UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 19, 2018

ANO Site Vice President
Arkansas Nuclear One
Entergy Operations, Inc.
N-TSB-58
1448 S.R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 2 - ISSUANCE OF AMENDMENT NO. 313 RE: POST-ACCIDENT INSTRUMENTATION TECHNICAL SPECIFICATION REVISION (EPID L-2017-LLA-0432)

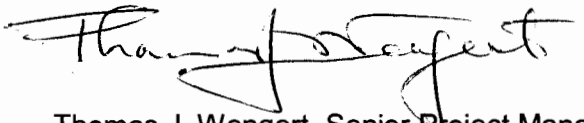
Dear Sir or Madam:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 313 to Renewed Facility Operating License No. NPF-6 for Arkansas Nuclear One, Unit 2 (ANO-2). The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated December 14, 2017.

The amendment revises the TS requirements regarding post-accident monitoring instrumentation. Specifically, the amendment modifies TS 3.3.3.6, "Post-Accident Instrumentation," to ensure both Category 1 and Type A Regulatory Guide 1.97, Revision 3, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident," instrumentation is included in the specification (unless already addressed within another specification) and gains greater consistency with NUREG-1432, Revision 4, "Standard Technical Specifications, Combustion Engineering Plants."

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,



Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-368

Enclosures:
1. Amendment No. 313 to NPF-6
2. Safety Evaluation

cc: Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENTERGY OPERATIONS, INC.

DOCKET NO. 50-368

ARKANSAS NUCLEAR ONE, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 313
Renewed License No. NPF-6

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Entergy Operations, Inc. (the licensee), dated December 14, 2017, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-6 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 313, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The license amendment is effective as of its date of issuance and shall be implemented within 90 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert J. Pascarelli, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility
Operating License No. NPF-6 and
Technical Specifications

Date of Issuance: December 19, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 313

RENEWED FACILITY OPERATING LICENSE NO. NPF-6

ARKANSAS NUCLEAR ONE, UNIT 2

DOCKET NO. 50-368

Replace the following pages of the Renewed Facility Operating License No. NPF-6 and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Operating License

REMOVE	INSERT
-3-	-3-

Technical Specifications

REMOVE	INSERT
3/4 3-39	3/4 3-39
3/4 3-40	3/4 3-40
3/4 3-40a	3/4 3-41
3/4 3-41	3/4 3-42
3/4 3-41a	--
6-19	6-19

(4) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(5) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(6) EOI, pursuant to the Act and 10 CFR Parts 30 and 70 to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to conditions specified in the following Commission regulations in 10 CFR Chapter I; Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

EOI is authorized to operate the facility at steady state reactor core power levels not in excess of 3026 megawatts thermal. Prior to attaining this power level EOI shall comply with the conditions in Paragraph 2.C.(3).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 313, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

Exemptive 2nd paragraph of 2.C.2 deleted per Amendment 20, 3/3/81.

(3) Additional Conditions

The matters specified in the following conditions shall be completed to the satisfaction of the Commission within the stated time periods following issuance of the renewed license or within the operational restrictions indicated. The removal of these conditions shall be made by an amendment to the renewed license supported by a favorable evaluation by the Commission.

2.C.(3)(a) Deleted per Amendment 24, 6/19/81.

INSTRUMENTATION

POST-ACCIDENT INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3.6 The post-accident monitoring (PAM) instrumentation channels for each Function shown in Table 3.3-10 shall be OPERABLE.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

In accordance with Table 3.3-10.

SURVEILLANCE REQUIREMENTS

4.3.3.6 Each post-accident monitoring instrumentation channel shall be demonstrated OPERABLE in accordance with Table 4.3-10.

TABLE 3.3-10

POST-ACCIDENT MONITORING INSTRUMENTATION

FUNCTION		REQUIRED CHANNELS	ACTION
1.	Penetration Flow Path Containment Isolation Valve Position	2 per Penetration Flow Path[(a)(b)]	1, 2
2.	Containment Pressure (Wide Range)	2	1, 2
3.	Pressurizer Pressure (Wide Range)	2	1, 2
4.	Pressurizer Level	2	1, 2
5.	Steam Generator (SG) Pressure	2 per SG	1, 2
6.	SG Water Level (Wide Range)	2 per SG	1, 2
7.	Refueling Water Tank Water Level	2	1, 2
8.	Containment Water Level (Wide Range)	2	1, 2
9.	Emergency Feedwater Flow Rate	2 per SG	1, 2
10.	Reactor Coolant System Hot Leg Temperature (Narrow Range)	2 per Loop	1, 2
11.	Reactor Coolant System Hot Leg Temperature (Wide Range)	2 per Loop	1, 2
12.	High Pressure Safety Injection Flow Rate	1 per Train	1, 2
13.	Core Exit Thermocouples (CETs) – Quadrant 1	2	1, 2
14.	CETs – Quadrant 2	2	1, 2
15.	CETs – Quadrant 3	2	1, 2
16.	CETs – Quadrant 4	2	1, 2
17.	Reactor Vessel Level Monitoring System (RVLMS)	2	1, 2, 3

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed Control Room indication channel.

TABLE 3.3-10 (cont'd)

POST-ACCIDENT MONITORING INSTRUMENTATION

ACTIONs[1]

1) With one or more Table 3.3-10 Functions with one required channel inoperable, restore the required channel to OPERABLE status within 30 days. If not restored to an OPERABLE status within 30 days, immediately initiate action in accordance with Specification 6.6.4.

2)[2] With one or more Table 3.3-10 Functions with no required channel OPERABLE, restore at least one inoperable channel to OPERABLE status within 7 days, or be in HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the following 6 hours.

3) With no required Table 3.3-10 RVLMS Function channel OPERABLE and repair is not feasible without shutting down, immediately initiate action in accordance with Specification 6.6.4.

Note 1 – Separate ACTION entry is allowed for each Table 3.3-10 Function.

Note 2 – Action 2 is applicable to the RVLMS Function only when repair is feasible without shutting down. Where RVLMS channel repair is not feasible, Action 3 shall be applicable.

TABLE 4.3-10

POST-ACCIDENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTION		CHANNEL CHECK	CHANNEL CALIBRATION
1.	Penetration Flow Path Containment Isolation Valve Position	M	R
2.	Containment Pressure (Wide Range)	M	R
3.	Pressurizer Pressure (Wide Range)	M	R
4.	Pressurizer Level	M	R
5.	Steam Generator (SG) Pressure	M	R
6.	SG Water Level (Wide Range)	M	R
7.	Refueling Water Tank Water Level	M	R
8.	Containment Water Level (Wide Range)	M	R
9.	Emergency Feedwater Flow Rate	M	R
10.	Reactor Coolant System Hot Leg Temperature (Narrow Range)	M	R
11.	Reactor Coolant System Hot Leg Temperature (Wide Range)	M	R
12.	High Pressure Safety Injection Flow Rate	M	R
13.	Core Exit Thermocouples (CETs) – Quadrant 1	M	R
14.	CETs – Quadrant 2	M	R
15.	CETs – Quadrant 3	M	R
16.	CETs – Quadrant 4	M	R
17.	Reactor Vessel Level Monitoring System (RVLMS)	M	R

6.6 REPORTING REQUIREMENTS

6.6.1 DELETED

6.6.2 Annual Radiological Environmental Operating Report

(Note: A single submittal may be made for ANO. The submittal should combine sections common to both units.)

The Annual Radiological Environmental Operating Report covering the operation of the unit during the previous calendar year shall be submitted by May 15 of each year. The report shall include summaries, interpretations, and analyses of trends of the results of the radiological environmental monitoring program for the reporting period. The material provided shall be consistent with the objectives outlined in the Offsite Dose Calculation Manual (ODCM), and in 10 CFR 50, Appendix I, Sections IV.B.2, IV.B.3, and IV.C.

The Annual Radiological Environmental Operating Report shall include the results of analyses of all radiological environmental samples and of all environmental radiation measurements taken during the period pursuant to the locations specified in the table and figures in the ODCM, as well as summarized and tabulated results of these analyses and measurements. In the event that some individual results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted in a supplementary report as soon as possible.

6.6.3 Radioactive Effluent Release Report

(Note: A single submittal may be made for ANO. The submittal shall combine sections common to both units. The submittal shall specify the releases of radioactive material from each unit.)

The Radioactive Effluent Release Report covering the operation of the unit in the previous year shall be submitted prior to May 1 of each year in accordance with 10 CFR 50.36a. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit. The material provided shall be consistent with the objectives outlined in the ODCM and Process Control Program and in conformance with 10 CFR 50.36a and 10 CFR 50, Appendix I, Section IV.B.1.

6.6.4 Post Accident Monitoring Report

When a report is required by TS Table 3.3-10, "Post-Accident Monitoring Instrumentation," Action 1 or Action 3, a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 313 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 2

DOCKET NO. 50-368

1.0 INTRODUCTION

By application dated December 14, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17348A150), Entergy Operations, Inc. (Entergy, the licensee), submitted a license amendment request (LAR) for Arkansas Nuclear One, Unit 2 (ANO-2). The amendment would revise technical specification (TS) requirements regarding post-accident monitoring (PAM) instrumentation. Specifically, the amendment would modify TS 3.3.3.6, "Post-Accident Instrumentation," to ensure both Category 1 and Type A Regulatory Guide (RG) 1.97, Revision 3, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident," May 1993 (ADAMS Accession No. ML003740282), instrumentation is included in the specification (unless already addressed within another specification) and gains greater consistency with NUREG-1432, Revision 4, "Standard Technical Specifications, Combustion Engineering Plants," April 2012 (ADAMS Accession No. ML12102A165).

2.0 REGULATORY EVALUATION

2.1 Background

The ANO-2 instrumentation and control systems provide the reactor operator with the required information and control capability to operate the station in a safe and efficient manner. The instrumentation and control systems monitor all operationally important reactor operating parameters such as neutron flux, system pressures, flow rates, temperatures, levels, etc. All transmitted signals (flows, pressures, temperatures, etc.) that can cause actuation of the engineered safety features are either indicated or recorded.

The TS requirements for the ANO-2 PAM instrumentation are specified in TS 3.3.3.6, "Post-Accident Instrumentation." In accordance with the Limiting Condition for Operation (LCO), the instrumentation channels shown in TS Table 3.3-10, "Post-Accident Monitoring Instrumentation," shall be operable in Modes 1, 2, and 3. TS Table 3.3-10 also specifies

restoration times (i.e., allowable outage times) and required actions for inoperable PAM instrumentation channels.

In accordance with Surveillance Requirement (SR) 4.3.3.6, each PAM instrumentation channel shall be demonstrated OPERABLE by performance of channel checks and channel calibrations at the frequencies shown in TS Table 4.3-10, "Post-Accident Monitoring Instrumentation Surveillance Requirements." The operability of the PAM instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess these variables following an accident.

In its application, the licensee stated that the current ANO-2 TSs are non-conservative in that not all Category 1 and Type A instrumentation (described in Section 2.2.3 of this safety evaluation (SE)), as designated in the ANO-2 safety analysis report (SAR) (ADAMS Accession No. ML16132A517), is included in the associated TS table, while some instrumentation in the TS table does not meet the Category 1 and/or Type A criteria for inclusion in the TSs. The licensee stated that the LAR is required to correct the non-conservatism, by ensuring that both Category 1 and Type A, RG 1.97 instrumentation are included in the ANO-2 TSs, unless already addressed within another specification. The licensee also stated that, currently, plant operations are administratively controlled in accordance with U.S. Nuclear Regulatory Commission (NRC) Administrative Letter (AL) 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," dated December 29, 1998 (ADAMS Accession No. ML031110108).

2.2 Regulatory Requirements and Guidance

The NRC staff identified the following regulatory requirements and guidance as applicable to the LAR:

2.2.1 Technical Specification Requirements

The NRC's regulatory requirements related to the content of the TSs are specified in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.36, "Technical specifications." Pursuant to 10 CFR 50.36, TSs are required to include items in the following categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) LCOs; (3) SRs; (4) design features; and (5) administrative controls. The regulation does not specify the particular requirements to be included in a plant's TSs.

As stated in 10 CFR 50.36(c)(2)(i), LCOs are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the LCO can be met. The LCO action requirements establish those remedial actions that must be taken when the requirements of an LCO are not met.

As stated in 10 CFR 50.36(c)(3), SRs are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met.

On July 22, 1993 (58 FR 39132), the Commission published a "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors" (Final Policy Statement), which discussed the criteria to determine which items are required to be included in the TSs as LCOs. The criteria were subsequently incorporated into the regulations by an amendment to

10 CFR 50.36 (60 FR 36953; July 19, 1995). Specifically, 10 CFR 50.36(c)(2)(ii) requires that a TS LCO be established for each item meeting one or more of the following criteria:

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

As discussed in the *Federal Register* notice for the final rule (60 FR 36955; July 19, 1995):

> LCOs that do not meet any of the criteria, and their associated actions and surveillance requirements, may be proposed for relocation from the technical specifications to licensee-controlled documents, such as the FSAR [Final Safety Analysis Report]. The criteria may be applied to either standard or custom technical specifications.

As discussed in the Final Policy Statement (58 FR 39138; July 22, 1983):

> When licensees submit amendment requests based on this Policy Statement, they should identify the location of and controls for the technical and administrative requirements of the relocated requirements. The NRC staff will carefully review these submittals to ensure the accountability and the acceptability of controls for each relocated requirement. Many of the requirements will be relocated to the FSAR and will be enforceable through 10 CFR 50.59. Other requirements will be relocated to more appropriate documents (e.g., Security Plan, QA [Quality Assurance] Plan) and controlled by the applicable regulatory requirements. The adequacy of controls for relocated requirements which do not fit in the above categories will be reviewed and approved by the NRC staff on a case-by-case basis to determine, among other things, whether an enforceable control method will need to be established.

As discussed in the licensee's letter dated December 14, 2017, Entergy proposed to remove certain variables from the ANO-2 PAM TSs, which are currently listed in the ANO-2 SAR, and therefore, would be controlled in accordance with the requirements of 10 CFR 50.59, "Changes, tests, and experiments."

2.2.2 General Design Criteria

Part 50 of 10 CFR, "Domestic Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," provides the minimum necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components (SSCs) important to safety.

In the ANO-2 safety evaluation report, Section 3.1, "Conformance with General Design Criteria," the NRC staff stated the following:

> Arkansas Nuclear One – Unit 2 was designed and is being constructed on the proposed AEC [Atomic Energy Commission] General Design Criteria, which were published July 11, 1967. Design and construction were therefore, initiated and proceeded to a significant extent based upon the criteria in 1967. Since July 15, 1971, when the Atomic Energy Commission published the General Design Criteria of Appendix A of 10 CFR Part 50 the applicant has attempted to comply with the newer criteria to the extent practical. Recognizing work already accomplished and design commitments made, the applicant discusses in Section 3.1 of the Final Safety Analysis Report the design of ANO-2 with respect to the criteria of July 15, 1971. As a result, our technical review assessed the plant against the General Design Criteria now in effect and we have concluded that the plant design conforms to the intent of these newer criteria.

Section 3.1, "Conformance with AEC General Design Criteria," of Amendment 26 of the ANO-2 SAR (ADAMS Accession No. ML16132A517), provides a summary discussion of the design and procedures that are intended to meet the design objectives reflected in each of the general design criteria (GDC).

GDC 13, "Instrumentation and control," states:

> Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges.

2.2.3 Regulatory Guide 1.97

Regulatory Guide 1.97, Revision 3, describes a method acceptable to the NRC staff for complying with the NRC's regulations to provide instrumentation to monitor plant variables and systems during and following an accident in a light-water-cooled nuclear power plant.

Accordingly, the NRC staff reviewed the LAR in accordance with the guidance in RG 1.97, Revision 3. RG 1.97 lists five types (Types A - E) of variables to help designers select the appropriate accident monitoring instrumentation. The types are as follows:

Type A: Those variables to be monitored that provide the primary information required to permit the control room operator to take specific manually controlled actions for which no automatic control

is provided and that are required for safety systems to accomplish their safety functions for design-basis accident (DBA) events.

Type B: Those variables that provide information to indicate whether plant safety functions are being accomplished. Plant safety functions are (1) reactivity control, (2) core cooling, (3) maintaining reactor coolant system integrity, and (4) maintaining containment integrity (including radioactive effluent control).

Type C: Those variables that provide information to indicate the potential for being breached or the actual breach of the barriers to fission product releases. The barriers are (1) fuel cladding, (2) primary coolant pressure boundary, and (3) containment.

Type D: Those variables that provide information to indicate the operation of individual safety systems and other systems important to safety. These variables are to help the operator make appropriate decisions in using the individual systems important to safety in mitigating the consequences of an accident.

Type E: Those variables to be monitored as required for use in determining the magnitude of the release of radioactive materials and continually assessing such releases.

Tables 2 and 3 in RG 1.97 list the specific variables for each of the five types listed above for boiling-water reactors and pressurized water reactors, respectively. Regulatory Positions 1.2 and 1.4 in RG 1.97 provide design and qualification criteria for the instrumentation used to measure the various variables in Tables 2 and 3. The design and qualification criteria are separated into three categories that provide a graded approach. Category 1 provides the most stringent requirements and is intended for key variables. Category 2 provides less stringent requirements and generally applies to instrumentation designated for indicating system operating status. Category 3 is intended to provide requirements that will ensure high-quality, off-the-shelf instrumentation is obtained and applies to backup and diagnostic instrumentation. It is also used where the state of the art will not support requirements for higher qualified instrumentation.

2.2.4 NUREG-1432

NUREG-1432, Revision 4, Volume 1, "Specifications" and Volume 2, "Bases" (ADAMS Accession Nos. ML12102A165 and ML12102A169, respectively) were used by the NRC staff as guidance regarding the PAM instrumentation that should be included in the TSs. As discussed in the Bases for Standard Technical Specification (STS) 3.3.11, "Post Accident Monitoring (PAM) Instrumentation (Analog)," the instrument channels required to be operable by the PAM LCO include two classes of parameters identified during plant-specific implementation of RG 1.97. Specifically, the two classes include Type A variables and Category 1 variables. Type A variables are included in this LCO because they provide the primary information required for the control room operator to take specific manually-controlled actions for which no automatic control is provided and that are required for safety systems to accomplish their safety

functions for DBAs. Category 1 variables are the key variables deemed risk-significant because they are needed to:

- Determine whether other systems important to safety are performing their intended functions;
- Provide information to the operators that will enable them to determine the likelihood of a gross breach of the barriers to radioactivity release; and
- Provide information regarding the release of radioactive materials to allow for early indication of the need to initiate action necessary to protect the public and to estimate the magnitude of any impending threat.

2.2.5 NUREG-0737

Following the accident at Three Mile Island Nuclear Station (TMI), Unit 2, on March 28, 1979, the NRC staff developed a number of proposed requirements to be implemented on operating reactors and on plants under construction. The requirements included:

- NUREG-0737, "Clarification of TMI Action Plan Requirements," published November 1980 (ADAMS Accession No. ML051400209).
- NUREG-0737, Supplement No. 1, "Clarification of TMI Action Plan Requirements: Requirements for Emergency Response Capability," published January 1983 (ADAMS Accession No. ML102560009).

The above documents provide additional requirements for PAM instrumentation, and include clarification of the RG 1.97 guidance.

2.2.6 ANO-2 SAR

Section 7.5.2.5, "Analysis of Post-Accident Monitoring Instrumentation," and Table 7.5-3, "RG 1.97 Post Accident Monitoring Variables," of the ANO-2 SAR, Amendment No. 26 (ADAMS Package Accession No. ML16132A517), describe ANO-2 conformance with the recommendations of RG 1.97. The NRC staff reviewed this document to evaluate the variables (Types A - E) and criteria (Categories 1 - 3) of the PAM instrumentation identified in Table 1 of this SE.

2.2.7 Other References

The NRC's AL 98-10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety," states in part: "The U.S. Nuclear Regulatory Commission (NRC) is issuing this administrative letter to reiterate to addressees the NRC staff's expectations regarding correction of facility Technical Specifications (TS) when they are found to contain non-conservative values or specify incorrect actions."

2.3 Proposed TS Changes

2.3.1 Proposed Instrument/Function Additions and Deletions to TS Tables 3.3-10 and 4.3-10

In its letter dated December 14, 2017, Entergy described the methodology it used to assess the proposed changes to TS Tables 3.3-10 and 4.3-10. The licensee stated, in part:

> In preparing this amendment request, a comparison of the current TS Table 3.3-10 with the list of RG 1.97 instrumentation in Table 7.5-3 of the ANO-2 SAR was completed, along with a comparison of the TS table to NUREG 1432. As a result, the TS table is being revised to clarify the intended "range" (narrow or wide) of some of the instrumentation listed. Current TS instruments that are not designated as Category 1 or Type A are removed. Category 1 and/or Type A instruments listed in SAR Table 7.5-3 that are not included or clearly identified in TS Table 3.3-10 are added (unless already addressed within another specification).

Accordingly, the licensee proposed to remove certain instruments from TS Tables 3.3-10 and 4.3-10 because they are not RG 1.97 Type A or Category 1, in accordance with the ANO-2, licensing basis pertaining to RG 1.97. In addition, the licensee proposed to add instruments to TS Tables 3.3-10 and 4.3-10 because, in accordance with the ANO-2 licensing basis, they are RG 1.97 Type A or Category 1 and are not currently shown in the tables. The proposed changes are summarized in Table 1 below.

Table 1 – Proposed Instrument/Function Changes to TS Tables 3.3-10 and 4.3-10

Item No.	**FUNCTION** (Current TS Title: INSTRUMENT)	Proposed TS Table Change	**REQUIRED CHANNELS** (Current TS Title: Minimum Channels Operable)	**ACTION**
1	Containment Pressure (Normal Design Range)	Remove	2	1
New	Penetration Flow Path Containment Isolation Valve Position	Add New Item 1	2 per Penetration Flow Path(a)(b)	1, 2
10	Reactor Coolant System Subcooling Margin Monitor	Remove	1	1
New	Reactor Coolant System Hot Leg Temperature (Narrow Range)	Add New Item 10	2 per Loop	1, 2
11	Pressurizer Safety Valve Acoustic Position Indication	Remove	1/Valve	1, 2
New	Reactor Coolant System Hot Leg Temperature (Wide Range)	Add New Item 11	2 per Loop	1, 2

Table 1 – Proposed Instrument/Function Changes to TS Tables 3.3-10 and 4.3-10				
Item No.	**FUNCTION** (Current TS Title: INSTRUMENT)	Proposed TS Table Change	**REQUIRED CHANNELS** (Current TS Title: Minimum Channels Operable)	**ACTION**
12	Pressurizer Safety Valve Tail Pipe Temperature	Remove	1/Valve	1, 2
New	High Pressure Safety Injection Flow Rate	Add New Item 12	1 per Train	1, 2
New	CETs – Quadrant 2	Add New Item 14	2	1, 2
New	CETs – Quadrant 3	Add New Item 15	2	1, 2
New	CETs – Quadrant 4	Add New Item 16	2	1, 2

2.3.2 Proposed Changes to Restoration Times (i.e., Allowable Outage Times (AOTs)) and Actions for Inoperable Channels in TS Table 3.3-10

To be consistent with NUREG-1432, Revision 4, the licensee also proposed to revise the restoration times and Actions for inoperable channels in the table notation of Table 3.3-10. The current Action wording and proposed wording changes are shown in Table 2 of this SE.

Table 2 – Proposed Changes to Action Statements and Restoration Times to TS Table 3.3-10		
Action	**Current Wording**	**Proposed Wording**
Action 1	With the number of OPERABLE post-accident monitoring channels less than required by Table 3.3-10, either restore the inoperable channel to OPERABLE status within 30 days, or be in HOT SHUTDOWN within the next 12 hours.	With one or more Table 3.3-10 Functions with one required channel inoperable, restore the required channel to OPERABLE status within 30 days. If not restored to an OPERABLE status within 30 days, immediately initiate action in accordance with Specification 6.6.4.
Action 2	With the number of OPERABLE post-accident monitoring channels less than required by Table 3.3-10, either restore the inoperable channel to OPERABLE status within 30 days, or be in HOT SHUTDOWN within the next 12 hours. If only one channel is inoperable and containment entry is required to restore the inoperable channel, the channel need not be restored until the following refueling outage.	With one or more Table 3.3-10 Functions with no required channel OPERABLE, restore at least one inoperable channel to OPERABLE status within 7 days, or be in HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the following 6 hours.

Action	Current Wording	Proposed Wording
Action 3	With the number of OPERABLE channels one less than the minimum number of channels required to be OPERABLE: a. If repairs are feasible, restore the inoperable channel to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours. b. If repair is not feasible without shutting down, operations may continue and a special report shall be submitted to the NRC within 30 days following the failure; describing the action taken, the cause of the inoperability, and the plans and schedule for restoring the channel to OPERABLE status during the next scheduled refueling outage.	With no required Table 3.3-10 RVLMS Function channel OPERABLE and repair is not feasible without shutting down, immediately initiate action in accordance with Specification 6.6.4.
Action 4	With the number of OPERABLE channels two less than the minimum channels required to be OPERABLE: a. If repairs are feasible, restore at least one inoperable channel to OPERABLE status within 48 hours or be in at least HOT SHUTDOWN within the next 12 hours. b. If repair is not feasible without shutting down, operation may continue and a special report shall be submitted to the NRC within 30 days following the failure; describing the action taken, the cause of the inoperability, and the plans and schedule for restoring the channels to OPERABLE status during the next scheduled refueling outage.	Deleted.

In addition, the licensee proposed to add the following new footnotes for the Actions of Table 3.3-10:

Note 1 – Separate ACTION entry is allowed for each Table 3.3-10 Function.

Note 2 – Action 2 is applicable to the RVLMS Function only when repair is feasible without shutting down. Where RVLMS channel repair is not feasible, Action 3 shall be applicable.

2.3.3 Proposed Changes to Instrument/Function Names, Required Channels, and Action Designations in TS Tables 3.3-10 and 4.3-10

Table 3 below lists the proposed Function name changes, Required Channels, and Action designations for the functions/instruments in ANO-2 TS Tables 3.3-10 and 4.3-10:

Table 3 – Proposed Changes to Function Names, Required Channels, and Actions

Item No.	**FUNCTION:** (Current Title: INSTRUMENT)	Proposed TS Table Change	**REQUIRED CHANNELS** (Current Title: Minimum Channels Operable)	**ACTION**
2	Current: Containment Pressure (High Range) Proposed: Containment Pressure (Wide Range)	Rename	2 (no change)	Current: 2 Proposed: 1, 2
3	Current: Pressurizer Pressure Proposed: Pressurizer Pressure (Wide Range)	Rename	2 (no change)	Current: 1 Proposed: 1, 2
4	Current: Pressurizer Water Level Proposed: Pressurizer Level	Rename	2 (no change)	Current: 1 Proposed: 1, 2
5	Current: Steam Generator Pressure Proposed: Steam Generator (SG) Pressure	Rename	Current: 2/steam generator Proposed: 2 per SG	Current: 1 Proposed: 1, 2
6	Current: Steam Generator Water Level Proposed: SG Water Level (Wide Range)	Rename	Current: 2/steam generator Proposed: 2 per SG	Current: 2 Proposed: 1, 2
8	Current: Containment Water Level – Wide Range Proposed: Containment Water Level (Wide Range)	Rename	2 (no change)	Current: 2 Proposed: 1, 2
9	Emergency Feedwater Flow Rate	Name: no change	Current: 1/steam generator Proposed: 2 per SG	Current: 1 Proposed: 1, 2

Table 3 – Proposed Changes to Function Names, Required Channels, and Actions				
Item No.	**FUNCTION:** (Current Title: INSTRUMENT)	Proposed TS Table Change	**REQUIRED CHANNELS** (Current Title: Minimum Channels Operable)	**ACTION**
13	Current: In Core Thermocouples (Core Exit Thermocouples) Proposed: Core Exit Thermocouples (CETs) – Quadrant 1	Rename	Current: 2/core quadrant Proposed: 2	Current: 1 Proposed: 1, 2
17	Current Item 14: Reactor Vessel Level Monitoring System (RVLMS)	Name: no change; Function No. is changed from 14 to 17	2 (no change)	Current: 3, 4 Proposed: 1, 2, 3

The licensee also proposed adding two notes for the Required Channels of proposed Function 1 (Penetration Flow Path CIV Position) to ANO-2 TS Table 3.3-10, as follows:

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed Control Room indication channel

2.3.4 Proposed Revision of TS 6.6.4, "Post Accident Monitoring Report"

In TS Section 6.6, "Reporting Requirements," the licensee proposed to revise Section 6.6.4 from "DELETED" to "Post Accident Monitoring Report," as shown below:

6.6.4 Post Accident Monitoring Report

When a report is required by TS Table 3.3-10, "Post-Accident Monitoring Instrumentation," Action 1 or Action 3, a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

2.3.5 Proposed Cosmetic/Editorial Changes

In its application dated December 14, 2017, the licensee identified the following additional proposed "cosmetic" changes with justifications, as follows:

- Acronyms are defined and used where appropriate (i.e., Steam Generator = SG) along with general administrative changes for consistency (such as deletion of a hyphen where not needed). These changes do not affect any requirement of the PAM TS.

- The Action stated in TS 3.3.3.6 is modified to state "in accordance with" in lieu of "as shown" with reference to TS Table 3.3-10. This is a change in preferred English and does not affect any requirement of the PAM TS.

- "Instrument" is replaced with "function" in the title of the first column of TS Tables 3.3-10 and 4.3-10 to be consistent with NUREG 1432. Likewise, the title of the second column is change from "minimum channels operable" to "required channels", for consistency with NUREG 1432. These changes do not affect any requirement of the PAM TS.

- The single CET line entry in the current TS Tables 3.3-10 and 4.3-10 is expanded into a single entry for each core quadrant. Therefore, "core quadrant" is removed from the second column of TS Tables 3.3-10 as this designation would now be redundant. This change provides consistency with NUREG 1432 and does not affect any requirement of the PAM TS.

- Function numbering is revised as necessary to accommodate the changes to TS Tables 3.3-10 and 4.3-10. This change does not affect any requirement of the PAM TS.

- Reference to TS Amendment 89, the applicability of which is discussed previously in this letter, is added to footer of ANO-2 TS Page 3/4 3-40 as this is the amendment that added the CETs to TS Tables 3.3-10 and 4.3-10. The amendment reference already exists on the TS Table 4.3-10 page. This changes permits historical tracking of amendments to the relevant TS requirements and does not affect any requirement of the PAM TS.

- The CET and RVLMS functions relative to TS Table 4.3-10 are relocated from TS Page 3/4 3-41a to Page 3/4 3-41 (renumbered as Page 3/4 3-42 in the attached TS markup and revised pages). Affected TS page numbers are changed as necessary to eliminate use of sub-numbering (such as 40a, 41a). These changes do not affect any requirement of the PAM TS.

3.0 TECHNICAL EVALUATION

3.1 NRC Staff Approach

The NRC staff evaluated the LAR using the regulatory requirements and guidance in Section 2.2 of this SE. The staff used the following approach to determine the acceptability of the LAR:

- For instruments proposed to be removed from TS Tables 3.3-10 and 4.3-10, confirm that the associated function: (1) does not meet any of the four criteria in 10 CFR 50.36(c)(2)(ii), and (2) is not considered a Type A or Category 1 variable, in accordance with the ANO-2 licensing basis related to RG 1.97.

- For instruments proposed to be added to TS Tables 3.3-10 and 4.3-10, confirm that the associated function is considered a Type A or Category 1 variable, in accordance with the ANO-2 licensing basis related to RG 1.97.

- For the proposed changes to restoration times and Actions for inoperable channels, confirm whether the changes are consistent with NUREG-1432 and the regulatory requirements in Section 2.2 of this SE.

- Verify that the proposed changes appropriately resolve the non-conservative Actions associated with the ANO-2 TS PAM instrumentation.

3.2 Proposed Changes to TS Tables 3.3-10 and 4.3-10

The NRC staff's evaluation of the proposed changes is provided in the following sections.

3.2.1 Proposed Revision to TS Table 3.3-10 and Table 4.3-10 to Add/Remove Instruments

3.2.1.1 Proposed Changes to Remove Containment Pressure (Normal Design Range) Indication from TS Tables 3.3-10 and 4.3-10 and Maintain the Containment Pressure (Wide Range) Indication

As discussed in the LAR, the containment pressure indication provides information for assessing inadequate pressure retaining integrity. The ANO-2 TS Tables 3.3-10 and 4.3-10 list both the Containment Pressure (Normal Design Range) indication (Item No. 1) and the Containment Pressure (High Range) indication (Item No. 2).

The licensee requested to remove the Containment Pressure (Normal Design Range) indication, which corresponds to Item No. 1, from ANO-2 TS Tables 3.3-10 and 4.3-10. The LAR and TS markups (Attachment 1 of the Enclosure to the LAR) indicated that the Containment Pressure (High Range) instrument channel would be retained (Function 2) in these TS tables. The LAR also requested to change the name of Containment Pressure (High Range) to Containment Pressure (Wide Range).

The NRC staff reviewed the safety basis of the containment pressure narrow range and wide range instrument channels with respect to the criteria in 10 CFR 50.36(c)(2)(ii) and the guidance in RG 1.97.

The NRC staff reviewed the ANO-2 SAR and verified that the Containment Pressure (Normal Design Range) indication is not mentioned or credited in the ANO-2 SAR. In the LAR, the licensee noted that:

> ... the narrow range containment pressure instruments are not contained in ANO-2 SAR Table 7.5-3. Therefore, instead of adding the Containment Pressure – High Range variable (Item 2) to ANO-2 TS Table 3.3-10 in TS Amendment 63 (References 2 and 3), the nomenclature for Item 1, Containment Pressure (Normal Design Range) should have been revised to clarify the actual RG 1.97 range credited in the ANO-2 SAR. [Therefore], Entergy proposes to remove the Item 1, Containment Pressure (Normal Design Range) from ANO-2 TS Table 3.3-10 to eliminate potential confusion.

In the LAR, the licensee also noted that:

> ... as documented in letter dated April 13, 1984 (Reference 10), the containment pressure instruments credited for RG 1.97 compliance were those with a range of 0 – 210 [pounds per square inch – absolute] psia (today referred to as "wide" range). Containment pressure instruments referred to as "narrow" range originally were scaled to indicate 0 – 70 psia, but were modified in the early 1990s to a scale of 0 – 27 psia in order to provide operators a pressure display with smaller increments for verification of proper actuation of reactor trip or engineered safety features (all of which occur at a pressure less than 24 psia). The original 0 – 70 psia scaling led to confusion during this time frame with respect to which instruments were credited for RG 1.97 compliance.

The containment pressure wide range indication does detect or indicate a significant abnormal degradation of the reactor coolant pressure boundary, as defined by Criterion 1. However, the containment pressure narrow range instrument does not perform the function to satisfy Criterion 1. Therefore, only the containment pressure wide range instrumentation satisfies Criterion 1.

The containment pressure narrow range indication is not a process variable that is an initial condition of a DBA accident analysis that either assumes the failure of or presents a challenge the integrity of a fission product barrier. Conversely, the containment pressure wide range indication is a process variable, design feature, or an operating restriction that is an initial condition of a DBA or transient analysis considered in Criterion 2.

The containment pressure instruments themselves are a part of the primary path in the SAR accident analysis because they must remain functional to enable the plant operators to mitigate a DBA, and therefore, must meet Criterion 3 of 10 CFR 50.36(c)(2)(ii). Consequently, the operability of the containment pressure instrument is required by TS 3.3.2.1, "Engineered Safety Feature Actuation System Instrumentation."

The containment pressure instrumentation is used to indicate a possible containment integrity challenge and to initiate the assessment of containment venting strategies in the severe accident management guidelines. Only the wide range instrument (Item No. 2) is used in the emergency operating procedures to identify the potential for a challenge to containment integrity due to over-pressurization and provides an adequate range and sensitivity for this purpose. The containment pressure narrow range instrument does not perform a function to satisfy Criterion 4. Therefore, only the containment pressure wide range instrumentation satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii).

The NRC staff reviewed the licensee's submittal and verified the following:

- The containment pressure wide range indication meets all four criteria of 10 CFR 50.36(c)(2)(ii), which determines those items that are required to be included in the TSs as LCOs. The containment pressure wide range is consistent with RG 1.97 (i.e., is designated as a Type B, Category 1 RG 1.97 variable) and NUREG-1432 (Function 7 in Table 3.3.11-1 of NUREG-1432).

- The containment pressure narrow range (normal design range) indication meets only Criterion 3 of the 10 CFR 50.36(c)(2)(ii), but is controlled by other ANO-2

TSs (e.g., TS 3.3.2.1, "Engineered Safety Feature Actuation System Instrumentation"). This function is not included in Table 3.3-11 of NUREG-1432.

Based on the foregoing, the NRC staff concludes that these proposed changes to remove the containment pressure (normal design range) indication from TS Tables 3.3-10 and 4.3-10 and to maintain the containment pressure (wide range) indication in these TS tables satisfy the criteria of 10 CFR 50.36(c)(2)(ii) and will continue to satisfy the requirements of GDC 13 and are, therefore, acceptable.

The name change from "Containment Pressure (High Range)" to "Containment Pressure (Wide Range)" is discussed in Section 3.2.2 of this SE.

3.2.1.2 Proposed Change to Add Penetration Flow Path Containment Isolation Valve (CIV) Position Indication

The design objective of the containment isolation valve (CIV) system is to allow the passage of fluids through the containment boundary while preserving the ability of the boundary to prevent or limit the escape of fission products that may result from postulated accidents. The operation of the CIVs ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere or pressurization of the containment. The penetration flow paths provide direct access from the containment atmosphere to the outside atmosphere. The penetration flow rate CIV position monitor provides information concerning the isolation status of the containment penetration to verify containment operability.

The licensee proposed to add the penetration flow path CIV position monitor to ANO-2 TS Tables 3.3-10 and 4.3-10 (as Function 1) with two required channels. The licensee also proposed adding two notes for the required channels of this proposed function in TS Table 3.3-10 as follows:

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed Control Room indication channel.

The NRC staff reviewed the safety basis of the penetration flow path CIV position monitor with respect to the criteria of 10 CFR 50.36(c)(2)(ii) and the guidance in RG 1.97.

Specifically, the penetration flow path CIV position monitor does detect or indicate a significant abnormal degradation of the reactor coolant pressure boundary, as defined by Criterion 1 of 10 CFR 50.36(c)(2)(ii).

The penetration flow path CIV position monitor is a process variable, a design feature, or an operating restriction that is an initial condition of a DBA or transient analysis considered in Criterion 2.

The penetration flow path CIV position monitor is also a part of the primary success path as indicated in Criterion 3.

The loss of the penetration flow path CIV position monitor has an effect on the probabilistic risk assessment and has been shown to be significant to public health and safety, as considered in Criterion 4.

As discussed above, the NRC staff finds that the penetration flow path CIV position monitor meets all four screening criteria of 10 CFR 50.36(c)(2)(ii), which provides the criteria to determine which items are required to be included in the TSs as LCOs.

In the LAR, the licensee provided the following justification for the proposed addition of Notes (a) and (b):

> These Notes are justified as stated in respective NUREG 1432 Bases and adopted as part of this amendment request:
>
> > The LCO requires one position indicator for each automatic CIV. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve and prior knowledge of the passive valve or via system boundary status. If an automatic CIV is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

The NRC staff verified that the proposed change to add these notes to TS Table 3.3-10 supports proposed Function 1 and is, therefore, reasonable.

Based on the foregoing, the NRC staff concludes that this proposed addition of the penetration flow path CIV position monitor to ANO-2 TS Tables 3.3-10 and 4.3-10 satisfies the criteria of 10 CFR 50.36(c)(2)(ii), and will continue to satisfy the requirements of GDC 13, and is, therefore, acceptable.

3.2.1.3 Proposed Changes to Remove Reactor Coolant System Subcooling Margin Monitor and Add Hot Leg Temperature (Narrow and Wide Range) Monitors

In the LAR, the licensee requested to:

(1) Remove the reactor coolant system (RCS) subcooling margin monitor, which corresponds to Item No. 10 in ANO-2 TS Tables 3.3-10 and 4.3-10, and

(2) Add the RCS hot leg temperature (narrow/wide range) indications to these tables, which correspond to new Functions 10 and 11.

The NRC staff reviewed the safety basis of the RCS subcooling margin monitor with respect to the criteria of 10 CFR 50.36(c)(2)(ii), the guidance in RG 1.97, and the ANO-2 SAR.

The RCS subcooling margin monitor provides information to the operators concerning the subcooling margin in terms of RCS pressure or temperature. The RCS subcooling margin monitor receives RCS hot leg temperature inputs to determine the temperature margin that exists to saturated conditions. The pressure inputs are supplied by the RCS wide range pressure indication and temperature inputs from the core exit thermocouples.

Proposed Removal of RCS Subcooling Margin Monitor

- The RCS subcooling margin monitor instrument serves as a PAM instrument in conjunction with the reactor vessel level instrumentation system and the core exit thermocouples. However, the RCS subcooling margin monitor does not detect or indicate a significant abnormal degradation of the reactor coolant pressure boundary, as defined by Criterion 1 of 10 of CFR 50.36(c)(2)(ii).

- The subcooling margin monitor in the control room receives the inputs from the RCS hot leg temperature (both narrow and wide ranges) instrumentation. Therefore, the RCS subcooling margin indication is not a process variable of a DBA or transient analysis and does not perform any function defined by Criterion 2.

- The RCS subcooling margin monitor is not a part of the primary success path as indicated in Criterion 3.

- The loss of the RCS subcooling margin monitor has no effect on the probabilistic risk assessment and has not been shown to be significant to public health and safety as considered in Criterion 4.

- In RG 1.97 and ANO-2 SAR (Function B10), the RCS subcooling margin monitor (indicated as "degrees of subcooling,") is designated as a Type B, Category 2 RG 1.97 instrument.

The NRC staff has reviewed the licensee's submittal and verified that the RCS subcooling margin indication does not meet four criteria of 10 CFR 50.36(c)(2)(ii) and is neither Category 1 nor Type A RG 1.97 instrumentation.

Proposed Addition of RCS Hot Leg Temperature (Narrow/Wide Range) Monitors

- The RCS hot leg temperature (both narrow and wide ranges) instrumentation provides inputs for the subcooling margin monitor in the control room. The RCS hot leg temperature channels (two narrow ranges (525 degrees Fahrenheit (°F) – 675 °F and 525 °F – 625 °F) and two wide ranges (125 °F – 625 °F and 150 °F – 750 °F)) are associated with the core protection calculators (CPCs), are monitored by the plant computers, and are displayed in the control room. Therefore, the RCS hot leg temperature (both narrow and wide range) instrumentation satisfy Criterion 1 of 10 CFR 50.36(c)(2)(ii).

- The RCS hot leg temperature instrument is a process variable, a design feature, or an operating restriction, which is an initial condition of a DBA or transient analysis considered in Criterion 2 of 10 CFR 50.36(c)(2)(ii).

- The RCS hot leg temperature instrument is part of primary success path and performs functions or actuates to mitigate a DBA as defined by Criterion 3 of 10 CFR 50.36(c)(2)(ii).

- The RCS hot leg temperature instrument is an SSC that operating experience or probabilistic risk assessment has shown to be significant to public health and safety as considered in Criterion 4 of 10 CFR 50.36(c)(2)(ii).

- In ANO-2 SAR, Table 7.5-3, "RG 1.97 Post Accident Monitoring Variables," the RCS hot leg water temperature variable is Function A01 and is designated as a Type A, Category 1 instrument. The RCS hot leg temperature is included in Table 3.3.11-1 of NUREG-1432 as Function 2.

The NRC staff has reviewed the licensee's submittal and verified that the RCS hot leg temperature indication meets all four criteria of 10 CFR 50.36(c)(2)(ii) and is consistent with the ANO-2 SAR and NUREG-1432

NRC Staff Conclusion for Section 3.2.1.3

Based on the foregoing, the NRC staff concludes that these proposed changes to: (1) remove the RCS subcooling margin indication, and (2) add the RCS hot leg temperature instruments (narrow and wide ranges) from/to ANO-2 TS Tables 3.3-10 and 4.3-10 satisfy the criteria of 10 CFR 50.36(c)(2)(ii) and will continue to satisfy the requirements of GDC 13 and are, therefore, acceptable.

3.2.1.4 Proposed Changes to Remove Pressurizer Safety Valve Acoustic Position and Pressurizer Safety Valve Tail Pipe Temperature Instruments

Overpressure protection for the RCS and steam generators (SGs) is accomplished by the pressurizer code safety valves, SG safety valves, and the RPS. Two safety valves are mounted on the top of the pressurizer and safety valves are mounted outside of the containment on each of the two main steam lines upstream of the steam line isolation valves. These valves are piped to the quench tank; therefore, the quench tank level, temperature, and pressure indications can also be used to identify safety valve leakage. Piping is provided with temperature sensors that read out in the control room. Any temperature increase that is detected will indicate leakage through the safety valves.

While the required RCS pressure and level indications provide the needed identification of a loss of RCS inventory, whether through a pressurizer safety valve or any other leak path, the pressurizer safety valve acoustic position monitor and tail pipe temperatures of the RCS are not essential to operator response. These indicators provide information to the operators that a pressurizer safety valve has lifted, and the location of an RCS leak.

The licensee requested to remove RCS pressurizer safety valve acoustic position monitor and tail pipe temperature indicators, which correspond to current Functions 11 and 12 in ANO-2 TS Tables 3.3-10 and 4.3-10.

The NRC staff reviewed the safety basis for the RCS pressurizer safety valve acoustic position monitor and tail pipe temperatures with respect to the criteria of 10 CFR 50.36(c)(2)(ii), the guidance in RG 1.97, and the ANO-2 SAR:

- While the pressurizer safety valves are credited as mitigating SSCs in certain accident scenarios (i.e., are required to be operable in accordance with ANO-2 TS 3.4.3, "Safety Valves – Operating"), the RCS pressurizer safety valve

acoustic position monitor and pressurizer safety valve tail pipe temperature instrument do not detect or indicate a significant abnormal degradation of the reactor coolant pressure boundary, as defined by Criterion 1 of the NRC Final Policy Statement.

- The RCS pressurizer safety valve acoustic position monitor and pressurizer safety valve tail pipe temperature instrument are not process variables, design features, or operating restrictions that are initial conditions of a DBA or transient analysis considered in Criterion 2.

- The function of the pressurizer safety valves is part of the primary success path in the accident analyses described in the ANO-2 SAR in accordance with Criterion 3 of 10 CFR 50.36(c)(2)(ii). However, the function of the pressurizer safety valve acoustic position monitor and pressurizer safety valve tail pipe temperature instrument are not part of the primary success path in accordance with Criterion 3 of 10 CFR 50.36(c)(2)(ii).

- The loss of the pressurizer safety valve acoustic position monitor and pressurizer safety valve tail pipe temperature instrument have no effect on the probabilistic safety assessment, and have not been shown to be significant to public health and safety as considered in Criterion 4.

- In Table 7.5-3 of the ANO-2 SAR, the pressurizer safety acoustic position monitors and tail pipe temperature instruments are designated as Category 2, Type D, RG 1.97 variables. In addition, these monitors are not included in Table 3.3.11-1 of NUREG-1432.

Based on the foregoing, the NRC staff concludes that the RCS pressurizer safety valve acoustic position monitor and pressurizer safety valve tail pipe temperature instrument do not meet any of the four screening criteria of 10 CFR 50.36(c)(2)(ii), and therefore, are not required to be included in ANO-2 TS Tables 3.3-10 and 4.3-10. Therefore, the NRC staff concludes that these proposed changes satisfy the criteria of 10 CFR 50.36(c)(2)(ii) and are acceptable.

3.2.1.5 Proposed Change to Add High Pressure Safety Injection Flow Rate Monitor

As discussed in the LAR, the high pressure safety injection (HPSI) system is capable of injecting borated water into the primary system while the RCS is at high pressure. Each HPSI train has one header flow instrument with a range of 0 - 1000 gallons per minute (gpm). The headers inject into both the cold and hot legs of the RCS. The HPSI flow rate monitor provides the inputs to allow the balancing of flow between the cold and hot leg injection paths.

In the LAR, the licensee stated, in part, that:

> HPSI flow is a Type A, Category 1, variable provided to enable the balancing of flow between the cold and hot leg injection paths, and may be required to ensure sufficient HPSI pump net positive suction head (NPSH) if, for example, the HPSI orifice bypass valve fails to close when required to align for hot leg injection.

In the ANO-2 SAR, the flow in the HPSI system is designated as Type A (A06), Category 1, and is designed for a range of 0 – 1000 gpm.

Based on the definition of Type A and Category 1 in RG 1.97 and in Section 2.2.3 of this SE, the HPSI flow rate monitor will satisfy the four criteria in 10 CFR 50.36(c)(2)(ii). The HPSI flow rate monitor, a Type A, Category 1 RG 1.97 variable:

- detects or indicate a significant abnormal degradation of the reactor coolant pressure boundary, as defined by Criterion 1;
- is a process variable, a design feature, or an operating restriction that is an initial condition of a DBA or transient analysis considered in Criterion 2;
- is part of the primary success path in the ANO-2 SAR, as indicated in Criterion 3; and
- the loss of which has an effect on the probabilistic safety assessment, and has been shown to be significant to public health and safety, as considered in Criterion 4.

The licensee proposed to add the HPSI flow rate monitor to ANO-2 TS Tables 3.3-10 and 4.3-10 (one channel per train), which corresponds to proposed Function 12.

Based on the foregoing evaluation, the NRC staff concludes that the HPSI flow rate monitor does meet all four screening criteria of 10 CFR 50.36(c)(2)(ii). In addition, the proposed change to add the HPSI flow rate monitor to ANO-2 TS Tables 3.3-10 and 4.3-10 is consistent with RG 1.97 and the ANO-2 SAR.

In NUREG-1432, HPSI flow rate monitor is not included in Table 3.3.11-1, "Post Accident Monitoring Instrumentation." In the LAR, the licensee stated, in part, that:

> Note that the ANO-2 TSs have not been converted to the improved standard of NUREG 1432 and, therefore, formatting, wording, and references may differ somewhat (such as the use of mode noun-names instead of numerical values). However, these differences do not prevent obtaining consistency with the NUREG or result in failure to meet the intent of the associated NUREG Actions.

The licensee also stated,

> Although the ANO-2 TSs have not been converted to the STS, the associated ANO-2 TS 3.3.3.6 Bases is significantly modified to include detail consistent with the corresponding NUREG 1432 Bases.

The NRC staff notes that although the HPSI flow rate monitor is not included in Table 3.3.11-1 of NUREG-1432, the proposal to add this function to the ANO-2 PAM TSs is acceptable.

Based on the review and preceding evaluation, the NRC staff concludes that this proposed change satisfies the criteria of 10 CFR 50.36(c)(2)(ii) and will continue to satisfy the requirements of GDC 13 and is, therefore, acceptable.

3.2.1.6 Proposed Change to Add Three Core Exit Thermocouples (Quadrants 2, 3, and 4)

The function of the in-core instrumentation system is to evaluate core power and temperature distributions. This system performs periodic calibrations of the out-of-core flux measurement system and provides inputs to the core operating limit supervisory system. A CET indicator will provide the operator with the indication of the reactor coolant temperature in the reactor vessel up until the time the head is removed for refueling.

Consequently, the operability of the CET instrument is required by TS Table 9.3-25, "Shutdown Cooling System Instrument Application." This designation is consistent with the Category 1 instrumentation requirements of RG 1.97 and satisfies the criteria of 10 CFR 50.36(c)(2)(ii).

In the current ANO-2 TSs, CET – Quadrant 1 is already included in TS Tables 3.3-10 and 4.3-10 as Function 13. In the LAR, the licensee requested to add three new CETs (Quadrants 2, 3, and 4) based on the following:

- The NRC letter, "Issuance of Amendment Nos. 116 and 89 to Facility Operating License Nos. DPR-51 and NPF-6 - Arkansas Nuclear One, Units 1 and 2" (Reference 6 of the LAR). In this letter, two thermocouples are required per quadrant as the minimum number of required operable channels of operation for Unit 2.

- ANO-2 TS Bases, Section 3/4.3.3.6, "Post-Accident Instrumentation." This Bases states, in part, "Two CETs are required to be operable in each quadrant of the reactor core. The CETs relied upon for operability must be powered from redundant trains to meet single failure criteria."

In addition, the proposed changes to add three new CETs – Quadrant 2 (as Function 14), CETs – Quadrant 3 (as Function 15), and CETs – Quadrant 4 (as Function 16) to ANO-2 TS Tables 3.3-10 and 4.3-10 are consistent with RG 1.97 (Type C, Category 1), the ANO-2 SAR (C01), and NUREG-1432 (Functions 13, 14, 15, and 16 in Table 3.3.11-1). The NRC staff notes that the licensee did not propose to adopt Note (c) ("A channel consists of two or more exit thermocouples.") for the required channels of the current CET and three new CET instruments described in NUREG-1432. The staff finds this exception acceptable, because the current ANO-2 TS requirement is for two channels, or two CETs per quadrant, rather than four CETs per quadrant, which was the basis for Note (c) in NUREG-1432.

The NRC staff concludes that these changes satisfy the criteria of 10 CFR 50.36(c)(2)(ii) and will continue to satisfy the requirements of GDC 13 and are, therefore, acceptable.

3.2.1.7 Other Variables

In the LAR, the licensee also addressed two other instruments: Neutron flux and containment radiation monitors. These two instruments satisfy the RG 1.97 criteria (Type A or not Type A,

but Category 1) but are not currently included in TS Table 3.3-10 of TS 3.3.3.6 because their requirements are controlled in accordance with other TSs, as shown in Table 1a below:

Table 1a – Other Variables			
TS	**Instrument**	**Type**	**Category**
TS Table 3.3-6, Instrument 1.b	Neutron Flux	B	1
TS Table 3.3-1, Functions 2 & 3 TS Table 3.3-9, Instrument 1	Containment Radiation Monitors	E	1

Because these variables are addressed by the referenced existing TSs, no further NRC evaluation is required.

3.2.2 Evaluation of Proposed Revision to TS Tables 3.3-10 and 4.3-10 to Rename Instruments

Table 2 of this SE lists the proposed name changes for the instruments in ANO-2 TS Tables 3.3-10 and 4.3-10. The NRC staff reviewed and evaluated the proposed changes using the guidance in RG 1.97 and NUREG-1432, as described below:

Item No.	Proposed Function Name Change	Type/Category	NRC Staff Evaluation
2	Current: Containment Pressure (**High** Range) Proposed: Containment Pressure (**Wide** Range)	Type B Category 1	This is a simple wording change and is consistent with NUREG-1432 (Function 7).
3	Current: Pressurizer Pressure Proposed: Pressurizer Pressure (**Wide Range**)	Type A Category 1	The NRC staff verified that the current Pressurizer Pressure is measured by pressure transmitters with a wide range (0 - 3000 psia). Therefore, this change provides consistency with the ANO-2 TSs.
4	Current: Pressurizer **Water** Level Proposed: Pressurizer Level	Type D Category 1	The proposed deletion of "Water" is consistent with NUREG-1432 (Function 7).
5	Current: Steam Generator Pressure Proposed: Steam Generator **(SG)** Pressure	Type A Category 1	The acronym for Steam Generator is defined; therefore, this change is consistent with the ANO-2 TSs.
6	Current: Steam Generator Water Level Proposed: SG Water Level **(Wide Range)**	Type A Category 1	The NRC staff verified that the current SG Water Level is measured by a wide range of water level (17.4" – 498.4" above tube sheet). Therefore, this change is consistent with ANO-2 TS requirements and with NUREG-1432 (Function 11).
7	Refueling Water Tank Water Level	Type D Category 1	No name change is proposed.

Item No.	Proposed Function Name Change	Type/Category	NRC Staff Evaluation
8	Current: Containment Water Level – Wide Range Proposed: Containment Water Level (Wide Range)	Type B Category 1	This proposed change replaces a hyphen by a parentheses "()" and is consistent with the ANO-2 SAR (Function B12) and NUREG-1432 (Function 11).
9	Emergency Feedwater Flow Rate	Type D Category 1	The name is unchanged. The proposed change of the number from "1" to "2" in Required Channels is discussed in Section 3.2.3.3 of this SE.
13	Current: In Core Thermocouples (Core Exit Thermocouples) Proposed: Core Exit Thermocouples (CETs) - Quadrant 1	Type C Category 1	This proposed addition of the acronym for Core Exit Thermocouples is consistent with the ANO-2 TSs.
17	Current Item 14: Reactor Vessel Level Monitoring System (RVLMS)	Type B Category 1	The proposed change of the number from "14" to "17" in Function is consistent with ANO-2 TS Tables 3.3-10 and 4.3-10.

The NRC staff verified that the instruments listed in Table 2 of this SE are either: (1) Type A variables, or (2) not Type A, but Category 1 variables. The proposed changes to rename the instruments (of ANO-2 TS Tables 3.3-10 and 4.3-10) in Table 2 provide consistency between the ANO-2 TSs and NUREG-1432, and do not affect any administrative control or action requirements of the PAM TSs. These changes will continue to satisfy the criteria of 10 CFR 50.36(c)(2)(ii) and the requirements of GDC 13 and are, therefore, acceptable.

3.2.3 Proposed Revision of Actions 1, 2, 3, 4 in TS Table 3.3-10

The licensee proposed to revise the current Actions 1, 2, 3, and 4 in ANO-2 TS Table 3.3-10, as shown in Table 3 of this SE.

3.2.3.1 Evaluation of Proposed Revision to ANO-2 Actions 1 and 2

Action 1

The current Action 1 of ANO-2 allows up to 30 days to restore an inoperable channel for a given function to OPERABLE status, and the failure to do so would require placing the unit in Hot Shutdown (Mode 4) in the next 12 hours.

The new ANO-2 Action 1 requires restoration of the required inoperable channel(s) within the allowable completion time of 30 days. If the allowable completion time is not met, however, new Action 1 does not require that the unit be placed in Mode 4 in this event. Rather, the new Action 1 refers to the proposed ANO-2 TS Section 6.6.4, which requires that a report be submitted to the NRC within the following 14 days, when required (similar to Section 5.6.5 of NUREG-1432 Actions A and B).

The new Action 1 is similar to Conditions A and B of NUREG-1432, LCO 3.3.11, "Post Accident Monitoring Instrumentation (Analog)."

Because of the allowable completion time of 30 days to restore the required inoperable channel to OPERABLE status and the requirement to provide a report is applicable to all Functions listed in ANO-2 TS Table 3.3-10, new Action 1 should be added to each of the Functions listed in Table 3.3-10 where it is not already listed (as shown in NUREG-1432, Table 3.3.11-1).

Action 2

Current Action 2 is similar to current Action 1, but has one more condition: "If only one channel is inoperable and containment entry is required to restore the inoperable..." In addition, current Action 2 is applicable only to the containment pressure and water level variables. The licensee proposed to revise Action 2 as shown in Table 2 of this SE.

In addition, proposed new Action 2 is similar to Conditions C, D, and E of NUREG-1432, LCO 3.3.11, "PAM Instrument (Analog & Digital)."

Because of the completion time of 7 days to restore at least one channel of a given Function is applicable to all Functions listed in ANO-2 TS Table 3.3-10, new Action 2 is proposed for each of the Functions listed in the ANO-2 Table 3.3-10, where Action 2 is not already listed (as shown in NUREG-1432 Table 3.3.11-1).

The NRC staff verified that:

(a) The wording of the current ANO-2 Actions 1 and 2 states, in part, "With the number of OPERABLE ... channels less than required," which means that the number of channels required to be OPERABLE is either 1 or 0. Proposed new Action 1 would state, in part, "With one or more ... with one required channel inoperable," which means that the number of channels required to be OPERABLE is 1. The proposed new Action 2 states, in part, "With one or more ... with no required channel OPERABLE," which means that the number of channels required to be OPERABLE is 0. Therefore, the number of channels required to be OPERABLE in current Actions 1 and 2 is the same as that for proposed Actions 1 and 2;

(b) The allowable completion time of 30 days to restore the required inoperable channel to OPERABLE status for proposed new Action 1 is consistent with current Actions 1 and 2;

(c) The allowable completion time to restore two inoperable channels for new Action 2 is 7 days, which is more restrictive than the 30 days permitted by the current ANO-2 TSs;

(d) Proposed new Action 2 requires the restoration of one required channel to OPERABLE status within 7 days following a failure. Whenever the allowable completion time is not met, new Action 2 would continue to require the unit to be in Mode 4 in 6 hours by entering Mode 3 (Hot Standby) within 6 hours. Therefore, the total allowed restoration time of new Action 2 would remain within 12 hours, as in the current Action 2. This requirement is also consistent with Condition E of NUREG-1432 (Condition E is referenced whenever the allowable completion time of Condition D is not met, as shown above).

(e) The proposed required Actions, if at least one channel is not restored to an OPERABLE status, remain consistent with the current ANO-2 TS requirements and NUREG-1432.

Based on the above evaluation, the NRC concludes that these proposed changes ensure the appropriate PAM instrumentation will be controlled by the station TSs and that specified accurate action will be taken when required instrumentation is inoperable. The proposed TS requirements will continue to support the operator's ability to monitor and control essential systems during post-accident conditions. Therefore, these changes continue to satisfy the criteria of 10 CFR 50.36(c)(2)(ii) and will continue to satisfy the requirements of GDC 13, and are acceptable.

3.2.3.2 Proposed Revision to ANO-2 Action 3 and Deletion of Action 4

Currently, ANO-2 Actions 3 and 4 are only associated with the Function "Reactor Vessel Level Monitoring System (RVLMS)." The licensee proposed to revise Action 3 and delete Action 4, as shown in Table 2 of this SE.

Current Actions 3 and 4 have the required Action completion times of 7 days for one inoperable channel and 48 hours for two inoperable channels. These restoration times are more restrictive than the proposed new Action 1. In addition, the restoration time of 7 days, instead of the 48-hour limit for the RVLMS Function, is consistent with the NUREG-1432 TS Bases, which states, in part (emphasis added):

> The Completion Time of 7 days is based on the relatively low probability of an event requiring PAM instrumentation operation and the availability of alternate means to obtain the required information. **Continuous operation with two required channels inoperable in a Function is not acceptable** because the alternate indications may not fully meet all performance qualification requirements applied to the PAM instrumentation. Therefore, requiring restoration of one inoperable channel of the Function **limits the risk that the PAM Function will be in a degraded condition should an accident occur.**

Additionally, for current Actions 3 and 4, the restoration is only required if "... repairs are feasible without shutting down." If repairs are feasible, the allowable restoration time is similar to current Action 2, which is proposed to be revised as discussed above. If the repairs are not feasible, a report must be submitted to the NRC within 30 days following the failure, containing information consistent with the reporting requirements. This reporting requirement is similar to proposed new Action 2.

As described above, current Action 4 of Function RVLMS would be deleted and new Action 2 would be added to this function. The NRC staff verified that these proposed changes would: (1) support Action 3; (2) eliminate the non-conservatism of current Action 4; and (3) be consistent with NUREG-1432.

Proposed new Action 3 is shown in Table 2 of this SE. This Action would be required for the RVLMS function and is consistent with Condition [F] of NUREG-1432 Table 3.3.11-1, as shown below:

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. [As required by Required Action D.1 and referenced in Table 3.3.11-1.	F.1 Initiate action in accordance with Specification 5.6.5.	Immediately]

Condition [F] is associated with Function 5, "Reactor Vessel Water Level," and Function 9, "Containment Area Radiation (high range)," of NUREG-1432. This condition is referenced by Condition D1, which requires an immediate action in accordance with TS 5.6.5 of NUREG-1432. Furthermore, the NUREG-1432 TS Bases state, in part (emphasis added):

> [At this plant, alternate means of monitoring Reactor Vessel Water Level and Containment Area Radiation have been developed and tested. These alternate means may be temporarily installed if the normal PAM channel cannot be restored to OPERABLE status within the allotted time. If these alternate means are used, **the Required Action is not to shut down the plant, but rather to follow the directions of Specification 5.6.5.** The report provided to the NRC should discuss whether the alternate means are equivalent to the installed PAM channels, justify the areas in which they are not equivalent, and provide a schedule for restoring the normal PAM channels.]

Therefore, proposed new Action 3, which integrates with new Actions 1 and 2, will permit continuous plant operation and will require a report to be submitted to the NRC, as described in proposed ANO-2 TS 6.6.4. In addition, proposed Action 3 will only remain an applicable condition for the RVLMS variable and is consistent with the requirements of NUREG-1432.

Based on the above evaluation, the NRC concludes that these proposed changes ensure the appropriate PAM instrumentation will be controlled by the station TSs and that specified accurate action will be taken when required instrumentation is inoperable. The proposed TS requirements will continue to support the operator's ability to monitor and control essential systems during post-accident conditions. Therefore, these changes continue to satisfy the criteria of 10 CFR 50.36(c)(2)(ii) and will continue to satisfy the requirements of GDC 13, and are acceptable.

3.2.3.3 Proposed Notes 1 and 2 for Actions 1, 2, 3 in Table 3.3-10

The licensee proposed to add (1) Note 1 for all Actions 1, 2, and 3. Note 1 specifies that these actions may be entered independently for each function that is listed in TS Table 3.3-10. The allowable outage time of the inoperable channel(s) of a function will be tracked separately for each function starting from the time the action was entered for that function, and (2) Note 2 for Action 2 only. Note 2 specifies that Action 2 is applicable to the proposed Function 17 (RVLMS) only when repair is feasible without shutting down.

The NRC staff verified that the proposed change to add Notes 1 and 2 into ANO-2 TS Table 3.3-10 supports the Actions 1, 2, and 3, and is therefore reasonable.

3.2.3.4 Revise the Number of Function 9, "Emergency Feedwater (EFW) Flow Rate," From "1 per SG" to "2 per SG"

In the LAR, the licensee stated, in part:

> The number of EFW flow instrument channels required to be operable (Item 9) is changed from one per SG to two per SG. ANO-2 has two EFW pumps, both of which can feed each of the two SGs via separate feedwater piping. Since it is unknown which of the two EFW pumps may remain available post-accident (assuming a single failure) and the accident initiator may involve the loss of a SG, it is appropriate to require two channels of EFW flow indication per SG (one from each EFW train). With only one flow indication required, the remaining three flow instruments could conceivably be inoperable pre-accident such that a single failure of the remaining flow instrument would eliminate the ability of operators to monitor flow. Although SG level is the key indicator in most accident events (i.e., EFW flow indication is not critical initially), a loss of feedwater accident could require re-initiating feedwater flow to a SG that has had the feed nozzle uncovered for some time. In such a case, feedwater flow must be initially minimized to avoid a thermal transient on the SG feedwater nozzle.

The NRC staff verified that the proposed change increases the number of required channels for Function 9 from "1 per SG" to "2 per SG," which is consistent with the design basis of the ANO-2's EFW system and will enhance the safe operation of the EFW system, and is, therefore, acceptable.

3.2.4 Proposed Revision of Section 6.6.4 from "DELETE" to "Post Accident Monitoring Report"

In Section 6.6, "Reporting Requirements," the licensee proposed to revise the section from "Delete" to "Post Accident Monitoring Report," which is shown below:

> 6.6.4 Post Accident Monitoring Report
>
> When a report is required by TS Table 3.3-10, "Post-Accident Monitoring Instrumentation," Action 1 or Action 3, a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

The NRC staff evaluated the changes to Table 3.3-10 and revised Section 6.6.4 as described below:

- Proposed new Section 6.6.4 is: (1) associated with new Actions 1 and 3 of the ANO-2 PAM TS Table, and (2) consistent with NUREG 1432, TS 5.6.5, "Post Accident Monitoring Report."

- The requirement for both new Actions 1 and 3 of ANO-2 (i.e. Condition B and F of NUREG-1432) requires the report to be submitted within the following 14 days.

- As described in Sections 3.2.3.1 and 3.2.3.2 of this SE, the proposed addition of Section 6.6.4 to the ANO-2 TS supports proposed new Actions 1 and 3 and is consistent with NUREG-1432.

The NRC staff concludes that the proposed change does not affect the administrative control and action requirements associated with the ANO-2 TS PAM Instrumentation. This proposed change continues to satisfy the criteria of 10 CFR 50.36(c)(2)(ii) and the requirements of GDC 13 and is, therefore, acceptable.

3.2.5 Other Proposed Editorial Changes

The licensee also requested NRC approval for minor editorial changes to TS 3.3.3.6, as listed and described in Section 2.3.5 of this SE.

The NRC staff reviewed these proposed changes and concludes that the changes are editorial in nature and do not affect the requirements of the current or proposed TS changes. These proposed changes will continue to satisfy 10 CFR 50.36(c)(2)(ii) and the requirements of GDC 13 and are, therefore, acceptable.

3.2.6 Technical Evaluation Summary

Based on the above evaluation, the NRC staff concludes that the proposed revision of the ANO-2 TSs described in the licensee's application to revise the TS 3.3.3.6, "Post-Accident Instrumentation," do not exceed or alter a design basis or a safety limit for a parameter to be described or established in the ANO-2 SAR. The NRC staff verified that the proposed changes continue to satisfy the criteria of 10 CFR 50.36(c)(2), 10 CFR 50.36(c)(2)(ii), and the requirements of GDC 13 and are, therefore, acceptable.

Based on a review of the licensee's application, the NRC staff concludes that the proposed changes will continue to provide reasonable assurance of adequate protection of public health, safety, and security. The NRC staff's evaluation, as described in Section 3.0 of this SE, applies current and applicable regulatory requirements identified in Section 2.3 of this SE. On this basis, the NRC staff determined that the proposed TS changes, as discussed in Section 3.2 of this SE, are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arkansas State official was notified of the proposed issuance of the amendment on November 19, 2018. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative

occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding published in the *Federal Register* on February 27, 2018 (83 FR 8515). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: H. Vu, NRR

Date: December 19, 2018

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 2 - ISSUANCE OF AMENDMENT NO. 313 RE: POST-ACCIDENT INSTRUMENTATION TECHNICAL SPECIFICATION REVISION (EPID L-2017-LLA-0432) DATED DECEMBER 19, 2018

DISTRIBUTION:

PUBLIC
PM File Copy
RidsACRS_MailCTR Resource
RidsNrrDorlLpl4 Resource
RidsNrrDeEicb Resource
RidsNrrDssSrxb Resource
RidsNrrDssStsb Resource
RidsNrrLAJBurkhardt Resource
RidsNrrLAPBlechman Resource
RidsNrrPMANO Resource
RidsRgn4MailCenter Resource
HVu, NRR
MChernoff, NRR
ASmith, NRR

ADAMS Accession No. ML18317A382 ***by e-mail** ****by memorandum**

OFFICE	NRR/DORL/LPL4/PM	NRR/DORL/LAiT*	NRR/DORL/LPL4/LA
NAME	TWengert	PTalukdar	PBlechman (JBurkhardt for)
DATE	11/20/18	11/14/18	11/20/18
OFFICE	NRR/DE/EICB/BC* **	NRR/DSS/SRXB/BC*	NRR/DSS/STSB/BC*
NAME	MWaters	JWhitman	VCusumano
DATE	10/2/18** reconcur 11/26/18*	11/26/18	11/30/18
OFFICE	OGC* NLO	NRR/DORL/LPL4/BC	NRR/DORL/LPL4/PM
NAME	BHarris	RPascarelli	TWengert
DATE	12/4/18	12/19/18	12/19/18

OFFICIAL RECORD COPY