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Fred Dacimo
Site Vice President
Administration

January 23, 2006

Re: Indian Point Unit 2
Docket No. 50-247
NL-06-011

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

Subject: **Response to Request for Additional Information regarding LAR for Pressurizer Level Requirements (TAC MC7061)**

References:
1. NRC letter to Entergy, dated October 14, 2005 regarding request for additional information, TAC MC7061 (ML052850213)
2. Entergy letter NL-05-062 to NRC, dated May 25, 2005; "Proposed Changes to IP2 Technical Specifications Regarding Pressurizer Water Level Requirements".

Dear Sir:

Entergy Nuclear Operations, Inc is submitting additional information, in response to Reference 1, to support NRC review of a License Amendment Request regarding a new limit on pressurizer water level in Mode 3 (Hot Standby). The response to NRC questions, provided in Attachment 1, results in changes to the proposed wording of the Technical Specification and Bases. Therefore new markup pages are provided in Attachment 2 to replace those previously provided in Reference 2. The conclusions of the No Significant Hazards Evaluation in Reference 2 are not changed by the additional information provided in this submittal.

There are no new commitments identified in this submittal. If you have any questions or require additional information, please contact Mr. Patric W. Conroy, Licensing Manager at (914) 734-6668.

I declare under penalty of perjury that the foregoing is true and correct. Executed on 1/23/06.

Sincerely,

Fred R. Dacimo
Site Vice President
Indian Point Energy Center

A001

Attachments:

1. Reply to NRC Request for Additional Information
2. Revised Markup of Technical Specification and Bases Pages

cc: Mr. John P. Boska, Senior Project Manager, NRC NRR
Mr. Samuel J. Collins, Regional Administrator, NRC Region 1
NRC Resident Inspector's Office, Indian Point Unit 2
Mr. Peter R. Smith, NYSERDA
Mr. Paul Eddy, NYS Department of Public Service

ATTACHMENT 1 TO NL-06-011

REPLY TO NRC REQUEST FOR ADDITIONAL INFORMATION REGARDING

PROPOSED LICENSE AMENDMENT REQUEST FOR

INDIAN POINT 2 PRESSURIZER WATER LEVEL REQUIRMENT

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
DOCKET NO. 50-247

NRC Question 1:

In its amendment request, Entergy proposed to add a new requirement to TS Limiting Condition for Operation (LCO) 3.4.9, "Pressurizer." The new requirement would establish a maximum actual level in the pressurizer of 90 percent during Mode 3 operation. The current TS LCO 3.4.9 maximum indicated pressurizer level for Modes 1 and 2 is 65.1 percent. Title 10 of the Code of Federal Regulations, Section 50.36, "Technical Specifications," defines a "Limiting Condition for Operation" as "the lowest functional capability or performance level of equipment required for safe operation of the facility." A TS LCO based on actual level as opposed to indicated level does not account for known uncertainties and establishes an allowable value for pressurizer water level that is inconsistent with the current (Modes 1 and 2) licensing basis for the pressurizer water level at IP2. The NRC staff requests that Entergy provide additional information to demonstrate that the proposed TS change satisfies NRC regulations regarding the allowable values for LCOs.

Entergy Response:

Entergy is revising the proposed amendment request for LCO 3.4.9 to specify the Mode 3 pressurizer water level limit in terms of 'indicated level' rather than 'actual level' as originally proposed in the amendment request NL-05-062, dated May 25, 2005. The existing LCO 3.4.9 water level for Modes 1 and 2 is already a limit on indicated level as explained in the Tech Spec Bases and as noted in NRC Question 1. Therefore no change for this value is required.

The proposed new LCO 3.4.9 limit for Mode 3 is being changed from '90% actual' to '84% indicated'. This limit on 'indicated level' is based on the originally proposed value of '90% actual' and incorporates allowances for instrument uncertainty as explained in the proposed revision to the Bases. See Attachment 2 for the new Tech Spec and Bases pages which supersede those previously provided in NL-05-062. Additional explanation of how indicated level will be determined by plant operators to comply with the Technical Specification limit is provided in the response to Question 3.

NRC Question 2:

Entergy provided a technical justification for the proposed change to TS LCO 3.4.9 in its amendment request. Specifically, the licensee stated that "In Mode 3, the rate of volumetric expansion of reactor coolant in the event of a loss of decay heat removal would be much less than that resulting from a loss-of-load or loss-of-normal feedwater, with the plant at full power." Since the purpose of TS LCO 3.4.9 is to preclude a water-solid condition that results in water relief through the pressurizer safety valves, the NRC staff requests the licensee provide its analysis that demonstrates that a loss of decay heat removal will not result in a water solid condition in the pressurizer. Additionally, the staff requests that the licensee determine the peak pressure reached in the reactor coolant system for a loss of decay heat removal capability under the proposed TS LCO changes and verify that it meets the IP2 safety limit for peak reactor coolant system pressure.

Entergy Response:

Entergy cannot provide an analysis that '...demonstrates that a loss of decay heat removal will not result in a water-solid condition...', because in certain transient scenarios, operator response in accordance with emergency operating procedures involves intentionally collapsing the pressurizer bubble and establishing a water-solid condition to safely manage the transient. The limiting analysis for a loss of decay heat removal at full power conditions demonstrates that safety limit acceptance criteria are met when a feed and bleed strategy is used for heat removal, with a water-solid condition in the pressurizer. The peak reactor coolant system pressure for the limiting analysis at full power conditions is 2664 psia which meets the IP2 safety limit for peak reactor coolant system pressure (2750 psia). This analysis takes no credit for operation of pressurizer spray or the power operated relief valves. This analysis result would bound a loss of decay heat scenario at Mode 3 because of the slower heatup rate, even with the initial condition at a higher pressurizer water level.

The Technical Specification Bases (Applicability section) state :

> "The need for pressure control is most pertinent when core heat can cause the greatest effect on RCS temperature, resulting in the greatest effect on pressurizer level and RCS pressure control. Thus, applicability has been designated for MODES 1 and 2. The applicability is also provided for MODE 3. The purpose is to prevent solid water RCS operation during heatup and cooldown to avoid rapid pressure rises caused by normal operational perturbation, such as reactor coolant pump startup."

The Technical Specification Bases (Background section) state:

> "The intent of the LCO is to ensure that a steam bubble exists in the pressurizer prior to power operation to minimize the consequences of potential overpressure transients."

The above statements emphasize the importance of the pressurizer water level limit at power operation when the magnitude of core heat has the greatest effect. The proposed amendment does not alter the intent of this LCO because the existing limit on water level that is assumed in the safety analysis is retained in Mode 1, and also in Mode 2 so that the water level and associated steam bubble exist prior to power operation (Mode 1). The Bases statement regarding 'solid water operation' means that normal operations in MODE 3 should not be performed with the pressurizer in a water-solid condition. This does not mean that off-normal events can not result in establishing a water-solid condition to manage that event. Therefore, there is no analysis which shows that a loss of decay heat removal will not result in a water-solid condition.

The proposed new water level limit in Mode 3 continues to provide a steam bubble for pressure control and does not allow a water-solid condition to be established as part of normal operations in Mode 3. Operators will continue to have the ability to respond to and safely manage a loss of decay heat removal event in Mode 3, with the higher water level limit, although such an event in Mode 3 is unlikely. Heat rejection in Mode 3 is accomplished using the condenser steam dump valves or the steam generator atmospheric dump valves. There are a total of 16 such valves, and any one valve is sufficient to remove the decay heat available in Mode 3. The time available for operator response to such a condition in Mode 3 is longer than in Mode 1 because the decay heat in Mode 3 is less than 1.5% of the Mode 1 rated thermal power. This is recognized in the Technical Specification Bases for the 'Pressurizer water level – High' reactor protection system function, which states:

"In MODE 1, when there is a potential for overfilling the pressurizer, the Pressurizer Water Level - High trip must be OPERABLE. This trip Function is automatically enabled on increasing power by the P-7 interlock. On decreasing power, this trip Function is automatically blocked below P-7. Below the P-7 setpoint, transients that could raise the pressurizer water level will be slow and the operator will have sufficient time to evaluate unit conditions and take corrective actions."

The decay heat in Mode 3 is well below the P-7 setpoint which is nominally 10% rated thermal power.

NRC Question 3:

The licensee stated in its amendment request that the instrument channel indicators for the pressurizer level must be adjusted by plant operators using density compensation curves when the pressurizer is not at the temperature used for the instrument channel calibration. Since the temperature range for the Mode 3 operation is defined in the TSs, the licensee should be able to calculate the maximum uncertainty in the indicated pressurizer level under the most limiting Mode 3 conditions. The NRC staff requests that the licensee identify the maximum uncertainty, describe the methodology used to perform the calculation, and provide a technical justification for why this uncertainty is bounding.

Entergy Response:

Instrument channel uncertainty and density compensation correction are two separate considerations for assuring that the proposed new pressurizer water level limit in Mode 3 is met. The methodology used for determining instrument channel uncertainty is Entergy Specification FIX-95-A-001, which was previously submitted to NRC in Reference 1. NRC review of this methodology is documented in Reference 2. A bounding value for instrument channel uncertainty is used to establish a limit on indicated level which assures that the actual level in the pressurizer remains at or below the assumed value. Density compensation of the value read from an instrument channel indicator is performed manually by operators to obtain the density-corrected indicated value

The 5.9% instrument uncertainty currently stated in the LCO 3.4.9 Bases is applicable for averaging readings from two of the available three level indicators corresponding to the three level transmitters (LT-459, LT-460, and LT-461) that are calibrated at the normal operating temperature condition (nominally 650 F). Procedures require that operators use an average of two channels when monitoring pressurizer level. A fourth indicator is available which is associated with a level transmitter (LT-462) that is calibrated for cold (70 F) conditions. The instrument uncertainty calculated for this channel is 4.8%. For the purpose of the pressurizer level technical specification, Entergy uses a bounding value for instrument uncertainty of 6.0%.

The above instrument uncertainty values are valid for the full range of temperature, from a cold condition to normal operating temperature, as long as operators apply the applicable density compensation adjustment based on indicated fluid temperature in the pressurizer. Figure One is a sample density compensation curve for the hot calibrated instrument channels. Operating procedures are already in place that require operators to use density compensation curves if the process temperature is not at the calibration temperature for that instrument channel.

Therefore, when using the hot-calibrated channels, operators average the readings from two of the three indicators, apply density compensation if needed, and compare the result to the Technical Specification limit. When using the cold-calibrated channel, density compensation is applied if needed to the reading available from the single channel to compare to the Technical Specification limit. This approach is currently in place for the existing Technical Specification limit. This approach will also apply for the proposed new technical specification which establishes a new limit in Mode 3 that is different from the Mode 1 / 2 limit.

NRC Question 4:

In its amendment request, Entergy stated that, as part of the proposed TS changes, administrative controls, implemented in plant procedures, will require that an operator be assigned for operating and controlling the chemical and volume control system, including monitoring pressurizer level, whenever the pressurizer level, in Mode 3, is above 65.1 percent. However, the licensee did not provide any description of the operator's responsibilities with regard to normal and accident conditions. The NRC staff is concerned that there may be undue reliance on operator actions to ensure the safe operation of IP2 under the proposed TS limits. The staff requests that the licensee provide a summary of operator responsibilities, training, and procedures that will be used to ensure the continued safe operation of IP2 under the proposed TS changes.

Entergy Response:

Plant operating procedure 2-POP-3.3 governs the plant cooldown from hot conditions (Mode 3) to cold conditions (Mode 4) and provides explicit instructions to the operators regarding control of pressurizer water level, including use of the density compensation curves when pressurizer temperature is different from the transmitter calibration temperature. As stated in the commitment made by Entergy for this license amendment request, the procedure will be revised to include provisions for a dedicated operator when level is above the current limit specified for Modes 1, 2, and 3. Routine training is provided as part of the operator training program for this duty. Procedures and training are also in place regarding response to off-normal conditions that could affect control of pressurizer level, such as loss of instrument air that could cause a loss of letdown flow or a CVCS malfunction for other reasons that could affect letdown or charging flow.

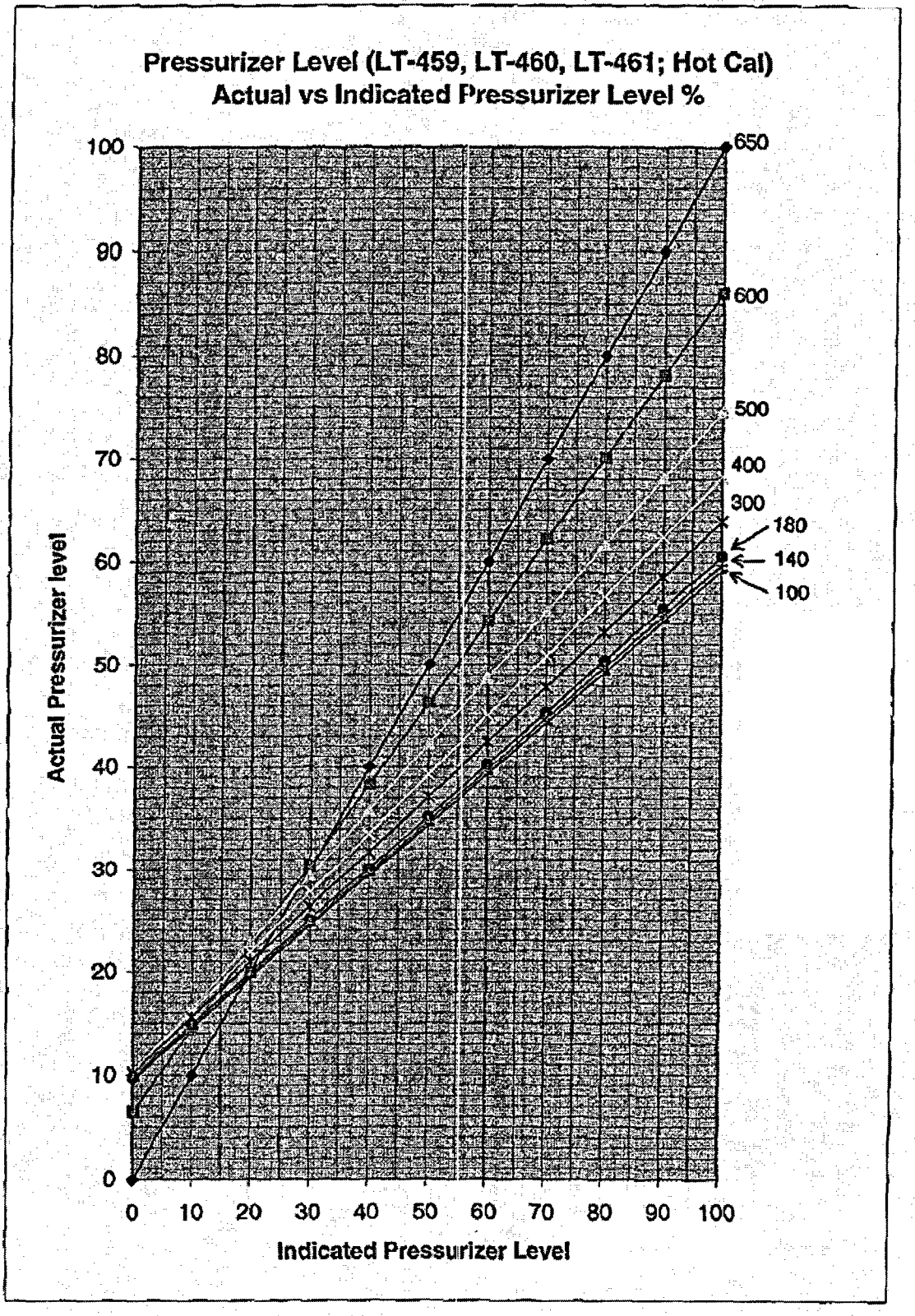
Since the proposed new Mode 3 level limit is typically of use for plant shutdowns in preparation for a refueling outage, just-in-time training is conducted for the operating crew scheduled for the shift that will perform the plant shutdown. The training includes the pressurizer level control duty.

References:

1. Entergy letter NL-03-117 to NRC, regarding license amendment request for conversion to Improved Standard Technical Specifications, dated July 18, 2003.

2. NRC letter to Entergy, regarding Amendment 241 for 3.26 percent power uprate, dated October 27, 2004.

FIGURE ONE - REPRESENTATIVE DENSITY COMPENSATION CURVE



Source: IP2 Calculation FIX-00071-00

ATTACHMENT 2 TO NL-06-011

REVISED MARKUP OF TECHNICAL SPECIFICATION AND BASES PAGES

PROPOSED LICENSE AMENDMENT REQUEST FOR

INDIAN POINT 2 PRESSURIZER WATER LEVEL REQUIRMENT

Bold, italics for added text

~~Strikeout~~ for deleted text

Note: These markup pages replace those previously provided in Attachment 2 of NL-05-062

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
DOCKET NO. 50-247

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Pressurizer

LCO 3.4.9 The pressurizer shall be OPERABLE with:

a. Pressurizer water level ≤ 65.1% ***in MODES 1 and 2, or ≤ 84% in MODE 3;*** and

b. Two groups of pressurizer heaters OPERABLE with the capacity of each group ≥ 150 kW with each group powered from a different safeguards power train.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Pressurizer water level not within limit.	A.1	Be in MODE 3.	6 hours
	AND		
	A.2	Fully insert all rods.	6 hours
	AND		
	A.3	Place Rod Control System in a condition incapable of rod withdrawal.	6 hours
	AND		
	A.4	Be in MODE 4.	12 hours
B. One required group of pressurizer heaters inoperable.	B.1	Restore required group of pressurizer heaters to OPERABLE status.	72 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.9.1	Verify pressurizer water level is ≤ 65.1% ***in MODES 1 and 2, or ≤ 84% in MODE 3.***	12 hours
SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters is ≥ 150 kW.	24 months

NO CHANGES THIS PAGE --- FOR INFORMATION ONLY

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.9 Pressurizer

BASES

BACKGROUND

The pressurizer provides a point in the RCS where liquid and vapor are maintained in equilibrium under saturated conditions for pressure control purposes to prevent bulk boiling in the remainder of the RCS. Key functions include maintaining required primary system pressure during steady state operation, and limiting the pressure changes caused by reactor coolant thermal expansion and contraction during normal load transients.

The pressure control components addressed by this LCO include the pressurizer water level, the required heaters, and their controls and emergency power supplies. Pressurizer safety valves and pressurizer power operated relief valves are addressed by LCO 3.4.10, "Pressurizer Safety Valves," and LCO 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)," respectively.

The intent of the LCO is to ensure that a steam bubble exists in the pressurizer prior to power operation to minimize the consequences of potential overpressure transients. The presence of a steam bubble is consistent with analytical assumptions. Relatively small amounts of noncondensible gases can inhibit the condensation heat transfer between the pressurizer spray and the steam, and diminish the spray effectiveness for pressure control.

Electrical immersion heaters, located in the lower section of the pressurizer vessel, keep the water in the pressurizer at saturation temperature and maintain a constant operating pressure. A minimum required available capacity of pressurizer heaters ensures that the RCS pressure can be maintained. The capability to maintain and control system pressure is important for maintaining subcooled conditions in the RCS and ensuring the capability to remove core decay heat by either forced or natural circulation of reactor coolant. Unless adequate heater capacity is available, the hot, high pressure condition cannot be maintained indefinitely and still provide the required subcooling margin in the primary system. Inability to control the system pressure and maintain subcooling under conditions of natural circulation flow in the primary system could lead to a loss of single phase natural circulation and decreased capability to remove core decay heat.

BASES

BACKGROUND (continued)

Pressurizer heaters are powered from either the offsite source or the diesel generators (DGs) through the four 480 V vital buses as follows:

Safeguards Power Train 5A supports heater group 23 (485 kW);

Safeguards Power Train 6A supports heater group 24 (277 kW); and

Safeguards Power Train 2A/3A supports both:
heater group 21 from Bus 3A (554 kW); and
heater group 22 from Bus 2A (485 kW).

APPLICABLE SAFETY ANALYSES

In MODES 1, 2, and 3, the LCO requirement for a steam bubble is reflected implicitly in the accident analyses. For events that result in pressurizer insurge (e.g., loss of normal feedwater and the loss of load/turbine trip), analyses assume that the limiting value for the highest initial pressurizer level is 71.0%. This is an analytical limit and is based on the pressurizer program level at a full power T_{avg} of 572 Degrees F (65%) plus a 6.0% allowance for instrument error. For other events, the nominal value of pressurizer level is assumed because the effect of initial pressurizer level on PCT is small (Ref. 1). Safety analyses performed for lower MODES are not limiting. All analyses performed from a critical reactor condition assume the existence of a steam bubble and saturated conditions in the pressurizer. In making this assumption, the analyses neglect the small fraction of noncondensible gases normally present.

Safety analyses presented in the UFSAR (Ref. 1) do not take credit for pressurizer heater operation; however, an implicit initial condition assumption of the safety analyses is that the RCS is operating at normal pressure.

The maximum pressurizer water level limit, which ensures that a steam bubble exists in the pressurizer, satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii). Although the heaters are not specifically used in accident analysis, the need to maintain subcooling in the long term during loss of offsite power, as indicated in NUREG-0737 (Ref. 2), is the reason for providing an LCO.

LCO

~~The LCO requires the pressurizer to be OPERABLE with the actual water level less than or equal to 71.0%. This maximum pressurizer level of 71.0% is the nominal level of the pressurizer program level at a full power T_{avg} of 572 Degrees F (65%) plus a 6.0% allowance for instrument error.~~

See Insert A

BASES

LCO (continued)

~~Pressurizer level indications in the control room are averaged to come up with a value for comparison to the limit. A maximum allowance for instrument error of 5.9% (based on 2 channel measurement) applied to the analytical limit of 71% results in an indicated level that should not exceed 65.1%.~~

Limiting the LCO maximum operating water level preserves the steam space for pressure control. The LCO has been established to ensure the capability to establish and maintain pressure control for steady state operation and to minimize the consequences of potential overpressure transients. Requiring the presence of a steam bubble is also consistent with analytical assumptions.

The LCO requires two groups of OPERABLE pressurizer heaters, each with a capacity $\geq$ 150 kW. Each of the two groups of pressurizer heaters must be powered from a different DG to ensure that the minimum required capacity of 150 kW can be energized during a loss of offsite power condition assuming the failure of a single DG. The minimum heater capacity required is sufficient to maintain the RCS near normal operating pressure when accounting for heat losses through the pressurizer insulation. By maintaining the pressure near the operating conditions, a wide margin to subcooling can be obtained in the loops. The value of 150 kW has been demonstrated to be adequate to maintain RCS pressures control.

APPLICABILITY

The need for pressure control is most pertinent when core heat can cause the greatest effect on RCS temperature, resulting in the greatest effect on pressurizer level and RCS pressure control. Thus, applicability has been designated for MODES 1 and 2. The applicability is also provided for MODE 3. The purpose is to prevent solid water RCS operation during heatup and cooldown to avoid rapid pressure rises caused by normal operational perturbation, such as reactor coolant pump startup.

In MODES 1, 2, and 3, there is need to maintain the availability of pressurizer heaters, capable of being powered from an emergency power supply. In the event of a loss of offsite power, the initial conditions of these MODES give the greatest demand for maintaining the RCS in a hot pressurized condition with loop subcooling for an extended period. For MODE 4, 5, or 6, it is not necessary to control pressure (by heaters) to ensure loop subcooling for heat transfer when the Residual Heat Removal (RHR) System is in service, and therefore, the LCO is not applicable.

BASES

ACTIONS

A.1, A.2, A.3, and A.4

Pressurizer water level control malfunctions or other plant evolutions may result in a pressurizer water level above the nominal upper limit, even with the plant at steady state conditions. If the pressurizer water level is not within the limit, action must be taken to bring the plant to a MODE in which the LCO does not apply. To achieve this status, within 6 hours the unit must be brought to MODE 3 with all rods fully inserted and incapable of withdrawal. Additionally, the unit must be brought to MODE 4 within 12 hours. This takes the unit out of the applicable MODES.

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.

B.1

If one required group of pressurizer heaters is inoperable, restoration is required within 72 hours. The Completion Time of 72 hours is reasonable considering that the redundant heater group is still available and the low probability of an event during this period. Pressure control may be maintained during this time using the remaining heaters.

C.1 and C.2

If one group of pressurizer heaters are inoperable and cannot be restored in the allowed Completion Time of Required Action B.1, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and to MODE 4 within 12 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.

SURVEILLANCE REQUIREMENTS

SR 3.4.9.1

~~This SR requires that during steady state operation, pressurizer level is maintained below the nominal upper limit to provide a minimum space for a steam bubble. The LCO requires that the actual pressurizer water level be less than or equal to 71.0%. Pressurizer level indications in the control room are averaged to come up with a value for comparison to the limit. An additional margin of approximately 5.9%, should be allowed for instrument error (i.e., the indicated level should not exceed 65.1%. The Frequency of 12 hours has been shown by operating~~

See Insert B

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~practice to be sufficient to regularly assess level for any deviation and verify that operation is within safety analyses assumption of ensuring that a steam bubble exists in the pressurizer. Alarms are also available for early detection of abnormal level indications.~~

SR 3.4.9.2

The SR is satisfied when the power supplies are demonstrated to be capable of producing the minimum power and the associated pressurizer heaters are verified to be at their design rating. This may be done separately by testing the power supply output which is performed by surveillance tests required by LCO 3.8.1, "AC Sources - Operating," and by performing an electrical check on heater element continuity and resistance. The Frequency of 24 months is considered adequate to detect heater degradation and has been shown by operating experience to be acceptable.

REFERENCES

1. UFSAR, Section 14.

2. NUREG-0737, November 1980.

INSERT A:

The LCO requires the pressurizer to be OPERABLE with the indicated water level less than or equal to 65.1% in MODES 1 and 2, and less than or equal to 84% in MODE 3. These limits account for instrument uncertainty and provide assurance that the actual levels corresponding to these indicated level limits do not exceed 71% and 90%, respectively. A higher limit on pressurizer level in MODE 3 is allowed because the lower value of core decay heat in this mode would result in slower transients associated with reactor coolant thermal expansion. This higher limit is typically used to provide greater flexibility to the plant operator when performing a plant shutdown below MODE 3, such as in preparation for a refueling outage. Whenever pressurizer water level in MODE 3 is above the MODE 1 and 2 limit, a dedicated operator is assigned for operating and controlling the chemical and volume control system, including monitoring pressurizer water level.

A 5.9% allowance for instrument uncertainty is based on averaging 2 of the 3 channels that are calibrated for a MODE 1 / 2 pressurizer temperature of 650 F ('hot-calibrated channels'). The 5.9% value bounds the 4.8% uncertainty applicable to the channel calibrated for a pressurizer temperature of 70 F ('cold-calibrated channel'). Also, whenever the pressurizer temperature is not at the calibration temperature for the instrument channel(s) being used, density compensation correction must be applied.

INSERT B:

This SR requires that during steady state operation, pressurizer level is maintained below the nominal upper limit to provide a minimum space for a steam bubble. The LCO requires that the indicated pressurizer water level be less than or equal to 65.1% in MODES 1 and 2, and 84% in MODE 3. Pressurizer level indications in the control room are usually averaged to come up with a value for comparison to the limit. In addition, density compensation correction is required if the pressurizer temperature is not at the calibration temperature for the instrument channel(s) being used.

The Frequency of 12 hours has been shown by operating practice to be sufficient to regularly assess level for any deviation and verify that operation is within safety analyses assumption of ensuring that a steam bubble exists in the pressurizer. Alarms are also available for early detection of abnormal level indications.