ArevaEPRDCPEm Resource

From: DUNCAN Leslie E (AREVA NP INC) [Leslie.Duncan@areva.com]
Sent: Thursday, April 09, 2009 12:41 PM
To: Getachew Tesfaye
Cc: Pederson Ronda M (AREVA NP INC); DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 101, Supplement 2
Attachments: RAI 101 Supplement 2 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided a schedule for a technically correct and complete response to RAI No. 101 on February 19, 2009. The attached file, "RAI 101 Supplement 2 Response US EPR DC.pdf" provides technically correct and complete responses to the remaining question, as committed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 101 Question 16-68.

The following table indicates the respective pages in the response document, "RAI 101 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 101 — 16-68	2	3

This concludes the formal AREVA NP response to RAI 101, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

(on the behalf of Ronda Pederson)

Les Duncan
Licensing Engineer
AREVA NP Inc.
An AREVA and Siemens Company
Tel: (434) 832-2849
Leslie.Duncan@areva.com

From: Pederson Ronda M (AREVA NP INC)
Sent: Thursday, February 19, 2009 6:41 PM
To: 'Getachew Tesfaye'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); PORTER Thomas (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 101, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 54 of the 71 questions of RAI No. 101 on December, 2008. The attached file, "RAI 101 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete responses to 16 of the remaining 17 questions, as committed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 101 Questions 16-56, 16-57, 16-61, 16-67, 16-69, 16-72, 16-77, 16-79, and 16-103.

The following table indicates the respective pages in the response document, "RAI 101 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 101 — 16-54	2	2
RAI 101 — 16-55	3	3
RAI 101 — 16-56	4	4
RAI 101 — 16-57	5	5
RAI 101 — 16-61	6	6
RAI 101 — 16-66	7	7
RAI 101 — 16-67	8	8
RAI 101 — 16-68	9	9
RAI 101 — 16-69	10	10
RAI 101 — 16-70	11	11
RAI 101 — 16-72	12	12
RAI 101 — 16-74	13	13
RAI 101 — 16-76	14	14
RAI 101 — 16-77	15	15
RAI 101 — 16-79	16	16
RAI 101 — 16-82	17	17
RAI 101 — 16-103	18	18

The schedule for a technically correct and complete response to the remaining question has been changed and is provided below:

Question #	Response Date
RAI 101 — 16-68	April 9, 2009

Sincerely,

Ronda Pederson
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From: Pederson Ronda M (AREVA US)
Sent: Friday, December 12, 2008 4:39 PM
To: 'Getachew Tesfaye'
Cc: PORTER Thomas (EXT); DUNCAN Leslie E (AREVA US); BENNETT Kathy A (OFR) (AREVA US); DELANO Karen V (AREVA US)
Subject: Response to U.S. EPR Design Certification Application RAI No. 101 (931), FSARCh. 16

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 101 Response US EPR DC.pdf" provides technically correct and complete responses to 54 of the 71 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 101 Questions 16-58, 16-59, 16-60, 16-63, 16-64, 16-65, 16-71, 16-73, 16-75, 16-78, 16-80, 16-81, 16-83, 16-84, 16-85, 16-86, 16-87, 16-89, 16-91, 16-92, 16-93, 16-94, 16-95, 16-96, 16-97, 16-98, 16-99, 16-100, 16-101, 16-102, 16-104, 16-107, 16-109, 16-110, 16-112, 16-113, 16-114, 16-115, 16-116, 16-117, 16-118, 16-122, 16-123, and 16-124.

The following table indicates the respective page(s) in the response document, "RAI 101 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 101 — 16-54	2	2
RAI 101 — 16-55	3	3
RAI 101 — 16-56	4	4
RAI 101 — 16-57	5	5
RAI 101 — 16-58	6	6
RAI 101 — 16-59	7	7
RAI 101 — 16-60	8	8
RAI 101 — 16-61	9	9
RAI 101 — 16-62	10	10
RAI 101 — 16-63	11	11
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RAI 101 — 16-124	77	77

A complete answer is not provided for 17 of the 71 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	**Response Date**
RAI 101 — 16-54	February 19, 2009
RAI 101 — 16-55	February 19, 2009
RAI 101 — 16-56	February 19, 2009
RAI 101 — 16-57	February 19, 2009
RAI 101 — 16-61	February 19, 2009
RAI 101 — 16-66	February 19, 2009
RAI 101 — 16-67	February 19, 2009
RAI 101 — 16-68	February 19, 2009
RAI 101 — 16-69	February 19, 2009
RAI 101 — 16-70	February 19, 2009

RAI 101 — 16-72	February 19, 2009
RAI 101 — 16-74	February 19, 2009
RAI 101 — 16-76	February 19, 2009
RAI 101 — 16-77	February 19, 2009
RAI 101 — 16-79	February 19, 2009
RAI 101 — 16-82	February 19, 2009
RAI 101 — 16-103	February 19, 2009

Sincerely,

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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Wednesday, November 12, 2008 8:14 PM
To: ZZ-DL-A-USEPR-DL
Cc: Hien Le; Michael Marshall; Peter Hearn; Joseph Colaccino; John Rycyna
Subject: U.S. EPR Design Certification Application RAI No. 101 (931), FSARCh. 16

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on October 16, 2008, and discussed with your staff on October 28, 2008. None of the draft RAI question were modified as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 394

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Subject: Response to U.S. EPR Design Certification Application RAI No. 101, Supplement 2
Sent Date: 4/9/2009 12:40:33 PM
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From: DUNCAN Leslie E (AREVA NP INC)

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Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
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Response to

Request for Additional Information No. 101 Supplement 2

11/12/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 16 - Technical Specifications
Application Section: TS Section 3.4

QUESTIONS for Technical Specification Branch (CTSB)

Question 16-68:

TS Bases B 3.4.11, Low Temperature Overpressure Protection (LTOP) System.

Justify that LCO 3.4.11, items a, b, c, and d, ensures LTOP is Operable and assure that it was developed from FSAR 5.2.2.2.2. Several of the mass and heat input transients were identified as being covered by other analyses without further discussion. Revise TS Bases B 3.4.11 to provide proper references or include any additional information needed to justify that LCO 3.4.11, items a, b, c, and d, ensures LTOP is Operable.

This additional information will be used to ensure that the LCO statement is accurate and complete, and adequately justified.

Response to Question 16-68:

U.S. EPR FSAR Tier 2, Section 5.2.2.2.2 presents the low temperature overpressure protection (LTOP) analyses. As stated in Section 5.2.2.2.2, "low temperature overpressure protection is operable during startup and shutdown conditions at or below the reactor pressure vessel (RPV) brittle fracture protection function enable temperature." The LTOP analyses are performed over the range of initial reactor coolant system (RCS) temperatures at which LTOP is operable. Correspondingly, U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications LCO 3.4.11 is applicable in Mode 4 when any RCS cold leg temperature is less than or equal to the LTOP arming temperature specified in the Pressure-Temperature Limitations Report (PTLR), in Mode 5, and in Mode 6 when the reactor vessel head is on. The minimum LTOP arming temperature specified in the PTLR will be such that the LTOP analysis spans the temperature range at which LTOP is operable. As stated in the response to RAI Batch 64, Question 05.03.02-5, AREVA NP will submit a generic PTLR to satisfy requirements in the Technical Specifications.

U.S. EPR FSAR Tier 2, Section 5.2.2.2.2 also states, the "capacity of the PSRVs at the reduced LTOP setpoints is sufficient to provide overpressure protection." Two pressurizer safety relief valves (PSRV) are used for overpressure protection during low temperature operations. U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications LCO 3.4.11 Item “d”, Option 1 requires for LTOP Operability two PSRVs which are LTOP capable with lift settings within the limits specified in the PTLR. LCO 3.4.11 Item “d”, Option 1, therefore, is consistent with the LTOP analyses for required relief capacity and valve setpoints. LCO 3.4.11 Item “d”, Option 2 requires for LTOP Operability a depressurized RCS and an RCS vent of ≥ 10.1 square inches. U.S. EPR FSAR Tier 2, Table 5.4-9, identifies the PSRV throat area calculated to achieve the minimum specified relief capacity. The value for the PSRV has been determined to be 4.5 square inches instead of the stated 4.6 square inches. This value will be changed in Table 5.4-9. As stated in the U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Bases for LCO 3.4.11, the required vent of ≥ 10.1 square inches is twice the calculated PSRV throat area with margin; therefore, it will provide equivalent or greater relief capability than LCO 3.4.11 Item “d”, Option 1.

The LTOP analyses presented in U.S. EPR FSAR Tier 2, Section 5.2.2.2.2 consider four mass input events. The first event is the unplanned start of four medium head safety injection (MHSI) pumps simultaneously with a failure of one large miniflow line to open. As stated in U.S. EPR FSAR Tier 2, Section 5.2.2.2.2, permissive "P17 holds open the large miniflow lines to prevent overpressurizing the RCS if this scenario occurs, however one large miniflow line is assumed to fail closed." LCO 3.4.11 Item “b” requires that the miniflow lines are open for any MHSI pump

capable of injecting into the RCS. The LCO thus defines the bounding initial conditions for the analyzed event. The U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Bases for LCO 3.4.11 will be revised to reflect the analyses performed.

The second and third mass input events are charging pump and extra borating system (EBS) pump injection, respectively. The LTOP analyses assume full injection capacity for these events and there are no corresponding LCOs.

The fourth mass input event is the release of accumulators into the RCS. U.S. EPR FSAR Tier 2 Section 5.2.2.2.2 will be modified to explain the accumulator isolation valve will be electrically de-energized to prevent inadvertent opening. LCO 3.4.11 Item “a” requires that the accumulators are isolated from injecting into the RCS. The control identified in the LCO allows the analysis to exclude the event in accordance with Branch Technical Position 5-2. The U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Bases for LCO 3.4.11 will be revised to reflect this exclusion. A Note in LCO 3.4.11 allows an accumulator to be unisolated when accumulator pressure is less than the maximum RCS pressure for the existing RCS cold leg temperature allowed by the pressure-temperature (P-T) limit curves provided in the PTLR. An accumulator at this pressure cannot pressurize the RCS above the P-T limits, which are the LTOP analysis acceptance criteria.

The LTOP analyses presented in U.S. EPR FSAR Tier 2, Section 5.2.2.2.2, consider three heat input events. The first event is the startup of a reactor coolant pump (RCP) with the secondary temperature 50F higher than the primary temperature. LCO 3.4.11 Item “c” prevents the reactor coolant pumps (RCP) from starting unless the secondary side water temperature of each steam generator is ≤ 50°F above each of the RCS cold leg temperatures. The LCO thus defines the bounding initial conditions for the analyzed event.

The second and third heat input events are pressurizer heaters energizing and residual heat removal system isolation, respectively. The LTOP analyses assume the maximum heat addition for these events and there are no corresponding LCOs.

The preceding discussion justifies that LCO 3.4.11, Items a, b, c, and d ensure LTOP is operable and are developed from the LTOP analyses presented in U.S. EPR FSAR Tier 2, Section 5.2.2.2.2. The applicable temperature range and the relief valve capacity and setpoints are consistent between the LTOP analysis and LCO 3.4.11. The LCO controls to exclude events from analysis and define the bounding initial conditions for analysis bound the LTOP events that are analyzed and presented in U.S. EPR FSAR Tier 2, Section 5.2.2.2.2.

FSAR Impact:

U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Bases for LCO 3.4.11, Table 5.4-9 and Section 5.2.2.2 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

5.2.2.2.2 Low Temperature Overpressure Protection

Features that provide low temperature overpressure protection (LTOP) for the RCPB are designed in accordance with BTP 5-2 (Reference 8). Each PSRV is equipped with two solenoid-operated pilot valves in series for LTOP of the RCPB, although only two PSRVs are used during low temperature operations. During reactor cool down, an alarm is generated from the wide range cold leg temperature instrumentation once conditions for permissive P17 are met, allowing the operator to validate the permissive to enable LTOP. Refer to Section 7.2.1.3.12 for a description of the P17 permissive. The operator manually validates permissives to enable LTOP. Low temperature overpressure protection is operable during startup and shutdown conditions at or below the reactor pressure vessel (RPV) brittle fracture protection function enable temperature.

The LTOP enable temperature and PSRV set points are selected so that the peak RPV pressure does not exceed the 10 CFR Part 50, Appendix G limits. PSRV setpoints are presented in Section 5.4.13. Section 5.3.2 addresses pressure-temperature limits for the RPV.

Low temperature RCPB overpressure events include mass input events and heat input events. These events are considered and are presented with the interlock or equipment lock-out that could prevent the event, where applicable:

- Mass input events.
  - Unplanned start of four medium head safety injection (MHSI) pumps simultaneously with a failure of one large miniflow line to open.
    - P17 holds open the large miniflow lines to prevent overpressurizing the RCS if this scenario occurs, however one large miniflow line is assumed to fail closed.
  - Both charging pumps running and the control valve failed open (a maximum runout flow of 112.66 lb_m/second, total for both pumps).
  - Unplanned start of two extra borating system pumps.
  - Release of accumulators into the RCS.
  - To prevent the potential for a LTOP event, the accumulator isolation valves

16-68

– Residual heat removal system (RHRS) connecting valves fail closed.

Two mass input events – start of four MHSI pumps with one large miniflow line closed, and both charging pumps running with control valve failed open – and one heat input event – startup of an RCP with the secondary side hotter than the primary side – were selected for analysis. The other overpressure events are bounded by the analyzed events. The conservative analyses assume water solid conditions with letdown lines isolated and the most limiting single failure. Set point uncertainties are added to the nominal PSRV open and close set points. For the charging pump and RCP events, the limiting single failure is a failure of one PSRV. For the MHSI event, the limiting single failure is the failure of one large miniflow line to open.

16-68

Analyses demonstrate that the low temperature PSRV set points yield peak pressures within 10 CFR Part 50, Appendix G limits for the corresponding temperatures for the design events over a range of initial RCS temperatures. The range for the initial RCS temperature covers the LTOP enable temperataure. The capacity of the PSRVs at the reduced (LTOP) setpoi~~o~~nts is sufficient to provide overpressure protection.

5.2.2.3 Piping and Instrumentation Diagrams

Figure 5.1-4—RCS Piping and Instrumentation Diagram, displays the piping and instrumentation diagram for the RCS, including the PSRVs.

5.2.2.4 Equipment and Component Description

Section 5.4.13 presents the PSRV design parameters, including capacities and set pressures, and addresses the operation of the PSRVs. Figure 5.4-8 includes a schematic representation of the PSRVs. Section 3.9 and Section 3.11 present component stress analyses and environmental conditions for which the components are designed.

5.2.2.5 Mounting of Pressure Relief Devices

The PSRVs are mounted to the PZR nozzles. The stress analyses and the associated acceptance criteria for the PZR nozzles and the PSRV is performed in accordance with the requirements for ASME class 1 components and piping. Section 3.9.3.2 addresses stress and load combination requirements for the PSRVs.

5.2.2.6 Applicable Codes and Classification

Table 5.4-9—Pressurizer Safety Relief Valve Design Parameters

Number	3
Minimum relief capacity at set pressure	661,400 lb_m/hr per PSRV
Design temperature	684°F
Design pressure	2535 psig
Throat Area[1]	4.5~~6~~ in^2
Power operation setpoints	2535 ± 1% psig
Low temperature operation setpoints	525 psig, 541 psig
Maximum opening time (including pilot valves)	0.7 sec

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Note:

1. The throat area of the PSRV is a calculated value based on the minimum relief capacity at the set pressure for power operation.

BASES

BACKGROUND (continued)

decay heat levels, the makeup system can provide adequate flow via the makeup control valve. By having the MHSI miniflow lines open, the MHSI pumps can be made available in the event of loss of inventory.

The RCPs~~S~~ are administratively restricted from being started unless the secondary side water temperature of each steam generator is less than or equal to 50°F above each of the RCS cold leg temperatures.

16-68

The LTOP System for pressure relief consists of two PSRVs with reduced lift settings, or a depressurized RCS and an RCS vent of sufficient size. ~~One PSRV has adequate relieving capability to keep from overpressurization for the assumed coolant input capability. Two PSRVs are required for redundancy.~~

PSRV Requirements for LTOP Capability

As designed for the LTOP System, each PSRV is signaled to open if the RCS pressure approaches a limit determined by the LTOP actuation logic in Technical Specification Section 3.3. The LTOP actuation logic monitors the RCS pressure and determines when a condition not acceptable in the PTLR limits is approached. If the indicated pressure meets or exceeds the calculated value, a PSRV is signaled to open.

The PTLR presents the PSRV setpoints for LTOP. The setpoints are normally staggered so only one valve opens during a low temperature overpressure transient. Having the setpoints of the valves within the limits in the PTLR ensures that the Reference 1 limits will not be exceeded in any analyzed event.

When a PSRV is opened in an increasing pressure transient, the release of coolant will cause the pressure increase to slow and reverse. As the PSRV releases coolant, the RCS pressure decreases until a reset pressure is reached and the valve is signaled to close. The pressure continues to decrease below the reset pressure as the valve closes.

In addition to the LTOP actuation logic the PSRVs are considered LTOP capable if they have the appropriate power supplies to perform their overpressure protection function.

BASES

BACKGROUND (continued)

RCS Vent Requirements for LTOP Capability

Once the RCS is depressurized, a vent exposed to the containment atmosphere will maintain the RCS at containment ambient pressure in an RCS overpressure transient, if the relieving requirements of the transient do not exceed the capabilities of the vent. Thus, the vent path must be capable of relieving the flow resulting from the limiting LTOP mass or heat input transient, and maintaining pressure below the P/T limits. The required vent capacity may be provided by one or more vent paths.

For an RCS vent to meet the flow capacity requirement (Ref.1) , it requires an open, clear flowpath and disabling any valves in the open position which could potentially block the flowpath. The vent path(s) must be above the level of reactor coolant, so as not to drain the RCS when open.

16-68

APPLICABLE SAFETY ANALYSES

~~Safety~~RCS overpressure analyses (Ref. 4) demonstrate that the reactor vessel is adequately protected against exceeding the Reference 1 P/T limits. In MODES 1, 2, and 3, and in MODE 4 with RCS cold leg temperature exceeding the LTOP arming temperature specified in the PTLR, the PSRVs will prevent RCS pressure from exceeding the Reference 1 limits. At about the LTOP arming temperature specified in the PTLR, and below, overpressure prevention falls to two OPERABLE PSRVs or to a depressurized RCS and a sufficient sized RCS vent. Each of these means has a limited overpressure relief capability.

The actual temperature at which the pressure in the P/T limit curve falls below the PSRV setpoint increases as the reactor vessel material toughness decreases due to neutron embrittlement. Each time the PTLR curves are revised, the LTOP System must be re-evaluated to ensure its functional requirements can still be met using PSRV method or the depressurized and vented RCS condition.

The PTLR contains the acceptance limits that define the LTOP requirements. Any change to the RCS must be evaluated against the Reference 4 analyses to determine the impact of the change on the LTOP acceptance limits.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Mass Input Type Transients

a. Safety Injection; or

b. Charging / letdown flow mismatch.

Heat Input Type Transients

Reactor coolant pump (RCP) startup with temperature asymmetry within the RCS or between the RCS and steam generators.

The following are required during the LTOP MODES to ensure that mass and heat input transients do not occur, which either of the LTOP overpressure protection means cannot handle:

a. Ensuring the MHSI miniflow lines are open on MHSI pumps capable of injecting into the RCS;

b. Deactivating the accumulator discharge isolation valves in their closed positions; and

c. Disallowing start of an RCP if secondary temperature is more than 50 °F above primary temperature in any one loop. ~~LCO 3.4.6, "RCS Loops - MODE 4," and LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," provide this protection.~~

16-68

The Reference 4 analyses demonstrate that either ~~one~~two PSRVs or the depressurized RCS and RCS vent can maintain RCS pressure below limits when ~~the~~ one MHSI miniflow line~~s~~ ~~are~~is closed~~open~~ and the pump~~s~~ ~~are~~is actuated. Thus, the LCO allows MHSI pumps to be available during the LTOP MODES. ~~Since neither the PSRV nor the RCS vent can handle the pressure transient need from accumulator injection, w~~When RCS temperature is low, the LCO also requires the accumulators isolation when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in the PTLR.

16-68

The isolated accumulators must have their discharge valves closed and the valve power supply breakers fixed in their open positions. ~~The~~

BASES

APPLICABLE SAFETY ANALYSES (continued)

Fracture mechanics analyses established the temperature of LTOP Applicability at the LTOP arming temperature specified in the PTLR.

The consequences of a small break loss of coolant accident (LOCA) in LTOP MODE 4 conform to 10 CFR 50.46 and 10 CFR 50, Appendix K (Refs. 5 and 6), requirements by having a minimum of three MHSI pumps and SI actuation enabled.

PSRV Performance

16-68

The fracture mechanics analyses show that the vessel is protected when the PSRVs are set to open at or below the limit shown in the PTLR. The setpoints are derived by analyses that model the performance of the LTOP System, assuming the limiting LTOP transient. ~~of four MHSI pumps at various temperatures from 70°F to 250°F injecting into the RCS.~~ These analyses consider pressure overshoot and undershoot beyond the PSRV opening and closing, resulting from signal processing and valve stroke times. The PSRV setpoints at or below the derived limit ensures the Reference 1 P/T limits will be met.

The PSRV setpoints in the PTLR will be updated when the revised P/T limits conflict with the LTOP analysis limits. The P/T limits are periodically modified as the reactor vessel material toughness decreases due to neutron embrittlement caused by neutron irradiation. Revised limits are determined using neutron fluence projections and the results of examinations of the reactor vessel material irradiation surveillance specimens. The Bases for LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits," discuss these examinations.

The PSRVs solenoid valves are considered active components. Thus, the failure of one PSRV is assumed to represent the worst case, single active failure.

RCS Vent Performance

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With the RCS depressurized, analyses show a vent size of 10.1 square inches is capable of mitigating the allowed LTOP overpressure transient. The required vent sizing is two times a PSRV throat area plus margin.

BASES

ACTIONS (continued)

The vent must be sized ≥ 10.1 square inches to ensure that the flow capacity is greater than that required for the worst case mass input transient reasonable during the applicable MODES. This action is needed to protect the RCPB from a low temperature overpressure event and a possible brittle failure of the reactor vessel.

The Completion Time considers the time required to place the plant in this Condition and the relatively low probability of an overpressure event during this time period due to increased operator awareness of administrative control requirements.

SURVEILLANCE REQUIREMENTS

SR 3.4.11.1

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To minimize the potential for a low temperature overpressure event by limiting the mass input capability the accumulator discharge isolation valves are verified closed and ~~locked out~~the motor will be de-energized.

The Frequency of 12 hours is sufficient, considering other indications and alarms available to the operator in the control room, to verify the required status of the equipment.

SR 3.4.11.2

To minimize the potential for a low temperature overpressure event by limiting the mass input capability the miniflow lines for each MHSI pump capable of injecting into the RCS is verified open. If the miniflow lines are not open an alternate method of LTOP control may be employed using at least two independent means to prevent a pump start such that a single failure or single action will not result in an injection into the RCS. This may be accomplished through the pump control circuit being disabled and at least one valve in the discharge flow path being closed.

The Frequency of 12 hours is sufficient, considering other indications and alarms available to the operator in the control room, to verify the required status of the equipment.

BASES

REFERENCES

1. 10 CFR 50, Appendix G.
2. Generic Letter 88-11.
3. ASME, Boiler and Pressure Vessel Code, Section III.
4. FSAR Chapter 5.2.2~~Chapter 15~~.
5. 10 CFR 50, Section 50.46.
6. 10 CFR 50, Appendix K.
7. Generic Letter 90-06.
8. ~~ASME Code for Operation and Maintenance of Nuclear Power Plants.~~

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