Proposed Steam Generator Tech Spec

REACTOR COOLANT SYSTEM (RCS)

3.4.X Steam Generator Tube Integrity

LCO 3.4.X Steam Generator tube integrity shall be maintained.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of LCO not met.	A.1 Be in MODE 3. AND A.2. Be in MODE 5	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.X Verify steam generator tube integrity is in accordance with the structural integrity and accident induced leakage performance criteria as determined by the Steam Generator Program.	In accordance with the Steam Generator Program

Proposed SG Tech Spec Changes
Admin Section and Bases, Version 23-2

5.5.9 Steam Generator Program

5.5.9.1 General Requirements

A program shall be established and implemented to ensure that the steam generator tube integrity performance criteria are maintained. The steam generator performance criteria are defined in the steam generator program.

5.5.9.2 Condition Monitoring Assessment

Condition Monitoring Assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural and accident leakage integrity. The "as found" condition refers to the condition of the tubing during a steam generator inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging or repair of tubes. Condition Monitoring Assessments shall be conducted during each outage during which the steam generator tubes are inspected, plugged, or repaired to confirm that the performance criteria are being met.

5.5.9.3 Performance Criteria

The steam generator performance criteria are defined in the steam generator program. The licensee may revise its performance criteria (and their associated definitions as used in the steam generator program) after review and approval by the NRC or to incorporate changes approved generically by the NRC subject to the limitations and conditions set forth in the staff's approving document. The licensee's demonstration of its satisfaction of the generic limitations and conditions must be documented in a safety evaluation prepared in accordance with 10 CFR 50.59.

5.5.9.4 Tube Repair Criteria and Repair Methods

Tube repair criteria and repair methods shall be described in and implemented by the steam generator program. The licensee may revise its repair criteria and repair methods after review and approval by the NRC, or after generic approval by the NRC subject to the limitations and conditions set forth in the staff's approving document. The licensee's demonstration of its satisfaction of the generic limitations and conditions must be documented in a safety evaluation prepared in accordance with 10 CFR 50.59. Note that tube plug designs do not need to be reviewed or approved by the NRC.

5.6.10 Steam Generator Tube Inspection Report

Proposed SG Tech Spec Changes
Admin Section and Bases, Version 23-2

If the results of the steam generator inspection indicate greater than 1% of the inspected tubes in any steam generator require repair in accordance with the requirements of the steam generator program, the licensee shall submit a special report within 120 days after the initial entry into Mode 4 following completion of the inspection. The report shall summarize:

a) The scope of inspections performed on each steam generator inspected in the affected unit during the current outage,
b) Active degradation mechanisms found,
c) NDE techniques utilized for each degradation mechanism,
d) Location, orientation(if linear) and measured sizes of service induced indications,
e) Number of tubes plugged or repaired during the inspection outage for each active degradation mechanism,
f) Repair method utilized and the number of tubes repaired by each repair method,
g) Total number and percentage of tubes plugged and/or repaired to date,
h) The effective plugging percentage for all plugging and tube repairs in each steam generator; and
i) The results of condition monitoring including the results of tube pulls and in-situ testing.

Template for an Administrative Section Technical Specification for a Steam Generator Program

Revision to NRC Submittal

Text in bold blue underlined font indicates a change from the version of the Steam Generator Generic License Change Package sent to the NRC in December 2000.

5.5.9 Steam Generator Program

A Steam Generator Program shall be established and implemented to ensure that steam generator tube integrity is maintained. Steam generator tube integrity is maintained by meeting the performance criteria as defined in the **Steam Generator Program.**

a. Condition Monitoring Assessment - Condition Monitoring Assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural and accident leakage integrity. The "as found" condition refers to the condition of the tubing during a steam generator inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging or repair of tubes. Condition Monitoring Assessments shall be conducted during each outage during which the steam generator tubes are inspected, plugged, or repaired to confirm that the performance criteria are being met. Requirements for condition monitoring are defined in the Steam Generator Program.

b. Performance Criteria - The steam generator performance criteria are defined in the Steam Generator Program. Revisions to performance criteria (and their associated definitions as used in the Steam Generator Program) require review and approval by the NRC. The performance criteria (and their associated definitions as used in the Steam Generator Program) may be revised to incorporate changes approved generically by the NRC subject to the limitations and conditions set forth in the staff's approving document. Demonstration of satisfaction of the generic limitations and conditions must be documented in a evaluation prepared in accordance with 10 CFR 50.59.

c. Tube Repair Criteria and Repair Methods - Tube repair criteria and repair methods shall be described in and implemented by the Steam Generator Program. Repair criteria and repair methods may be implemented after review and approval by the NRC. In addition, repair criteria and repair methods approved generically by the NRC may be used subject to the limitations and conditions set forth in the staff's approving document. Demonstration of satisfaction of the generic limitations and conditions must be documented in a evaluation prepared in accordance with 10 CFR 50.59. Note that tube plugging is not a repair and does not need to be reviewed or approved by the NRC.

5.6.10 Steam Generator Tube Inspection Report

If the results of the steam generator inspection indicate greater than 1% of the inspected tubes in any steam generator exceed the repair criteria in accordance with the requirements of the Steam Generator Program, a Special Report shall be submitted within 120 days after the initial entry into Mode 4 following completion of the inspection. The report shall summarize:

a) The scope of inspections performed on each steam generator inspected in the affected unit during the current outage,
b) Active degradation mechanisms found,
c) NDE techniques utilized for each degradation mechanism,
d) Location, orientation(if linear) and measured sizes (if available) of service induced indications,
e) Number of tubes plugged or repaired during the inspection outage for each active degradation mechanism,
f) Repair method utilized and the number of tubes repaired by each repair method,
g) Total number and percentage of tubes plugged and/or repaired to date,
h) The effective plugging percentage for all plugging and tube repairs in each steam generator, and
i) The results of condition monitoring including the results of tube pulls and in-situ testing.

Template for a Licensee Controlled Document [Technical Requirements Manual]

Revision to NRC Submittal

Text in bold blue underlined font indicates a change from the version of the Steam Generator Generic License Change Package sent to the NRC in December 2000.

TRM x.y **<u>Steam Generators</u>**

LCO Steam generator tubes shall meet the primary to secondary pressure boundary integrity Performance Criteria **<u>below as determined by the Steam Generator Program.</u>**

A. <u>Performance Criteria</u>

(i) <u>Structural criterion</u>:
Steam Generator Tubing shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cooldown and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a safety factor of 3.0 against Burst under Normal Steady State Full Power Operation and a safety factor of 1.4 against Burst under the Limiting Design Basis Accident. Any additional loading combinations shall be included as required by existing design and licensing basis.

(ii) <u>Accident Induced Leakage criterion</u>:
The primary to secondary Accident Induced Leakage rate for the Limiting Design Basis Accident, other than a steam generator tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all steam generators and leakage rate for an individual steam generator. Leakage is not to exceed [1 gpm per steam generator, except for specific types of degradation at specific locations where the NRC has approved greater accident-induced leakage as part of a plant's licensing basis. Exceptions to the 1 gpm limit can be applied if approved by the NRC in conjunction with approved Alternate Repair Criteria].

(iii) <u>Operational leakage criterion</u>:
Requirements related to the Operational Leakage criterion are delineated in the RCS Operational LEAKAGE Technical Specification.

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

[CONTINGENCY MEASURES:]

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Performance Criteria (i) or (ii) not met.	**A.1 Enter the appropriate Conditions and Required Actions in TS 3.4.X.**	**Immediately**

[VERIFICATION REQUIREMENTS]

VERIFICATION		FREQUENCY
SR. A.	Verify steam generator tube integrity **as determined by the Steam Generator Program** is in accordance with the Performance Criteria.	**In accordance with technical specification requirements**
SR B.	Verify that SG tubes that exceed the Repair Criteria are plugged or repaired in accordance with Repair Methods.	Prior to entry into MODE 4

The following reporting requirements <u>must</u> be included in an appropriate section of the licensee controlled document

6.x <u>Steam Generator Performance and Repair Criteria Reports</u>

6.X.1 **<u>If a steam generator tube(s) is found to not meet the Performance Criteria while in MODES 1, 2, 3, or 4</u>**, a special report shall be submitted to the NRC within 60 days of the discovery that provides **<u>the Performance Criteria exceeded</u>** and the basis for the planned operating period.

next

6.X.2 If a steam generator tube(s) is found to not meet the Performance Criteria **<u>while in MODES 5, or 6</u>**, the NRC shall be notified within 8 hours. A special report shall subsequently be submitted to the NRC within 60 days of the discovery that provides **<u>corrective actions taken and</u>** information on the Performance Criteria exceeded. Another special report that provides **<u>a root cause evaluation of the condition and</u>** the basis for the planned operating period shall subsequently be submitted to the NRC within 120 days of entering MODE 4.

The following definitions apply to terms used within the context of the licensee controlled document and its Bases. They should be considered for inclusion in the implementing plant document.

Accident-induced Leakage

The primary-to-secondary leakage occurring during postulated accidents other than a steam generator tube rupture. This includes the primary-to-secondary leakage existing immediately prior to the accident plus additional primary-to-secondary leakage induced during the accident.

Burst

The gross structural failure of the tube wall. The condition typically corresponds to an unstable opening displacement (e.g., opening area increased in response to constant pressure) accompanied by ductile (plastic) tearing of the tube material at the ends of the degradation.

Limiting Design Basis Accident

In the context of steam generator primary-to-secondary pressure boundary integrity, it is the accident that results in either the largest differential pressure across the steam generator tubes for structural considerations or the minimum margin to the applicable dose limits for accident leakage considerations.

Normal Steady State Full Power Operation

The conditions existing during MODE 1 operation at the maximum steady state reactor power as defined in the design or equipment specification. Changes in design parameters such as plugging or sleeving levels, primary or secondary modifications, or T_{hot} should be assessed and included if necessary.

Repair Criteria

Those NDE measured parameters at or beyond which the tube must be repaired or removed from service by plugging.

Repair Methods

Those means used to reestablish the RCS pressure boundary integrity of SG tubes without removing the tube from service. Plugging a steam generator tube is not a repair.

Steam Generator Tubing

Steam generator tubing refers to the entire length of the tube, including the tube wall and any repairs to it, between the tube-to-tube sheet weld at the tube inlet and the tube-to-tube sheet weld at the tube outlet. The tube-to-tube sheet weld is not considered part of the tube.

Proposed Licensee Controlled Document for Steam Generator Integrity, Version 28

Information listed here are the key elements to be included in the licensee controlled documents referenced in Technical Specification 5.5.9.1. Content, not format, is important.

TRM x.y **Steam Generators**

Each steam generator shall meet primary to secondary pressure boundary integrity performance criteria as given below during MODES 1, 2, 3, and 4.

Performance Criteria

(i) Structural criterion:
Steam generator tubing shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cooldown and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a margin of 3.0 against **burst** under **normal steady state full power operation** and a margin of 1.4 against **burst** under the limiting design basis accident concurrent with a safe shutdown earthquake.

(ii) **Accident induced leakage** criterion:
The primary to secondary **accident induced leakage** rate for the limiting design basis accident, other than a steam generator tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all steam generators and leakage rate for an individual steam generator. Leakage is not to exceed [1 gpm per steam generator, except for specific types of degradation at specific locations where the tubes are confined, as approved by the NRC and enumerated in conjunction with the list of approved repair criteria in the TRM].

(iii) Operational leakage criterion:
The RCS operational primary to secondary leakage through any one steam generator shall be limited to 150 gallons per day at standard temperature and pressure.

Requirements related to the Operational Leakage criterion are delineated in the RCS Operational LEAKAGE Technical Specification.

CONTINGENCY MEASURES:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Does not meet **repair criteria** as discovered in MODE 5 or 6	Plug or repair the tubes exceeding the repair criteria in accordance with **repair methods**	Prior to entering MODE 4

Proposed Licensee Controlled Document for Steam Generator Integrity, Version 28

Information listed here are the key elements to be included in the licensee controlled documents referenced in Technical Specification 5.5.9.1. Content, not format, is important.

B. Does not meet performance criteria (i) or (ii) as discovered in MODE 5 or 6	Notify the NRC of the failure to meet the performance criteria. AND Investigate to determine causal factors and perform corrective measures AND Submit a special report to the NRC including the performance criteria exceeded and a root cause evaluation of the failure. AND Submit a special report to the NRC describing corrective actions taken and the basis for the planned operating period.	In accordance with §50.72 and 50.73 Prior to entering MODE 4 In accordance with §50.72 and 50.73 120 days after entering MODE 4
C. Failure to implement required plugging or repair discovered while in MODE 1, 2, 3, or 4	Notify the NRC of the failure to implement required plugging or repair. AND Determine steam generators remain acceptable for continued operation based on meeting the performance criteria AND Submit a special report to the NRC providing a root cause evaluation of the failure, corrective actions taken, and the basis for the planned operating period.	In accordance with §50.72 and 50.73 In accordance with [the licensee's corrective action program]. In accordance with §50.72 and 50.73

VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
SR x.y	Tube integrity surveillance requirements are contained within the Operational Leakage technical specification.	In accordance with the Operational Leakage technical specification.

Proposed Licensee Controlled Document for Steam Generator Integrity, Version 28

Information listed here are the key elements to be included in the licensee controlled documents referenced in Technical Specification 5.5.9.1. Content, not format, is important.

TRM x.z Definitions

The following definitions are applicable to Technical Requirement x.y only.

Accident induced leakage rate means the primary-to-secondary leakage occurring during postulated accidents other than a steam generator tube rupture. This includes the primary-to-secondary leakage rate existing immediately prior to the accident plus additional primary-to-secondary leakage induced during the accident.

Burst is defined as the gross structural failure of the tube wall. The condition typically corresponds to an unstable opening displacement (e.g., opening area increased in response to constant pressure) accompanied by ductile (plastic) tearing of the tube material at the ends of the degradation.

Normal steady state full power operation is defined as the conditions existing during MODE 1 operation at the maximum steady state reactor power as defined in the design or equipment specification. Changes in design parameters such as plugging or sleeving levels, primary or secondary modifications, or T_{hot} should be assessed and included if necessary.

Repair Criteria are those NDE measured parameters at or beyond which the tube must be repaired or removed from service by plugging. The repair criteria approved for use are:

- 40% nominal tube wall thickness (includes plug or repair on detection)
- [list Repair Criteria that are currently approved for licensee use]

Repair Methods are those means used to reestablish the RCS pressure boundary integrity of SG tubes without removing the tube from service. Plugging a steam generator tube is not a repair. The repair methods approved for use are:

- [Laser welded sleeves (Reference:.....)]
- [TIG welded sleeves (Reference ....)]
- [list Repair Methods that are currently approved for licensee use]

Steam generator tubing refers to the entire length of the tube between the tube-to-tubesheet joint at the tube inlet to the tube-to-tubesheet joint at the tube outlet. If the joint is a weld, the weld is not considered part of the tube.

Proposed Licensee Controlled Document for Steam Generator Integrity, Version 28

Information listed here are the key elements to be included in the licensee controlled documents referenced in Technical Specification 5.5.9.1. Content, not format, is important.

Operating MODES are plant or NSSS design specific. The following typical Westinghouse operating MODES are shown to provide context for the APPLICABILITY requirement in this sample Licensee Controlled Document.

MODES

MODE	TITLE	REACTIVITY CONDITION (K_{eff})	% RATED THERMAL POWER[1]	AVERAGE REACTOR COOLANT TEMPERATURE (F)
1	Power Operation	≥ 0.99	> 5	NA
2	Startup	≥ 0.99	≤ 5	NA
3	Hot Standby	< 0.99	NA	$\geq$ [350]
4	Hot Shutdown[2]	< 0.99	NA	[350] $> T_{avg} >$ [200]
5	Cold Shutdown[2]	< 0.99	NA	$\leq$ [200]
6	Refueling[3]	NA	NA	NA

[1] Excluding decay heat
[2] All reactor vessel head closure bolts fully tensioned
[3] One or more reactor vessel head closure bolts less than fully tensioned

Proposed RCS Operational Leakage Tech Spec

REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS Operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;
b. 1 gpm unidentified LEAKAGE;
c. 10 gpm identified LEAKAGE;
d. 150 gallons per day primary to secondary LEAKAGE through any one Steam Generator (SG).

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS Operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours
B. Required action and associated completion time of Condition A not met. OR Pressure boundary LEAKAGE exists. OR Primary to secondary LEAKAGE not within limits.	B.1 Be in MODE 3 AND B.2. Be in MODE 5	6 hours 36 hours

Proposed RCS Operational Leakage Tech Spec

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.13.1 ------------------------------NOTE------------------------------ 1. Not required to be performed in MODE 3 or 4 until 12 hours of steady state operation. 2. Not applicable to primary to secondary LEAKAGE. -- Perform RCS water inventory balance.	---------------NOTE--------------- Only required to be performed during steady state operation -- 72 hours
SR 3.4.13.2 Verify primary to secondary LEAKAGE is in accordance with the operational leakage performance criterion described in the Steam Generator Program.	In accordance with the Steam Generator Program

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;

b. 1 gpm unidentified LEAKAGE;

c. 10 gpm identified LEAKAGE;

~~d. 1 gpm total primary to secondary LEAKAGE through all steam generators (SGs); and~~

d. ~~e.~~ 150 [~~500~~] gallons per day primary to secondary LEAKAGE through any one SG.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours
B. Required Action and associated Completion Time of Condition A not met. OR Pressure boundary LEAKAGE exists.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.13.1	-------------------NOTE------------------- Not required to be performed in MODE 3 or 4 until 12 hours of steady state operation. -- Perform RCS water inventory balance.	-----NOTE------ Only required to be performed during steady state operation --------------- 72 hours
SR 3.4.13.2	Verify steam generator tube integrity is in accordance with the the performance criteria described in the Steam Generator ~~Tube Surveillance~~ Program.	In accordance with the Steam Generator ~~Tube Surveillance~~ Program

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.13 RCS Operational LEAKAGE

BASES

BACKGROUND

Components that contain or transport the coolant to or from the reactor core make up the RCS. Component joints are made by welding, bolting, rolling, or pressure loading, and valves isolate connecting systems from the RCS.

During plant life, the joint and valve interfaces can produce varying amounts of reactor coolant LEAKAGE, through either normal operational wear or mechanical deterioration. The purpose of the RCS Operational LEAKAGE LCO is to limit system operation in the presence of LEAKAGE from these sources to amounts that do not compromise safety. This LCO specifies the types and amounts of LEAKAGE.

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

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

A limited amount of leakage inside containment is expected from auxiliary systems that cannot be made 100% leaktight. Leakage from these systems should be detected, located, and isolated from the containment atmosphere, if possible, to not interfere with RCS leakage detection.

This LCO deals with protection of the reactor coolant pressure boundary (RCPB) from degradation and the core from inadequate cooling, in addition to preventing the accident analyses radiation release assumptions from being exceeded. The consequences of violating this LCO include the possibility of a loss of coolant accident (LOCA).

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes a 1 gpm primary to secondary LEAKAGE as the initial condition. Insert Attached

Primary to secondary LEAKAGE is a factor in the dose releases outside containment resulting from a steam line break (SLB) accident. To a lesser extent, other accidents or transients involve secondary steam release to the atmosphere, such as a steam generator tube rupture (SGTR). The leakage contaminates the secondary fluid.

The FSAR (Ref. 3) analysis for SGTR assumes the contaminated secondary fluid is only briefly released via safety valves and the majority is steamed to the condenser. The ~~1 gpm~~ 150 gpd primary to secondary LEAKAGE is relatively inconsequential.

The [SLB] is more limiting for site radiation releases. The safety analysis for the SLB accident assumes 1 gpm primary to secondary LEAKAGE in one generator as an initial condition. The dose consequences resulting from the [SLB] accident are well within the limits defined in 10 CFR 100 or the staff approved licensing basis (i.e., a small fraction of these limits).

The RCS operational LEAKAGE satisfies Criterion 2 of the NRC Policy Statement.

LCO

RCS operational LEAKAGE shall be limited to:

a. Pressure Boundary LEAKAGE

No pressure boundary LEAKAGE is allowed, being indicative of material deterioration. LEAKAGE of this type is unacceptable as the leak itself could cause further deterioration, resulting in higher LEAKAGE. Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.

(continued)

Proposed SG Tech Spec Changes
Operational Leakage Bases, Version 21

B LCO 3.4.13 <u>**RCS Operational LEAKAGE**</u>

<u>**APPLICABLE SAFETY ANALYSIS:**</u>

The Technical Specification requirement to limit primary to secondary leakage through any one steam generator to less than 150 gallons per day is significantly less than the initial condition of the safety analysis. A limit of 150 gallons per day is based on operating experience as an indication of one or more propagating tube leak mechanisms. This leakage rate provides additional assurance against tube burst at normal and faulted conditions and provides additional assurance that flaws will not propagate to burst prior to detection by leakage monitoring methods and commencement of plant shutdown.

BASES

LCO
(continued)

b. Unidentified LEAKAGE

One gallon per minute (gpm) of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment sump level monitoring equipment can detect within a reasonable time period. Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary.

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of identified LEAKAGE and is well within the capability of the RCS Makeup System. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include pressure boundary LEAKAGE or controlled reactor coolant pump (RCP) seal leakoff (a normal function not considered LEAKAGE). Violation of this LCO could result in continued degradation of a component or system.

~~d. Primary to Secondary LEAKAGE through All Steam Generators (SGs)~~

~~Total primary to secondary LEAKAGE amounting to 1 gpm through all SGs produces acceptable offsite doses in the SLB accident analysis. Violation of this LCO could exceed the offsite dose limits for this accident. Primary to secondary LEAKAGE must be included in the total allowable limit for identified LEAKAGE.~~

e. Primary to Secondary LEAKAGE through Any One SG

150 flaw

The [~~500~~] gallons per day limit on one SG is based on the assumption that a single ~~crack~~ leaking this amount would not propagate to a SGTR under the stress conditions of a LOCA or a main steam line rupture. If leaked through many ~~cracks~~, the ~~cracks~~ are very small, and the above assumption is conservative.

flaws

(continued)

BASES (continued)

APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In MODES 5 and 6, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage," measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leak tight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

ACTIONS

A.1

Unidentified LEAKAGE, identified LEAKAGE, or primary to secondary LEAKAGE in excess of the LCO limits must be reduced to within limits within 4 hours. This Completion Time allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

B.1 and B.2

If any pressure boundary LEAKAGE exists, or if unidentified LEAKAGE, identified LEAKAGE, or primary to secondary LEAKAGE cannot be reduced to within limits within 4 hours, the reactor must be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. The reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. This action reduces the LEAKAGE and also reduces the factors that tend to degrade the pressure boundary.

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. In MODE 5, the pressure stresses

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

acting on the RCPB are much lower, and further deterioration is much less likely.

SURVEILLANCE REQUIREMENTS

SR 3.4.13.1

Verifying RCS LEAKAGE to be within the LCO limits ensures the integrity of the RCPB is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance. Primary to secondary LEAKAGE is also measured by performance of an RCS water inventory balance in conjunction with effluent monitoring within the secondary steam and feedwater systems.

The RCS water inventory balance must be met with the reactor at steady state operating conditions and near operating pressure. Therefore, this SR is not required to be performed in MODES 3 and 4 until 12 hours of steady state operation near operating pressure have been established.

Steady state operation is required to perform a proper inventory balance; calculations during maneuvering are not useful and a Note requires the Surveillance to be met when steady state is established. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment sump level. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation."

The 72 hour Frequency is a reasonable interval to trend LEAKAGE and recognizes the importance of early leakage

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.13.1 (continued)

detection in the prevention of accidents. A Note under the Frequency column states that this SR is required to be performed during steady state operation.

SR 3.4.13.2

This SR provides the means necessary to determine SG OPERABILITY in an operational MODE. The requirement to demonstrate ~~SG tube integrity~~ in accordance with the Steam Generator ~~Tube Surveillance~~ Program emphasizes the importance of SG tube integrity, even though this Surveillance cannot be performed at normal operating conditions.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 30.
2. Regulatory Guide 1.45, May 1973.
3. FSAR, Section [15].

Protocol for Resolution of Steam Generator Issues Between the Industry and the NRC

1.0 Purpose

The purpose of this protocol is to define a process for identifying, tracking, and resolving issues that arise during the NRC review of the industry's Steam Generator Program Generic License Change Package.

2.0 Scope

This process applies to all identified steam generator program related issues, whether technical or regulatory. Both industry and NRC actions will be tracked.

3.0 Interface

The two principal parties involved in this process will be the NEI Steam Generator Program Task Force (SGTF) for the industry and the NDE and Metallurgy Section for the NRC. Other organizations will be called to support the effort as necessary.

Each principal party has identified a lead individual ("Lead") and a point of contact ("Contact") for communications as follows:

	Industry	NRC
Lead	Jim Riley	Ted Sullivan
Point of Contact	Jim Riley	ELM

The Lead for each party will have overall responsibility for coordinating the resolution of the issues. The Point of Contact will be the focal point for written documents intended to either offer positions on the issues or provide comments on a position.

4.0 Process

1.1 Issue identification

This process is intended to capture all Steam Generator Program related issues that require resolution because of different NRC and industry positions. The industry and NRC Contacts will be responsible for obtaining a summary of their party's position on each issue. Each

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issue and its industry and NRC positions will be included in the Tracking Database.

Resolution of the issues will involve the identification of one or more actions. Both the NRC and the industry Leads must approve newly identified actions for inclusion in the process. Each action will be assigned to an individual for completion and given an expected completion date. Each action will be included in the Tracking Database.

4.2 Issue tracking

4.2.1 Issue management

4.2.1.1 Authority for Identifying Issues and Actions

The NRC and the industry Leads will jointly decide which issues and actions to add to the Tracking Database and will coordinate their resolution.

4.2.1.2 Prioritization of Issues

Each issue will be assigned a priority based on its safety significance and schedule importance. Priority will be assigned as follows:

- 1 – highest priority – needs immediate attention
- 2 – normal priority – target resolution within 12 months
- 3 – low priority – resolve as time permits

4.2.1.3 Action Status

Each action will be given a status in the database as follows:

- O – "Open" - actively working
- P – "Pending" – on hold
- C – "Closed"

4.2.1.4 Assigning Action responsibilities

The Leads are responsible for the identification of an individual assigned to complete each action in the Tracking Database.

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4.2.1.5 Due dates

The Leads are responsible for the identification of due dates for the completion of each action in the Tracking Database.

4.2.2 Tracking Database

1.1.1.1 Description

A database will be developed to aid the tracking of each issue identified. The database will include:

- A statement of each issue being resolved
- A summary of each party's position on the issue
- The priority of each issue
- All actions identified for each issue
- Individuals responsible for action completion
- Action due dates and status

The database will be used as the primary tool to structure industry / NRC meetings and follow the resolution of all open issues.

1.1.1.2 Responsibility for upkeep

NEI will be responsible for upkeep of the database. The Contacts will be responsible for informing NEI of changes to the information contained within the database.

1.1.1.3 Authority to change entries

The Leads will be responsible for approving changes to the information in the database.

4.3 Issue resolution

4.3.1 Means of communication

Verbal communication is encouraged to facilitate progress on each issue. However, at some point written positions will be required to ensure understanding of the positions.

Written draft industry or NRC positions will be created for each issue and for actions as appropriate. The draft positions will be

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communicated via e-mail through the Contact to the other party for review. Written comments on positions will be communicated via e-mail through the Contact back to the individual responsible for the work.

4.3.2 Meetings and phone calls

NRC and industry intend to meet frequently to resolve the steam generator issues. It is expected that monthly phone calls and / or meetings will be necessary for this purpose. In so far as possible, written positions and comments will be brought to these meetings to facilitate understanding of each party's position.

4.4 Issue closeout

4.4.1 Issue Closure

For the purpose of this process, an issue will be considered closed when the NRC and the industry agree on the resolution or agree to disagree on the solution. If further action is required to complete the resolution, it will be the responsibility of the industry to track the items to their ultimate completion. For example:

Industry and NRC agree on the changes necessary to a Guideline. The Guideline must be changed before all the actions are final, but once industry and the NRC have reached agreement on the proposed change, the item is considered closed.

4.4.2 Documentation requirements

Once the industry has reached a final position on each issue, NEI will communicate the final industry response to the NRC by formal correspondence.

The NRC will formally respond to each final position in writing, either acknowledging agreement or documenting its final comments on the industry position and providing an alternate approach.

Final positions will be documented in the Tracking Database.

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5.0 Documentation

The final NEI database will document all issues and the actions taken to resolve them.

Ultimately the closeout of every issue will be documented by a formal industry position submitted via NEI letter to the NRC and by a formal written NRC response that either expresses agreement with the industry position or provides NRC comments and an alternate position.