BWROG Option 3 LOOP-LOCA Separation Report (NEDO 33148) Revision 2 Draft RAI Responses

Presentation to NRC

July 25, 2007

BWROG

Meeting Agenda
Option 3 LOOP-LOCA Separation LTR
Draft RAI Responses

Opening Statements and Introductions	NRC, BWROG	1300
Schedule	All	1310
NRC EEB questions 1-4	Visweswaran	1315
NRC PRAB questions 3, 7, 8, 14	Visweswaran/Farkas	1340
Break		1450
NRC PRAB questions 10-13	Visweswaran	1500
NRC Systems Branch questions 1-4	Browning	1515
Remaining PRAB questions (as time permits)	Visweswaran	1530
Summarize action items and NRC comments	All	1545
Meeting adjourn		1600

Overview

- Purpose of Meeting
- Background
- Schedule
- Draft RAI responses
- Action Items and Closing

Purpose of Meeting

- Review BWROG draft RAI responses on Option 3 Report NEDO 33146 “Separation of Loss of Offsite Power from Large Break LOCA”
- Obtain NRC staff feedback on responses, proposed plan, and schedule

The BWROG believes that, in the absence of a useful 10 CFR 50.46a rule, this risk-informed application has a high value to the BWR fleet. The BWROG will work with NRC to achieve an implementable LTR.

Background

- BWROG submitted NEDO 33148 report April 27, 2004.
  - Risk-informed justification for the separation of Loss of Offsite Power events from Large Break LOCA.
  - Risk evaluation for the whole BWR fleet
- NRC issued RAIs on December 21, 2005
- During February 15, 2006 BWROG agreed to plant-specific PRA as part of licensee's submittal
- Pre-submittal meeting with NRC June 14, 2006
- Revised LTR submitted August 25, 2006
- NRC issued additional RAIs on June 15, 2007
- BWROG has prepared draft responses to the RAIs

Schedule

- Plan to compete responses to RAIs by August 15, 2007
- Complete BWROG review by September 21, 2007
- Submit to NRC by September 30, 2007
- LTR revision (if required) to follow RAI responses by one month
- NRC projected schedule for draft SE?

Electrical Engineering Branch RAIs 1-4 and Draft Responses

Electrical Engineering Branch RAI 1: NUREG-1829

- Electrical RAI 1: NUREG-1829, used for estimating the LOCA frequencies, is still in the draft form. Would a licensee wait for the finalization of the NUREG report?.

  BWROG Response: The BWROG proposes to recommend use of the preliminary or final version of NUREG-1829, whichever is available at the time of the licensee submittal.

Electrical Engineering Branch RAI 2a: Double Sequencing

- Electrical RAI 2a: NRC Staff has concerns about double sequencing. IPEs do not model LOCA/LOOP events or address associated GSI-171 concerns. Explain how the licensees will address the above concerns for various LOCA sizes and submit the requisite analyses and the plant-specific information.

  BWROG Response:
  - Most utilities have made significant improvements to the IPE risk models prepared originally during the 1990s.
  - The plant-specific PRAs for this exemption will conform to RG 1.200 Category II standards
  - In any event, double sequencing and the GSI-171 items are not significant since the LBLOCA/LOOP event is assumed to lead directly to core damage in the PRA required by the LTR
  - This is the most conservative treatment possible for these events in a PRA

Electrical Engineering Branch RAI 2b: Double Sequencing

- Electrical RAI 2b: The submittal should cover the concerns discussed in the "Enclosure 3: Responses to NRC Comments on EPRI Reports 1009110 and 1007966 Regarding the Issue of Double Sequencing Nuclear Plant Safety Loads.“

  BWROG Response:
  - Double sequencing is not part of the current licensing basis and is therefore neither addressed in the design nor included in the current Appendix K analysis.
  - However, double sequencing is being considered as part of the LOOP/LOCA event for this exemption
  - Thermal-hydraulic analyses in this LTR demonstrate that the LBLOCA/LOOP event is successfully mitigated - double sequencing is encompassed in the overall delay time for injection.
  - The LTR conservatively requires the PRA to assume the LBLOCA/LOOP event to lead directly to core damage. Therefore, it does not matter what caused the consequential LOOP.

Electrical Engineering Branch RAI 3: Optimize EDG Loading

- Electrical RAI 3:
  - a) Will a revised 24- hour EDG loading profile for a worst-case design-basis accident will be developed?
  - b) Include Technical Specifications changes relating to the EDG testing.
  - c) The revised EDG testing should meet requirements of Reg. Guide (RG) 1.9, Revision 3. Provide any specific exemptions to RG 1.9 with justifications.

BWROG Responses:

- a) Individual licensees will submit 24- hour EDG loading profile
- b) Individual licensees will submit EDG testing-related Tech Spec changes.
- c) RG 1.9 tests are already part of NUREG-1433 (Standard Tech Specs). Individual licensees will be required to meet the load testing requirement of RG 1.9 for the EDGs.

Electrical Engineering Branch RAI 4: EDG Start on LOCA Signal

- Electrical RAI 4: The present requirement of the starting an EDG on LOCA signal, even if offsite power is available, provides an added assurance that a redundant onsite power source is readily available. Provide additional justification for removing the LOCA start signal from the EDG start logic.

  BWROG Response:
  - After the exemption, the LBLOCA/LOOP event will be analyzed and shown to be mitigated as a beyond design basis event.
  - However, in the risk analysis, LBLOCA/LOOP event will be assumed to lead directly to core damage with the increase in core damage risk within the allowable RG 1.174 guidelines.
  - Consequential LOOP is not an issue, and random LOOP is a low frequency event. Requiring an automatic start signal will result in unnecessary wear on the diesel, and an unnecessary operator action to shut down an operating diesel, for this low frequency event.
  - Therefore, there is very little benefit to an anticipatory start of EDGs while there is significant benefit associated with starting the EDGs only for a LOOP event, as stated in the LTR

PRA Branch RAIs 3, 7, 8, 14 and Draft Responses

PRA Branch RAI 3: LOCA Frequencies

- PRA RAI 3a: How will the 5th, 95th, and median estimates of the LOCA frequencies be used?

  BWROG Response: The 5^{th} and 95^{th} values will be used for the PRA uncertainty analysis described in Step 17.

- PRA RAI 3b: Please justify the use of the older, generic NUREG/CR-5750 LOCA frequencies for the exemption request.

  BWROG Response: The LTR will be revised to require use of the newer NUREG-1829 values only.

PRA Branch RAI 3: LOCA Frequencies

- PRA RAI 3c: Describe the difference between the purpose and context of the decisions sought in this TR report versus the change in the LOCA size described in 70 FR 67598. The differences should justify your proposal to rely on the mean of the geometric mean aggregation technique contrary to the rulemaking, which relied on all the aggregation techniques.

  BWROG Response:

  - NRC's use of the 95th percentile value from NUREG 1829 for estimating the frequency of Large Break LOCA is appropriate for the rulemaking but not for comparison for the frequency determination in this LTR
    - Large break LOCA is removed from the design basis and is not analyzed. Therefore, it is necessary to be conservative.
    - In this LTR, the LBLOCA remains in the design basis and is analyzed – LBLOCA/LOOP mitigation is using a realistic code.
  - The use of geometric vs arithmetic means is more appropriately justified in NUREG-1829 than in this LTR
  - Requirement to use of 95th percentile values + arithmetic mean is unnecessarily conservative and will lead to the selection of the same TBS as in the 10CFR 50.46 rule change

PRA Branch RAI 3: LOCA Frequencies

- PRA RAI 3d:
  - a) How is the uncertainty in the LOCA frequency included in the sample results reported in Section C.3.8?
  - b) How is the uncertainty in the aggregation technique modeling assumptions included in the sample results?
  - c) What guidance will be provided in the TR about how to interpret and reach a conclusion if the results of a sensitivity study indicate that the acceptance guideline is exceeded under some modeling assumptions?

  BWROG Responses:
  - a) Section C.3.8 contains uncertainty results using the generic PRA model of the LTR and does not include the uncertainties associated with the aggregation techniques.
  - b) As noted in response a) to RAI 3d above, BWROG is not addressing the uncertainties in the aggregation techniques.
  - c) The purpose of the sensitivity studies is only to provide risk insights. It is acceptable for the results of the sensitivity studies to exceed the RG 1.174 acceptance guidelines.

PRA Branch RAI 3: LOCA Frequencies

- PRA RAI 3e: How the use of the 40-year frequency estimates apply to a plant that has extended its license to 60 years.

  BWROG Response: Plants extending their license beyond 40 years will be required to use the frequency estimates for 60 years from NUREG-1829

PRA Branch RAIs 7, 8

- Separate presentation by EPRI

PRA Branch RAI 14: Performance Measurement Strategies

- PRA RAI 14: How to monitor whether the LOCA frequency and the conditional LOOP probability are changing and respond to changes that require a smaller LOCA size to be selected in order to maintain the the 1E-6/year guideline?

  BWROG Response: Reg. Guide 1.200 requires a PRA maintenance plan. Licensees will be required to include a review of LOCA frequencies and consequential LOOP frequencies in their periodic updates to the PRA as a part of this PRA maintenance plan. The licensee will continue to meet the guideline through additional analysis or compensatory measures

PRA Branch RAIs 10-13 and Draft Responses

PRA Branch RAI 10: Defense-in-Depth and Safety Margins

- PRA RAI 10: Proposed change to start one loop of RHR in the suppression pool cooling mode creates the need for a new operator action for scenarios involving failure of the low pressure coolant injection (LPCI) train lined up for injection. Please provide an assessment of this and any other new operator actions in terms of potential impact on defense-in-depth.

  BWROG Response:

  - The proposed change to RHR would reduce CDF associated with loss of containment heat removal, but would increase CDF for sequences involving loss of injection, but overall there will be a net reduction in CDF. The likelihood of a need for the third LPCI in the core cooling mode is very low as any other systems have to fail before this system is needed, and therefore the operator action to re-align the RHR pump from the SPC mode to core cooling mode is not judged to be an over-reliance on programmatic activities.

  - The only other new operator action is part of optimizing the diesel generator loading and involves operators manually starting a LPCS pump or LPCI pump. This is a fairly routine action that is offset by reductions in operator burden related to reducing DC loads, monitoring battery consumption, and manually restarting the battery chargers, during LOOP events. The changes do not represent an "over-reliance on programmatic activities" nor are they proposed in response to any perceived "weaknesses in plant design".

PRA Branch RAI 11: Defense-in-Depth and Safety Margins

- PRA RAI 11 a,b,c,d and e: Questions on what combinations of LOCA and LOOP events are analyzed before and after the exemption.

  BWROG Response: See the comparison in the following tables

Current Licensing Basis

Case	LOCA Size			
	Small ID < 1 in.	Medium 1” ≤ ID ≤ 5”	Large 5” < ID	RPV Rupture [1]
	Analyzed per 10CFR 50.46a and GDC 35?			
LOCA	Yes	Yes	Yes	No
LOCA + single failure	Yes	Yes	Yes	No
LOCA + coincident LOOP	Yes	Yes	Yes	No
LOCA + delayed LOOP	No	No	No	No
LOCA + double sequencing	No	No	No	No
LOCA + single failure + coincident LOOP	Yes	Yes	Yes	No

Post-Exemption Licensing Basis

Case	LOCA Size				
	Small ID < 1 in.	Medium 1” ≤ ID ≤ 5”	Large (LLOCA) 5” < ID ≤ 10”	Large (LBLOCA) 10” < ID[3]	RPV Rupture [1]
	Analyzed per 10CFR 50.46a and GDC 35?				
LOCA	Yes	Yes	Yes	Yes	No
LOCA + single failure	Yes	Yes	Yes	Yes	No
LOCA + coincident LOOP	Yes	Yes	Yes	Yes, but using MAAP	No
LOCA + delayed LOOP	No	No	No	No	No
LOCA + double sequencing	No	No	No	No	No
LOCA + single failure + coincident LOOP	Yes	Yes	Yes	Not analyzed	No

PRA Branch RAI 11: Defense-in-Depth and Safety Margins

- PRA RAI 11f: Would a licensee be expected to verify that the generic thermal-hydraulic analyses were applicable to its specific plant and the actual plant changes anticipated?

  BWROG Response: Yes, but if analysis parameters of the generic analysis in the LTR bound the parameters for a specific plant, plant-specific thermal-hydraulic analysis is not needed.

PRA Branch RAI 12: Modeling MOV Stroke Times in MAAP Analysis

- PRA RAI 12: Regarding the option to increase MOV stroke times, what valve stroke times were used for the analysis, nominal or increased? Was any increase in valve stroke time added to the EDG delay? How should a licensee analyze this proposed plant modification in its plant-specific analyses?

  BWROG Response:
  - MAAP analysis does not break down the MOV stroke time and the EDG delay time individually.
  - Total injection delay time in the analysis includes all the parts, one of which is the MOV stroke time.
  - Licensees performing plant-specific thermal-hydraulic analysis should do the same.
  - A note will added to the option description to enable licensees selecting this option to correctly apply the results of the MAAP analyses to their plant.

PRA Branch RAI 13: Comparison of PRA Results to RG 1.174 Guidelines

- PRA RAI 13: Explain how the CDF due to LBLOCA/LOOP will be combined with the PRA results due to other modifications and then compared to the RG 1.174 guidelines.

  BWROG Response:

  - CDF due to the LBLOCA/LOOP event alone is first compared to RG 1.174 acceptance guideline value
  - To facilitate selection of proper plant modification options, the impact of each option on PRA results is then checked against the 1.0E-6 value
  - Finally, the impact of all selected options + the LBLOCA/LOOP effect will be checked against the 1.0E-6 value. If the 1.0E-6 is exceeded, different set of options have to be selected until the guideline limit is met
  - BWROG review indicates that most of the proposed options result in a CDF decrease, and not an increase.

Systems Branch RAIs 1-4 and Draft Responses

Systems Branch RAI 1: Loop-select Logic Elimination

- Systems RAI 1a: Loop-select logic elimination and starting one RHR in SPC mode cannot be implemented together.
  - Can plants that do not have, or have eliminated, loop-select logic implement RHR in the SPC mode change?

  BWROG Response:
  - LPCI Modified plants as well as those later plants that never had Loop-Select Logic, are sufficiently divisionalized, electrically and mechanically, that they can implement the RHR-SPC change, as indicated in the following tables

Systems Branch RAI 1: Loop-select Logic Elimination

LPCI Loop-Select Logic		
ECCS Pump	Mechanical Division[1]	Electrical Division
"A" RHR	1	1
"B" RHR	2	2
"C" RHR	1	1
"D" RHR	2	2
"A" Core Spray	3	1
"B" Core Spray	4	2

LPCI Modified		
ECCS Pump	Mechanical Division[1]	Electrical Division
"A" RHR	1	1
"B" RHR	2	1
"C" RHR	1	2
"D" RHR	2	2
"A" Core Spray	3	1
"B" Core Spray	4	2

1) Mechanical Division refers to the piping arrangement – common suction and discharge piping paths.

Systems Branch RAI 1: Loop-select Logic Elimination

- Systems RAI 1b: Discuss how, if this change can be implemented in plants without the LPCI Loop-select logic system, licensees will continue to meet the single failure criterion assuming the availability of offsite power. Provide separate discussions for the BWR/3 and BWR/4 that previously had and have eliminated the LPCI loop select logic system, BWR/3 and BWR/4 that were not designed with a LPCI loop select logic system (if any exist), and BWR/5 and BWR/6, which do not have a LPCI loop select logic system

  BWROG Response:

  Because LSL plants are not both mechanically and electrically cross-train divisionalized, the "simplified LPCI Mod" proposed in this LTR leaves the plant vulnerable to certain single failures in electrical distribution that could leave the plant vulnerable to specific combinations of break location and single failure (regardless of offsite power status) which would lead to unacceptable results (PCT > 2200 °F) if one RHR mechanical division were initially aligned in SPC mode and not LPCI Injection mode, allowing for the common licensing basis assumption of no Operator actions allowed for the first 10 minutes of the event. Because the LPCI Mod designs are cross-train electrically divisionalized, they are not similarly vulnerable.

  The above is also true for later BWR/4s, 5s and 6s that did not have LPCI Loop Select Logic as part of their original design. In these later designs, the RHR pumps are all electrically cross train divisionalized or assigned to their own electrical division (4 division plants).

Systems Branch RAI 2: Loop-select Logic Elimination

- Systems RAI 2: The TR suggests that some plants have already removed the LPCI loop select logic system and that previous modifications to accomplish this task were much more complicated. Describe in detail the process by which a licensee would implement this change under the auspices of this TR and associated exemption requests

  BWROG Response: The conversion from LSL to "LPCI Modified" configuration took place in approximately the 1975-77 timeframe, in response to the rule changes in §50.46 and App. K in 1975. Given the various physical configurations of BWRs (single units, dual units, plants with swing Diesel Generators, 2 Electrical Divisions vs. 4 Divisions, etc.), there was no single/universal design change. So each licensee described their plant-specific design changes in their license amendment requests and LOCA analysis reports. There are, however, some key features common to all LPCI Mod plants, which are: 1) closed RHR cross-tie valve, 2) cross-train electrical divisionalization, including removal of the LPCI Swing Bus, 3) DC Inverters to power AC MOVs, 4) revise LPCI injection logic to removed LSL (example, close signal to the recirculation suction and discharge valves in the broken recirculation loop). In this LTR, a "Simplified LPCI Mod" is proposed that does not include items 2 and 3 above, which are both complex and costly.

Systems RAI 3: MAAP Analyses

- Systems RAI 3:
  - In the MAAP cases from what was the ECCS flow that was unchanged?
  - Confirm that the range of liquid volumes analyzed will bound limiting initial conditions for the MELLA plus operating state points.

  BWROG Response:
  - MAAP model does not include a single value for the ECCS flow. ECCS flow is provided in the form a pump head curve. The ECCS flows in the analysis remains unchanged from those derived from the curves given in Table 2-3

  - This LTR has nothing to do with MELLLA + modification which has its own LTR. Each LTR has to be independent and stand-alone. At the time the plant implements this LTR, the plant has to see if the generic MAAP analysis is still applicable for its conditions and then decide accordingly.

Systems Branch RAI 4: Fuel Type in MAAP Analyses

- Systems RAI 4: How does the thermal-hydraulic analysis account for different fuel designs?

  BWROG Response: The analysis was done assuming GE 14 fuel, but is valid for any GE 10 x 10 fuel. Plant-specific analysis will be needed for any plant that uses fuel from a different vendor.

Remaining PRA Branch RAIs and Draft Responses

PRA Branch RAI 1: Break Size and Deterministic Analysis

- PRA RAI 1 (a) (i): Is this the methodology for which the TR is requesting approval, or is a 10-inch break size proposed for all plants with a check that the plant-specific LOCA/LOOP frequency is less than 1E-6/year?

  BWROG Response: The LTR is requesting approval for the methodology. Each plant will find a break-size based on its plant-specific analysis

- PRA RAI 1 (a)(ii): Which generic conclusions developed by the TR would no longer be valid if, for example, a plant determined that a much smaller break size would satisfy the 1E-6/year guideline value? For example, the TR states in many places that realistic analysis illustrates that core damage is not expected even with a concurrent LOOP/LOCA. Is this observation a necessary conclusion supporting the proposed exemption?

  BWROG Response: The realistic plant-specific thermal-hydraulic analysis should show that core damage is not expected from a LBLOCA/LOOP. This conclusion that core damage is not expected from LBLOCA/LOOP is necessary to support the exemption. There is no other conclusion of the TR that will be invalidated if a plant selected a smaller size or a larger size than the 10” break.

PRA Branch RAI 1: Break Size and Deterministic Analysis

- PRA RAI 1 (a) (iii): At what LOCA size (i.e., smaller than 10 inches) would this conclusion no longer be valid?

  BWROG Response: The methodology is applicable for all break sizes that are selected by using the plant-specific approach. Note that the smaller the break size, in BWR plants, more time is available for EDGs to start.

- PRA RAI 1(b):
  - i. Is it the intent of the TR that the exemption only apply to large LOCAs with a "simultaneous" or "coincident" LOOP?
  - ii. If so, would a plant still have to be able to mitigate a large LOCA with consequential LOOP after a slight time delay, rather than "simultaneous" or "coincident?"
  - iii. If the intent is that the exemption be from any LOOP as a consequence of a LOCA greater than a given break size, please state this explicitly in the TR. That is, would the licensing basis analysis for LOCAs greater than some size no longer include any evaluation of the affects of a LOOP on the mitigating systems?

  BWROG Response: See response to PRA Branch RAI 11

PRA Branch RAI 1: Break Size and Deterministic Analysis

- PRA RAI 1(c): For the large LOCAs with offsite power available, which would remain in the plant's design basis, is it the intent that the single failure requirement of GDC 35 still hold following granting of the exemption?

  BWROG Response: Yes, with offsite power available, the single failure requirement of GDC 35 is required to be met for all break sizes.

PRA Branch RAI 2: Plant Modifications

- PRA RAI 2: Is it the intent of the LTR to provide a generic methodology for any change that may be enabled by the granting of the requested exemption, or is the scope of the exemption describe in the LTR limited to the seven specific changes identified?

  BWROG Response:

  - Scope of the exemption described in the LTR is limited to the seven specific changes identified.
  - The LTR states that a licensee desiring to implement a not described in the LTR, must seek and obtain approval from NRC separately.
  - The lead plant submittal will contain more details of the plant-specific changes selected for that plant.
  - BWROG will consider rewording LTR to address NRC Staff's concern

PRA Branch RAI 4: Selection of LOCA Frequencies and Break Size

- PRA 4: Will the requested exemption from 10 CFR 50.46 apply only to LBLOCAs with break sizes greater than or equal to 10 inches? Please explain whether one break size will apply to all BWRs that wish to request an exemption as described in the TR, or does the TR allow for site-specific break sizes? If break sizes other than 10 inches are allowed, would a licensee have to perform plant-specific thermal-hydraulic analyses at the chosen LOCA size?

  BWROG Response: The selected break size for the PRA and thermal-hydraulic evaluations will be addressed separately.

  PRA Study: The break size for the exemption is plant-specific and will be chosen by each plant per the guidance in the LTR. However, since NUREG-1829 does not provide LOCA frequencies for break sizes between 7" and 18", the LTR suggests using the 7" LOCA frequency as a conservative value that will bound the frequency of larger break sizes, rather than having licensees try to interpolate a frequency for their chosen break size from the NUREG-1829 information.

  Thermal Hydraulic Study: The thermal-hydraulic analysis provided in Appendix B of the LTR was performed for breaks in the recirculation piping (28"). Sensitivity cases were quantified, as described in B.6.2, which showed that the highest PCT was reached with the largest break size. Therefore, the thermal-hydraulic analysis of Appendix B is bounding for smaller break sizes. Plant-specific thermal-hydraulic analysis would not be required based solely on the licensee selecting a different break size for their exemption request. The text on Page 4-3 will be revised to avoid confusion about the analyzed break size.

PRA Branch RAI 5: Selection of LOCA Frequencies and Break Size

- RAI 5: How would a PRA model using "earlier sources" meet the guidance of RG 1.200, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities” (ADAMS Accession No. ML070240001), for acceptable technical adequacy, considering this risk-informed exemption request is focused on LOCA events?

  BWROG Response: The LTR will be revised to direct the use of NUREG-1829 for LOCA frequencies. However, since the NUREG does not provide probabilities between 7” and 18” pipe sizes, the LTR would permit interpolation of the values.

PRA Branch RAI 6: Selection of LOCA Frequencies and Break Size

- RAI 6: In Section 4.1, the methodology allows use of NUREG/CR-5750 or NUREG-1829 LOCA frequency estimates. Please describe how "all possible contributors" to LOCA are addressed in each of these references.

  BWROG Response: NUREG-1829 specifically excludes rare event loading due to seismic events, water hammer, and other sources from its estimates of LOCA frequency. Piping that carries reactor coolant is designed to withstand seismic events with a significant margin of safety. These pipes are not expected to fail during a SSE magnitude earthquake. Actually, because of the built in seismic margins in the design, these pipes are not expected to fail during earthquakes much beyond the SSE level.

  The ALWR Requirements Document ("Advanced Light Water Utility Requirements Document", Vol. III, ALWR Passive Plant, Chapter 1, Appendix A, PRA Key Assumptions and Ground Rules) provides suggested seismic fragilities (Table A.3-4) for piping and seismic hazard curves (Figure A.3-1 and Table A.3-2) for five different soil type sites. Combining the median fragilities with the hazard curves results in median failure frequencies of 5.0E-09 or lower for piping. This is an insignificant contributor to the LOCA frequencies provided in NUREG-1829.

  Pipe failure due to causes other than seismic are judged to have even lower frequencies as there are no credible failure mechanisms that can cause a LOCA. Therefore, the frequency of pipe failures from these other contributors is considered to be subsumed in the LOCA frequencies provided in NUREG-1829.

PRA Branch RAI 9: Probability of Consequential LOOP

- RAI 9: The third full paragraph on Page 2-7 uses a conditional probability of LOOP given a LOCA of 0.01 in discussing inter-systems LOCA. The NRC staff notes that the conditional probability of a LOOP given LOCA will be a number derived as described in Section 4.2. Also, the generic value for this probability given in Section 4.2 is larger by more than a factor of two. Please explain why 0.01 is used on Page 2-7 when the TR methodology has the licensee determine a specific number for its plant in Section 4.2.

  BWROG Response: The BWROG believes that the ISLOCA concerns can be demonstrated to be negligible on a generic basis. The intent of the LTR section was to demonstrate this using a conservative, generic analysis. BWROG will revise the value for the probability of LOOP given LOCA to a bounding value of 0.1; the ISLOCA concerns will still be shown to be negligible and that plant-specific analysis will not be required.

Action Items and Closing