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Waterford 3

W3F1-2004-0028

May 7, 2004

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

SUBJECT: License Amendment Request NPF-38-254
Reactor Coolant System Leakage Detection
Waterford Steam Electric Station, Unit 3
Docket No. 50-382
License No. NPF-38

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests the following amendment for Waterford Steam Electric Station, Unit 3 (Waterford 3). The proposed changes will revise the Waterford 3 Technical Specifications (TS) to clarify the actions of TS 3.4.5.1, Reactor Coolant System (RCS) Leakage; some of the surveillance requirements (SR) of TS 3.4.5.2, RCS Operational Leakage; and delete duplication in TS 3.3.3.1, Radiation Monitoring Instrumentation. The proposed change is based on NUREG-1432, "Standard Technical Specifications Combustion Engineering Plants," Revision 2, dated April 30, 2001. Also, the proposed change will delete the containment atmosphere gaseous radioactivity monitoring system from the TS because this monitor does not meet the requirements of Regulatory Guide 1.45, Revision 0, dated May 1973, "Reactor Coolant Pressure Boundary Leakage Detection Systems" (Regulatory Guide 1.45) and 10 CFR 50 Appendix A, General Design Criteria (GDC) 30, "Quality of Reactor Coolant System Pressure Boundary."

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and it has been determined that this change involves no significant hazards consideration. The bases for these determinations are included in the attached submittal.

The proposed change does not include any new commitments.

Currently, Waterford 3 is in Technical Specification 3.3.3.1 Action Statements for the containment atmosphere gaseous radioactivity monitor, because the requirements of Regulatory Guide 1.45 are not being met. Therefore, Entergy requests approval of the proposed amendment by November 15, 2004. Once approved, the amendment shall be implemented within 60 days. Although this request is neither exigent nor emergency, your prompt review is requested.

A001

If you have any questions or require additional information, please contact Charles DeDeaux at 504-739-6531.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 7, 2004.

Sincerely,

A handwritten signature in black ink, appearing to read "J. E. Venable", with a long horizontal flourish extending to the right.

J. E. Venable
Vice President, Operations
Waterford Steam Electric Station, Unit 3

JEV/CED/cbh

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Proposed Technical Specification Changes (mark-up)
3. Changes to Technical Specification Bases Pages – For Information Only

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Attachment 1 To

W3F1-2004-0028

Analysis of Proposed Technical Specification Change

1.0 DESCRIPTION

This letter is a request to amend Operating License NPF-38 for Waterford Steam Electric Station, Unit 3 (Waterford 3). The proposed changes will revise the Waterford 3 Technical Specifications (TS) to clarify the actions of TS 3.4.5.1, "Reactor Coolant System Leakage Detection Systems," the surveillance requirements (SR) of TS 3.4.5.2, "Reactor Coolant System Operational Leakage," and delete duplication in TS 3.3.3.1, "Radiation Monitoring Instrumentation." The proposed changes are based on NUREG-1432, "Standard Technical Specifications Combustion Engineering Plants," Revision 2, dated April 30, 2001 (STS). Also, the proposed changes will ensure Waterford 3's continued compliance with Regulatory Guide 1.45, Revision 0, dated May 1973, "Reactor Coolant Pressure Boundary Leakage Detection Systems," (Regulatory Guide 1.45) and 10 CFR 50 Appendix A, General Design Criteria (GDC) 30, "Quality of Reactor Coolant System Pressure Boundary."

2.0 PROPOSED CHANGE

- The requirements for Reactor Coolant System (RCS) leakage detection process radiation monitors will be deleted from TS 3.3.3.1. This change involves:
 1. Deleting table entries 2.a.1 and 2.a.2 from Table 3.3-6 for the Containment Atmosphere Gaseous Activity RCS Leakage Detection Process Monitor and the Containment Atmosphere Particulate Activity RCS Leakage Detection Process Monitor. The measurement range for the particulate channel will be deleted from this table. The measurement range is currently located in the Updated Final Safety Analysis Report (UFSAR), Table 12.3-3. Other deleted information is redundant to that of Specification 3.4.5.1. The gaseous monitor will be deleted from TS.
 2. Deleting ACTION 23 of Table 3.3-6. With the deletion of the containment airborne radiation monitors, this ACTION is no longer referenced in the table and is not necessary.
 3. Deleting table entries 2.a.1 and 2.a.2 from Table 4.3-3. The containment atmosphere particulate radioactivity monitor SRs are being consolidated with the current SRs in TS 3.4.5.1 and the containment atmosphere gaseous radioactivity monitors SRs are being deleted from TS.
- The Limiting Condition for Operation (LCO), ACTIONs, and SRs associated with Specification 3/4.4.5.1 will be changed to be similar to the requirements of the STS. These changes involve:
 1. The title and LCO will be revised to refer to instrumentation rather than systems.
 2. LCO item "a" will be revised to add "One" to the beginning of the sentence. The LCO will read "One containment atmosphere particulate radioactivity monitoring system."
 3. LCO item "b" will be revised to delete reference to "level and flow," to clarify the type of monitor by adding "(weir)," and to add "One" to the beginning of the sentence. The LCO will read "One containment sump monitor (weir)."

4. LCO item "c" will be revised to delete the requirement for the gaseous radioactivity monitor. In addition, the current requirement to have the containment air cooler condensate flow switches on at least three coolers will be revised to require only one containment fan cooler (CFC) condensate flow switch. This change is consistent with the STS. A change is also proposed to revise the noun name of "air cooler" to "fan cooler."
 5. The current Action will be replaced with multiple Actions that address single and multiple leakage detection instrumentation inoperability. The changes for the single instrument inoperability are consistent with the STS. The change for multiple instrument inoperability is for any two of three monitors being inoperable and requires one to be restored to operable status in 30 days. This is different than the STS.
 6. An exclusion from TS 3.0.4 will be included to provide further consistency with the STS.
 7. An ACTION statement will be added, consistent with the STS, to require the plant to initiate ACTION within 1 hour to be in MODE 3 within the next 6 hours and MODE 5 in the following 30 hours when all of the required leak detection monitors are inoperable.
 8. The SR frequency that will be deleted from Table 4.3-3 for the particulate channel will be incorporated into SR 4.4.5.1.a. The type of containment sump monitor, "(weir)," will be incorporated into SR 4.4.5.1.b and the name "Containment air cooler" will be changed to "Containment fan cooler," and "switches" will be changed to "switch" in SR 4.4.5.1.c.
- TS 3.4.5.2 SRs 4.4.5.2.1.a, 4.4.5.2.1.b, 4.4.5.2.1.c and 4.4.5.2.1.e will be deleted and 4.4.5.2.1.d will be retained (performance of a reactor coolant system inventory balance once per 72 hours). A note will be added to 4.4.5.2.1.d (renumbered to 4.4.5.2.1) which will allow the SR to be delayed until 12 hours after steady state operation is reached. These changes are consistent with the STS.
 - The applicable bases will also be revised. Information will be added to aid the operator. A draft markup of the planned Bases changes is provided in Attachment 3 for information only.

In summary, TS 3.4.5.1, RCS Leakage Detection Systems, will be revised to be similar to the STS by reorganizing the instruments in the LCO, expanding the Actions, and revising the Surveillance Requirements. Technical Specification 3.3.3.1, Radiation Monitoring Instrumentation, will be revised to delete duplication with the Leakage Detection Instrumentation requirements for the containment atmosphere particulate radioactivity monitor. TS 3.4.5.2, RCS Operational Leakage, SRs will be revised for clarification.

3.0 BACKGROUND

General Design Criteria 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 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.

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 following combination of instruments provides the diverse monitoring necessary to afford appropriate leak detection:

- Containment Atmosphere Particulate Radioactivity Monitor
- Containment Sump Monitor
- CFC Condensate Flow Switch

The containment atmosphere particulate radioactivity monitor is designed to provide continuous indication in the main control room of the particulate levels inside the containment. Radioactivity in the containment atmosphere indicates the presence of fission products due to an RCS leak or leakage of a contaminated secondary fluid system. High radiation level and alert status alarms are provided in the main control room.

The collection of water in the reactor cavity containment sump indicates possible reactor coolant leakage. Reactor building floor drains and containment fan cooling unit condensate drains are routed to the sump so that water does not accumulate in areas of the containment other than the sump. Equipment and floor drains are routed through a single eight inch diameter pipe to a measurement tank and from there to the sump. A triangular notch weir is machined on the outlet side of the measurement tank. The flow through the weir causes the level of the measurement tank to correspond to the flow of water into the tank. The tank is fitted with a level transmitter. The measuring tank level is a function of the flow into the tank. The level transmitter sends a signal proportional to the tank level to the main control room for input to the plant monitoring computer and annunciator. The alarm is set at one gpm leakage flow above normal as required by Regulatory Guide 1.45.

The CFC flow switches detect flow in the CFC drains that are piped to the containment sump measuring tank inlet pipe. The presence of flow in the lines is detected by six flow switches which are monitored by the plant monitoring computer (PMC). CFC A and C have two switches each and CFC B and D have one switch each. Possible sources of flow detected by the CFC flow switches are normal condensation from the containment air, steam pipe rupture, and component cooling water coil rupture inside of the fan cooler enclosure.

Industry experience has shown that water flow changes of 0.5 gpm to 1.0 gpm can be detected in the containment sump by monitoring changes in water level or flow rate. The containment sump monitor and a CFC condensate flow switch are instrumented to alarm for

increases of ≤ 1.0 gpm in the normal flow or fill rates. Regulatory Guide 1.45 establishes the position that acceptable leak detection instrumentation should be capable of detecting a leak of 1.0 gpm in < 1 hour.

The reactor coolant contains radioactivity that, when released to the containment, can be detected by radioactivity 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, because of their sensitivity and rapid response to RCS leakage, the particulate radioactivity monitoring instrumentation also provide an acceptable means of leak detection.

The combination of the above means of detection provides 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 Regulatory Guide 1.45. Further, it 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."

On January 27, 2004, Waterford 3 Condition Report, CR-WF3-2004-0249 was initiated because the alarm setpoints for the containment particulate, iodine and gaseous (PIG) airborne radioactivity monitor were based on average RCS activity concentrations with an assumed fuel failure rate of 0.12% as listed in the UFSAR (UFSAR Table 11.1-3). Due to the relatively low percentage of fuel failures, the radioactivity concentrations listed in the UFSAR are higher by several orders of magnitude than have been observed during a typical operating cycle. Therefore, although the setpoints for the containment atmosphere gaseous and particulate radioactivity monitors were in compliance with the licensing basis of record, a leak of 1.0 gpm may not be detected within 1 hour as required by Regulatory Guide 1.45 based on current RCS activity.

The radioactivity monitors were subsequently declared inoperable and the Actions of TS 3.3.3.1 and TS 3.4.5.1 were entered. Waterford 3 was placed in a situation where a loss of another leakage detection instrument or the PMC would require a plant shutdown per the Actions of TS 3.4.5.1. Evaluations were performed on the containment atmosphere gaseous and particulate monitors to determine if the monitors could meet the requirements of Regulatory Guide 1.45. The results showed that the particulate monitor meets the requirement of Regulatory Guide 1.45 to detect a 1.0 gpm leakage in 1 hour, but the gaseous monitor does not. Because the RCS leakage detection instrumentation is non-conforming (containment gaseous radiation monitor does not meet the requirements of Regulatory Guide 1.45); it was decided to submit an amendment request to restore the Waterford 3 leakage detection instrumentation into compliance with Regulatory Guide 1.45. This is being accomplished by proposing to delete the containment airborne gaseous radiation monitor from TS and by adopting the requirements of the STS for the RCS leakage detection LCO and Actions, and adopting the SRs of the RCS operational leakage specification. This change could also prevent cycling Waterford 3 through the transient of a plant shutdown.

4.0 TECHNICAL ANALYSIS

The proposed changes to TS 3.3.3.1, TS 3.4.5.1, and TS 3.4.5.2 encompass three administrative changes, two more restrictive changes, and seven less restrictive changes. These changes are listed with their respective categories below along with the technical justification for the change. With few exceptions, these changes are consistent with the STS.

1. TS 3.3.3.1, Table 3.3-6 and 4.3-3 and TS 3.4.5.1 LCO c – delete entry 2.a.1 for containment atmosphere gaseous radioactivity monitor from each table and from TS 3.4.5.1 LCO c. **More Restrictive**

The deletion of the containment atmosphere gaseous radioactivity monitor from TS 3.3.3.1 and TS 3.4.5.1, and not including it with another RCS leakage detection instrument, is considered a More Restrictive change. Retaining the gaseous radioactivity monitor in TS 3.4.5.1 would provide flexibility by allowing either the particulate or gaseous monitor to be operable. However, Waterford 3 calculations show that the gaseous radioactivity monitor cannot detect a 1.0 gpm leak within 1 hour. Since the gaseous monitor is in TS only to support the RCS leakage detection instrumentation, deleting the gaseous monitor from TS will not decrease the effectiveness of the RCS leakage detection instrumentation because the gaseous monitor cannot detect a 1.0 gpm leak within 1 hour.

Furthermore, the deletion of the containment atmosphere gaseous radioactivity monitor is acceptable, because this requirement does not meet any of the four criterion for retention specified in 10 CFR 50.36 (c)(2)(ii)(A), (B), (C), and (D) as specified below.

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

Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," stipulates that leakage detection instrumentation should be adequate to detect a leakage rate or its equivalent of 1.0 gpm in < 1 hour. The Waterford 3 containment atmosphere gaseous radioactivity monitor does not meet this requirement; therefore, it is no longer being credited as one of the leakage detection instruments in TS 3.4.5.1.

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

The containment atmosphere gaseous radioactivity monitor is not a process variable, design feature, or operating restriction. It is installed instrumentation that is being proposed to be deleted from TS because it does not meet the requirements of Regulatory Guide 1.45 for RCS leakage detection instrumentation.

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

The containment atmosphere gaseous radioactivity monitor is not part of the primary success path that functions or actuates to mitigate a design basis accident or transient. It is installed instrumentation proposed for deletion from TS because it does not meet the requirements of Regulatory Guide 1.45 for RCS leakage detection instrumentation.

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

The containment atmosphere gaseous radioactivity monitor is not credited in the Waterford 3 probabilistic risk assessment to be significant to the public health and safety. This instrument is one of several instruments currently used to detect RCS leakage; however, it does not meet the requirement of Regulatory Guide 1.45 for RCS leakage detection instrumentation and is being proposed for deletion from TS.

2. TS 3.3.3.1, Table 3.3-6 and 4.3.3 – delete entry 2.a.2 for containment atmosphere particulate radioactivity monitor from each table. The requirement for this monitor will be retained in TS 3.4.5.1. The frequency for the SRs will be relocated to TS 3.4.5.1 SRs. TS 3.4.5.1 Title/LCO – word changes (adding “Instrumentation” and adding “one” to LCO items ‘a’, ‘b’, and ‘c’) are consistent with the STS. **Administrative**

The containment particulate monitor requirements of TS 3.3.3.1, Table 3.3-6, Radiation Monitoring Instrumentation, are deleted from the table. The minimum channels operable, applicable modes, and action for the particulate channel that will be deleted from Table 3.3-6 are all bounded by the proposed requirements of TS 3.4.5.1. The Actions, for the deleted radiation monitors, refer to the required actions of TS 3.4.5.1. These administrative changes allow the requirements for the particulate radioactivity monitor to be located in one TS. This will remove a human error trap by allowing plant operators to enter only one TS Action if the radioactivity monitor is inoperable.

Deleting the containment radioactivity channels from Table 4.3-3 and relocating the SR frequencies to TS 3.4.5.1 is an administrative change to consolidate all the SRs into one TS. Also, administrative wording changes will be made to TS 3.4.5.1 to make it consistent with the STS. The above administrative changes will not have any impact on the effectiveness of the leakage detection instrumentation to detect leaks.

3. TS 3.3.3.1 Table 3.3-6 – delete the measurement range for entry 2.a.2 for the containment atmosphere particulate radioactivity monitor. The measurement range will be retained in the UFSAR. **Less Restrictive**

The measurement range for the particulate radioactivity monitor currently located in the TS is being deleted. This level of detail is not required to be located in TS. This information is more appropriate for the UFSAR and is currently located in the UFSAR. Since this information is located in a licensing basis document, changes are subject to review via the 10 CFR 50.59 program. The 10 CFR 50.59 program is sufficient to ensure proper controls of this information are maintained. Therefore, this change will not have an adverse impact on the effectiveness of the leakage detection instrumentation to detect RCS leakage.

4. TS 3.4.5.1 LCO – TS 3.0.4 exception was added. **Less Restrictive**

The proposed addition of the TS 3.0.4 exception will allow the plant to change Modes while not in compliance with TS 3.4.5.1. Allowing the plant to change Modes while one or two of the leakage detection instrumentation are inoperable will not have an adverse affect to the plant's ability to detect RCS leakage. One method of leakage detection will remain operable, and an RCS inventory balance is required to be performed or grab samples of the containment atmosphere are required to be analyzed. Also, other parameters (i.e., containment temperature, containment pressure, etc.) required by the TS are available that could provide information to indicate an RCS leak. This change is consistent with the STS.

5. TS 3.4.5.1 LCO Item b – LCO item "b" will be revised to delete reference to "level and flow," and add the type of containment sump monitor in parenthesis to the end sentence. The LCO will read "One containment sump monitor (weir)."

Administrative

Technical Specification 3.4.5.1 LCO Item b for the containment sump monitor will be reworded to be consistent with the STS. Wording changes that do not change the intent are considered administrative.

6. TS 3.4.5.1 LCO Item c – allow one CFC condensate flow switch to satisfy the LCO versus flow switches on three CFCs. **Less Restrictive**

The proposed revision to TS 3.4.5.1 LCO Item 'c' will require only one CFC flow switch to be operable versus requiring flow switches on at least three CFCs. This change will align TS 3.4.5.1 more closely with TS 3.6.2.2. Technical Specification 3.6.2.2, Containment Cooling System, requires two independent trains of containment cooling to be operable with one fan cooler operable in each train. Therefore only two CFCs are required to be operable; however, none are required to be operating. The containment flow switches are only effective when they are associated with an operating CFC. Although Waterford 3 normally operates with CFCs operating to maintain containment temperature there is no requirement to do so. Thus, the proposed change will require at least one CFC to be operating at all times, while allowing Waterford 3 the flexibility afforded by TS 3.6.2.2. This change will not adversely affect the ability of the RCS leakage detection instrumentation to detect RCS leakage. This change is consistent with the STS.

7. TS 3.4.5.1 Actions

- a. Containment Sump monitor inoperable – added requirement to perform an RCS inventory balance once per 24 hours. A note will be added to all Actions requiring an RCS inventory balance which delays the RCS Inventory Balance for up to 12 hours to establish steady state conditions. **More Restrictive**

The proposed change to TS 3.4.5.1 Actions, adds a requirement to perform an RCS inventory balance once per 24 hours to the requirement to restore the containment sump monitor to operable status within 30 days. Adding the requirement to perform an RCS inventory balance is appropriate because it provides a compensatory method that is adequate to detect leakage. The RCS inventory balance is also the most effective method of quantifying RCS leakage. A note was also added which allows 12 hours to establish steady state operation prior to performing the RCS inventory balance. This change will not adversely affect the RCS leakage detection capability. This change is consistent with the STS.

- b. Containment atmosphere particulate radioactivity monitor inoperable – allows an RCS inventory balance or a grab sample to be performed versus just taking a grab sample. A requirement was also added which allows verifying one CFC flow switch is operable within 30 days if the radioactivity monitor cannot be restored to operable status provided the RCS inventory balance or the grab samples are obtained every 24 hours. **Less Restrictive**

The proposed change to TS 3.4.5.1 Actions, when the containment atmosphere particulate radioactivity monitor is inoperable, allows an RCS inventory balance or a grab sample to be performed versus just taking a grab sample. A requirement was also added which allows verifying one CFC flow switch is operable within 30 days if the radioactivity monitor cannot be restored to operable status provided the RCS inventory balance or the grab samples are obtained every 24 hours. The added requirement which allows the option of performing either an RCS inventory balance or grab samples is appropriate, because the RCS inventory balance is at least as effective as taking and analyzing containment atmosphere grab samples. The requirement to allow the option to verify the CFC flow switch is operable within 30 days versus restoring the particulate monitor to operable status within 30 days is appropriate because the RCS inventory balance or analysis of containment grab samples are required once per 24 hours. Either the RCS inventory balance or analysis of the grab sample will provide appropriate leakage detection information. This change will not have an adverse impact on the leakage detection instrumentation capability to detect RCS leakage. This change is consistent with STS.

- c. Containment Fan Cooler Flow Switch inoperable – requires either a channel check to be performed on the containment atmosphere particulate radioactivity monitor once per 8 hours or an inventory balance to be performed once per 24 hours. There are no other requirements in the Action. **Less Restrictive**

The proposed change to TS 3.4.5.1 Actions, when the CFC flow switch is inoperable, deletes the Action to restore the CFC flow switch to operable status within 30 days and will require either a channel check to be performed on the containment atmosphere particulate radioactivity monitor once per 8 hours or an RCS inventory balance to be performed once per 24 hours. Either of these actions is appropriate to adequately detect RCS leakage. This change will not have an adverse impact on the leakage detection instrumentation capability to detect RCS leakage. This change is consistent with STS.

- d. Two of the three RCS leak detection instrumentation inoperable – allows 30 days to restore one to operable status versus an immediate shutdown required by current Actions. **Less Restrictive**

The proposed change to TS 3.4.5.1 Actions adds an Action to allow any two of the three RCS leakage detection instrumentation to be inoperable with an allowed outage time to restore one instrument to operable status within 30 days. Currently, a shutdown is required if more than one RCS leakage detection instrumentation is inoperable. Therefore, allowing a 30 day allowed outage time to restore one monitor to operable status is a less restrictive change. This change is consistent with the STS when both the containment atmosphere particulate radioactivity monitor and the CFC flow switch are inoperable. However, while there is no longer diversity in the RCS leakage detection instrumentation when any two monitors are inoperable, other diverse means of leakage detection remain operable to adequately detect RCS leakage (the one remaining operable RCS leakage detection instrumentation and the required RCS inventory balance performed once per 24 hours or analyzing containment atmosphere grab samples once per 24 hours). Other TS also require the containment temperature and pressure to be monitored periodically. Containment temperature is required to be verified once per 24 hours and containment pressure is required to be monitored once per 12 hours. This change will not have an adverse impact on the ability of the plant to detect RCS leakage.

- e. Addition of an Action which specifies to initiate ACTION within 1 hour to be in MODE 3 within the next 6 hours and MODE 5 in the following 30 hours when all RCS leakage detection instrumentation are inoperable - adding this Action, which is consistent with TS 3.0.3, versus an implied entry in TS 3.0.3, when there is no specific action, will not adversely affect ability of the RCS leakage detection instrumentation to detect RCS leakage. **Administrative**
8. TS 3.4.5.2 SRs – SR 4.4.5.2.1.a, b, c, and e will be deleted. Performance of an RCS inventory balance once per 72 hours will be the only SR retained. A note will be added which allows 12 hours to establish steady state operation prior to performing the RCS inventory balance. The SRs being deleted are listed below. **Less Restrictive**

- Commencing an RCS inventory balance within 1 hour to determine the leak rate when RCS leakage is alarmed and confirmed in a flow path with no flow rate indication.
- Monitoring the containment atmosphere gaseous and particulate radioactivity monitor at least once per 12 hours.
- Monitoring the containment sump inventory and discharge at least once per 12 hours.
- Monitoring the reactor head flange leakoff system at least once per 24 hours.

RCS inventory balances are required to be performed once per 72 hours and if leakage is detected by any means a Condition Report will be initiated and appropriate actions (i.e., identifying the source, quantifying leakage, etc.) will be initiated. The requirements to monitor containment radioactivity, containment sump inventory and discharge once per 12 hours, and the reactor head leakoff system once per 24 hours is redundant to the continuous monitoring of these parameters which are alarmed to alert the control room operators when certain setpoints are reached. Also, performance of an RCS inventory balance (which is required to be performed) is the most accurate means of detecting and quantifying RCS leakage. Deletion of the above SRs will not have an adverse impact on the ability of leakage detection instrumentation to detect RCS leakage.

The added note, which allows the performance of the RCS inventory balance to be delayed until 12 hours after steady state operation has been established, ensures the RCS inventory balance is representative of the actual RCS leakage. This allows time for temperature, power level, and pressurizer and makeup tank levels to stabilize. The addition of the note is consistent with the STS.

The aforementioned changes provide the flexibility and consistency needed for the RCS leak detection instrumentation while maintaining the diversity, leak rate, and timing criteria of Regulatory Guide 1.45. The provision of an allowed outage time and contingency action for an inoperable containment sump monitoring system or containment air cooler condensate flow switch reduces the possibility of a shutdown and provides for 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 of 1.0 gpm within 1 hour in accordance with Regulatory Guide 1.45 is maintained. The alternative of grab sample analysis (i.e., performance of an RCS water inventory balance) also 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 TS. These changes are consistent with the philosophies of the STS.

5.0 REGULATORY ANALYSIS

5.1 Applicable Regulatory Requirements/Criteria

The proposed changes have been evaluated to determine whether applicable regulations and requirements continue to be met. This change does not affect the Waterford 3 ability to meet

the requirement of 10 CFR 50 Appendix A, General Design Criteria (GDC) 30 and Regulatory Guide 1.45, Revision 0, dated May 1973, (Regulatory Guide 1.45) requirements for detecting RCS leakage.

Entergy has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the Technical Specifications (TS), and do not affect conformance with any GDC differently than described in the Updated Final Safety Analysis Report (UFSAR).

5.2 No Significant Hazards Consideration

Entergy Operations, Inc. is proposing that the Waterford Steam Electric Station, Unit 3 (Waterford 3) Operating License be amended to provide an acceptable restoration period and contingency action for periods when the containment airborne particulate radioactivity monitor, containment sump monitoring system and/or the containment air cooler condensate flow switch are inoperable. The proposal also consolidates the operability requirements for Reactor Coolant System (RCS) leak detection into one specification and deletes redundant requirements from the TS.

Currently, no specific actions exist during a period when any two of the three RCS leakage detection instrumentation are inoperable. The changes herein will add actions and contingencies similar to the NUREG-1432, "Standard Technical Specifications Combustion Engineering Plants," Revision 2, dated April 30, 2001 (STS). The STS allows a 30 day allowed outage time when two of three monitors are inoperable and requires contingencies when in the AOT (i.e., performance of a daily RCS water inventory balance or a daily channel check of the required containment atmosphere radioactivity monitor). The Surveillance Requirements (SRs) were revised to consolidate and to remove redundancy between TS SRs. Administratively, requirements associated with RCS leak detection instruments and components have been relocated from various specifications and placed in the RCS Leak Detection specification. A note was added to delete the applicability of TS 3.0.4 from TS 3.4.5.1 since other leak detection methods remain available during periods of inoperability of the identified leak detection components.

The proposed changes are consistent with the philosophies used in the STS and with Regulatory Guide 1.45 and meet the requirements of 10 CFR 50 Appendix A, GDC 30.

Entergy Operations, Inc. has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed revisions do not involve any physical change to plant design. The less restrictive changes proposed in this amendment request include relocation of information to the UFSAR, addition of a TS 3.0.4 exception, utilization of the diversity and redundancy of the Waterford 3 leakage detection instrumentation, allowing

diversity in the contingency actions, deletion of SRs, and addition of an allowed outage time when two of three required leakage detection instrumentation is inoperable. The less restrictive changes will not affect the capability of Waterford 3 to detect RCS leakage. At least one RCS leakage detection instrumentation is always required to remain operable, and other leakage detection indication, while not credited specifically for RCS leakage detection, is still available and required to be operable per other TS requirements (i.e., Containment Temperature and Containment Pressure). Also contingency actions are required (i.e., RCS Inventory Balance, containment grab samples, flow switch verification) when any of the RCS leakage detection instrumentation is inoperable. Performance of the RCS inventory balance is the most accurate method of determining and quantifying leakage. The RCS inventory balance is being added as a contingency and replacement for monitoring instrumentation that has continuous indication and alarms in the control room.

The more restrictive changes proposed by this revision do not adversely affect the capability of Waterford 3 RCS leakage detection instrumentation to detect RCS leakage. The deletion of the containment atmosphere gaseous radioactivity monitor is considered a more restrictive change. This monitor does not meet the leakage detection requirements of Regulatory Guide 1.45 and does not meet the requirements for retention specified in 10 CFR 50.36. Deletion of this monitor will reduce the diversity of the Waterford 3 instrumentation for monitoring the containment atmosphere and require the plant to enter an Action statement when the containment atmosphere particulate monitor is inoperable. Requiring performance of an RCS inventory balance when the containment sump monitor is inoperable provides contingency actions when the plant is in a degraded RCS leakage detection condition.

The administrative changes proposed by this revision do not adversely affect the capability of Waterford 3 RCS leakage detection instrumentation to detect RCS leakage. Relocating the requirements associated with the RCS Leak Detection System from various TS to Specification 3.4.5.1 and adding requirement to shutdown when all required RCS leakage detection instrumentation are inoperable are administrative in nature. The relocation of information from one TS to another consolidates information and causes less confusion in the control room by having all requirements for the leakage detection instrumentation in one TS. The addition of a specific action to shutdown when all three leakage detection instrumentation are inoperable versus an implied requirement to enter TS 3.0.3 is being performed to be similar to the STS.

None of the above less restrictive, more restrictive, or administrative changes affects the accident analyses. 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. These changes also do not affect the mitigation capability of any accident previously evaluated. The consequences of an accident previously evaluated are not affected since the mitigation of previously evaluated accidents is not affected and leak rate information will remain available to station personnel.

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

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The aforementioned revisions do not involve any physical change to plant design. None of the proposed changes 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 can not cause an accident. Likewise, detecting a RCS leak, while in its beginning 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 does not result due to the proposed changes of this submittal.

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

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The aforementioned revisions do not involve any physical change to plant design. The proposed changes do not adversely affect the ability of the RCS leakage detection system to detect RCS leakage. The ability of the RCS leakage detection instrumentation to detect leakage within the requirements of Regulatory Guide 1.45 is actually improved. The containment atmosphere gaseous monitor is being deleted from TS, because, it does not meet the requirements of Regulatory Guide 1.45 to detect a 1.0 gpm RCS leakage within 1 hour. Extending the AOT when two of three leakage detection systems is inoperable does not decrease the margin of safety because one instrument remains operable, other instrumentation capable of indicating RCS leakage is available, and an RCS inventory balance is required to be performed on an increased frequency. The RCS 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 and capable of prompt leakage detection 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.

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

Based on the above, Entergy concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.3 Environmental Considerations

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

Attachment 2 To

W3F1-2004-0028

Proposed Technical Specification Changes (mark-up)

TABLE 3.3-6
RADIATION MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABLE MODES</u>	<u>ALARM/TRIP SETPOINT</u>	<u>MEASUREMENT RANGE</u>	<u>ACTION</u>
1. AREA MONITORS					
a. Deleted					
b. Containment - Purge & Exhaust Isolation	1/train	1, 2, 3, 4 & **	40 mR/h or ≤ 2x background whichever is Higher	20 - 5x10 ⁵ mR/h	25
2. PROCESS MONITORS					
a. Containment Atmosphere					
1) Gaseous Activity					
RCS Leakage Detection	1	1, 2, 3, & 4	Not Applicable	10 ⁻⁶ - 10 ⁻¹ μCi/cc	23
2) Particulate Activity					
RCS Leakage Detection	1	1, 2, 3, & 4	Not Applicable	10 ⁻¹¹ - 10 ⁻⁶ μCi/cc	23
b. Control Room Intake Monitors	1/intake	ALL MODES & ***	≤ 5.45x10 ⁻⁸ μCi/cc	10 ⁻⁸ - 10 ⁻² μCi/cc	26
c. Steam Generator Blowdown Monitor	1	1, 2, 3, & 4	≤ 10 ⁻³ μCi/cc	10 ⁻⁶ - 10 ⁻¹ μCi/cc	28
d. Component Cooling Water Monitors A&B	1/line	ALL MODES	≤ 10 ⁻⁴ μCi/cc	10 ⁻⁷ - 10 ⁻² μCi/cc	28
e. Component Cooling Water Monitor A/B	1	1, 2, 3, & 4	≤ 10 ⁻⁴ μCi/cc	10 ⁻⁷ - 10 ⁻² μCi/cc	28

DELETED

*Deleted

**During CORE ALTERATIONS or movement of irradiated fuel within the containment.

***During movement of irradiated fuel.

TABLE 3.3-6 (Continued)

ACTION STATEMENTS

DELETED

- ACTION 23 -** ~~With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.4.5.1.~~
- ACTION 24 -** DELETED
- ACTION 25 -** With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.9.9.
- ACTION 26 -** With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, within 1 hour initiate and maintain operation of the control room emergency ventilation system in the recirculation mode of operation.
- ACTION 27 -** With the number of OPERABLE channels less than required by the Minimum Channels OPERABLE requirement, either restore the inoperable Channel(s) to OPERABLE status within 72 hours, or:
1. Initiate the preplanned alternate method of monitoring the appropriate parameter(s), and
 2. If the monitor is not restored to OPERABLE status within 7 days after the failure, 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 28 -** With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirements, operation of the plant may continue for up to 30 days provided grab samples are taken once per 8 hours and these samples are analyzed for gross activity within 24 hours.
- If the monitor is not restored to OPERABLE status within 30 days after the failure, continue sampling and prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within 14 days outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

TABLE 4.3-3

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES FOR WHICH SURVEILLANCE IS REQUIRED</u>
1. AREA MONITORS				
a. Deleted				
b. Containment - Purge & Exhaust Isolation	S	R	Q	1, 2, 3, 4 & **
2. PROCESS MONITORS				
a. Containment Atmosphere				
1) Gaseous Activity - RCS Leakage Detection	S	R	Q	1, 2, 3, & 4
2) Particulate Activity - RCS Leakage Detection	S	R	Q	1, 2, 3, & 4
b. Control Room Intake Monitors	S	R	Q	ALL MODES & ***
c. Steam Generator Blowdown	S	R	Q	1, 2, 3, & 4
d. Component Cooling Water Monitors A&B	S	R	Q	ALL MODES
e. Component Cooling Water Monitor A/B	S	R	Q	1, 2, 3, & 4

DELETED

*Deleted

**During CORE ALTERATIONS or movement of irradiated fuel within the containment.

***During movement of irradiated fuel.

REACTOR COOLANT SYSTEM

3/4.4.5 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

Instrumentation

LIMITING CONDITION FOR OPERATION

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

- a. ~~A~~ containment atmosphere particulate radioactivity monitoring system,
- One b. ~~The~~ containment sump level and flow monitoring system, and (Weir)
- c. ~~Either the~~ (Fan) containment air cooler condensate flow switches ~~on at least three coolers or a containment atmosphere gaseous radioactivity monitoring system.~~

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

ACTION:

INSERT ACTION

With only two of the above required leakage detection systems OPERABLE, operation may continue for up to 30 days provided grab samples of the containment atmosphere are obtained and analyzed at least once per 24 hours when the required gaseous and/or particulate radioactivity monitoring system is inoperable; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.5.1 The leakage detection systems shall be demonstrated OPERABLE by:

- a. Containment atmosphere ~~(gaseous and particulate) monitoring system-performance of CHANNEL CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST, at the frequencies specified in Table 4.3.3,~~
 - b. Containment sump level and flow monitoring system - performance of CHANNEL CALIBRATION at least once per 18 months, (Weir)
 - c. Containment (Fan) air cooler condensate flow switches - performance of a CHANNEL FUNCTIONAL TEST at least once per 18 months.
- at least once per 92 days at least once per 12 hours at least once per 18 months

INSERT ACTION

(Page 1 of 2)

NOTE: TS 3.0.4 is not applicable.

- a. Required containment atmosphere particulate radioactivity monitor inoperable.

NOTE: SR 4.4.5.2.1 is not required until 12 hours after establishment of steady state operation.

Analyze grab samples of the containment atmosphere once per 24 hours or perform SR 4.4.5.2.1 once per 24 hours;

and

Restore required containment atmosphere particulate radioactivity monitor to OPERABLE status within 30 days or verify one containment fan cooler condensate flow switch is OPERABLE within 30 days;

or

Be in MODE 3 in 6 hours and MODE 5 in the following 30 hours.

- b. Required containment sump monitor inoperable.

NOTE: SR 4.4.5.2.1 is not required until 12 hours after establishment of steady state operation.

Perform SR 4.4.5.2.1 once per 24 hours and restore the containment sump monitor to OPERABLE status within 30 days;

or

Be in MODE 3 in 6 hours and MODE 5 in the following 30 hours.

- c. Required containment fan cooler condensate flow switch inoperable.

NOTE: SR 4.4.5.2.1 is not required until 12 hours after establishment of steady state operation.

Perform a CHANNEL CHECK on the containment atmosphere particulate radioactivity monitor once per 8 hours or perform SR 4.4.5.2.1 once per 24 hours;

or

Be in MODE 3 in 6 hours and MODE 5 in the following 30 hours.

INSERT ACTION

(Page 2 of 2)

- d. Two required RCS leakage detection instrumentation inoperable.

Restore one required RCS leakage detection instrumentation to OPERABLE status within 30 days or be in MODE 3 in 6 hours and MODE 5 in the following 30 hours.

- e. All required RCS leakage detection instrumentation inoperable.

Initiate ACTION within 1 hour to be in MODE 3 within the next 6 hours and MODE 5 in the following 30 hours.

REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

- 3.4.5.2 Reactor Coolant System leakage shall be limited to:
- a. No PRESSURE BOUNDARY LEAKAGE,
 - b. 1 gpm UNIDENTIFIED LEAKAGE,
 - c. 1 gpm total primary-to-secondary leakage through all steam generators and 720 gallons per day through any one steam generator,
 - d. 10 gpm IDENTIFIED LEAKAGE from the Reactor Coolant System, and
 - e. 1 gpm leakage at a Reactor Coolant System pressure of 2250 ± 20 psia from any Reactor Coolant System pressure isolation valve specified in Table 3.4-1.

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

ACTION:

- a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With any Reactor Coolant System leakage greater than any one of the limits, excluding PRESSURE BOUNDARY LEAKAGE and leakage from Reactor Coolant System pressure isolation valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- c. With any Reactor Coolant System pressure isolation valve leakage greater than the above limit, isolate the high pressure portion of the affected system from the low pressure portion within 4 hours by use of at least one closed manual or deactivated automatic valve, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.5.2.1 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by ~~the~~

- a. ~~Commencing an RCS inventory balance within 1 hour to determine the leak rate when RCS leakage is alarmed and confirmed in a flow path with no flow rate indication.~~
- b. ~~Monitoring the containment atmosphere gaseous and particulate radioactivity monitor at least once per 12 hours.~~
- c. ~~Monitoring the containment sump inventory and discharge at least once per 12 hours.~~

REACTOR COOLANT SYSTEM

*NOTE: Not required to be performed until
12 hours after establishment of steady
state operation.*

SURVEILLANCE REQUIREMENTS (Continued)

- d. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours.
- e. ~~Monitoring the reactor head flange leakoff system at least once per 24 hours.~~

4.4.5.2.2 Each Reactor Coolant System pressure isolation valve specified in Table 3.4-1, Section A and Section B, shall be demonstrated OPERABLE by verifying leakage to be within its limit:

- a. At least once per 18 months,
- b. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 7 days or more and if leakage testing has not been performed in the previous 9 months,
- c. Prior to returning the valve to service following maintenance, repair, or replacement work on the valve,
- d. Following valve actuation for valves in Section B due to automatic or manual action or flow through the valve:
 - 1. Within 24 hours by verifying valve closure, and
 - 2. Within 31 days by verifying leakage rate.

The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4.

4.4.5.2.3 Each Reactor Coolant System pressure isolation valve power-operated valve specified in Table 3.4-1, Section C, shall be demonstrated OPERABLE by verifying leakage to be within its limit:

- a. At least once per 18 months, and
- b. Prior to returning the valve to service following maintenance, repair, or replacement work on the valve.

The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4.

Attachment 3 To

W3F1-2004-0028

**Changes to Technical Specification Bases Pages
For Information Only**

3.4.5.1 BASES

Background

GDC 30 of Appendix A to 10 CFR 50 (Ref. 1) requires means for detecting and, to the extent practical, identifying the location of the source of RCS leakage. Regulatory Guide 1.45 (Ref. 2) describes acceptable methods for selecting leakage detection systems.

Leakage detection 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. Thus an early indication or warning signal is necessary to permit proper evaluation of all UNIDENTIFIED LEAKAGE.

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 or in flow rate. The containment sump used to collect UNIDENTIFIED LEAKAGE and the containment fan cooler (CFC) condensate flow switches are instrumented to alarm for increases of 0.5 gpm to 1.0 gpm in the normal flow rates. This sensitivity is acceptable for detecting increases in UNIDENTIFIED LEAKAGE.

The reactor coolant contains radioactivity that, when released to the containment, can be detected by radiation monitoring instrumentation. Reactor coolant 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. Radioactivity detection systems are included for monitoring particulate activities, because of their sensitivities and rapid responses to RCS leakage.

Air temperature and pressure monitoring methods may also be used to infer UNIDENTIFIED LEAKAGE to the containment. Containment temperature and pressure fluctuate slightly during plant operation, but arise above the normally indicated range of values may indicate RCS leakage into the containment. The relevance of temperature and pressure measurements is affected by containment free volume and, for temperature, detector location. Alarm signals from these instruments can be valuable in recognizing rapid and sizable leakage to the containment. Temperature and pressure monitors are not required by this LCO.

Applicable Safety Analyses

The need to evaluate the severity of an alarm or an indication is important to the operators, and the ability to compare and verify with indications from other systems is necessary. The system response times and sensitivities are described in the UFSAR (Ref. 3). Multiple instrument locations are utilized, if needed, to ensure the transport delay time of the leakage from its source to an instrument location yields an acceptable overall response time.

The safety significance of RCS leakage varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS leakage into the containment area are necessary. Quickly separating the IDENTIFIED LEAKAGE from the UNIDENTIFIED LEAKAGE

provides quantitative information to the operators, allowing them to take corrective action should leakage occur detrimental to the safety of the facility and the public.
RCS leakage detection instrumentation satisfies Criterion 1 of 10 CFR 50.36(c)(2)(ii).

Limiting Condition for Operation

One method of protecting against large RCS leakage derives from the ability of instruments to rapidly detect extremely small leaks. This LCO requires instruments of diverse monitoring principles to be OPERABLE to provide a high degree of confidence that extremely small leaks are detected in time to allow actions to place the plant in a safe condition when RCS leakage indicates possible RCPB degradation.

The LCO is satisfied when monitors of diverse measurement means are available. Thus, the containment sump monitor (weir), in combination with a particulate radioactivity monitor and a CFC condensate flow switch, provides an acceptable minimum.

The required CFC condensate flow switch is operable when it is associated with one of the two required OPERABLE CFCs that are in operation.

Applicability

Because of elevated RCS temperature and pressure in MODES 1, 2, 3, and 4, RCS leakage detection instrumentation is required to be OPERABLE.

In MODE 5 or 6, the temperature is $\leq 200^{\circ}\text{F}$ and pressure is maintained low or at atmospheric pressure. Since the temperatures and pressures are far lower than those for MODES 1, 2, 3, and 4, the likelihood of leakage and crack propagation is much smaller. Therefore, the requirements of this LCO are not applicable in MODES 5 and 6.

Actions

The Actions are modified by a Note that indicates the provisions of TS 3.0.4 are not applicable. As a result, a MODE change is allowed when the containment sump and required radiation monitor channels are inoperable. This allowance is provided because other instrumentation is available to monitor RCS leakage.

ACTION a

With the containment atmosphere particulate radioactivity monitoring instrumentation inoperable, alternative action is required. Either grab samples of the containment atmosphere must be taken and analyzed, or water inventory balances, in accordance with SR 4.4.5.2.1, must be performed to provide alternate periodic information. With a sample obtained and analyzed or an inventory balance performed every 24 hours, the reactor may be operated for up to 30 days to allow restoration of the radioactivity monitor. Alternatively, continued operation is allowed if the CFC flow switch is OPERABLE, provided grab samples are taken or water inventory balance performed every 24 hours.

The 24 hour interval provides periodic information that is adequate to detect leakage. A Note is added allowing that SR 4.4.5.2.1 is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown). The 12 hour allowance provides sufficient time to establish stable plant conditions. The 30 day allowed outage time recognizes at least one other form of leakage detection is available.

If ACTION 'a' cannot be met within the allowed outage time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within the following 30 hours. The allowed outage times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

ACTION b

If the containment sump monitor is inoperable, no other form of sampling can provide the equivalent information.

However, the containment atmosphere radioactivity monitor and the CFC flow switch will provide indication of changes in leakage. Together with the atmosphere monitor, the periodic surveillance for RCS water inventory balance, SR 4.4.5.2.1, must be performed at an increased frequency of 24 hours to provide information that is adequate to detect leakage. A Note is added allowing that SR 4.4.5.2.1 is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown). The 12 hour allowance provides sufficient time to establish stable plant conditions.

Restoration of the required sump monitor to OPERABLE status is necessary to regain the function in an allowed outage time of 30 days after the monitor's failure. This time is acceptable considering the remaining OPERABLE leakage detection instrumentation and the frequency and adequacy of the RCS water inventory balance required by the ACTION.

If ACTION 'b' cannot be met within the allowed outage time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within the following 30 hours. The allowed outage times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

ACTION c

If the required CFC condensate flow switch is inoperable, alternative action is again required. Either SR 4.4.5.1.a (containment atmosphere particulate radiation monitor CHANNEL CHECK) must be performed, or water inventory balances, in accordance with SR 4.4.5.2.1, must be performed to provide alternate periodic information. Provided a CHANNEL CHECK is performed every 8 hours or an inventory balance is performed every 24 hours, reactor operation may continue while awaiting restoration of the CFC condensate flow switch to OPERABLE status.

The 24 hour interval provides periodic information that is adequate to detect RCS leakage. A Note is added which states that SR 4.4.5.2.1 is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown). The 12 hour allowance provides sufficient time to establish stable plant conditions.

If ACTION c cannot be met within the allowed outage time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within the following 30 hours. The allowed outage times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

ACTION d

If two required RCS leakage detection instrumentation are inoperable, there is only one means of detecting RCS leakage. This ACTION does not provide the required diverse means of leakage detection. The ACTION is to restore either of the inoperable monitors to OPERABLE status within 30 days to regain the intended leakage detection diversity. The 30 day allowed outage time ensures that the plant will not be operated in a reduced configuration for a lengthy time period. Also 30 days is acceptable because contingency actions are required to be taken in ACTION a, b, or c depending on which monitors are inoperable.

For example, if the containment atmosphere particulate radioactivity monitor and the CFC condensate flow switch are declared inoperable, ACTION b, c, and d will have to be entered and contingency Actions performed per ACTION b and c. ACTION d requires one monitor to be restored within 30 days or to commence a plant shutdown. If prior to the 30 days, the containment atmosphere particulate radioactivity monitor is restored to OPERABLE status, ACTION b and d can be exited; however, the Actions of ACTION c are still applicable.

If ACTION d cannot be met within the allowed outage time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within the following 30 hours. The allowed outage times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

ACTION e

If all required monitors are inoperable, no automatic means of monitoring leakage are available and immediate plant shutdown is required. ACTION must be initiated within 1 hour to be in MODE 3 within the next 6 hours and MODE 5 in the following 30 hours. These times are consistent with TS 3.0.3.

Surveillance Requirements

SR 4.4.5.1.a - Channel Check

SR 4.4.5.1.a requires the performance of a CHANNEL CHECK of the required containment atmosphere particulate radioactivity monitor. The check gives reasonable confidence the channel is operating properly. The frequency of 12 hours is based on instrument reliability and is reasonable for detecting off normal conditions.

SR 4.4.5.1.a – Channel Functional Test

SR 4.4.5.1.a requires the performance of a CHANNEL FUNCTIONAL TEST of the required containment atmosphere particulate radioactivity monitor. The test ensures that the monitor can perform its function in the desired manner. The test verifies the alarm setpoint and relative accuracy of the instrument string. A successful test of the required contacts of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. The frequency of 92 days considers instrument reliability, and operating experience has shown it proper for detecting degradation.

SR 4.4.5.1.a, SR 4.4.5.1.b, and SR 4.4.5.1.c – Channel Calibration

These SRs require the performance of a CHANNEL CALIBRATION for each of the RCS leakage detection instrumentation channels. The calibration verifies the accuracy of the instrument string, including the instruments located inside containment. The frequency of 18 months is a typical refueling cycle and considers channel reliability. Operating experience has shown this frequency is acceptable.

References

1. 10 CFR 50, Appendix A, Section IV, GDC 30.
2. Regulatory Guide 1.45, Revision 0, dated May 1973.
3. UFSAR, Sections 5.2.5 and 12.3.