Within 60 days of amendment approval.