Florida Power & Light Company, 6501 S. Ocean Drive, Jensen Beach, FL 34957

March 11, 2011

L-2011-073
10 CFR 50.90

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
RE: License Amendment Request For Adoption Of Technical Specification Task Force (TSTF)-513, Revision 3, "Revise PWR Operability Requirements And Actions For RCS Leakage Instrumentation"

In accordance with the provisions of Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR), Florida Power and Light is submitting a request for an amendment to the Technical Specifications (TS) for St. Lucie Units 1 and 2.

The proposed amendment would revise the TS to define a new time limit for restoring inoperable Reactor Coolant System (RCS) leakage detection instrumentation to operable status; establish alternate methods of monitoring RCS leakage when one or more required monitors are inoperable; and make TS Bases changes which reflect the proposed changes and more accurately reflect the contents of the facility design basis related to operability of the RCS leakage detection instrumentation. Insofar as the St. Lucie Plant has custom TSs and TS Bases, to the extent practical these changes are consistent with NRC-approved Revision 3 to TSTF Improved Standard Technical Specification (STS) Change Traveler TSTF-513, "Revise PWR Operability Requirements and Actions for RCS Leakage Instrumentation." The availability of this TS improvement was announced in the *Federal Register* on January 3, 2011 (79 FR 189) as part of the consolidated line item improvement process (CLIIP).

- Attachment 1 provides an evaluation of the proposed changes.
- Attachment 2 provides the markup pages of existing TS to show the proposed changes.
- Attachment 3 provides a markup pages of the existing TS Bases to show the proposed changes.
- Attachment 4 provides revised (clean) TS pages.

Florida Power and Light requests that this amendment be processed as a normal priority amendment, with implementation within 60 days of NRC approval.

In accordance with 10 CFR 50.91(a)(1), "Notice for Public Comment," the analysis about the issue of no significant hazards consideration using the standards in 10 CFR 50.92 is being provided to the Commission in accordance with the distribution requirements in 10 CFR 50.4. In accordance with 10 CFR 50.91(b)(1), "State Consultation," a copy of this application and its reasoned analysis about no significant hazards considerations is being provided to the designated Florida Official.

A001
NRR

If you should have any questions about this submittal, please contact Eric Katzman, Licensing Manager, at (772) 467-7734.

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

Executed on March 11, 2011

Sincerely,

Richard L. Anderson
Site Vice President
St. Lucie Plant

Attachments

cc: Mr. W. A. Passetti, Florida Department of Health

ATTACHMENT 1

EVALUATION OF PROPOSED CHANGES

License Amendment Request for Adoption of TSTF-513, Revision 3, "Revise PWR Operability Requirements and Actions for RCS Leakage Instrumentation"

1.0 DESCRIPTION

The proposed amendment would revise the Technical Specifications (TS) to define a new time limit for restoring inoperable Reactor Coolant System (RCS) leakage detection instrumentation to operable status; establish alternate methods of monitoring RCS leakage when one or more required monitors are inoperable; and make conforming TS Bases changes. Insofar as the St. Lucie Plant has custom TSs, to the extent practical these changes are consistent with NRC-approved Revision 3 to Technical Specification Task Force (TSTF) Standard Technical Specification (STS) Change Traveler TSTF-513, "Revise PWR Operability Requirements and Actions for RCS Leakage Instrumentation." The availability of this TS improvement was announced in the *Federal Register* on January 3, 2011 (79 FR 189) as part of the consolidated line item improvement process (CLIIP).

2.0 PROPOSED CHANGES

The proposed changes revise Action a. and add a new Action b. to TS 3/4.4.6, "Reactor Coolant System Leakage – Leakage Detection Systems," and revise the associated bases.

Action a. is revised to read:

With the ~~required~~ reactor cavity sump inlet flow monitoring system inoperable <u>with an operable containment particulate radioactivity monitor</u>, perform a RCS water inventory balance at least once per 24* hours and restore the sump inlet flow monitoring system to OPERABLE status within 30 days; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

New Action b. reads as follows:

With the reactor cavity sump inlet flow monitoring system inoperable with only the containment gaseous radioactivity monitor operable, perform a RCS water inventory balance at least once per 24* hours and analyze grab samples of the containment atmosphere at least once per 12 hours, and either restore the sump inlet flow monitoring system to OPERABLE status within 7 days or restore the containment particulate radioactivity monitor to OPERABLE status within 7 days and enter action a. above with the time in this action applied against the allowed outage time of

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

The proposed changes also correct inappropriate references to "required" equipment in TS 3/4.4.6. The specifications incorrectly refer to a "required" reactor cavity sump inlet flow monitoring system. The term "required" is reserved for situations in which there are multiple ways to meet the LCO, such as the requirement for either a gaseous or particulate radiation monitor. The incorrect use of the term "required" is removed from TS 3/4.4.6 Action a.

Because St. Lucie has custom TSs, Florida Power and Light is proposing variations from the TS changes described in TSTF-513, Revision 3. However, the changes above and shown in the proposed TS Bases provide new St. Lucie custom TS requirements that are functionally equivalent to the ISTS usage rules and the content of TSTF-513. These format changes were necessary to accommodate the ISTS allowance for simultaneous Condition entry, concurrent required actions, and concurrent completion times. These deviations do not materially affect the NRC staff's model safety evaluation (SE) published in the *Federal Register* on January 3, 2011 (79 FR 189) as part of the CLIIP Notice of Availability.

3.0 BACKGROUND

In a 1999 NRC TIA response (Reference 3), the NRC Staff evaluated the St. Lucie plant's compliance with Regulatory Guide (RG) 1.45 with respect to the containment gaseous radioactivity monitor's inability to detect a one gpm leak in one hour. The NRC concluded that although the radiation monitoring system described in the St. Lucie Units 1 and 2 UFSARs were not consistent with the recommendation of Regulatory Position C.5 of RG 1.45, there was no significant increase in risk; the intent of RG 1.45 was met until such time as the planned generic activities needed to resolve the issue were completed. NRC Information Notice (IN) 2005-24, "Nonconservatism in Leakage Detection Sensitivity," dated August 3, 2005, informed addressees that the reactor coolant activity assumptions for primary containment atmosphere gaseous radioactivity monitors may be non-conservative. This means the monitors may not be able to detect a one gallon per minute leak within one hour. Some licensees have taken action in response to IN 2005-24 to remove the gaseous radioactivity monitor from the TS list of required monitors. However, industry experience has shown that the primary containment atmosphere gaseous radiation monitor is often the first monitor to indicate an increase in RCS leak rate. As a result, the TSTF and the NRC staff met on April 29, 2008, and April 14, 2009, to develop an alternative approach to address the issue identified in IN 2005-24. The agreed solution is to retain the primary containment atmosphere gaseous radiation monitor in the LCO list of required equipment, revise the specified safety function of the gas monitor to specify the required instrument sensitivity level, revise the Actions to require additional monitoring, and provide less time before a plant shutdown is required when the primary containment atmosphere gaseous radiation monitor is the only operable monitor.

4.0 TECHNICAL ANALYSIS

Florida Power and Light has reviewed TSTF-513, Revision 3, and the model SE published on January 3, 2011 (79 FR 189) as part of the CLIIP Notice of Availability. Florida Power and Light has concluded that the technical bases presented in TSTF Traveler-513, Revision 3, and the model SE prepared by the NRC staff are applicable to St. Lucie Units 1 and 2.

Consistent with the level of detail contained in the St. Lucie TS Bases, the proposed amendment revises the language in the TS Bases that describes when the gaseous and particulate containment atmosphere radioactivity monitor is operable. The proposed amendment requires additional batch or manual RCS leakage monitoring to be performed when the primary containment atmosphere gaseous radiation monitor is the only operable continuous or automatic monitor. These alternative batch methods provide an RCS leakage detection capability similar to the TS-required methods. The grab sample has an RCS leakage detection capability that is comparable to that of the containment particulate radiation monitor. The proposed Actions and allowed outage times for grab samples are adequate because use of frequent grab samples and mass balances provides additional assurance that any significant RCS leakage will be detected prior to significant RCPB degradation.

St. Lucie meets General Design Criteria (GDC) 30, "Quality of Reactor Coolant Pressure Boundary," leakage detection system requirements. As described in the St. Lucie UFSARs (Reference 2), containment sump instrumentation is used to detect reactor coolant system leakage (Section 5.2.4 for Unit 1 and 5.2.5 for Unit 2) by providing information on sump levels and frequency of sump pump operation. Flow instrumentation indicates and records make-up flow rate and volumes from the primary water system. This instrumentation allows detection of suddenly occurring leaks or those which are gradually increasing. Containment radiation monitors provide an additional means of reactor coolant system leakage detection. GDC 30 will continue to be met with the application of TSTF-513 changes to the Licensing Bases.

5.0 REGULATORY SAFETY ANALYSIS

5.1 NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

Florida Power and Light has evaluated the proposed changes to the TS using the criteria in 10 CFR 50.92 and has determined that the proposed changes do not involve a significant hazards consideration. An analysis of the issue of no significant hazards consideration is presented below: Description of Amendment Request: The proposed amendment would revise TS 3/4.4.6, "Reactor Coolant System Leakage – Leakage Detection Systems," and the licensing basis for the gaseous radiation monitor, as well as make associated TS Bases changes for TS 3/4.4.6.

Basis for proposed no significant hazards consideration determination: As required by 10 CFR 50.91(a), the Florida Power and Light analysis of the issue of no significant hazards consideration using the standards in 10 CFR 50.92 is presented below:

1. Does the Proposed Change Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated?

   Response: No

   The proposed change clarifies the operability requirements for the RCS leakage detection instrumentation and reduces the time allowed for the plant to operate when the only TS-required operable RCS leakage detection instrumentation monitor is the containment atmosphere gaseous radiation monitor. The monitoring of RCS leakage is not a precursor to any accident previously evaluated. The monitoring of RCS leakage is not used to mitigate the consequences of any accident previously evaluated. Therefore, it is concluded that 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 clarifies the operability requirements for the RCS leakage detection instrumentation and reduces the time allowed for the plant to operate when the only TS-required operable RCS leakage detection instrumentation monitor is the containment atmosphere gaseous radiation monitor. The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. The proposed change maintains sufficient continuity and diversity of leak detection capability that the probability of piping evaluated and approved for Leak-Before-Break progressing to pipe rupture remains extremely low. Therefore, it is concluded that 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 proposed change clarifies the operability requirements for the RCS leakage detection instrumentation and reduces the time allowed for the plant to operate when the only TS-required operable RCS leakage detection instrumentation monitor is the containment atmosphere gaseous radiation monitor. Reducing the amount of time the plant is allowed to operate with only the containment atmosphere gaseous radiation monitor operable increases the margin of safety by increasing the likelihood that an increase in RCS leakage will be detected before it potentially results in gross failure. Therefore, it is concluded that the proposed change does not involve a significant reduction in a margin of safety.

Based upon the above analysis, Florida Power and Light concludes that the requested change does not involve a significant hazards consideration, as set forth in 10 CFR 50.92(c), "Issuance of Amendment."

5.2 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

A description of the proposed TS change and its relationship to applicable regulatory requirements were published in the *Federal Register on January 3, 2011 (79 FR 189).*

Florida Power and Light has reviewed the NRC staff's model SE referenced in the CLIIP Notice of Availability and concluded that, with the allowance for changes necessitated by the St. Lucie custom TS format, the regulatory evaluation section is applicable to St. Lucie Units 1 and 2.

6.0 ENVIRONMENTAL CONSIDERATION

The proposed change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR Part 20, and would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change 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 change.

7.0 REFERENCES

1. NUREG 1432, Revision 3, "Standard Technical Specifications Combustion Engineering Plants."

2. St. Lucie Unit 1 and Unit 2 UFSARs.

3. The Safety Assessment by Plant Systems Branch Division of Systems Safety and Analysis Office of Nuclear Reactor Regulation Region II Concerns (TIA 96-019) Regarding the Containment Radiation Monitoring Systems at St. Lucie Units 1 and 2, and Turkey Point Units 3 and 4, dated May 27, 1999.

Technical Specification Markups

Unit 1

Page 3/4 4-12

Unit 2

Page 3/4 4-18

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following RCS leakage detection systems will be OPERABLE:

a. The reactor cavity sump inlet flow monitoring system; and

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

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

ACTION:

a. With the ~~required~~ reactor cavity sump inlet flow monitoring system inoperable with an operable containment particulate radioactivity monitor, perform a RCS water inventory balance at least once per 24* hours and restore the sump inlet flow monitoring system to OPERABLE status within 30 days; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the reactor cavity sump inlet flow monitoring system inoperable with only the containment gaseous radioactivity monitor operable, perform a RCS water inventory balance at least once per 24* hours and analyze grab samples of the containment atmosphere at least once per 12 hours, and either restore the sump inlet flow monitoring system to OPERABLE status within 7 days or restore the containment particulate radioactivity monitor to OPERABLE status within 7 days and enter action a. above with the time in this action applied against the allowed outage time of action a.; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

~~b~~c. With the required radioactivity monitor inoperable, analyze grab samples of the containment atmosphere or perform a RCS water inventory balance at least once per 24* hours, and restore the required radioactivity monitor to OPERABLE status within 30 days; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

~~c~~d. With all required monitors inoperable, enter LCO 3.0.3 immediately.

~~d~~e. The provisions of Specification 3.0.4 are not applicable if at least one of the required monitors is OPERABLE.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The RCS leakage detection instruments shall be demonstrated OPERABLE by:

a. Performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor at the frequencies specified in Table 4.3-3.

b. Performance of the CHANNEL CALIBRATION of the ~~required~~ reactor cavity sump inlet flow monitoring system at least once per 18 months.

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

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following RCS leakage detection systems will be OPERABLE:

a. The reactor cavity sump inlet flow monitoring system; and

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

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the ~~required~~ reactor cavity sump inlet flow monitoring system inoperable, ~~,~~ with an operable containment particulate radioactivity monitor, perform a RCS water inventory balance at least once per 24* hours and restore the sump inlet flow monitoring system to OPERABLE status within 30 days; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the reactor cavity sump inlet flow monitoring system inoperable with only the containment gaseous radioactivity monitor operable, perform a RCS water inventory balance at least once per 24* hours and analyze grab samples of the containment atmosphere at least once per 12 hours, and either restore the sump inlet flow monitoring system to OPERABLE status within 7 days or restore the containment particulate radioactivity monitor to OPERABLE status within 7 days and enter action a. above with the time in this action applied against the allowed outage time of action a.; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

~~b~~c. With the required radioactivity monitor inoperable, analyze grab samples of the containment atmosphere or perform a RCS water inventory balance at least once per 24* hours, and restore the required radioactivity monitor to OPERABLE status within 30 days; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

~~c~~d. With all required monitors inoperable, enter LCO 3.0.3 immediately.

~~d~~e. The provisions of Specification 3.0.4 are not applicable if at least one of the required monitors is OPERABLE.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The RCS leakage detection instruments shall be demonstrated OPERABLE by:

a. Performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor at the frequencies specified in Table 4.3-3.

b. Performance of the CHANNEL CALIBRATION of the ~~required~~ reactor cavity sump inlet flow monitoring system at least once per 18 months.

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

Information Only

Technical Specification Bases Markups

SECTION NO.: 3/4.4	TITLE: TECHNICAL SPECIFICATIONS BASES ATTACHMENT 6 OF ADM-25.04 REACTOR COOLANT SYSTEM ST. LUCIE UNIT 1	PAGE: 13 of 34
REVISION NO.: 4		

3/4.4 REACTOR COOLANT SYSTEM (continued)

BASES (continued)

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

BACKGROUND

GDC 30 of Appendix A to 10 CFR 50 requires means for detecting and, to the extent practical, identifying the location of the source of RCS LEAKAGE. Regulatory Guide 1.45, Revision 0, 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.

The containment sump used to collect unidentified LEAKAGE is instrumented to alarm for increases in the normal flow rates.

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

Other indications may be used to detect an increase in unidentified LEAKAGE; however, they are not required to be OPERABLE by this LCO. An increase in humidity of the containment atmosphere would indicate release of water vapor to the containment. Dew point temperature measurements can thus be used to monitor humidity levels of the containment atmosphere as an indicator of potential RCS LEAKAGE.

Since the humidity level is influenced by several factors, a quantitative evaluation of an indicated leakage rate by this means may be questionable and should be compared to observed increases in liquid flow into or from the containment sump. Humidity level monitoring is considered most useful as an indirect alarm or indication to alert the operator to a potential problem. Humidity monitors are not required by this LCO.

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.

The above-mentioned LEAKAGE detection methods or systems differ in sensitivity and response time.

APPLICABLE SAFETY ANALYSIS

The need to evaluate the severity of an alarm or an indication is important SAFETY to the operators, and the ability to compare and verify with indications ANALYSES from other systems is necessary.

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).

LCO

This LCO requires instruments of diverse monitoring principles to be OPERABLE to provide confidence that small amounts of unidentified LEAKAGE are detected in time to allow actions to place the plant in a safe condition when RCS LEAKAGE indicates possible RCPB degradation.

The LCO requires instruments to be OPERABLE. The containment sump is used to collect unidentified LEAKAGE. The monitor on the containment sump detects flow rate and is instrumented to detect when there is leakage of 1 gpm. The identification of unidentified LEAKAGE will be delayed by the time required for the unidentified LEAKAGE to travel to the containment sump and it may take longer than one hour to detect a 1 gpm increase in unidentified LEAKAGE, depending on the origin and magnitude of the LEAKAGE. This sensitivity is acceptable for containment sump monitor OPERABILITY.

The reactor coolant contains radioactivity that, when released to the containment, can be detected by the gaseous or particulate containment atmosphere radioactivity monitor. Only one of the two detectors is required to be OPERABLE. Radioactivity detection systems are included for monitoring both particulate and gaseous activities because of their sensitivities and rapid responses to RCS LEAKAGE, but have recognized limitations. Reactor coolant radioactivity levels will be low during initial

SECTION NO.: 3/4.4	TITLE: TECHNICAL SPECIFICATIONS BASES ATTACHMENT 6 OF ADM-25.04 REACTOR COOLANT SYSTEM ST. LUCIE UNIT 1	PAGE: 15 of 34
REVISION NO.: 4		

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. If there are few fuel element cladding defects and low levels of activation products, it may not be possible for the gaseous or particulate containment atmosphere radioactivity monitors to detect a 1 gpm increase within 1 hour during normal operation. However, the gaseous or particulate containment atmosphere radioactivity monitor is OPERABLE when it is capable of detecting a 1 gpm increase in unidentified LEAKAGE within 1 hour given an RCS activity equivalent to that assumed in the design calculations for the monitors.

The LCO is satisfied when monitors of diverse measurement means are available. Thus, the containment sump monitor, in combination with a particulate or gaseous radioactivity monitor, provides an acceptable minimum. 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.

ACTION a

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

For this action, the containment atmosphere particulate radioactivity monitor will provide indications of changes in leakage. Together with the containment particulate atmosphere radioactivity monitor, the periodic surveillance for RCS water inventory balance 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 the RCS water inventory balance 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, and RCP seal injection and return flows). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

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

SECTION NO.: 3/4.4	TITLE: TECHNICAL SPECIFICATIONS BASES ATTACHMENT 6 OF ADM-25.04 REACTOR COOLANT SYSTEM ST. LUCIE UNIT 1	PAGE: 16 of 34
REVISION NO.: 4		

ACTION b

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

For this action, the containment atmosphere gaseous radioactivity monitor will provide indications of changes in leakage. Together with the containment gaseous atmosphere radioactivity monitor, the periodic surveillance for RCS water inventory balance 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 the RCS water inventory balance 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, and RCP seal injection and return flows). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

However, the containment atmosphere gaseous radioactivity monitor typically cannot detect a 1 gpm leak within one hour when RCS activity is low. In addition, this configuration does not provide the required diverse means of leakage detection. Indirect methods of monitoring RCS leakage must be implemented. Grab samples of the containment atmosphere must be taken and analyzed must be performed every 12 hours to provide alternate periodic information. The 12 hour interval is sufficient to detect increasing RCS leakage.

The action provides 7 days to restore another RCS leakage monitor to OPERABLE status to regain the intended leakage detection diversity. If the sump monitor is recovered, the action is exited. If the containment atmosphere particulate radioactivity monitor is restored, the action b is exited, the time spent in action b is subtracted from the 30-day allowed outage time of action a, and action a is entered. The 7 day allowed outage time ensures that the plant will not be operated in a degraded configuration for a lengthy time period.

ACTION c

With both gaseous and particulate containment atmosphere radioactivity monitoring instrumentation channels inoperable, alternative action is required. Either grab samples of the containment atmosphere must be taken and analyzed, or water inventory balances, 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 at least one of the radioactivity monitors.

The 24 hour interval provides periodic information that is adequate to detect leakage. A Note is added allowing that the RCS water inventory balance 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, and RCP seal injection and return flows). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. The 30 day Completion Time recognizes at least one other form of leakage detection is available.

ACTION d

If all required monitors are inoperable, no automatic means of monitoring leakage are available and immediate plant shutdown in accordance with LCO 3.0.3 is required.

ACTION e

States that TS 3.0.4 is not applicable if at least one of the required monitors is operable.

SURVEILLANCE SR 4.4.6.1

REQUIREMENTS

SR 4.4.6.1 requires the performance of CHANNEL CHECKs, CHANNEL FUNCTIONAL TESTs, and CHANNEL CALIBRATIONs of the required leakage detection monitors. These checks give reasonable confidence the channels are operating properly.

~~The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973. The LCO is consistent with NUREG-1432, Revision 1, and is satisfied when leakage detection monitors of diverse measurement means are OPERABLE in MODES 1, 2, 3, and 4. Monitoring the reactor cavity sump inlet flow rate, in combination with monitoring the containment particulate or gaseous radioactivity, provides an acceptable minimum to assure that unidentified leakage is detected in time to allow actions to place the plant in a safe condition when such leakage indicates possible pressure boundary degradation.~~

3/4.4.6.2 REACTOR COOLANT SYSTEM OPERATIONAL LEAKAGE

Components that contain or transport the coolant to or from the reactor core make up the reactor coolant system (RCS). Component joints are made by

3/4.4 REACTOR COOLANT SYSTEM (continued)

BASES (continued)

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

BACKGROUND

GDC 30 of Appendix A to 10 CFR 50 requires means for detecting and, to the extent practical, identifying the location of the source of RCS LEAKAGE. Regulatory Guide 1.45, Revision 0, 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.

The containment sump used to collect unidentified LEAKAGE is instrumented to alarm for increases in the normal flow rates.

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

Other indications may be used to detect an increase in unidentified LEAKAGE; however, they are not required to be OPERABLE by this LCO. An increase in humidity of the containment atmosphere would indicate release of water vapor to the containment. Dew point temperature measurements can thus be used to monitor humidity levels of the containment atmosphere as an indicator of potential RCS LEAKAGE.

Since the humidity level is influenced by several factors, a quantitative evaluation of an indicated leakage rate by this means may be questionable and should be compared to observed increases in liquid flow into or from the containment sump. Humidity level monitoring is considered most useful as an indirect alarm or indication to alert the operator to a potential problem. Humidity monitors are not required by this LCO.

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

SECTION NO.: 3/4.4	TITLE: TECHNICAL SPECIFICATIONS BASES ATTACHMENT 6 OF ADM-25.04 REACTOR COOLANT SYSTEM ST. LUCIE UNIT 2	PAGE: 17 of 37
REVISION NO.: 7		

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.

The above-mentioned LEAKAGE detection methods or systems differ in sensitivity and response time.

APPLICABLE SAFETY ANALYSIS

The need to evaluate the severity of an alarm or an indication is important SAFETY to the operators, and the ability to compare and verify with indications ANALYSES from other systems is necessary.

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).

LCO

This LCO requires instruments of diverse monitoring principles to be OPERABLE to provide confidence that small amounts of unidentified LEAKAGE are detected in time to allow actions to place the plant in a safe condition when RCS LEAKAGE indicates possible RCPB degradation.

The LCO requires instruments to be OPERABLE. The containment sump is used to collect unidentified LEAKAGE. The monitor on the containment sump detects flow rate and is instrumented to detect when there is leakage of 1 gpm. The identification of unidentified LEAKAGE will be delayed by the time required for the unidentified LEAKAGE to travel to the containment sump and it may take longer than one hour to detect a 1 gpm increase in unidentified LEAKAGE, depending on the origin and magnitude of the LEAKAGE. This sensitivity is acceptable for containment sump monitor OPERABILITY.

The reactor coolant contains radioactivity that, when released to the containment, can be detected by the gaseous or particulate containment atmosphere radioactivity monitor. Only one of the two detectors is required to be OPERABLE. Radioactivity detection systems are included for monitoring both particulate and gaseous activities because of their sensitivities and rapid responses to RCS LEAKAGE, but have recognized

limitations. 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. If there are few fuel element cladding defects and low levels of activation products, it may not be possible for the gaseous or particulate containment atmosphere radioactivity monitors to detect a 1 gpm increase within 1 hour during normal operation. However, the gaseous or particulate containment atmosphere radioactivity monitor is OPERABLE when it is capable of detecting a 1 gpm increase in unidentified LEAKAGE within 1 hour given an RCS activity equivalent to that assumed in the design calculations for the monitors.

The LCO is satisfied when monitors of diverse measurement means are available. Thus, the containment sump monitor, in combination with a particulate or gaseous radioactivity monitor, provides an acceptable minimum. 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.

ACTION a

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

For this action, the containment atmosphere particulate radioactivity monitor will provide indications of changes in leakage. Together with the containment particulate atmosphere radioactivity monitor, the periodic surveillance for RCS water inventory balance 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 the RCS water inventory balance 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, and RCP seal injection and return flows). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

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

SECTION NO.: 3/4.4	TITLE: TECHNICAL SPECIFICATIONS BASES ATTACHMENT 6 OF ADM-25.04 REACTOR COOLANT SYSTEM ST. LUCIE UNIT 2	PAGE: 19 of 37
REVISION NO.: 7		

ACTION b

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

For this action, the containment atmosphere gaseous radioactivity monitor will provide indications of changes in leakage. Together with the containment gaseous atmosphere radioactivity monitor, the periodic surveillance for RCS water inventory balance 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 the RCS water inventory balance 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, and RCP seal injection and return flows). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

However, the containment atmosphere gaseous radioactivity monitor typically cannot detect a 1 gpm leak within one hour when RCS activity is low. In addition, this configuration does not provide the required diverse means of leakage detection. Indirect methods of monitoring RCS leakage must be implemented. Grab samples of the containment atmosphere must be taken and analyzed must be performed every 12 hours to provide alternate periodic information. The 12 hour interval is sufficient to detect increasing RCS leakage.

The action provides 7 days to restore another RCS leakage monitor to OPERABLE status to regain the intended leakage detection diversity. If the sump monitor is recovered, the action is exited. If the containment atmosphere particulate radioactivity monitor is restored, the action b is exited, the time spent in action b is subtracted from the 30-day allowed outage time of action a, and action a is entered. The 7 day allowed outage time ensures that the plant will not be operated in a degraded configuration for a lengthy time period.

ACTION c

With both gaseous and particulate containment atmosphere radioactivity monitoring instrumentation channels inoperable, alternative action is required. Either grab samples of the containment atmosphere must be taken and analyzed, or water inventory balances, 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 at least one of the radioactivity monitors.

SECTION NO.: 3/4.4	TITLE: TECHNICAL SPECIFICATIONS BASES ATTACHMENT 6 OF ADM-25.04 REACTOR COOLANT SYSTEM ST. LUCIE UNIT 2	PAGE: 20 of 37
REVISION NO.: 7		

The 24 hour interval provides periodic information that is adequate to detect leakage. A Note is added allowing that the RCS water inventory balance 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, and RCP seal injection and return flows). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. The 30 day Completion Time recognizes at least one other form of leakage detection is available.

ACTION d

If all required monitors are inoperable, no automatic means of monitoring leakage are available and immediate plant shutdown in accordance with LCO 3.0.3 is required.

ACTION e

States that TS 3.0.4 is not applicable if at least one of the required monitors is operable.

SURVEILLANCE SR 4.4.6.1

REQUIREMENTS

SR 4.4.6.1 requires the performance of CHANNEL CHECKs, CHANNEL FUNCTIONAL TESTs, and CHANNEL CALIBRATIONs of the required leakage detection monitors. These checks give reasonable confidence the channels are operating properly.

~~The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973. The LCO is consistent with NUREG-1432, Revision 1, and is satisfied when leakage detection monitors of diverse measurement means are OPERABLE in MODES 1, 2, 3, and 4. Monitoring the reactor cavity sump inlet flow rate, in combination with monitoring the containment particulate or gaseous radioactivity, provides an acceptable minimum to assure that unidentified leakage is detected in time to allow actions to place the plant in a safe condition when such leakage indicates possible pressure boundary degradation.~~

3/4.4.6.2 OPERATIONAL LEAKAGE

Background

Word-Processed Technical Specifications

Unit 1

Page 3/4 4-12

Unit 2

Page 3/4 4-18

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following RCS leakage detection systems will be OPERABLE:

a. The reactor cavity sump inlet flow monitoring system; and

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

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

ACTION:

a. With the reactor cavity sump inlet flow monitoring system inoperable with an operable containment particulate radioactivity monitor, perform a RCS water inventory balance at least once per 24* hours and restore the sump inlet flow monitoring system to OPERABLE status within 30 days; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the reactor cavity sump inlet flow monitoring system inoperable with only the containment gaseous radioactivity monitor operable, perform a RCS water inventory balance at least once per 24* hours and analyze grab samples of the containment atmosphere at least once per 12 hours, and either restore the sump inlet flow monitoring system to OPERABLE status within 7 days or restore the containment particulate radioactivity monitor to OPERABLE status within 7 days and enter action a. above with the time in this action applied against the allowed outage time of action a.; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With the required radioactivity monitor inoperable, analyze grab samples of the containment atmosphere or perform a RCS water inventory balance at least once per 24* hours, and restore the required radioactivity monitor to OPERABLE status within 30 days; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

d. With all required monitors inoperable, enter LCO 3.0.3 immediately.

e. The provisions of Specification 3.0.4 are not applicable if at least one of the required monitors is OPERABLE.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The RCS leakage detection instruments shall be demonstrated OPERABLE by:

a. Performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor at the frequencies specified in Table 4.3-3.

b. Performance of the CHANNEL CALIBRATION of the reactor cavity sump inlet flow monitoring system at least once per 18 months.

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

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following RCS leakage detection systems will be OPERABLE:

a. The reactor cavity sump inlet flow monitoring system; and

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

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

ACTION:

a. With the reactor cavity sump inlet flow monitoring system inoperable with an operable containment particulate radioactivity monitor, perform a RCS water inventory balance at least once per 24* hours and restore the sump inlet flow monitoring system to OPERABLE status within 30 days; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the reactor cavity sump inlet flow monitoring system inoperable with only the containment gaseous radioactivity monitor operable, perform a RCS water inventory balance at least once per 24* hours and analyze grab samples of the containment atmosphere at least once per 12 hours, and either restore the sump inlet flow monitoring system to OPERABLE status within 7 days or restore the containment particulate radioactivity monitor to OPERABLE status within 7 days and enter action a. above with the time in this action applied against the allowed outage time of action a.; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With the required radioactivity monitor inoperable, analyze grab samples of the containment atmosphere or perform a RCS water inventory balance at least once per 24* hours, and restore the required radioactivity monitor to OPERABLE status within 30 days; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

d. With all required monitors inoperable, enter LCO 3.0.3 immediately.

e. The provisions of Specification 3.0.4 are not applicable if at least one of the required monitors is OPERABLE.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The RCS leakage detection instruments shall be demonstrated OPERABLE by:

a. Performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor at the frequencies specified in Table 4.3-3.

b. Performance of the CHANNEL CALIBRATION of the reactor cavity sump inlet flow monitoring system at least once per 18 months.

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