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October 21, 2011

SOUTHERN COMPANY

Docket Nos.: 50-348
50-364

NL-11-1960

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Joseph M. Farley Nuclear Plant
License Amendment Request to Adopt TSTF-513-A Revision 3
Response to Request for Additional Information
Regarding Requiring Performance of Reactor Coolant System Mass Balance

Ladies and Gentlemen:

On April 29, 2011, Southern Nuclear Operating Company (SNC) submitted a request for an amendment to the Technical Specifications (TS) for the Joseph M. Farley Nuclear Plant (FNP) and Vogtle Electric Generating Plant (VEGP). The proposed amendment would revise the TS to adopt Technical Specification Task Force Traveler TSTF-513-A Revision 3 titled, "Revise PWR Operability Requirements and Actions for RCS Leakage Instrumentation."

By letter dated August 24, 2011, the NRC requested additional information regarding requiring performance of a reactor coolant system (RCS) mass balance for FNP only. Enclosure 1 provides the response to the NRC request for additional information (RAI). As part of the RAI response, SNC has modified the proposed change to FNP TS 3.4.15 and associated TS Bases to assure an RCS mass balance will be performed every 24 hours when the new proposed Condition C, based on the TSTF-513-A Condition D, is entered. Enclosure 2 provides the modified FNP TS and Bases markup pages showing the proposed changes. Enclosure 3 provides the modified FNP TS and Bases clean typed pages showing the proposed changes. Enclosures 2 and 3 supersede the referenced April 29, 2011 SNC submittal's Enclosures 2 and 3.

(Affirmation and signature are provided on the following page)

Mr. M. J. Ajluni states he is Nuclear Licensing Director of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

This letter contains no NRC commitments. If you have any questions, please contact Jack Stringfellow at (205) 992-7037.

Respectfully submitted,

M. J. Ajluni
Nuclear Licensing Director

Sworn to and subscribed before me this 21st *day of* October, *2011.*

Notary Public

My commission expires: 11-30-14

MJA/CLT/<>

Enclosures:
1. Response to Request for Additional Information Regarding Requiring Performance of Reactor Coolant System Mass Balance
2. FNP Technical Specifications and Bases Markup Pages
3. FNP Technical Specifications and Bases Clean Typed Pages

cc: Southern Nuclear Operating Company
Mr. S. E. Kuczynski, Chairman, President & CEO
Mr. D. G. Bost, Chief Nuclear Officer
Mr. T. A. Lynch, Vice President - Farley
Ms. P. M. Marino, Vice President – Engineering
RTYPE: CFA04.054

U. S. Nuclear Regulatory Commission
Mr. V. M. McCree, Regional Administrator
Mr. V. Sreenivas, NRR Project Manager - Farley
Mr. E. L. Crowe, Senior Resident Inspector – Farley

Alabama Department of Public Health
Dr. D. E. Williamson, State Health Officer

Joseph M. Farley Nuclear Plant
License Amendment Request to Adopt TSTF-513-A Revision 3
Response to Request for Additional Information Regarding
Requiring Performance of Reactor Coolant System Mass Balance

Enclosure 1

Response to Request for Additional Information Regarding
Requiring Performance of Reactor Coolant System Mass Balance

NRC Question

By letter dated April 29, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML111220091), Southern Nuclear Operating Company, Inc., submitted a license amendment request regarding the Joseph M. Farley Nuclear Plant (FNP), Units 1 and 2, to revise Technical Specification (TS) 3.4.15, "RCS Leakage Detection Instrumentation."

As stated in the "Model Application for Plant Specific Adoption of Technical Specification Task Force (TSTF)-513, Revision 3, "Revise Pressurized Water Reactor (PWR) Operability Requirements and Actions for Reactor Coolant System (RCS) Leakage Instrumentation" (ADAMS Accession No. ML101340271):

> The proposed Required Actions for new Condition D require the licensee to analyze grab samples of the containment atmosphere once per 12 hours and restore the required containment sump monitor to operable status within 7 days, or analyze grab samples of the containment atmosphere once per 12 hours and restore the containment air cooler condensate flow rate monitor to operable status within 7 days. These actions are in addition to the Required Actions of Condition A, which require performing an RCS mass balance once per 24 hours.

The FNP TSs differ from the Standard TSs in that the action of Condition A is to analyze grab samples once per 24 hours OR perform an RCS mass balance (Surveillance Requirement 3.4.13.1) once per 24 hours. Hence, once the proposed Condition C, which is the equivalent to the TSTF-513 Condition D, is entered, the action for C, analyzing grab samples once per 12 hours, satisfies FNP TS Condition A without any assurance that an RCS mass balance will be performed every 24 hours.

The proposed application of the TSTF-513 changes to the FNP TSs is not in accordance with the model application. Please revise your amendment request to fit the model or provide adequate justification for the deviation.

SNC Response

SNC has modified the proposed change to the FNP TS 3.4.15 and associated TS Bases to assure an RCS mass balance will be performed every 24 hours when the new proposed Condition C is entered. Specifically, a Required Action is added to perform the RCS mass balance every 24 hours while in the proposed Condition C. Enclosure 2 to this letter provides the modified FNP TS and Bases markup pages showing the proposed changes. Enclosure 3 to this letter provides the modified FNP TS and Bases clean typed pages showing the proposed changes. Enclosures 2 and 3 supersede the referenced April 29, 2011 SNC submittal's Enclosures 2 and 3.

As noted in Enclosure 1, Basis for Proposed Change, of the referenced SNC submittal dated April 29, 2011, the Conditions in FNP TS 3.4.15 differ from the Standard TS to reflect the FNP specific RCS leakage detection instrumentation. Specifically, the FNP TS 3.4.15 does not contain requirements for a containment sump monitor, and does not

have the Standard TS Condition A with Required Actions to perform an RCS mass balance once per 24 hours AND restore required containment sump monitor to OPERABLE status within 30 days.

Given the plant specific Conditions in FNP TS 3.4.15, SNC added a Required Action to perform the RCS mass balance every 24 hours to the proposed Condition C. This accommodates the plant specific configuration of FNP TS 3.4.15 and conforms to the model safety evaluation (SE) for plant-specific adoption of TSTF-513. The referenced paragraph in the NRC question, which includes requiring performing an RCS mass balance once per 24 hours, is specifically from the TSTF-513 model SE section 3.0 titled "Technical Evaluation."

The 10 CFR 50.92 evaluation and the justification for the categorical exclusion from performing an environmental impact statement or environmental assessment, included in the referenced April 29, 2011 SNC submittal's Enclosure 1, continue to remain valid and are applicable to the proposed TS change.

Joseph M. Farley Nuclear Plant
License Amendment Request to Adopt TSTF-513-A Revision 3
Response to Request for Additional Information Regarding
Requiring Performance of Reactor Coolant System Mass Balance

Enclosure 2

Technical Specifications and Bases Markup Pages

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required containment atmosphere gaseous radioactivity monitor inoperable. AND Required containment air cooler condensate level monitor inoperable. Insert 1	B.1.1 Analyze grab samples of the containment atmosphere. OR B.1.2 Perform SR 3.4.13.1. AND B.2 Restore at least one required monitor to OPERABLE status.	Once per 24 hours Once per 24 hours 30 days
~~C~~. Required Action and associated Completion Time not met. D	~~C~~.1 Be in MODE 3. D AND D ~~C~~.2 Be in MODE 5.	6 hours 36 hours
~~D~~. All required monitors inoperable. E	~~D~~.1 Enter LCO 3.0.3. E	Immediately

Insert 1:

C.	Containment atmosphere particulate radioactivity monitor inoperable.	C.1	Analyze grab samples of the containment atmosphere.	Once per 12 hours
	AND	AND		
	Required containment air cooler condensate level monitor inoperable.	C.2	Perform SR 3.4.13.1	Once per 24 hours
		AND		
		C.3.1	Restore containment atmosphere particulate radioactivity monitor to OPERABLE status.	7 days
		OR		
		C.3.2	Restore required containment air cooler condensate level monitor to OPERABLE status.	7 days

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.15 RCS Leakage Detection Instrumentation

, Revision 0

BASES

BACKGROUND

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

In addition to meeting the OPERABILITY requirements, the monitors are typically set to provide the most sensitive response without causing an excessive number of spurious alarms.

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 to 1.0 gpm can be readily detected in contained volumes by monitoring changes in water level, or flow rate, or in the operating frequency of a pump. The containment air cooler condensate level monitor is instrumented~~ to alarm for abnormal increases in the level (flow rates). ~~The sensitivity is acceptable for detecting increases in unidentified LEAKAGE.~~ The condensate flow rate is measured by monitoring the water level in a vertical standpipe. As flow rate increases, the water level in the standpipe rises.

may

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. Instrument sensitivities of 10^{-9} µCi/cc radioactivity for particulate monitoring and of 10^{-6} µCi/cc radioactivity for gaseous monitoring are practical for these leakage detection systems.~~ 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

(continued)

BASES

BACKGROUND (continued)

levels of the containment atmosphere as an indicator of potential RCS LEAKAGE. ~~A 1°F increase in dew point is within the sensitivity range of available instruments.~~

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 from the containment condensate air coolers. Humidity level monitoring is considered most useful as an indirect alarm or indication ~~to alert~~ is 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 ~~are~~ 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 FSAR (Ref. 3). Multiple instrument locations are utilized, if needed, to ensure that the transport delay time of the leakage from its source to an instrument location yields an acceptable overall response time.~~

The above-mentioned LEAKAGE detection systems differ in sensitivity and response time. Some of these systems could serve as early alarm systems identifying to the operators that closer examination of other detection systems is necessary to determine the extent of any corrective action that may be required.

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 is necessary. Quickly separating the identified LEAKAGE from the unidentified LEAKAGE provides quantitative information to the operators, allowing them to take corrective action should a leakage occur detrimental to the safety of the unit and the public.

RCS leakage detection instrumentation satisfies Criterion 1 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

Insert 2

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

The LCO is satisfied when monitors of diverse measurement means are available. Thus, the containment atmosphere particulate radioactivity monitor (R-11) in combination with a gaseous radioactivity monitor (R-12) or a containment air cooler condensate level 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 to be ≤ 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 are much smaller. Therefore, the requirements of this LCO are not applicable in MODES 5 and 6.

ACTIONS

A.1.1, A.1.2, and A.2

With the required containment atmosphere particulate radioactivity monitor inoperable, no other form of sampling can provide the

(continued)

containment

radioactivity

BASES

ACTIONS

A.1.1, A.1.2, and A.2 (continued)

equivalent information; however, the containment atmosphere gaseous radioactivity monitor or the containment air cooler condensate level monitor will provide indications of changes in leakage. Together with the atmosphere gaseous monitor or the condensate level monitor, the periodic surveillance for RCS water inventory balance, SR 3.4.13.1, must be performed at an increased frequency of 24 hours or grab samples of the containment atmosphere must be taken and analyzed once per 24 hours to provide information that is adequate to detect leakage.

containment air cooler

Restoration of the required Particulate radioactivity monitor to OPERABLE status within a Completion Time of 30 days is required to regain the function after the monitor's failure. This time is acceptable, considering the Frequency and adequacy of the RCS water inventory balance or containment grab sample analyses required by Required Action A.1.1 or A.1.2.

B.1.1, B.1.2, and B.2

With both the required gaseous containment atmosphere radioactivity monitoring instrumentation channel and the required containment air cooler condensate level monitoring instrumentation channel 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 3.4.13.1, must be performed to provide alternate periodic information.

With a sample obtained and analyzed or water 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 required containment monitors.

Insert 3

D

The 24 hour interval provides periodic information that is adequate to detect leakage. The 30 day Completion Time recognizes at least one other form of leakage detection is available.

D

, B, or C

C.1 and C.2

If a Required Action of Condition A ~~or B~~ cannot be met, the plant must be brought to a MODE in which the requirement does not apply. To

(continued)

BASES

ACTIONS

D

D

~~C~~.1 and ~~C~~.2 (continued)

achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion 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.

E

~~D~~.1

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

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1

SR 3.4.15.1 requires the performance of a CHANNEL CHECK of the required containment atmosphere radioactivity monitor. The check gives reasonable confidence that the channel is operating properly. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.4.15.2

SR 3.4.15.2 requires the performance of a COT on the required containment atmosphere 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. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.4.15.3 and SR 3.4.15.4

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 Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

REFERENCES

1. 10 CFR 50, Appendix A, Section IV, GDC 30.
2. ~~Regulatory Guide 1.45.~~
3. FSAR, Section 5.2.7.

Regulatory Guide 1.45, Revision 0, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973.

Insert 2:

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 two instruments to be OPERABLE.

The reactor coolant contains radioactivity that, when released to the containment, may be detected by the gaseous or particulate containment atmosphere radioactivity monitor. 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 the initial reactor startup following a refueling outage and for a few weeks thereafter, until activated corrosion products have been formed and fission products appear from fuel assembly cladding contamination or cladding defects. If there are few fuel assembly 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 approximately a 1 gpm increase in unidentified LEAKAGE within approximately 1 hour given an RCS activity equivalent to that assumed in the design calculations for the monitors as described in Reference 3.

An increase in humidity of the containment atmosphere could indicate the release of water vapor to the containment. The containment air cooler condensate level monitor detects condensate flow from air coolers by monitoring a standpipe level increase versus time. The time required to detect approximately a 1 gpm increase above the normal value varies based on environmental and system conditions and may take longer than 1 hour. This sensitivity is acceptable for containment air cooler condensate level monitor OPERABILITY.

Insert 3:

<u>C.1, C.2, C.3.1, and C.3.2</u>

With the required containment atmosphere particulate radioactivity monitor inoperable and the required containment air cooler condensate level monitor inoperable, the only means of detecting LEAKAGE is the required containment atmosphere gaseous radioactivity monitor. This Condition is applicable when the only OPERABLE monitor is the containment atmosphere gaseous radioactivity monitor. The containment atmosphere gaseous radioactivity monitor typically cannot detect a 1 gpm leak within 1 hour when the 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 to provide alternate periodic information. The 12 hour interval is sufficient to detect increasing RCS leakage. In addition, the periodic surveillance for RCS water inventory balance, SR 3.4.13.1, must

be performed at an increased frequency of once per 24 hours to provide information that is adequate to detect leakage.

The Required Action provides 7 days to restore another RCS leakage monitor to OPERABLE status to regain the intended leakage detection diversity. The 7 day Completion Time ensures that the plant will not be operated in a degraded configuration for a lengthy time period.

Joseph M. Farley Nuclear Plant
License Amendment Request to Adopt TSTF-513-A Revision 3
Response to Request for Additional Information Regarding
Requiring Performance of Reactor Coolant System Mass Balance

Enclosure 3

Technical Specifications and Bases Clean Typed Pages

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required containment atmosphere gaseous radioactivity monitor inoperable. AND Required containment air cooler condensate level monitor inoperable.	B.1.1	Analyze grab samples of the containment atmosphere.	Once per 24 hours
	OR		
	B.1.2	Perform SR 3.4.13.1.	Once per 24 hours
	AND		
	B.2	Restore at least one required monitor to OPERABLE status.	30 days
C. Containment atmosphere particulate radioactivity monitor inoperable. AND Required containment air cooler condensate level monitor inoperable.	C.1	Analyze grab samples of the containment atmosphere.	Once per 12 hours
	AND		
	C.2	Perform SR 3.4.13.1	Once per 24 hours
	AND		
	C.3.1	Restore containment atmosphere particulate radioactivity monitor to OPERABLE status.	7 days
	OR		
	C.3.2	Restore required containment air cooler condensate level monitor to OPERABLE status.	7 days

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours
E. All required monitors inoperable.	E.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.15.1	Perform CHANNEL CHECK of the required containment atmosphere radioactivity monitor.	In accordance with the Surveillance Frequency Control Program
SR 3.4.15.2	Perform COT of the required containment atmosphere radioactivity monitor.	In accordance with the Surveillance Frequency Control Program
SR 3.4.15.3	Perform CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor.	In accordance with the Surveillance Frequency Control Program
SR 3.4.15.4	Perform CHANNEL CALIBRATION of the required containment air cooler condensate level monitor.	In accordance with the Surveillance Frequency Control Program

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.15 RCS Leakage Detection Instrumentation

BASES

BACKGROUND

GDC 30 of Appendix A to 10 CFR 50 (Ref. 1) requires means for detecting and, to the extent practical, identifying the location of the source of RCS LEAKAGE. Regulatory Guide 1.45, Revision 0 (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. In addition to meeting the OPERABILITY requirements, the monitors are typically set to provide the most sensitive response without causing an excessive number of spurious alarms.

The containment air cooler condensate level monitor is instrumented to alarm for abnormal increases in the level (flow rates). The condensate flow rate is measured by monitoring the water level in a vertical standpipe. As flow rate increases, the water level in the standpipe rises.

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.

(continued)

BASES

BACKGROUND (continued)

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 from the containment condensate air coolers. 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 systems differ in sensitivity and response time. Some of these systems could serve as early alarm systems identifying to the operators that closer examination of other detection systems is necessary to determine the extent of any corrective action that may be required.

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 safety significance of RCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS LEAKAGE into the containment area is necessary. Quickly separating the identified LEAKAGE from the unidentified LEAKAGE provides quantitative information to the operators, allowing them to take corrective action should a leakage occur detrimental to the safety of the unit and the public.

RCS leakage detection instrumentation satisfies Criterion 1 of 10 CFR 50.36(c)(2)(ii).

(continued)

BASES (continued)

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 two instruments to be OPERABLE.

The reactor coolant contains radioactivity that, when released to the containment, may be detected by the gaseous or particulate containment atmosphere radioactivity monitor. 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 the initial reactor startup following a refueling outage and for a few weeks thereafter, until activated corrosion products have been formed and fission products appear from fuel assembly cladding contamination or cladding defects. If there are few fuel assembly 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 approximately a 1 gpm increase in unidentified LEAKAGE within approximately 1 hour given an RCS activity equivalent to that assumed in the design calculations for the monitors as described in Reference 3.

An increase in humidity of the containment atmosphere could indicate the release of water vapor to the containment. The containment air cooler condensate level monitor detects condensate flow from air coolers by monitoring a standpipe level increase versus time. The time required to detect approximately a 1 gpm increase above the normal value varies based on environmental and system conditions and may take longer than 1 hour. This sensitivity is acceptable for containment air cooler condensate level monitor OPERABILITY.

The LCO is satisfied when monitors of diverse measurement means are available. Thus, the containment atmosphere particulate radioactivity monitor (R-11) in combination with a gaseous radioactivity monitor (R-12) or a containment air cooler condensate level monitor provides an acceptable minimum.

BASES (continued)

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 to be ≤ 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 are much smaller. Therefore, the requirements of this LCO are not applicable in MODES 5 and 6.

ACTIONS

A.1.1, A.1.2, and A.2

With the required containment atmosphere particulate radioactivity monitor inoperable, no other form of sampling can provide the equivalent information; however, the containment atmosphere gaseous radioactivity monitor or the containment air cooler condensate level monitor will provide indications of changes in leakage. Together with the containment atmosphere gaseous radioactivity monitor or the containment air cooler condensate level monitor, the periodic surveillance for RCS water inventory balance, SR 3.4.13.1, must be performed at an increased frequency of 24 hours or grab samples of the containment atmosphere must be taken and analyzed once per 24 hours to provide information that is adequate to detect leakage.

Restoration of the required Particulate radioactivity monitor to OPERABLE status within a Completion Time of 30 days is required to regain the function after the monitor's failure. This time is acceptable, considering the Frequency and adequacy of the RCS water inventory balance or containment grab sample analyses required by Required Action A.1.1 or A.1.2.

B.1.1, B.1.2, and B.2

With both the required gaseous containment atmosphere radioactivity monitoring instrumentation channel and the required containment air cooler condensate level monitoring instrumentation channel 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 3.4.13.1, must be performed to provide alternate periodic information.

(continued)

BASES

ACTIONS

B.1.1, B.1.2, and B.2 (continued)

With a sample obtained and analyzed or water 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 required containment monitors.

The 24 hour interval provides periodic information that is adequate to detect leakage. The 30 day Completion Time recognizes at least one other form of leakage detection is available.

C.1, C.2, C.3.1, and C.3.2

With the required containment atmosphere particulate radioactivity monitor inoperable and the required containment air cooler condensate level monitor inoperable, the only means of detecting LEAKAGE is the required containment atmosphere gaseous radioactivity monitor. This Condition is applicable when the only OPERABLE monitor is the containment atmosphere gaseous radioactivity monitor.

The containment atmosphere gaseous radioactivity monitor typically cannot detect a 1 gpm leak within 1 hour when the 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 to provide alternate periodic information. The 12 hour interval is sufficient to detect increasing RCS leakage. In addition, the periodic surveillance for RCS water inventory balance, SR 3.4.13.1, must be performed at an increased frequency of once per 24 hours to provide information that is adequate to detect leakage.

The Required Action provides 7 days to restore another RCS leakage monitor to OPERABLE status to regain the intended leakage detection diversity. The 7 day Completion Time ensures that the plant will not be operated in a degraded configuration for a lengthy time period.

D.1 and D.2

If a Required Action of Condition A, B or C cannot be met, the plant must be brought to a MODE in which the requirement does not apply.

(continued)

BASES

ACTIONS

D.1 and D.2 (continued)

To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion 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.

E.1

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

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1

SR 3.4.15.1 requires the performance of a CHANNEL CHECK of the required containment atmosphere radioactivity monitor. The check gives reasonable confidence that the channel is operating properly. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.4.15.2

SR 3.4.15.2 requires the performance of a COT on the required containment atmosphere 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. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.4.15.3 and SR 3.4.15.4

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 Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

REFERENCES

1. 10 CFR 50, Appendix A, Section IV, GDC 30.
2. Regulatory Guide 1.45, Revision 0, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973.
3. FSAR, Section 5.2.7.