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February 6, 2001

2CAN020102

U. S. Nuclear Regulatory Commission
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Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Proposed Technical Specification Changes Revising the Requirements for the Reactor Coolant Leak Detection System

Gentlemen:

Attached for your review and approval are proposed changes to the Arkansas Nuclear One – Unit 2 (ANO-2) Technical Specifications (TS) and bases associated with Reactor Coolant System (RCS) Leak Detection components. Revisions to the following TSs are proposed:

TS 3.3.3.1
TS 3.4.6.1
Surveillance Requirement 4.4.6.1
Surveillance Requirement 4.4.6.2.1
TS 3.4.6.1 Bases

The proposed changes will enhance the current specification requirements associated with the RCS Leak Detection system and make them consistent with those of the Revised Standard Technical Specifications (RSTS) of NUREG 1432.

A key example of the enhancement involved with this change deals with the ACTIONS required to address the inoperability of some of the leak detection methods. Currently, actions are only provided for the inoperability of the containment airborne radioactivity monitors. The RSTS identifies acceptable actions that may be taken in the event the sump monitor is inoperable, however. ANO-2 is requesting to implement these action statements. The RSTS requirement is consistent with those contained in General Design Criteria 30 of Appendix A to 10CFR50 and Regulatory Guide 1.45. Therefore, revising the current ANO-2 specifications to be consistent with the RSTS provides reasonable assurance that a small RCS leak will be detected in a timely manner and potentially prevents an unnecessary unit shutdown.

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The proposed changes discussed in this submittal are similar to previous submittals made by Palo Verde Nuclear Generating Station Units 1, 2, and 3 (November 9, 1998), by North Anna Power Station Units 1 and 2 (July 20, 1999), and by St. Lucie Plant Units 1 and 2 as approved by the NRC in their Safety Evaluation Report dated May 30, 1996.

The proposed changes have been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and it has been determined that the changes involve no significant hazards considerations. The basis for this determination is included in the attached submittal.

Entergy Operations, Inc. requests prompt approval of the proposed changes, with an implementation period of 60 days. There are no new commitments made in this submittal.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 6, 2001.

Very truly yours,

CGA/dbb
Attachment

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ATTACHMENT

TO

2CAN020102

PROPOSED TECHNICAL SPECIFICATION

AND

RESPECTIVE SAFETY ANALYSES

IN THE MATTER OF AMENDING

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT TWO

DOCKET NO. 50-368

LICENSE NO. NPF-6

DESCRIPTION OF PROPOSED CHANGES

The proposed change to the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TS) is necessary to clarify the actions and requirements of Specification 3.4.6.1. Revising the requirements as proposed is consistent with the requirements found in the Revised Standard Technical Specifications (RSTS) of NUREG 1432. Details of the requested changes are described below:

- The requirements for Reactor Coolant System (RCS) Leak Detection process radiation monitors have been deleted from Specification 3.3.3.1. This change involves:

  1. Deleting the entries for these radiation monitors from Table 3.3-6 (page 3/4 3-29). The measurement range is deleted from this table and a discussion of measurement range is added to the applicable bases in order to provide consistency with the RSTS. Other deleted information is redundant to that of Specification 3.4.6.1.

  2. Deleting Action 14 of Table 3.3-6 (page 3/4 3-26). With the deletion of the containment airborne radiation monitors, this ACTION was no longer applicable or necessary.

  3. Deleting the surveillance requirements of Table 4.3-3 (page 3/4 3-27). These requirements have been relocated to Surveillance Requirement 4.4.6.1.

- The Limiting Condition for Operation (LCO) and ACTION statements of Specification 3.4.6.1 (page 3/4 4-13) has been changed to reflect the requirements of the RSTS. In particular, actions associated with an inoperable containment sump level monitor have been established. The surveillance requirements deleted from Table 4.3-3 as well as those from Surveillance Requirement 4.4.6.2.1 have been added to the lower portion of this TS page. The applicable bases have also been revised. An exclusion from Specification 3.0.4 has been included to provide further consistency with the RSTS.

- Surveillance Requirements 4.4.6.2.1.a and 4.4.6.2.1.b (page 3/4 4-14a) have been deleted. The intended objectives of these surveillances are accomplished by performance of the channel checks as included in the revised Surveillance Requirement 4.4.6.1.

The associated bases for Specification 3.4.6.1 has also been revised. Minor format changes that do not affect technical content are also included where readibility would be improved. Since format changes are administrative in nature, no further discussion related to these changes are included in this submittal.

BACKGROUND

General Design Criteria (GDC) 30 of Appendix A to 10 CFR 50 requires means for detecting and, to the extent practical, identifying the location of the source of RCS leakage. Regulatory Guide (RG) 1.45 describes acceptable methods for selecting leakage detection systems. These

systems must have the capability to detect significant reactor coolant pressure boundary (RCPB) degradation as soon after occurrence as practical to minimize the potential for propagation to a gross failure. Therefore, an early indication or warning is necessary to permit proper evaluation of all unidentified RCS leakage. As noted in the ANO-2 UFSAR (Section 5.2.7.1) and TS Bases 3.4.6.1, the RCS Leak Detection System is consistent with RG 1.45.

Diverse monitoring principles are required to be operable in order to provide a high degree of confidence that extremely small RCS leaks are detected in time to allow actions to place the plant in a safe condition when RCS leakage indicates possible RCPB failure. The detection means required by the TSs are:

- the containment sump level monitoring system,
- the containment atmosphere particulate radioactivity monitor,and
- the containment atmosphere gaseous radioactivity monitor.

The combination of the containment sump level monitor and either of the two containment atmosphere radioactivity monitors provide the diverse monitoring necessary to afford appropriate leak detection. As described in NUREG-1432, this level of detection is sufficient to satisfy the requirements of RG 1.45, and will support the continued use of Topical Report CEN-637, "Leak-Before-Break Evaluation of Primary Coolant Loop Piping in Combustion Engineering (CE) Designed Nuclear Steam Supply Systems," at ANO-2.

Industry experience has shown that water flow changes of 0.5 gpm to 1.0 gpm can be detected in contained volumes by monitoring changes in water level, in flow rate, or in the operating frequency of a pump. The containment sump, used to collect unidentified leakage, is instrumented to alarm for increases of $\leq$ 1.0 gpm in the normal flow or fill rates. This sensitivity is acceptable for detecting increases in unidentified leakage. RG 1.45 establishes the position that an acceptable leak detection system should be capable of detecting a leak of $\leq$ 1.0 gpm in $\leq$ 1 hour. Note, however, that ANO-2 time for detection could be up to 70 minutes when the initial containment sump level is within the lower 1/3 of the incremental switch ranges. This was presented in detail to the NRC in ANO-2 submittal 2CAN089804, dated August 11, 1998.

The reactor coolant contains radioactivity that, when released to the containment, can be detected by radiation monitoring instrumentation. RCS radioactivity levels will be low during initial reactor startup and for a few weeks thereafter until activated corrosion products have been formed and fission products appear from fuel element cladding contamination or cladding defects. Therefore, radioactivity detection systems are included for monitoring both particulate and gaseous activities because of their sensitivity and rapid response to RCS leakage.

The RSTS, under the provisions of NUREG 1432, provides acceptable restoration periods and contingency actions for cases where a required leak detection instrument becomes inoperable. Grab samples are required of the containment atmosphere during events where

the required containment atmosphere particulate or gaseous monitor is inoperable. However, no other form of sampling can provide the equivalent information obtained from the containment sump level monitoring system. Therefore, to provide an acceptable contingency action during the allowable outage time for the containment sump level monitoring system, the RSTS requires a RCS water inventory balance to be performed once every 24 hours. This action statement is proposed for the ANO-2 TS. The normal frequency required by the ANO-2 TSs for the RCS water inventory balance is 72 hours. Increasing the required frequency of this surveillance provides assurance that adequate RCS leak detection capability is maintained during inoperability of the containment sump level monitor.

The existing action associated with Specification 3.4.6.1 concerning the operability of the RCS Leak Detection system requires grab samples of the containment atmosphere to be obtained and analyzed periodically if a required containment atmosphere activity monitor is rendered inoperable. This action is appropriate for scenarios where the containment atmosphere particulate or gaseous radioactivity monitor is inoperable, but does not provide any value for scenarios where the containment sump level monitoring system is inoperable. As currently written, the loss of the containment sump level monitoring system could result in continued plant operation for up to 30 days with no alternate means of detection required. Not having a restoration period or contingency action clearly depicted for the inoperability of of this indicator could also be interpreted to require an unnecessary shutdown of the reactor when other actions could have provided an adequate margin of safety for continued operation for a designated period of time. In summation, the ambiguous nature of the current LCO actions requires some measure of interpretation by the licensee as to what actions are required during inoperability periods of the containment sump level monitoring system. Therefore, Entergy Operations, Inc. proposes to revise the existing TSs and establish the restoration period and contingency actions provided by the RSTS as approved by NUREG 1432.

DISCUSSION OF CHANGE

The majority of the proposed changes act to consolidate all operability, action, and surveillance requirements associated with the RCS Leak Detection System into the RCS Leak Detection TS. Other than the deletion of the measurement ranges of the containment atmosphere radioactivity monitors from the TSs, the consolidation of this information into one specification is considered administrative in nature. The measurement ranges found in Table 4.3-3 of the existing TSs are discussed within information added to the applicable RCS Leak Detection TS bases. In addition, the RSTS also consolidates various associated requirements into the single RCS Leak Detection specification. Another significant change includes the addition of effective contingency actions for periods when the containment sump level monitoring system is inoperable. These revisions are also consistent with the RSTS.

The containment gaseous and particulate monitor requirements of TS Table 3.3-6, Radiation Monitoring Instrumentation, are deleted from the table. The minimum channels operable, applicable modes, and action that are deleted from Table 3.3-6 are all bounded by the proposed requirements of Specification 3.4.6.1. The alarm/trip setpoint of Table 3.3-6 is not applicable to these instruments and is therefore deleted and not relocated to the RCS Leak

Detection specification. The measurement range for the RCS leak detection instruments is also deleted and not relocated to the RCS Leak Detection specification since this level of detail is not required within the TSs. These revisions are consistent with those of the RSTS.

The surveillance requirements associated with the RCS Leak Detection instruments are relocated from TS Table 4.3-3 to the surveillance requirement section of Specification 3.4.6.1. The relocation is administrative in nature and does not revise any technical requirements of the existing surveillances. The column "Modes In Which Surveillance Required" is consistent with the applicability statement of Specification 3.4.6.1. These revisions are consistent with those of the RSTS.

The LCO and action sections of Specification 3.4.6.1 are revised to be consistent with that of the RSTS. The associated bases have also been revised to reflect these changes. Maintaining the operability of a containment sump level monitor, in addition to either a containment atmosphere particulate or gaseous radioactivity detector, provides the diversity necessary to ensure acceptable detection of RCS leakage. Additionally, the action statements of TS 3.4.6.1 have been divided into subsections in order to address containment atmosphere radioactivity monitor and containment sump level monitoring system inoperability individually. The actions associated with the containment atmosphere radioactivity monitors are revised to provide an option for either taking grab samples (as in the existing specification and the RSTS) or to increase the frequency of the RCS water inventory surveillance (as allowed in the RSTS). The RCS water inventory balance is the most accurate means of leak detection for leakage approaching or exceeding 1 gpm. Actions related to the containment sump level monitoring system are added to allow a restoration period of 30 days, provided the frequency of the RCS water inventory balance surveillance is increased from 72 hours to 24 hours. The inventory balance provides acceptable diversity in detecting RCS leakage during the 30-day period in which the containment sump level monitoring system may be inoperable. These changes are consistent with the RSTS.

Since other instrumentation is available to monitor for RCS leakage, the provisions of TS 3.0.4 are not applicable to the actions described in the preceding paragraph. Therefore, plant mode changes will not affect the ability to effectively monitor for RCS leakage as described above. Excluding the provisions of TS 3.0.4 from Specification 3.4.6.1 is consistent with the RSTS.

In all cases where the option of performing an RCS inventory balance is provided, a note is added to clarify that this method need not be performed until steady state conditions have been achieved for 12 hours. This exception prevents inaccurate leak measurements that would result by performing RCS inventory balance surveillances during changing plant conditions. The 12 hour allowance was approved by the NRC on September 12, 1998 as part of a generic change (TSTF 116) to NUREG-1432, Revision 2.

ANO-2 TS Surveillance Requirements 4.4.6.2.1 (a) and (b) are deleted. The requirement to monitor these instruments is addressed by the Channel Check statements of the revised RCS Leak Detection surveillance requirements. Documentation of the 12-hour Channel Check

provides the monitoring necessary to detect adverse trends or increases in RCS leakage. The terminology difference, therefore, is not significant and no reduction in existing requirements has been applied. This change is consistent with that of the RSTS. Note that the requirement to monitor the sump level is beyond the recommendations of the RSTS, but has been retained for the proposed ANO-2 specifications.

The aforementioned changes provide the flexibility and consistency needed for the RCS Leak Detection system while maintaining the diversity, leak rate, and time requirements of RG 1.45. In most cases, proposed changes within this submittal are administrative in nature and do not affect plant or personnel safety. The provision of an allowed outage time and contingency action for an inoperable containment sump level monitoring system reduces the possibility of an unnecessary shutdown and provides continued diverse measurement of RCS leakage at an increased frequency. Because the proposed changes require at least one of the normal leak detection methods to remain operable at all times within Modes 1, 2, 3, and 4, the ability to detect small leaks in $\leq$ 1 hour in accordance with RG 1.45 is maintained (see exception described in the background section of this submittal). The alternative of grab sample analysis (i.e., performance of an RCS water inventory balance) effectively assures the ability to detect RCS leakage within an acceptable period of time. The revisions proposed in this submittal provide the clarity needed for correct use and effective implementation of the aforementioned TSs. They are consistent with the philosophies of the RSTS.

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 provide an acceptable restoration period and contingency action for periods when the containment sump level monitoring system is inoperable. The proposal also consolidates the operability requirements for RCS leak detection into one specification, deletes redundant requirements from the Technical Specifications (TS), and establishes requirements that are consistent with the Revised Standard Technical Specifications (RSTS) of NUREG 1432. Currently, no contingency actions exist that would provide an acceptable, diverse detection of RCS leakage during the period of containment sump level monitor inoperability. The requirements of the RSTS include such a contingency in the action statement to perform a RCS water inventory balance at an increased frequency of once per 24 hours when the containment sump level monitoring system is inoperable. Administratively, requirements associated with RCS Leak Detection instruments and components have been relocated from various specifications and placed in the ANO-2 RCS Leak Detection specification. The provisions of TS 3.0.4 are not applicable to ANO-2 Specification 3.4.6.1 since other leak detection methods remain available during periods of inoperabilities of leak detection components. The proposed changes are consistent with the philosophies used in the RSTS and with RG 1.45, and eliminate the possibility of an unnecessary plant shutdown due to the failure of a single instrument.

An evaluation of the proposed changes 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:

Criterion 1 - Does Not Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated.

The aforementioned revisions do not involve any physical change to plant design. Relocating the requirements associated with the RCS Leak Detection System from various TSs to ANO-2 Specification 3.4.6.1 is administrative in nature and does not affect the accident analyses. The RCS water inventory balance is more accurate than normal leak detection methods in regard to actual RCS leak rates, and therefore is an excellent alternative when other leak detection components may become inoperable. Since the proposed changes only affect the requirements for the detection of RCS leakage, the probability that an accident previously evaluated will occur remains unchanged. The proposed changes do not prevent nor limit the diversity of acceptable detection of RCS leakage and, therefore, do not significantly affect the consequences of an accident previously evaluated since leak rate information will remain available to station personnel. Although the non-administrative revisions result in less restrictive requirements, the proposed changes remain within the acceptability of General Design Criteria (GDC) 30 of Appendix A to 10 CFR 50 and Regulatory Guide (RG) 1.45, and are consistent with the philosophies of the RSTS.

Therefore, the proposed changes do <u>not</u> involve a significant increase in the probability or consequences of any accident previously evaluated.

Criterion 2 - Does Not Create the Possibility of a New or Different Kind of Accident from any Previously Evaluated.

The aforementioned revisions do not involve any physical change to plant design. Relocating the requirements associated with the RCS Leak Detection System from various TSs to ANO-2 Specification 3.4.6.1 is administrative in nature and does not affect the accident analyses. The RCS water inventory balance is more accurate than normal leak detection methods in regard to actual RCS leak rates, and therefore is an excellent alternative when other leak detection components may become inoperable. The proposed changes do not prevent acceptable detection of RCS leakage by diverse methods. The detection of a RCS leak does not cause an accident or prevent an accident from occurring. Likewise, detecting a RCS leak while in its initial stages does not create the possibility of a new or different kind of accident than any previously analyzed. Therefore, a new or different kind of accident than that previously analyzed is not expected to result due to the proposed changes of this submittal. Although the

non-administrative revisions result in less restrictive requirements, the proposed changes remain within the acceptability of General Design Criteria (GDC) 30 of Appendix A to 10 CFR 50, Regulatory Guide (RG) 1.45, and are consistent with the philosophies of the RSTS.

Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

Criterion 3 - Does Not Involve a Significant Reduction in the Margin of Safety.

The aforementioned revisions do not involve any physical change to plant design. Relocating the requirements associated with the RCS Leak Detection System from various TSs to the ANO-2 Specification 3.4.6.1 is administrative in nature and does not affect the margin of safety. The RCS water inventory balance is more accurate than normal leak detection methods in regard to actual RCS leak rates, and therefore is an excellent alternative when other leak detection components may become inoperable. Maintaining diverse and accurate RCS leak detection methods available helps to ensure RCS leaks will be detected within an acceptable period of time and, therefore, the proposed changes do not significantly reduce the margin to safety. Although the non-administrative revisions result in less restrictive requirements, the proposed changes remain within the acceptability of General Design Criteria (GDC) 30 of Appendix A to 10 CFR 50 and Regulatory Guide (RG) 1.45, and are consistent with the philosophies of the RSTS.

Therefore, the proposed changes do 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, Inc. has determined that the requested changes do not involve a significant hazards consideration.

ENVIRONMENTAL IMPACT EVALUATION

10 CFR 51.22(c) provides criteria for and identification of licensing and regulatory actions eligible for categorical exclusion from performing an environmental assessment. A proposed amendment to an operating license for a facility requires no environmental assessment if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant hazards consideration, (2) result in a significant change in the types or significant increase in the amounts of any effluents that may be released off-site, or (3) result in a significant increase in individual or cumulative occupational radiation exposure. Entergy Operations, Inc. has reviewed this license amendment and has determined that it 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 proposed license amendment. The bases 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, the proposed license amendment does not result in a significant change or significant increase in the radiological doses for any Design Bases 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.

    1. The proposed license amendment does not result in a significant increase to the individual or cumulative occupational radiation exposure because this does not modify the method of operation of systems and components necessary to prevent a radioactive release.

PROPOSED ANO-2 TECHNICAL SPECIFICATION CHANGES

TABLE 3.3-6

RADIATION MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	MEASUREMENT RANGE	ACTION
1. AREA MONITORS					
a. Spent Fuel Pool Area Monitor	1	Note 1	$\leq 1.5 \times 10^{-2}$ R/hr	10^{-4} - 10^{1} R/hr	13
b. Containment High Range	2	1, 2, 3, & 4	Not Applicable	1 - 10^{7} R/hr	18
2. PROCESS MONITORS					
a. Containment Purge and Exhaust Isolation	1	5 & 6	$\leq$ 2 x background	10 - 10^{6} cpm	16
b. Control Room Ventilation Intake Duct Monitors	2	Note 2	$\leq$ 2 x background	10 - 10^{6} cpm	17, 20
c. Main Steam Line Radiation Monitors	1/Steam Line	1, 2, 3, & 4	Not Applicable	10^{-1} - 10^{4} mR/hr	19

Note 1 - With fuel in the spent fuel pool or building.
Note 2 - MODES 1, 2, 3, 4, and during handling of irradiated fuel.

TABLE 3.3-6 (Continued)

TABLE NOTATION

ACTION 13 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

ACTION 16 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, complete the following:

a. If performing CORE ALTERATIONS or moving irradiated fuel within the reactor building, secure the containment purge system or suspend CORE ALTERATIONS and movement of irradiated fuel within the reactor building.

b. If a containment PURGE is in progress, secure the containment purge system.

c. If continuously ventilating, verify the SPING monitor operable or perform the ACTIONS of 3.3.3.9, or secure the containment purge system.

ACTION 17 - With no channels OPERABLE, within 1 hour initiate and maintain operation of the control room emergency ventilation system in the recirculation mode of operation.

ACTION 18 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, (1) either restore the inoperable channel to OPERABLE status within 7 days or (2) prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within 30 days following the event, outlining the action taken, the cause of the inoperability, and the plans and schedule for restoring the system to OPERABLE status. With both channels inoperable, initiate alternate methods of monitoring the containment radiation level within 72 hours in addition to the actions described above.

ACTION 19 - With the number of OPERABLE Channels less than required by the Minimum Channels OPERABLE requirements, initiate the preplanned alternate method of monitoring the appropriate parameter(s), within 72 hours, and:

1) either restore the inoperable Channel(s) to OPERABLE status within 7 days of the event, or

2) prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within 14 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

ACTION 20 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 7 days, or within the next 6 hours initiate and maintain the control room emergency ventilation system in the recirculation mode of operation.

TABLE 4.3-3

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. AREA MONITORS				
a. Spent Fuel Pool Area Monitor	S	R	M	Note 1
b. Containment High Range	S	R Note 4	M	1, 2, 3, & 4
2. PROCESS MONITORS				
a. Containment Purge and Exhaust Isolation	Note 2	R	Note 3	5 & 6
b. Control Room Ventilation Intake Duct Monitors	S	R	M	Note 5
c. Main Steam Line Radiation Monitors	S	R	M	1, 2, 3, & 4

Note 1 - With fuel in the spent fuel pool or building.
Note 2 - Within 8 hours prior to initiating containment purge operations and at least once per 12 hours during containment purge operations.
Note 3 - Within 31 days prior to initiating containment purge operations and at least once per 31 days during containment purge operations.
Note 4 - Acceptable criteria for calibration are provided in Table II.F.1-3 of NUREG-0737.
Note 5 - MODES 1, 2, 3, 4, and during handling of irradiated fuel.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following Reactor Coolant System leakage detection systems shall be OPERABLE:

a. The containment sump level monitor, and

b. One containment atmosphere radioactivity monitor (gaseous or particulate).

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the required containment atmosphere radioactivity monitor inoperable, operation may continue for up to 30 days provided:

1. grab samples of the containment atmosphere are obtained and analyzed at least once per 24 hours, or

2. a Reactor Coolant System water inventory balance is performed once per 24 hours in accordance with Surveillance Requirement 4.4.6.2.1.a;*

3. otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the containment sump level monitor inoperable, operation may continue for up to 30 days provided:

1. a Reactor Coolant System water inventory balance is performed once per 24 hours in accordance with Surveillance Requirement 4.4.6.2.1.a;*

2. otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The leakage detection system shall be demonstrated OPERABLE by:

a. Performing a CHANNEL CHECK of the required containment atmosphere radioactivity monitor at least once per 12 hours.

b. Performing a CHANNEL CHECK of the containment sump level monitor at least once per 12 hours.

c. Performing a CHANNEL FUNCTIONAL TEST of the required containment atmosphere radioactivity monitor at least once per 31 days.

d. Performing a CHANNEL CALIBRATION of the containment sump level monitor at least once per 18 months.

e. Performing a CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor at least once per 18 months.

*Not required until 12 hours after establishment of steady state conditions.

SURVEILLANCE REQUIREMENTS

4.4.6.2.1 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by:

a. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours during steady state operation except when operating in the shutdown cooling mode.

b. Monitoring the reactor head flange leakoff temperature at least once per 24 hours.

4.4.6.2.2 Each Reactor Coolant System Pressure Isolation Valve specified in Table 3.4.6-1 shall be demonstrated OPERABLE by individually verifying leakage to be within its limit:

a. Prior to entering MODE 2 after each refueling outage,

b. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 72 hours or more and if leakage testing has not been performed in the previous 9 months, and

c. Prior to returning the valve to service following maintenance, repair or replacement work on the valve.

Wastage type defects are unlikely with proper chemistry treatment of the secondary coolant. However, even if a defect should develop in service, it will be found during scheduled inservice steam generator tubes examinations. Plugging will be required for all tubes with imperfections exceeding the plugging limit as defined in Surveillance Requirement 4.4.5.4.a. Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that could affect tube wall integrity. Additionally, upgraded testing methods will be evaluated and appropriately implemented as better methods are developed and validated for commercial use.

Whenever the results of any steam generator tubing inservice inspection fall into Category C-3 certain results will be reported in a Special Report to the Commission pursuant to Specification 6.9.2 as denoted by Table 4.2-2. Notification of the Commission will be made prior to resumption of plant operation. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

GDC 30 of Appendix A to 10 CFR 50 requires means for detecting and, to the extent practical, identifying the location of the source of RCS LEAKAGE. The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems" May 1973. Likewise, the actions implemented upon inoperability of a required leak detection instrument are sufficient in maintaining the diversity and accuracy needed to effectively detect RCS leaks.

Industry practice has shown that water flow changes of 0.5 gpm to 1.0 gpm can readily be detected in contained volumes by monitoring changes in water level, in flow rate, or in the operating frequency of a pump. In addition, the reactor coolant contains radioactivity that, when released to the containment, can be detected by radiation monitoring instrumentation. Instrument sensitivities of 10 - 10^6 cpm for particulate and gaseous monitoring are practical for these leakage detection systems.

3/4.4.6.2 REACTOR COOLANT SYSTEM LEAKAGE

Industry experience has shown that while a limited amount of leakage is expected from the RCS, the unidentified portion of this leakage can be reduced to a threshold value of less than 1 GPM. This threshold value is sufficiently low to ensure early detection of additional leakage.

The 10 GPM IDENTIFIED LEAKAGE limitation provides allowances for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the leakage detection systems.

The Surveillance Requirements for RCS Pressure Isolation Valves provide added assurance of valve integrity thereby reducing the probability of gross valve failure and consequent intersystem LOCA. Leakage from the RCS Pressure Isolation Valves is IDENTIFIED LEAKAGE and will be considered as a portion of the allowed limit.

MARKUP OF CURRENT ANO-2 TECHNICAL SPECIFICATIONS

(FOR INFO ONLY)

TABLE 3.3-6

RADIATION MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	MEASUREMENT RANGE	ACTION
1. AREA MONITORS					
a. Spent Fuel Pool Area Monitor	1	Note 1	$\leq 1.5 \times 10^{-2}$ R/hr	10^{-4} - 10^{1} R/hr	13
b. Containment High Range	2	1, 2, 3, & 4	Not Applicable	1 - 10^{7} R/hr	18
2. PROCESS MONITORS					
~~a. Containment~~					
~~i. Gaseous Activity~~					
a. ~~a) Purge & Exhaust Isolation~~ Containment Purge and Exhaust Isolation	1	5 & 6	$\leq$ 2 x background	10 - 10^{6} cpm	16
~~b) RCS Leakage Detection~~	~~1~~	~~1, 2, 3 & 4~~	~~Not Applicable~~	~~10 - 10^{6} cpm~~	~~14~~
~~ii. Particulate Activity~~					
~~a) RCS Leakage Detection~~	~~1~~	~~1, 2, 3 & 4~~	~~Not Applicable~~	~~10 - 10^{6} cpm~~	~~14~~
b. Control Room Ventilation Intake Duct Monitors	2	Note 2	$\leq$ 2 x background	10 - 10^{6} cpm	17, 20
c. Main Steam Line Radiation Monitors	1/Steam Line	1, 2, 3, & 4	Not Applicable	10^{-1} - 10^{4} mR/hr	19

Note 1 - With fuel in the spent fuel pool or building.
Note 2 - MODES 1, 2, 3, 4, and during handling of irradiated fuel.

TABLE 3.3-6 (Continued)

TABLE NOTATION

ACTION 13 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

~~ACTION 14 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.4.6.1.~~

ACTION 16 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, complete the following:

a. If performing CORE ALTERATIONS or moving irradiated fuel within the reactor building, secure the containment purge system or suspend CORE ALTERATIONS and movement of irradiated fuel within the reactor building.

b. If a containment PURGE is in progress, secure the containment purge system.

c. If continuously ventilating, verify the SPING monitor operable or perform the ACTIONS of 3.3.3.9, or secure the containment purge system.

ACTION 17 - With no channels OPERABLE, within 1 hour initiate and maintain operation of the control room emergency ventilation system in the recirculation mode of operation.

ACTION 18 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, (1) either restore the inoperable channel to OPERABLE status within 7 days or (2) prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within 30 days following the event, outlining the action taken, the cause of the inoperability, and the plans and schedule for restoring the system to OPERABLE status. With both channels inoperable, initiate alternate methods of monitoring the containment radiation level within 72 hours in addition to the actions described above.

ACTION 19 - With the number of OPERABLE Channels less than required by the Minimum Channels OPERABLE requirements, initiate the preplanned alternate method of monitoring the appropriate parameter(s), within 72 hours, and:

1) either restore the inoperable Channel(s) to OPERABLE status within 7 days of the event, or

2) prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within 14 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

ACTION 20 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 7 days, or within the next 6 hours initiate and maintain the control room emergency ventilation system in the recirculation mode of operation.

TABLE 4.3-3

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. AREA MONITORS				
a. Spent Fuel Pool Area Monitor	S	R	M	Note 1
b. Containment High Range	S	R Note 4	M	1, 2, 3, & 4
2. PROCESS MONITORS				
~~a. Containment~~				
~~i. Gaseous Activity~~				
a. Containment ~~a)~~ Purge & and Exhaust Isolation	Note 2	R	Note 3	5 & 6
~~b) RCS Leakage Detection~~	~~S~~	~~R~~	~~M~~	~~1, 2, 3, & 4~~
~~ii. Particulate Activity~~				
~~a) RCS Leakage Detection~~	~~S~~	~~R~~	M	~~1, 2, 3, & 4~~
b. Control Room Ventilation Intake Duct Monitors	S	R	M	Note 5
c. Main Steam Line Radiation Monitors	S	R	M	1, 2, 3, & 4

Note 1 - With fuel in the spent fuel pool or building.
Note 2 - Within 8 hours prior to initiating containment purge operations and at least once per 12 hours during containment purge operations.
Note 3 - Within 31 days prior to initiating containment purge operations and at least once per 31 days during containment purge operations.
Note 4 - Acceptable criteria for calibration are provided in Table II.F.1-3 of NUREG-0737.
Note 5 - MODES 1, 2, 3, 4, and during handling of irradiated fuel.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following Reactor Coolant System leakage detection systems shall be OPERABLE:

~~a. A containment atmosphere particulate radioactivity monitoring system,~~

~~b~~a. The containment sump level monitor~~ing system~~, and

~~c~~b. ~~A~~One containment atmosphere ~~gaseous~~ radioactivity monitor~~ing system~~ (gaseous or particulate).

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With ~~only two of~~ the ~~above~~ required ~~leakage detection systems~~ containment atmosphere radioactivity monitor inoperable~~OPERABLE~~, operation may continue for up to 30 days provided:

1. grab samples of the containment atmosphere are obtained and analyzed at least once per 24 hours, or ~~when the required gaseous and/or particulate radioactivity monitoring system is inoperable~~

2. a Reactor Coolant System water inventory balance is performed once per 24 hours in accordance with Surveillance Requirement 4.4.6.2.1.a;*

~~1~~3. otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the containment sump level monitor inoperable, operation may continue for up to 30 days provided:

1. a Reactor Coolant System water inventory balance is performed once per 24 hours in accordance with Surveillance Requirement 4.4.6.2.1.a;*

2. otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The leakage detection system shall be demonstrated OPERABLE by:

a. ~~Containment atmosphere particulate and gaseous monitoring systems performance of CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST at the frequencies specified in Table 4.3-3.~~Performing a CHANNEL CHECK of the required containment atmosphere radioactivity monitor at least once per 12 hours.

b. Performing a CHANNEL CHECK of the containment sump level monitor at least once per 12 hours.

c. Performing a CHANNEL FUNCTIONAL TEST of the required containment atmosphere radioactivity monitor at least once per 31 days.

~~b~~d. Performing a CHANNEL CALIBRATION of the c~~C~~ontainment sump level monitor~~ing system performance of CHANNEL CALIBRATION~~ at least once per 18 months.

e. Performing a CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor at least once per 18 months.

*Not required until 12 hours after establishment of steady state conditions.

SURVEILLANCE REQUIREMENTS

4.4.6.2.1 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by:

~~a. Monitoring the containment atmosphere particulate radioactivity at least once per 12 hours.~~

~~b. Monitoring the containment sump inventory and discharge at least once per 12 hours.~~

~~e~~a. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours during steady state operation except when operating in the shutdown cooling mode.

~~d~~b. Monitoring the reactor head flange leakoff temperature at least once per 24 hours.

4.4.6.2.2 Each Reactor Coolant System Pressure Isolation Valve specified in Table 3.4.6-1 shall be demonstrated OPERABLE by individually verifying leakage to be within its limit:

a. Prior to entering MODE 2 after each refueling outage,

b. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 72 hours or more and if leakage testing has not been performed in the previous 9 months, and

c. Prior to returning the valve to service following maintenance, repair or replacement work on the valve.

Wastage type defects are unlikely with proper chemistry treatment of the secondary coolant. However, even if a defect should develop in service, it will be found during scheduled inservice steam generator tubes examinations. Plugging will be required for all tubes with imperfections exceeding the plugging limit as defined in Surveillance Requirement 4.4.5.4.a. Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that could affect tube wall integrity. Additionally, upgraded testing methods will be evaluated and appropriately implemented as better methods are developed and validated for commercial use.

Whenever the results of any steam generator tubing inservice inspection fall into Category C-3 certain results will be reported in a Special Report to the Commission pursuant to Specification 6.9.2 as denoted by Table 4.2-2. Notification of the Commission will be made prior to resumption of plant operation. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

GDC 30 of Appendix A to 10 CFR 50 requires means for detecting and, to the extent practical, identifying the location of the source of RCS LEAKAGE. The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems" May 1973. Likewise, the actions implemented upon inoperability of a required leak detection instrument are sufficient in maintaining the diversity and accuracy needed to effectively detect RCS leaks.

Industry practice has shown that water flow changes of 0.5 gpm to 1.0 gpm can readily be detected in contained volumes by monitoring changes in water level, in flow rate, or in the operating frequency of a pump. In addition, the reactor coolant contains radioactivity that, when released to the containment, can be detected by radiation monitoring instrumentation. Instrument sensitivities of 10 - 10^6 cpm for particulate and gaseous monitoring are practical for these leakage detection systems.

3/4.4.6.2 REACTOR COOLANT SYSTEM LEAKAGE

Industry experience has shown that while a limited amount of leakage is expected from the RCS, the unidentified portion of this leakage can be reduced to a threshold value of less than 1 GPM. This threshold value is sufficiently low to ensure early detection of additional leakage.

The 10 GPM IDENTIFIED LEAKAGE limitation provides allowances for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the leakage detection systems.

The Surveillance Requirements for RCS Pressure Isolation Valves provide added assurance of valve integrity thereby reducing the probability of gross valve failure and consequent intersystem LOCA. Leakage from the RCS Pressure Isolation Valves is IDENTIFIED LEAKAGE and will be considered as a portion of the allowed limit.