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W3F1-2006-0005

February 15, 2006

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

SUBJECT: License Amendment Request NPF-38-267
Reactor Coolant System Leakage Detection Instrumentation
Waterford Steam Electric Station, Unit 3
Docket No. 50-382
License No. NPF-38

REFERENCES:
1. Entergy Letter dated August 8, 2005, "Licensee Event Report 2005-002-00" (W3F1-2005-0061)
2. Entergy Letter dated January 13, 2006, "Licensee Event Report 2005-002-01" (W3F1-2006-0004)

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests an amendment to Waterford Steam Electric Station, Unit 3 (Waterford 3). Technical Specification (TS) 3.4.5.1, "Reactor Coolant System Leakage – Leakage Detection Instrumentation," regarding containment fan cooler condensate flow monitoring. The change will specifically credit the measurement tank weir flow instrumentation for the containment fan cooler condensate flow monitoring system in place of the one containment fan cooler condensate flow switch currently required by the TS limiting condition for operation.

As a result of investigations initiated following the issuance of Reference 1, it was determined that the containment fan cooler condensate flow switches were not capable of detecting a one gallon per minute (gpm) leak in one hour. This is because the containment fan cooler condensate flow switches monitor condensate flow from individual containment fan coolers and do not sum the condensate flow from all containment fan coolers. This condition has existed since the original Waterford 3 license was issued. The combined condensate flows from all of the containment fan coolers, along with other sources of water, are routed to the measurement tank. The measurement tank weir flow instrument is capable of detecting a one gpm leak in one hour as a one gpm rise above the normal indication. Administrative controls have been put in place in accordance with NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety." Additional discussion regarding this issue is provided in Reference 2.

A001

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.

Entergy requests approval of the proposed amendment within one year of the date of this request. Once approved, the amendment shall be implemented within 60 days. Although this request is neither exigent nor emergency, your prompt review is requested since administrative controls will need to remain in place until the proposed change is approved and implemented.

If you have any questions or require additional information, please contact Jerry Burford at 601-368-5755.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 15, 2006.

Sincerely,

Joe Venable

JEV/DBM/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

W3F1-2006-0005

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).

A change is proposed to Technical Specification (TS) 3.4.5.1, "Reactor Coolant System Leakage – Leakage Detection Instrumentation," that will credit the measurement tank weir flow instrumentation for the Containment Fan Cooler (CFC) condensate flow monitoring system in place of the one CFC condensate flow switch currently required by the TS Limiting Condition for Operation (LCO). As requested and approved in Amendment 197 (References 6.1 - 6.4), the measurement tank weir flow instrumentation or the containment sump level/rate-of-change instrumentation could be credited as the required containment sump monitor (i.e., LCO 'b'). With the approval of the proposed change, the measurement tank weir flow instrumentation will no longer be credited as a containment sump monitor.

2.0 PROPOSED CHANGE

All references to the "condensate flow **switch**" are proposed to be changed to "condensate flow **monitor**." This change will be made in:

- LCO 3.4.5.1c, (one place)
- Action a (one place)
- Action c (one place)
- Action d (two places)
- Action e (two places)
- Surveillance Requirement (SR) 4.4.5.1c (one place)

SR 4.4.5.1b is proposed to be revised to remove references to both the containment sump level and flow monitors. SR 4.4.5.1b currently states:

> Containment sump **level and flow** monitors - performance of a CHANNEL CHECK **(containment sump level monitor only)** at least once per 12 hours and a CHANNEL CALIBRATION at least once per 18 months,

SR 4.4.5.1b will be revised to state:

> Containment sump monitor - performance of a CHANNEL CHECK at least once per 12 hours and a CHANNEL CALIBRATION at least once per 18 months,

It is proposed to delete the CFC condensate flow switch CHANNEL FUNCTIONAL TEST required by SR 4.4.5.1c and relocate the measurement tank weir flow instrumentation CHANNEL CALIBRATION currently required by SR 4.4.5.1b to SR 4.4.5.1c. SR 4.4.5.1c currently states:

> Containment fan cooler condensate flow **switch** - performance of a CHANNEL **FUNCTIONAL TEST** at least once per 18 months.

SR 4.4.5.1c will be revised to state:

> Containment fan cooler condensate flow **monitor** - performance of a CHANNEL **CALIBRATION** at least once per 18 months.

In summary, TS 3.4.5.1 and SR 4.4.5.1 will be revised to credit the measurement tank weir flow instrumentation as the CFC condensate flow monitoring system in place of a CFC condensate flow switch. The CFC condensate flow switch CHANNEL FUNCTIONAL TEST is proposed to be eliminated since the CFC condensate flow switch will no longer be credited. The change also proposes to revise SR 4.4.5.1b to no longer credit the use of the measurement tank weir flow (i.e., flow) instrumentation for the containment sump monitor.

The Technical Specification Bases will be revised to reflect the changes described above in accordance with the TS Bases Control Program (TS 6.16). The Bases will clearly define that the measurement tank weir flow instrumentation will be credited as the containment fan cooler condensate flow monitor and that the measurement tank weir flow instrumentation cannot be credited as a containment sump monitor. Marked up TS Bases pages are attached for information only.

3.0 BACKGROUND

Waterford 3 employs four methods of leak detection:

- Monitoring sump level and flow,
- Monitoring airborne particulate radioactivity,
- Monitoring the condensate from the containment air coolers, and
- Monitoring airborne gaseous radioactivity.

Waterford 3 applies all four methods of leak detection; however, no credit is taken in the Waterford 3 Technical Specifications for monitoring airborne gaseous radioactivity (Reference 6.4).

The RCS leakage detection instrumentation is not a part of plant control instruments or engineered safety feature actuation circuits and is used for monitoring RCS leakage.

3.1 Containment Sump Level and Flow (Rate of Level Change) Monitor

Containment sump level instrumentation channels, SP IL6705A and SP IL6705B, are used to monitor the level of the containment sump. SP IL6705A provides a level indication on the Qualified Safety Parameter Display System (QSPDS) and a control board indicator in the main control room. SP IL6705B provides a level indication on the Plant Monitoring Computer (PMC) and a recorder in the main control room. The time rate of change in sump level is automatically converted to an in-leakage flow rate by the PMC based on level changes from SP IL6705B only. The containment sump level transmitters are safety related, seismically qualified and have the sensitivity to detect a one gallon per minute (gpm) leak within one hour as required by Regulatory Guide (RG) 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems." The PMC is non-safety related and is not seismically qualified. Therefore, guidance to perform this level rate of change conversion manually using either level loop (i.e., SP IL6705A or SP IL6705B) is included in operating procedures should the PMC be unavailable. Computer alarms are set at one gpm and 10 gpm. The containment sump level rate of change instrumentation was approved as an acceptable containment sump monitoring method via Amendment 197. Refer to References 6.3 and 6.4 for additional information regarding the containment sump level rate of change instrumentation method of monitoring the containment sump.

3.2 Containment Building Airborne Monitor

The containment atmosphere is monitored for airborne radiation by a Particulate - Iodine - Gas (PIG) monitor (PRMRE0100Y) and provides indications to the main control room of particulate, iodine, and gaseous radioactivity in the containment. The PIG is comprised of three channels, each providing potential indication of RCS leakage. However, only the particulate channel has the required sensitivity and response time to detect a one gpm leak within one hour as specified in RG 1.45 at the RCS activity levels normally seen during power operation. The containment atmosphere radiation monitor is safety-related, seismically qualified, and provides a continuous indication in the main control room of the particulate, iodine and gaseous radioactivity levels inside the containment. Each PIG channel provides an alert and high alarm indication in the main control room. The alert annunciates on a rising radiation level that corresponds to about 0.1 gpm RCS leakage. The high alarm annunciates on a rising radiation level that corresponds to about 1.0 gpm RCS leakage.

3.3 Air Cooler Condensate Flow Switch

CFC flow switches detect flow through the CFC drains that are piped to the containment sump measuring tank inlet pipe. CFC A and C have two drain lines each and CFC B and D have one drain line each. The presence of flow in the lines is detected by six flow switches (one per drain line) which are monitored by the PMC. Each switch is set to provide a PMC alarm when approximately 1 gpm of flow is present in its associated drain line.

Prior to Amendment 197 (Reference 6.4), which was approved on July 30, 2004, the TS required containment air cooler condensate flow switches on at least three coolers or a containment gaseous radioactivity monitoring system. Currently, the TS LCO requires at least one CFC condensate flow switch associated with an operable and operating CFC.

Following the issuance of Licensee Event Report (LER) 2005-002-000 dated August 8, 2005, (Reference 6.5), it was recognized that the CFC condensate flow switches, as required by TS, prior to and following the approval of Amendment 197, were and are not capable of detecting a one gpm RCS steam leak (Reference 6.6). The CFC condensate flow switches potentially would not detect a one gpm increase in aggregate CFC condensate drain flow if the flow was split between two or more drains. When it is assumed that the steam is condensed by multiple CFCs or a single CFC containing two drains/switches a one gpm steam leak may go undetected because the CFC condensate switches provide discrete flow/no-flow indication, and cannot provide an indication of the aggregate CFC condensate drain flow. Waterford 3 normally runs multiple CFCs during power operation. Refer to Reference 6.6 for additional details.

3.4 Measurement Tank Weir Flow Instrumentation

The measurement tank weir flow instrumentation was the containment sump monitoring method prior to Amendment 197 and was one of two containment sump monitoring methods as allowed by Amendment 197. (See the discussion of the containment sump level and flow (rate of level change) monitor in Section 3.1 above for a description of the other containment sump monitoring method.)

The following sources are routed to the measuring tank prior to entering the containment sump:

- air cooler condensate drains,
- equipment drains (~30) (e.g., instrument cabinets, valve leakoff, etc.), and
- reactor building floor drains (~28)

The following discharge directly to the containment sump without passing through the measurement tank:

- two shutdown cooling system suction line relief valves (TS 3.4.8.3), and
- reactor drain tank relief valve

With the approval of the proposed change, the measurement tank weir flow instrument (SP IL6710) will become the air cooler condensate flow monitor. The measurement tank weir flow instrumentation consists of a measurement tank with a triangular notch weir through which water entering the tank flows prior to exiting the tank. The measurement tank is fitted with a level transmitter. Level measured in the tank is a function of the flow through the measurement tank weir. Increased level in the tank indicates increased flow through the weir. The instrument loop, SP IL6710, is non-safety related and seismically qualified. The weir transmitter SP ILT6710 is non-safety related and is qualified seismic class 2.

The measurement tank weir flow instrumentation is capable of detecting a one gpm leak within one hour as specified in RG 1.45. An alarm, with an adjustable setpoint, is available that is normally set at one gpm above normal flow through the measurement tank.

3.5 Amendment 197

Amendment 197 (Reference 6.4) approved changes to TS 3.4.5.1 and was issued on July 30, 2004. Amendment 197:

- deleted the containment atmosphere gaseous radioactivity monitor,
- incorporated a second containment sump monitoring method (i.e., containment sump level rate of change instrumentation), and
- clarified the actions statements consistent with NUREG-1432.

4.0 TECHNICAL ANALYSIS

This license amendment request proposes to credit the measurement tank weir flow instrumentation as the CFC condensate flow monitor in place of a single CFC condensate flow switch. This will be accomplished in the TS by changing all references from "CFC condensate flow switch" to "CFC condensate flow monitor."

4.1 CFC Condensate Flow Monitor

The six CFC condensate drains drain to the measurement tank along with various other equipment and floor drains. A one gpm increase in aggregate CFC condensate drain flow can be detected by the measurement tank weir flow instrumentation with indication provided in the main control room. If flow from other sources (e.g., equipment drains and floor drains) coincided with flow from the CFC condensate drains, the measurement tank weir flow instrumentation would provide a conservative indication of CFC condensate drain flow.

Regulatory Guide 1.45 C.3, lists the leakage detection methods that may be employed to identify RCS leakage and includes monitoring condensate flow rate from containment air coolers as an acceptable third method. Per the RG, this RCS leakage detection instrumentation must:

1. be capable of a sensitivity and response time adequate to detect a leak rate, or its equivalent, of one gpm in less than one hour (C.5),
2. perform its functions following seismic events that do not require a plant shutdown (C.6),
3. provide indicators and alarms in the main control room (C.7),
4. be equipped with provisions to readily permit testing for operability and calibration during plant operation (C.8), and
5. be addressed in technical specifications (C.9).

The following provides an explanation of how the above criteria are met by the CFC condensate flow monitor.

1. As described above, flow through the measurement tank is a function of level. The measurement tank weir flow instrumentation converts level to flow and has the sensitivity to detect a one gpm increase (leak) within one hour.

2. The measurement tank weir flow instrument loop is non-safety related and seismically qualified. The measurement tank weir level transmitter is non-safety related and is qualified seismic class 2. Therefore, the measurement tank weir flow instrumentation is seismically qualified and expected to remain functional following seismic events that do not require a plant shutdown.

3. Flow through the measurement tank is indicated in the main control room on a chart recorder with a 0-20 gpm range. There are two main control room annunciators associated with the measurement tank weir flow instrumentation. One alarm is adjustable and is normally set for one gpm above the current leak rate. The second alarm will alarm at a fixed leakage rate of 10 gpm or more.

4. The measurement tank weir flow instrumentation can be calibrated during plant operation, however a downpower may be required to reduce personnel exposure to as low as reasonably achievable in order to perform this calibration. The associated measurement tank weir level transmitter cannot be calibrated at power due to its location in the containment sump. The ability to calibrate the measurement tank weir flow and level instrumentation remains unchanged from when the instrumentation was accepted as a containment sump monitoring method.

5. The CFC condensate flow monitor is addressed in TS 3.4.5.1c.

The measurement tank weir flow monitor was previously credited as one of two acceptable containment sump monitoring methods. With the approval of the proposed change, the measurement tank weir flow instrumentation will be credited as the CFC condensate flow monitor and will no longer be credited as a containment sump monitoring method. The CFC condensate flow switches will no longer be credited for TS compliance but will remain available to assist the operator in locating the source of unidentified leakage.

Since the CFC condensate drains drain into the measurement tank and the measurement tank weir flow instrumentation meets the RCS leakage detection instrumentation requirements as specified in RG 1.45 or, in the case of online calibration, is consistent with the existing licensing bases, the measurement tank weir flow instrumentation can be credited as the CFC condensate flow monitor. Therefore, it is acceptable to change all TS 3/4.4.5.1 references from "...condensate flow switch" to "...condensate flow monitor."

With the approval of the proposed change, the TS 3.4.5.1 LCO will be consistent with the NUREG-1432 (Reference 6.7) TS 3.4.15 LCO with one exception. As approved in Amendment 197 (Reference 6.4) the gaseous containment radioactivity monitor is not credited in the Waterford 3 TS.

4.2 Action Statements

The measurement tank weir flow instrumentation was previously credited as one of two acceptable containment sump monitoring methods. With the approval of the proposed change, the measurement tank weir flow instrumentation will be credited as the CFC condensate flow monitor and will no longer be credited as a containment sump monitoring method. Therefore, with the approval of the proposed change, the action statements currently applicable to the "containment sump monitor" will no longer apply to the measurement tank weir flow instrumentation and will only apply to the containment sump level rate of change instrumentation. This is considered to be a risk neutral change since the TS action will continue to require the timely restoration of an operable containment sump monitor if it were to become inoperable.

The action statements currently applicable to the "CFC condensate flow switch" will apply to the "CFC condensate flow monitor" (i.e., measurement tank weir flow instrumentation) following the approval of the proposed change. This is considered to be a risk neutral change since the actions will continue to apply to CFC condensate flow detection instrumentation and require that the instrumentation be restored to operable or additional actions be taken. Therefore, the proposed change is considered to be acceptable.

With the approval of the proposed change, the TS 3.4.5.1 actions will continue to be consistent with actions in NUREG-1432 (Reference 6.7) TS 3.4.15 and TS 3.0.3.

4.3 Surveillance Requirements (SR)

The CFC condensate flow switches will no longer be credited in TS as a method of RCS leakage detection; therefore, it is acceptable to delete their channel function test from SR 4.4.5.1c.

The measurement tank weir flow instrumentation (i.e., proposed CFC condensate flow monitor) was previously credited as one of two acceptable containment sump monitoring methods. As a containment sump monitoring method SR 4.4.5.1b required that a channel calibration be performed on the measurement tank weir flow instrumentation at least once per 18 months. To clearly differentiate that the measurement tank weir flow instrumentation will be credited only for the CFC condensate flow monitor, its associated channel calibration will be relocated from SR 4.4.5.1b to 4.4.5.1c. This is considered to be an administrative change since the actual surveillance requirements associated with the measurement tank weir flow instrumentation remain unchanged.

With the approval of the proposed change, the SR 4.4.5.1 surveillance requirements will be consistent with the NUREG-1432 (Reference 6.7) SR 3.4.15 surveillance requirements with one exception. As approved in Amendment 197, SR 4.4.5.1b requires a channel check be performed on the containment sump monitor at least once per 12 hours. NUREG-1432 SR 3.4.15 does not include the requirement of a channel check for the containment sump monitor.

5.0 REGULATORY ANALYSIS

5.1 Applicable Regulatory Requirements/Criteria

General Design Criterion 30, "Quality of Reactor Coolant Pressure Boundary," of Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants," requires that means be provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage. Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems" describes acceptable methods of implementing this requirement with regard to the selection of leakage detection systems for the reactor coolant pressure boundary. The means by which the Waterford Steam Electric Station, Unit 3 (Waterford 3) leak detection systems conforms to each Regulatory Position of Regulatory Guide 1.45 is provided below.

Regulatory Position C.1:
The source of reactor coolant leakage should be identifiable to the extent practical. Reactor coolant pressure boundary leakage detection and collection systems should be selected and designed to include the following:

Leakage to the primary reactor containment from identified sources should be collected or otherwise isolated so that:

a. the flow rates are monitored separately from unidentified leakage, and
b. the total flow rate can be established and monitored.

Justification for Conformance with Regulatory Position C.1:
Identified Reactor Coolant System (RCS) leakage as defined in RG 1.45 Section B is (1) leakage into closed systems, such as pump seal or valve packing leaks that are captured, flow metered, and conducted to a sump or collecting tank, or (2) leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of unidentified leakage monitoring systems or not to be from a flaw in the reactor coolant pressure boundary. The original Waterford 3 Safety Evaluation Report (NUREG-0787) cites the identified leakage sources and their adherence to the RG 1.45 recommendations. The cited identified leakage sources are described in further detail in the Waterford 3 Final Safety Analysis Report (FSAR) Section 5.2.5.1. Waterford 3 TS define identified leakage as leakage (except controlled leakage) into closed systems, such as pump seal or valve packing leaks that are captured, and conducted to a sump or collecting tank, or

leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be pressure boundary leakage, or reactor coolant system leakage through a steam generator to the secondary system. Controlled leakage is defined in TS as the seal water flow supplied from the reactor coolant pump seals. Unidentified leakage is defined in TS as all leakage which is not identified leakage or controlled leakage.

As described in FSAR 5.2.5.1, unidentified and identified leakage rates are discernable, quantifiable, and easily totaled to derive RCS total leakage.

Regulatory Position C.2:
Leakage to the primary reactor containment from unidentified sources should be collected and the flow rate monitored with an accuracy of one gallon per minute (gpm) or better.

Justification for Conformance with Regulatory Position C.2:
Leakage to the primary reactor containment from unidentified sources is collected in the containment sump after passing through a measurement tank. The flow rate is monitored as described in FSAR 5.2.5.1.1 by the measurement tank weir flow instrumentation or the sump level rate of change instrumentation with an accuracy of better than one gpm.

Regulatory Position C.3:
At least three separate detection methods should be employed and two of these methods should be (1) sump level and flow monitoring and (2) airborne particulate radioactivity monitoring. The third method may be selected from the following:

a. monitoring of condensate flow rate from air coolers,
b. monitoring of airborne gaseous radioactivity.

Humidity, temperature, or pressure monitoring of the containment atmosphere should be considered as alarms or indirect indication of leakage to the containment.

Justification for Conformance with Regulatory Position C.3:
The sump level and flow monitoring (first required detection method) is described in detail in FSAR section 5.2.5.1.1. The method is comprised of redundant containment sump level instrumentation and flow indication is derived from the change in level over time.

The airborne particulate radioactivity (second required detection method) is monitored by a dedicated particulate radiation monitor as described in FSAR section 5.2.5.1.2.

The condensate flow from the air coolers (third method) is drained collectively to a common discharge at the containment sump, which is monitored by the measurement tank weir flow instrumentation. FSAR section 5.2.5.1.1 describes this indication and that all of the air cooler drain flow is detected by the measurement tank weir flow instrumentation.

The airborne gaseous radioactivity (fourth method) is monitored by a dedicated gaseous radiation monitor. Note that this fourth method (i.e., gaseous radiation monitor) was removed from the Technical Specifications via Amendment 197 (Reference 6.4) because it was not capable of detecting a one gpm RCS leak within one hour.

Various other leak detection methods, not included in TS 3.4.5.1, are employed for diversity and to aid in identifying the potential leak source. The condensate flow from the air coolers is also monitored by individual condensate flow switches at the drains from each air cooler to assist the operator in locating unidentified leakage. Containment pressure, temperature, and humidity are monitored to provide additional information to the operators.

Regulatory Position C.4:
Provisions should be made to monitor systems connected to the [Reactor Coolant Pressure Boundary] RCPB for signs of intersystem leakage. Methods should include radioactivity monitoring and indicators to show abnormal water levels or flow in the affected area.

Justification for Conformance with Regulatory Position C.4:
The RCS connects to the Chemical Volume Control System (CVCS), Primary Sample System (PSL), Safety Injection (SI), and Steam Generator (SG) systems. Intersystem leaks would be indicated by a change in volume control tank level (control room alarm and indication is provided) and decrease in letdown flow to maintain pressurizer level (control room indication and a high pressurizer level deviation is provided). Refueling Water Storage Pool (RWSP) level, Safety Injection Tank (SIT) level, and SG level control room alarms and indications are provided. Process radiation monitors are also provided to detect intersystem leakage. Details of these systems are described in FSAR 5.2.5.1.

Regulatory Position C.5:
The sensitivity and response time of each leakage detection system in regulatory position 3 above employed for unidentified leakage should be adequate to detect a leakage rate, or its equivalent, of one gpm in less than one hour.

Justification for Conformance with Regulatory Position C.5:
The basis for compliance for regulatory position C.5 includes the sensitivity for detecting a one gpm unidentified leak. The sump level and flow monitoring (first required detection method) is capable of readily detecting a one gpm leak as indicated by a sump level change of 0.22 ft (2.7 inches) within one hour via level transmitters and level indication available in the control room.

The airborne particulate radioactivity (second required detection method) is monitored by a dedicated particulate radiation monitor. The monitor provides a continuous indication in the main control room for particulate radioactivity levels inside the containment and alarms within one hour at an equivalent activity that would be expected for one gpm RCS unidentified leakage.

The condensate flow from the air coolers (third method) is drained collectively to a common discharge at the containment sump, which is monitored by the measurement tank weir flow instrumentation. The adjustable alarm set point is set for the current normal leak rate plus one gpm in order to detect an increase of one gpm of unidentified leakage above the previously identified normal leakage within one hour.

The airborne gaseous radioactivity (fourth method) is monitored by a dedicated gaseous radiation monitor, which alarms at an equivalent activity that would be expected for one gpm RCS unidentified leakage per the assumptions and bases described in FSAR question 211.21 item 6. At extremely low RCS activity values, the airborne gaseous radiation monitor sensitivity and response time may be adversely impacted; however, the monitor would remain an available diverse indication of RCS unidentified leakage. Because the sensitivity of the gaseous radiation monitor is adversely impacted by extremely low RCS activity, it was removed from the Technical Specifications via Amendment 197 (Reference 6.4).

<u>Regulatory Position C.6</u>:
The leakage detection systems should be capable of performing their functions following seismic events that do not require plant shutdown. The airborne particulate radioactivity monitoring system should remain functional when subjected to the safe shutdown earthquake (SSE).

<u>Justification for Conformance with Regulatory Position C.6</u>:
The sump level and flow monitoring (first required detection method) is described in detail in FSAR section 5.2.5.1.1. The method is comprised of redundant containment sump level instrumentation and flow indication is derived from the change in level over time either automatically (B train only) on the Plant Monitoring Computer (PMC) or manually by the operator. The containment sump level loops are seismically qualified and, therefore, expected to remain functional following seismic events that do not require a plant shutdown.

The containment particulate radiation monitor flow indication (second required detection method) and containment gaseous radiation monitor are designed to remain functional when subjected to the SSE.

The drain flow from the air coolers via the containment sump weir flow indication (third method) would be expected to remain functional following seismic events that do not require plant shutdown.

<u>Regulatory Position C.7</u>:
Indicators and alarms for each leakage detection system should be provided in the main control room. Procedures for converting various indications to a common leakage equivalent should be available to the operators. The calibration of the indicators should account for needed independent variables.

<u>Justification for Conformance with Regulatory Position C.7</u>:
Sump level and flow monitoring (first required detection method), airborne particulate radioactivity monitoring (second required detection method), condensate flow from air coolers (third method), and airborne gaseous radioactivity all have indicators and alarms (annunciators and/or PMC alarms) provided in the main control room. Indicator calibration is performed and accounts for needed independent variables. Operating procedures include the necessary guidance for converting gaseous activity and containment sump level change over time to a RCS unidentified leak rate. Converting particulate activity to RCS unidentified leakage is a linear function between the alert activity level (equivalent to 0.1 gpm) and the alarm activity level (1 gpm). The measurement tank weir flow indication reads out in flow rate and therefore requires no conversion.

<u>Regulatory Position C.8</u>:
The leakage detection systems should be equipped with provisions to readily permit testing for operability and calibration during plant operation.

Justification for Conformance with Regulatory Position C.8:
All leak detection equipment that is likely to require testing for operability and calibration during plant operation can be calibrated during plant operation, however the measurement tank weir flow transmitter may require a downpower to reduce personnel exposure to as low as reasonably achievable. Consistent with the post Amendment 197 licensing basis, the level transmitters for the sump and weir cannot be calibrated during plant operation. Plant procedures provide the needed guidance for calibrating and testing the containment sump level indication, weir flow indication, and radiation monitors. The following operating procedures, "Technical Specification and Technical Requirements Compliance" and "Technical Specification Surveillance Logs," provide guidance for assuring operability of the leak detection systems.

Regulatory Position C.9:
The technical specifications should include the limiting conditions for identified and unidentified leakage and address the availability of various types of instruments to assure adequate coverage at all times.

Justification for Conformance with Regulatory Position C.9:
Waterford 3 TS 3.4.5.1 includes the limiting conditions for RCS leakage detection instrumentation and TS 3.4.5.2 includes the limiting conditions for RCS leakage.

Entergy has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the TS, and do not negatively affect conformance with any General Design Criterion (GDC).

5.2 No Significant Hazards Consideration

The proposed change to Technical Specification (TS) 3.4.5.1, "Reactor Coolant System Leakage – Leakage Detection Instrumentation," will credit the measurement tank weir flow instrumentation for the Condensate Fan Cooler (CFC) condensate flow monitoring system in place of the one CFC condensate flow switch currently required by the TS Limiting Condition for Operation (LCO). As approved in Amendment 197 (Reference 6.4), the measurement tank weir flow instrumentation or the containment sump level/rate-of-change instrumentation could be credited as the required containment sump monitor. With the approval of the proposed change, the measurement tank weir flow instrumentation will no longer be credited as a containment sump monitor.

Entergy Operations, Inc. has evaluated whether or not a significant hazards consideration is involved with the proposed amendment 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 Reactor Coolant System (RCS) leakage detections systems are passive monitoring systems; therefore, the proposed changes do not affect reactor operations or accident analyses and have no radiological consequences. The change maintains conservative restrictions on RCS leakage detections systems consistent with Regulatory Guide 1.45 and 10 CFR 50 Appendix A General Design Criteria 30. 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 proposed change introduces no new mode of plant operation or any plant modification. The RCS leakage detection instrumentation is not part of plant control instruments or engineered safety feature actuation circuits but is used solely for monitoring purposes. The change does not vary or affect any plant operating condition or parameter. 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.

   There will be no adverse affects on margins of safety since more stringent requirements will be applied to the third method (CFC condensate flow monitoring) of detecting RCS leakage. The third required RCS leakage detection method will now be capable of detecting a one gallon per minute leak within one hour. 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 present 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.

6.0 REFERENCES

6.1. Entergy Letter dated May 7, 2004, "License Amendment Request NPF-38-254, Reactor Coolant System Leakage Detection" (W3F1-2004-0028)

6.2. Entergy Letter dated July 8, 2004, "Reactor Coolant System Leakage Detection" (W3F1-2004-0059)

6.3. Entergy Letter dated July 16, 2004, "Supplement to Amendment Request NPF-38-254, Reactor Coolant System Leakage Detection" (W3F1-2004-0060)

6.4. NRC Letter dated July 30, 2004, "Waterford Steam Electric Station, Unit 3 – Issuance of Amendment RE: Reactor Coolant System Leakage Detection (TAC No. MC3085)"

6.5. Entergy Letter dated August 8, 2005, "Licensee Event Report 2005-002-00" (W3F1-2005-0061)

6.6. Entergy Letter dated January 13, 2006, "Licensee Event Report 2005-002-01" (W3F1-2006-0004)

6.7. NUREG-1432, "Improved Standard Technical Specifications Combustion Engineering Plants," Revision 3.1

Attachment 2

W3F1-2006-0005

Proposed Technical Specification Changes (mark-up)

REACTOR COOLANT SYSTEM

3/4.4.5 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.4.5.1 The following Reactor Coolant System leakage detection instrumentation shall be OPERABLE: P16 L F

a. One containment atmosphere particulate radioactivity monitor,

b. One containment sump monitor, and

c. One containment fan cooler condensate flow ~~switch~~ monitor.

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

ACTION:

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~~ monitor 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.

REACTOR COOLANT SYSTEM

LIMITING CONDITION FOR OPERATION (Continued)

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.

monitor

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.

d. Required containment atmosphere particulate radioactivity monitor inoperable and required containment fan cooler condensate flow switch inoperable.

monitor

Restore the required containment atmosphere particulate radioactivity monitor or the required containment fan cooler condensate flow switch to OPERABLE status within 30 days.

monitor

or

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

e. Required containment sump monitor inoperable and either the required containment atmosphere particulate radioactivity monitor inoperable or the required containment fan cooler condensate flow switch inoperable.

monitor

Restore the required containment sump monitor to OPERABLE status within 1 hour.

or

Restore the required containment atmosphere particulate radioactivity monitor or the required containment fan cooler condensate flow switch to OPERABLE status within 1 hour;

monitor

or

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

REACTOR COOLANT SYSTEM

LIMITING CONDITION FOR OPERATION (Continued)

f. 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.

SURVEILLANCE REQUIREMENTS

4.4.5.1 The leakage detection systems shall be demonstrated OPERABLE by:

a. Containment atmosphere particulate monitor system - performance of CHANNEL CHECK at least once per 12 hours, CHANNEL CALIBRATION at least once per 18 months and CHANNEL FUNCTIONAL TEST at least once per 92 days,

b. Containment sump ~~level and flow~~ monitor~~s~~ - performance of a CHANNEL CHECK ~~(containment sump level monitor only)~~ at least once per 12 hours and a CHANNEL CALIBRATION at least once per 18 months,

c. Containment fan cooler condensate flow ~~switch~~ monitor - performance of a CHANNEL ~~FUNCTIONAL TEST~~ CALIBRATION at least once per 18 months.

Attachment 3

W3F1-2006-0005

Changes to Technical Specification Bases Pages
For Information Only

REACTOR COOLANT SYSTEM

BASES

3/4.4.5 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.5.1 LEAKAGE DETECTION SYSTEMS

→ (DRN 04-1223, Ch. 33)

Background

GDC 30 of Appendix A 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. monitor

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 a rise 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).

← (DRN 04-1223, Ch. 33)

→ (DRN 04-1223, Ch. 33)

REACTOR COOLANT SYSTEM

BASES (continued)

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 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 monitors (either the containment sump level instrumentation or the containment flow instrumentation (weir)), in combination with a particulate radioactivity monitor and a CPC condensate flow switch, provide acceptable monitoring capability for leakage detection.~~

INSERT

~~The required CFC condensate flow switch must be 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 ≤200°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. 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.
ate monitor

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 or leakage detection is available.

← (DRN 04-1223, Ch. 33)

INSERT

The RCS leakage detection instrumentation required to be operable by this LCO consists of the following:

a. Containment atmosphere particulate radioactivity monitor consisting of the particulate portion of the containment particulate-iodine-gaseous (PIG) monitor (PRMRE0100Y).
b. Containment sump monitor consisting of either one of the two containment sump level instrument loops (SP IL6705A or B). (Note: Flow is calculated based on the containment sump level rate of change either manually or via the PMC. The containment sump monitor is also referred to as the "sump level and flow" monitor in R.G. 1.45.)
c. Containment fan cooler condensate flow monitor consisting of the measurement tank weir flow instrumentation loop (SP IL6710).

The RCS leakage rate control room annunciators and plant monitoring computer alarms, while highly desired, are not required for RCS leakage detection instrumentation TS operability as administrative controls and sufficient information is available in the control room for the operator to identify a one gpm increase above normal RCS leakage within one hour.

→ (DRN 04-1223, Ch. 33)

REACTOR COOLANT SYSTEM

BASES (continued)

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, (both ~~the~~ of the two available containment sump level instrumentation ~~and the containment flow instrumentation (weir)~~), no other form of sampling can provide the equivalent information.

However, the containment atmosphere particulate radioactivity monitor and the CFC flow ~~switch~~ monitor 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~~ monitor 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.

← (DRN 04-1223, Ch. 33)

→ (DRN 04-1223, Ch. 33)

REACTOR COOLANT SYSTEM

BASES (continued)

If ACTION c cannot be met, when contingency Actions cannot be completed within the Action 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 the required containment atmosphere particulate radioactivity monitor and the required containment fan cooler condensate flow ~~switch~~ monitor are inoperable, the only means of detecting RCS leakage is the containment sump monitor. This condition does not provide the required diverse means of RCS 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 the plant is not 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 or c.

For example, if the containment atmosphere particulate radioactivity monitor and the CFC condensate flow ~~switch~~ monitor are declared inoperable, ACTION a, c, and d will have to be entered and contingency Actions performed per ACTION a 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 a 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 with 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 the required containment sump monitor is inoperable (both ~~the~~ of the two available containment sump level ~~and flow (weir)~~ instrumentation) and either the required containment atmosphere particulate radioactivity monitor or the required containment fan cooler condensate flow ~~switch~~ monitor is inoperable, there is only one means of detecting RCS leakage. In this condition, the containment sump monitor, which is the best method for detecting RCS leakage, is inoperable along with one of the other leakage detection methods. This condition does not provide the required diverse means of RCS leakage detection. The ACTION is to restore either of the inoperable monitors to OPERABLE status within 1 hour to regain the intended leakage detection diversity. The 1 hour allowed outage time ensures the plant is not operated with two RCS leakage detection monitors inoperable for a lengthy time period.

If ACTION e 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.

← (DRN 04-1223, Ch. 33)

→ (DRN 04-1223, Ch. 33)

REACTOR COOLANT SYSTEM

BASES (continued)

Because of the short duration of the allowed outage time, the contingency Actions of a, b, or c do not have to be completed while the requirements of Action e are being followed. If one of the monitors are restored to OPERABLE status, Action e may be exited and the requirements of Action a, b, or c, whichever is applicable must be complied with.

Action f

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, 4.4.5.1.b - Channel Check

SR 4.4.5.1.a requires the performance of a CHANNEL CHECK of the required containment atmosphere particulate radioactivity monitor. SR 4.4.5.1.b requires the performance of a CHANNEL CHECK on the required containment sump level monitor. The CHANNEL CHECK is not required to be performed on the containment sump flow monitor (weir). 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.

← (DRN 04-1223, Ch. 33)

→ (DRN 04-1223, Ch. 33)
REACTOR COOLANT SYSTEM.

BASES (continued)

Monitoring Containment Sump In-Leakage Flow

During automatic operation of the containment sump pumps (after a containment sump pump has operated), the flow calculation performed by the plant monitoring computer based on a level change will no longer be accurate since the level in the sump will be lowering. A 20 minute time period has been conservatively determined based on engineering calculations for this equipment operation. In addition, upon reboot of the plant monitoring computer, a period of 10 minutes is required for the leak rate calculation to become available. It has been determined these time periods (independent or combined) of calculation sump in-leakage flow inaccuracies, the instrumentation remains adequate to detect a leakage rate, or its equivalent, of one gpm in less than one hour; therefore, the containment sump level instrumentation and the corresponding flow calculation is considered to remain operable.

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.

← (DRN 04-1223, Ch. 33)

3/4.4.5.2 OPERATIONAL LEAKAGE

Industry experience has shown that while a limited amount of leakage is expected from 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 allowable limit.

→(DRN 04-1243, Ch. 38)

The 75 gallon per day (gpd) per steam generator tube leakage limit ensures that the radiological consequences, including that from tube leakage, will be limited to the 10CFR50.67 limits for offsite dose and within the limits of General Design Criterion 19 for control room dose. For those analyzed events that do not result in faulted steam generators, greater than or equal to 75 gpd primary-to-secondary leakage per steam generator is assumed in the analysis. For those analyzed events that result in a faulted steam generator (e.g., MSLB), 540 gpd primary-to-secondary leakage is assumed through the faulted steam generator while greater than or equal to 75 gpd primary-to-secondary leakage is assumed through the intact steam generator.

←(DRN 04-1243, Ch. 38)