DRAFT

Request for Additional Information No. 34, Revision 0

7/15/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 15 - Introduction - Transient and Accident Analyses
SRP Section: 15.01.01 - 15.01.04 - Decrease in Feedwater Temperature, Increase in Feedwater Flow, Increase in Steam Flow, and Inadvertent Opening of a Steam Generator Relief or Safety Valve
SRP Section: 15.01.05 - Steam System Piping Failures Inside and Outside of Containment (PWR)
SRP Section: 15.02.01-15.02.05 - Loss of External Load; Turbine Trip; Loss of Condenser Vacuum; Closure of Main Steam Isolation Valve (BWR); and Steam Pressure Regulator Failure (Closed)
SRP Section: 15.02.06 - Loss of Non-Emergency AC Power to the Station Auxiliaries
SRP Section: 15.02.07 - Loss of Normal Feedwater Flow
SRP Section: 15.02.08 - Feedwater System Pipe Breaks Inside and Outside Containment (PWR)
SRP Section: 15.03.03-15.03.04 - Reactor Coolant Pump Rotor Seizure and Reactor Coolant Pump Shaft Break
SRP Section: 15.05.01-15.05.02 - Inadvertent Operation of ECCS and Chemical and Volume Control System Malfunction that Increases Reactor Coolant Inventory
SRP Section: 15.06.01 - Inadvertent Opening of a PWR Pressurizer Pressure Relief Valve or a BWR Pressure Relief Valve
SRP Section: 15.06.03 - Radiological Consequences of Steam Generator Tube Failure (PWR) 07/1981
Application Section: FSAR Ch. 15.0
SRSB Branch

QUESTIONS

15-1

Please provide the assessment for the parameters, initial conditions, and single failures used in various transients and accidents to support the values and sequence of events assumed in each event that would lead to the most conservative results with respect to each acceptance criteria.

15-2

Confirm that each of the transient and accident analyzed has been assessed against multiple acceptance criteria including specified acceptable fuel design criteria (SAFDL), the maximum primary pressure, maximum secondary side pressure, and the minimum departure from nucleate boiling ratio (MDNBR).

15-3

Please extend the tables shown in chapter 15.0 to show for each transient and accident the limiting power, temperatures, flows, levels, scram reactivity, reactivity coefficients, heat transfer coefficients, and degree of SG tube plugging.

15-4

Please provide in the analysis section of each transient and accident the technical bases to demonstrate that the limiting single failure is selected. Specifically state the physical bases. Consider each acceptance criteria and show that the limiting single failure is selected for each acceptance criteria ( for example minimum DNBR, peak RCS pressure, and peak secondary side pressure may differ with the single failure assumed in the analysis.)

In addition to providing an explanation in each section of the SAR please include the information in a summary table in section 15.0 of the SAR.

15-5

Please provide in the analysis section of each transient and accident the technical bases to demonstrate that the limiting analysis conditions are selected. Specifically state the physical or phenomenological bases with respect to 1) why retention or loss of offsite power is limiting, 2) why beginning or end of cycle is limiting, 3) why HFP or HZP or an intermediate power is limiting. Consider each acceptance criteria and show that limiting conditions are selected for consideration of each criteria ( for example minimum DNBR, peak RCS pressure, and peak secondary side pressure may differ with limiting analysis conditions.)

In addition to providing an explanation in each section of the SAR include the information in a summary table in section 15.0 of the SAR.

> <u>Regulatory basis</u>: SRP acceptance criteria instructs the reviewer to verify "*whether the event evaluation considers single failures, operator errors, and performance of nonsafety-related systems consistent with the RG 1.206 regulatory guidelines*.
>
> RG 1.206, C.I.15.6.2 *Sequence of Events and Systems Operation* states "*The applicant should discuss the following considerations for each initiating event:…"*

15-6

For each transient and accident describe the specific S-RELAP model if it is different from the generic base model. It appears that some transients have been evaluated using a single channel core while other transients have used a multiple core channel model. Please provide directly or by reference a description of the S-RELAP 5 model including nodalization used in non-LOCA asymmetric calculations.

15-7

In computing the reactor power for the transients analyzed in Sections 15.1 through 15-6, provide the decay heat curve used to calculate the total core thermal power. Specify the model that was used to calculate the decay power curve along with any assumptions made. Use a logarithmic scale over an appropriate range to display this quantity

(SRP 15.2.1-15.2.5 Section III.6.A, 15.2.6 Section III.5.A, 15.2.7-15.2.8 Section III)

15-8

Several of the transients analyzed in this chapter assumed the reactor tripped on a DNBR trip. Please explain how the system code interacts with the computer code which calculates the DNBR trip.

15.01.01 - 15.01.04-1

Provide the representative DNBR as a function of time for all Chapter 15.1 analyses for which it is a key parameter.

Regulatory basis: SRP 15.0, p. 15.0-10. "*The reviewer ensures that the applicant has presented the results of the analyses, including key parameters as a function of time…"*

*…List all single failures or operator errors considered in the transient and accident analysis, and identify the limiting single failure for each even*t

15.01.01 - 15.01.04-2

Several tables in section 15.1 show a scram worth of -7353 pcm/F. Please clarify the units being used for scram worth.

Regulatory basis: SRP 15.0, p. 15.0-7. "*The reviewer ensures that the application contains the key plant parameters….*"

15.01.01 - 15.01.04-3

In Section 15.1.1, an instantaneous reduction in feedwater temperature of 100 F is assumed in the analysis. Provide the quantitative assessment showing that this conservatively bounds the possible physical reduction in feedwater temperature.

Regulatory basis: SRP 15.0, p. 15.0-8. "*For each initiating evaluated, the reviewer ensures that the application includes a description of the occurrences that can lead to the event ….*"

15.01.01 - 15.01.04-4

This event addressed in Section 15.1.1 assumes the minimum RCS flow allowed by plant TSs. Explain why this assumption is conservative.

Regulatory basis: SRP 15.1.1-15.1.4, p. 5. "*The values of the parameters used in the analytical model should be suitably conservative."*

15.01.01 - 15.01.04-5

Figure 15.1-7 shows the SG pressure exceeding the MSRIV setpoint of 1384 psia. Explain why the MSRTs did not actuate. If the MSRTs did actuate it would result in all 4 SGs blowing down until the MSRCVs close. Please present the analysis results of such a scenario.

Regulatory basis: SRP 15.1.1-15.1.4, p. 3. "*The reviewer reviews the values …for conformance to plant design.*"

15.01.01 - 15.01.04-6

Please explain the apparent asymmetric temperatures shown in Fig 15.1-4

15.01.01 - 15.01.04-7

Please explain the rod worth shown in figure 15.1-6. Show how the worth in $ equals the worth in pcm divided by beta.

15.01.01 - 15.01.04-8

The asymmetry of this event addressed in Section 15.1.2 is increased if an increase in feedwater flow to one generator is accompanied by a decrease in feedwater flow to the other steam generators. Please explain the basis for the 150% increase in feedwater flow to one steam generator with no decrease in feedwater flow to the remaining SGs.

Regulatory basis: SRP 15.1.1-15.1.4, p. 5. "*The values of the parameters used in the analytical model should be suitably conservative.*"

15.01.01 - 15.01.04-9

Figure 15.1-18 shows the SG pressure exceeding the MSRIV setpoint of 1384 psia. Explain why the MSRTs did not actuate. If the MSRTs did actuate it would result in all 4 SGs blowing down until the MSRCVs close. Please present the analysis results of such a scenario.

Regulatory basis: SRP 15.1.1-15.1.4, p. 3. "*The reviewer reviews the values …for conformance to plant design.*"

15.01.01 - 15.01.04-10

It appears that a sectorized core model was used for the analysis addressed in Section 15.1.2, In EMF-2310 the sectorized core model was applied only to the main steam line break event. The use of the model for the increase in feedwater flow event needs to be discussed fully. In particular, explain how the power for each core region is calculated.

Regulatory basis: SRP 15.1.1-15.1.4, p. 3. "*The analytical methods are reviewed to ascertain whether the mathematical modeling and computer codes have been previously reviewed and accepted by the staff*"

The SER for EMF-2320 states "*The staff also notes, however, that a generic topical report describing a code such as S-RELAP5 cannot provide full justification for each specific individual plant application. The individual applicant must still provide justification for each specific application of the code which is expected to include as a minimum, the nodalization…*"

15.01.01 - 15.01.04-11

Clarify Table 15.1-11 as to which MSRCV (SG-3 or SG-4) is failed open.

Regulatory basis: SRP 15.1.1-15.1.4, p. 2. "*The topics covered in the review include: …valve malfunctions.*"

15.01.01 - 15.01.04-12

Please clarify why SG-3 has higher heat transfer (Fig. 15.1-36) yet a higher outlet temperature (Fig 15.1-37) compared to the other loops.

Regulatory basis: SRP 15.1.1-15.1.4, p. 2. "*The results of the transient analysis are reviewed….*"

15.01.01 - 15.01.04-13

For event addressed in Section 15.1.4, please provide information to support the conclusion that the peak return to power for each HZP case does not cause fuel damage.

Regulatory basis: SRP 15.1.1-15.1.4, p. 2. "*The results of the transient analysis are reviewed to ensure system parameters are within the ranges expected…DNBR…*"

15.01.05-1

Please provide the results of pipe failures inside the containment and provide justification that the 1.72 $ft^2$ break outside containment is limiting with respect to core performance.

Regulatory basis: SRP 15.1.5, p. 2. "*…a range of break sizes must be considered both inside and outside containment to determine the acceptability of the system response*"

15.01.05-2

Please provide the results of HFP and HZP cases with and without loss of offsite power so that the staff can verify the accident scenario presented is indeed limiting.

15.01.05-3

Please provide a discussion of the pre-scram portion of the MSLB.

15.01.05-4

The EPR is designed to have a constant Tavg for power levels above 60%. Explain how it was determined that intermediate power levels do not present a more challenging initial condition.

15.01.05-5

Please explain why the Tech. Spec. minimum flow used in the analysis is conservative.

Regulatory basis: SRP 15.1.5, p. 2. "*Evaluation with various assumed initial conditions is required to verify that the condition leading to the severest consequences has been identified"*

15.01.05-6

Please explain why modeling the SG secondary boiler region as a single volume is conservative.

Regulatory basis: Final SER of TR ANP-10263(P), p. 12. "*The staff finds the methods that utilizes S-RELAP5 are in general applicable to the U.S. EPR; however, it has deferred its final position on the complete methodology that uses S-RELAP5 code until the justification for steam generator modeling is provided."*

15.01.05-7

Page 15.1-20 states the mixing of fluid between core sectors and conservative treatment of MFW flow are both described in reference 1 (ANP-10263P-A). Please indicate where they are described in that reference.

15.01.05-8

Please clarify section 15.1.5.1, second paragraph, where it is stated "*Because the break is assumed to be located upstream of an MSIV, their closure isolates the* ***affected*** *SG from the break (emphasis added)*"

15.01.05-9

Please explain the apparent inconsistency of Tables 15.1-15 and 15.1-16. The former says the power peaks at 23.14% of RTP while the latter says the power peaks at 649.28 MWt, which is 14.15% of RTP.

15.01.05-10

Please explain how the fuel failure at clad strain limit value (Table 15.1-16) is calculated.

15.01.05-11

Please confirm that the initial shutdown margin presented in Table 15.1-13 is the minimum shutdown margin (SDM) allowed by the Technical Specifications.

15.01.05-12

Please explain the reactor power increase shown in Figure 15.1-55.

15.02.01-15.02.05-1

Section 15.2.2.4 states that the radiological consequences of the turbine trip event are bounded by the inadvertent opening of an MSSV event described in Section 15.1.4. The approach of comparing one event to another in different event type (Heat up transients vs cooldown transients) requires more justifications since the assumptions, initial conditions and other plant conditions for different type of events will not provide same base line for comparisons. For each type of events, please identify the most limiting case with respect to all acceptance criteria within the group of events in the same event type.

Note: The approach of comparing events with different types has been used in many cases in the EPR DC application.

<u>Regulatory basis</u>: SRP acceptance criteria instructs the reviewer to verify "*whether the event evaluation considers single failures, operator errors, and performance of nonsafety-related systems consistent with the RG 1.206 regulatory guidelines*.

15.02.01-15.02.05-2

The turbine trip transient listed in Table 15.2.3 assumed with LOOP at 7.37 sec. Turbine trip with offsite power available may result in higher primary system pressure. Please provide an analysis with and without loss offsite power available for each transient and accident. Explain the physical basis that leads to one sequence being more limiting than the other.

SRP 15.2.1-15.2.5 states "To the extent deemed necessary, the reviewer evaluates the effect of single active system or component failures that may affect the course of the transient. For new applications, LOOP should not be considered a single failure; each of the reduction-of-heat-removal transients should be analyzed with and without a LOOP in combination with a single active failure.

15.02.01-15.02.05-3

In Section 15.2.2, the analysis assumes single failure of a secondary side MSRIV. All 3 pressurizer safety valves are assumed to function. With respect to maximum primary pressure, explain why the secondary side safety valve failure to open is more restrictive than a primary side safety valve failure to open.

SRP acceptance criteria instructs the reviewer to verify “whether the event evaluation considers single failures, operator errors, and performance of nonsafety-related systems consistent with the RG 1.206 regulatory guidelines.

RG 1.206, **C**.I.15.6.2 *Sequence of Events and Systems Operation* states
“The applicant should discuss the following considerations for each initiating event:
…List all single failures or operator errors considered in the transient and
accident analysis, and identify the limiting single failure for each event.

15.02.01-15.02.05-4

Please provide the minimum DNBR as a function of time.

SRP 15.2.1-15.2.5-5 Revision 2 - March 2007 states the reviewer confirms that:

A. Pressure in the reactor coolant and main steam systems should be maintained below 110 percent of the design values.

B. Fuel cladding integrity must be maintained by the minimum departure from nucleate boiling ratio (DNBR) remaining above the 95/95 DNBR limit for PWRs.

15.02.01-15.02.05-5

In the event addressed in Section 15.2.4,,explain the prediction of MSIV flow rate oscillation shown in Figure 15.2-MSIVC Secondary Overpressurization—MSIV Flow Rates. It appears that the oscillations are due to rapid closure of the turbine valve. Pressure waves bouncing back and forth in the steam lines?

15.02.01-15.02.05-6

Section 15.2.4.3.2 DNBR analysis results do not provide the results of the DNBR calculation. Please provide a figure showing minimum DNBR as a function of time.

15.02.01-15.02.05-7

Please provide a description of how DNBR calculations were done for the event addressed in Section 15.2.4.

15.02.01-15.02.05-8

Section 15.2.4.3.2 implies that a 3-D kinetics calculation was done. This would mean S-RELAP5 would have to have sectorized vessel in order to get asymmetric inlet conditions to the core inlet. Please explain how the 3-D kinetics calculation was performed.

15.02.06-1

Insufficient information is provided to assess the conclusions in the FSAR. The FSAR states that this event is bounded by the turbine trip event. Provide a sequence of events explaining the functioning of the reactor coolant pumps, feedwater pumps, and other auxiliaries which are lost upon loss of non-emergency power and explain why this event is bounded.

**SRP 15.2.6** III. REVIEW PROCEDURES states “2. If the SAR states that the loss of ac power transient is not as limiting as some other similar transient, the reviewer evaluates the applicant’s justification.

Review instructions include “The sequence of events from initiation until condition stabilization is reviewed to ascertain:
A. The extent to which normally operating plant instrumentation and controls are assumed to function.
B. The extent to which plant and reactor protection systems are required to function.
C. The credit taken for the functioning of normally operating plant systems.
D. The operation of engineered safety systems required.
E. The extent to which operator actions are required.
F. The operation of standby diesel generators required."

15.02.07-1

Please provide a figure showing minimum DNBR as a function of time for this event.

15.02.08-1

Provide description of the modeling methodology used to analyze the reactor behavior during feedwater pipe break transients.

15.02.08-2

Provide data of calculated transient DNBR and amount of fuel failures to support the evaluation of the acceptance criteria for this event as stated in Section 15.2.8.2 of the FSAR.

15.02.08-3

Figure 15.2-67—FWLB Representative Small Break – “Reactivities shows liquid fraction vs time”. Figure 15.2-68—“FWLB Representative Small Break – Liquid Volume Fraction in Pressurizer Dome” shows power vs time. Figure 15.2-69—“FWLB Maximum RCS Pressure Case – Reactor and Total Steam Generator Power shows pressure vs time”. Please explain the discrepancies between the titles and the parameters presented in the transient curves.

15.02.08-4

For transients analyzed in Sections 15.2.1 through 15.2-8, provide the decay heat curve used to calculate the total core thermal power. Specify the model used to calculate the decay power curve along with any assumptions made. Use a logarithmic scale over an appropriate range in displaying this quantity (SRP 15.2.1-15.2.5 Section III.6.A, 15.2.6 Section III.5.A, 15.2.7-15.2.8 Section III)

15.02.08-5

Figure 15.2-50 “FWLB Representative Small Break - Pressurizer Pressure” shows a predicted pressure range, which is above 1,600 psia till the end point of analysis at 7,000 s. Figure 15.2-65 “FWLB Representative Small Break – RCS Maximum Pressure” reveals a predicted pressure range that is below 1,500 psia from the beginning of the analysis at 0 s. Please explain the difference (15.2.8 Section III).

15.02.08-6

Figure 15.2-66 “FWLB Representative Small Break – Steam Generator Maximum Pressure” shows reactivity quantities plotted in units of $. Please clarify the unit. (15.2.8 Section III).

15.02.08-7

Figure 15.2-67 “FWLB Representative Small Break – Reactivities” shows a liquid fraction quantity in dimensionless units. Please clarify the unit. (15.2.8 Section III).

15.02.08-8

Figure 15.2-68 “Representative Small Break – Liquid Volume Fraction in Pressurizer Dome” shows quantities in units of MW. Please clarify the unit. (15.2.8 Section III).

15.02.08-9

For the break flow in Figure 15.2-58 “FWLB Representative Small Break – Break Flow”, explain how the break flow area was determined. Please explain the criterion used for determining the worst break size. Provide the flow quality as well as the fluid-phase temperatures at the break opening. In addition, provide the liquid- and vapor-phase mass flow rate at the break and specify the break backpressure used in the calculations. Use a logarithmic scale over an appropriate range in displaying quantities that vary significantly in magnitude (15.2.8 Section III).

15.02.08-10

Figure 15.2-69 “FWLB Maximum RCS Pressure Case – Reactor and Total Steam Generator Power” shows a quantity in psia units. Please clarify the unit. (15.2.8 Section III).

15.02.08-11

For the break flow in Figure 15.2-77 ”FWLB Maximum RCS Pressure Case – Break Flow” explain how the break flow area was determined. Please explain the criterion used for determining the worst break size. Demonstrate that it produces the highest peak RCS pressure. Provide the flow quality as well as the fluid-phase temperatures at the break opening. In addition, provide the liquid- and vapor-phase mass flow rate at the break and specify the break backpressure used in the calculations. Use a logarithmic scale over an appropriate range in displaying quantities that vary significantly in magnitude (15.2.8 Section III).

15.02.08-12

Provide the valve flow areas used to compute the mass flow rates shown in Figure 15.2-78 “FWLB Maximum RCS Pressure Case – Main Steam Relief Loops 1 and 2“ and in Figure 15.2-79 “FWLB Maximum RCS Pressure Case – Main Steam Relief Loops 3 and 4” (15.2.8 Section III).

15.02.08-13

Provide the valve flow areas used to compute the mass flow rates shown in Figure 15.2-96 “FWLB Maximum Secondary Pressure Case – Main Steam Relief Loops 1 and 2“ and in Figure 15.2-97 “FWLB Maximum Secondary Pressure Case – Main Steam Relief Loops 3 and 4” (15.2.8 Section III).

15.02.08-14

Provide, as function of time, all individual reactivity components used to compute the total reactivity parameters shown in Figures 15.2.5 and 15.2-22 (15.2.8 Section III).

15.03.03-15.03.04-1

Provide plots showing the total reactivity as well as each individual reactivity component used in computing the reactor power for the reactor transients analyzed in Sections 15.3.1 through 15.3.4. Provide those quantities as function of time (SRP 15.3.1-15.3.2 Section III, SRP 15.3.3-15.3.4 Section III).

15.03.03-15.03.04-2

Quantify the RCP inertia applied for the reactor transients in Sections 15.3.1 through 15.3.4 and explain any assumptions used in determining the inertia for all individual RCPs (SRP 15.3.1-15.3.2 Section III, SRP 15.3.3-15.3.4 Section III)

15.03.03-15.03.04-3

Provide the RCP coast-down flow characteristics used for determining the mass flow rate in the primary reactor coolant recirculation loops for the reactor transients in Sections 15.3.1 through 15.3.4. Discuss how those characteristics were determined and explain any assumptions made (SRP 15.3.1-15.3.2 Section III, SRP 15.3.3-15.3.4 Section III).

15.03.03-15.03.04-4

Explain how the core inlet temperature is computed and used in the determination of the DNBR criterion for the reactor transients presented in Sections 15.3.1 through 15.3.4. Provide a plot of this parameter for each individual transient (SRP 15.3.1-15.3.2 Section III, SRP 15.3.3-15.3.4 Section III).

15.03.03-15.03.04-5

Provide a plot that shows the computed DNBR criterion as well as the DNB margin available as function of time for the reactor transients presented in Section 15.3.1 through 15.3.4 (SRP 15.3.1-15.3.2 Section III, SRP 15.3.3-15.3.4 Section III).

15.03.03-15.03.04-6

Provide a comparison between the maximum core local heat flux and the core average heat flux shown in Figures 15.3-3, 15.3-7 and 15.3-12 (SRP 15.3.1-15.3.2 Section III, SRP 15.3.3-15.3.4 Section III).

15.03.03-15.03.04-7

Plot governing thermal hydraulic quantities that enter into the DNBR calculation such as, but not limited to, local mass flow rate and heat flux for the reactor transients in Sections 15.3.1 through 15.3.4 (SRP 15.3.1-15.3.2 Section III, SRP 15.3.3-15.3.4 Section III). Explain the applicability of the DNBR correlation to the range of the relevant parameters.

15.03.03-15.03.04-8

Plot the peak fuel centerline temperature as function of time for the reactor transients in Sections 15.3.1 through 15.3.4 (SRP 15.3.1-15.3.2 Section III, SRP 15.3.3-15.3.4 Section III). Explain the associated safety limit.

15.05.01-15.05.02-3

Table 6.8-1—Extra Borating System Design and Operating Parameters provides a nominal flow rate of 52 gpm / pump and a maximum allowable flow rate of 110.8 gpm (for the system). This corresponds to the flow rate of 15.5 lbm/sec shown in Figure 15.5-9—Inadvertent Operation of the EBS. Table 9.3.4-1—Major CVCS Component Design Data Sheet 1 of 5 shows 2 Centrifugal Charging Pumps with a normal flow rate of 176 gpm, and a maximum flow rate of 285 gpm. This does not correspond to the flow rate of 13 to 16 lbs/sec shown in Figure 15.5-18—CVCS Malfunction that Increases RCS Inventory. Please explain.

15.05.01-15.05.02-4

Explain the charging flow shown in Figure 15.5-18—CVCS Malfunction that Increases RCS Inventory –Charging Flow. Explain why the flow rate to loop 2 and 4 are different prior to RT. It is recognized that the analysis assumes that 2 pumps are de-energized at RT; one pump is immediately started and tripped again at about 1000 sec. Explain the rapid changes in flow shown in the figure between reactor trip and isolation of the changing pumps at 1019 seconds.

<u>Regulatory basis:</u> *SRP 15.5.1 - 15.5.2 INADVERTENT OPERATION OF ECCS AND CHEMICAL AND VOLUME CONTROL SYSTEM MALFUNCTION THAT INCREASES REACTOR COOLANT INVENTORY, III Procedures, states "The applicant should present a quantitative analysis in the SAR of the most limiting events that lead to an increase in reactor coolant inventory." and "The results of the applicant's analysis are reviewed in accordance with the acceptance criteria."*

15.06.01-1

Provide the DNBR as a function of time for all Chapter 15.6 analyses for which it is a key parameter.
<u>Regulatory basis</u>: SRP 15.0, p. 15.0-10. "*The reviewer ensures that the applicant has presented the results of the analyses, including key parameters as a function of time…"*

15.06.01-2

For each Chapter 15.6 analysis, provide an assessment showing why the parameters, initial conditions and single failures assumed for each event are those which lead to the most conservative results.

Regulatory basis: SRP acceptance criteria instructs the reviewer to verify "*whether the event evaluation considers single failures, operator errors, and performance of nonsafety-related systems consistent with the RG 1.206 regulatory guidelines"*.

RG 1.206, C.I.15.6.2 *Sequence of Events and Systems Operation* states
"*The applicant should discuss the following considerations for each initiating event:.."*
*"…List all single failures or operator errors considered in the transient and accident analysis, and identify the limiting single failure for each event*…"

15.06.01-3

This event as presented in Section 15.6.1 shows an initial power increase due to boron reactivity feedback. Explain how the boron feedback as well as axial and radial power profiles are treated conservatively.

Regulatory basis: SRP 15.6.1, p 5, "*The core burn-up is selected to yield the most limiting combination of moderator temperature coefficient, void coefficient, Doppler coefficient, axial power profile, and radial power distribution"*

15.06.03-1

Please clarify the first sentence in section15.6.3.1, "*…the reactor trips automatically on low PZR pressure, high SG pressure, or **high PZR pressure.***" (emphasis added)

15.06.03-2

Please present the results of the analyses that led to the conclusion that the case presented is the limiting case for radiological release.

15.06.03-3

Please present the results of the SG overfill analyses.

Regulatory basis: SRP 15.0, p 10, "*The reviewer ensures that the applicant has presented the results of analyses…"*

15.06.03-4

Please clarify where the SG apex is located (Fig 15.6-26).