Project Number 694

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WOG-04-470

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Subject: **Westinghouse Owners Group Comments on Cost and Benefit of NRC's Conceptual Rule Change for Redefining the Large Break Loss of Coolant Accident Design Basis Break Size in 10CFR50.46**

Dear Dr. Sheron:

The WOG appreciates the opportunity to comment on the potential costs and benefits that might result from WOG licensee implementation of various plant changes that will be possible if the NRC were to adopt the conceptual rule change to 10CFR50.46 that was discussed in the public meeting held on August 17, 2004. The WOG maintains its position that the current design basis large break loss of coolant accident (LBLOCA) is unnecessarily conservative and imposes a broad and significant regulatory constraint on plant design and operation and also believes that redefining the LBLOCA design basis will improve safety. We welcome the NRC's LBLOCA design basis redefinition efforts and look forward to working with the NRC on the details of the rule change and its implementation.

The NRC staff posed seven specific questions to industry to support the regulatory analysis for development of the planned changes to 10CFR50.46 and other associated regulations. The WOG response to those questions is attached.

Although the WOG believes there are potential benefits from the conceptual rule, those benefits are substantially less than what the WOG originally envisioned for redefinition of the LBLOCA design basis for the following reasons: 1) the higher than expected costs for PRA analysis and thermal-hydraulic analyses associated with mitigation of breaks larger than the new design basis break size, 2) the relatively large size of the proposed new design basis break size, and 3) the scope of the rule change does not include some of the General Design Criteria for LBLOCA mitigating systems. These comments are discussed in detail in the attached responses to the NRC's questions.

Please contact Mr. Wayne Harrison (STPNOC), Chairman of the WOG LBLOCA Redefinition Working Group, at 361-972-7298 with any questions or comments regarding this information.

Sincerely yours,

Frederick P. "Ted" Schiffley, II, Chairman,
Westinghouse Owners Group

FPS:PJH:las

Attachment (1)

cc: Brian Thomas, NRC (by e-mail)
George J. Mencinsky (by e-mail)
Rich Barrett, NRC (by e-mail)
Suzie Black, NRC (by e-mail)
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BENEFITS OF LARGE BREAK LOCA REDEFINITION

Risk-informed operation promotes safety by focusing regulations and regulatory enforcement on risk-significant issues. It allows use of limited NRC resources in a manner that is better correlated with protecting the health and safety of the public. From an industry perspective, risk-informed operation and associated risk-informed regulations enable the limited economic resources of the operating plants to be used to ensure safe, efficient plant operation. It also provides a strong incentive for seeking out and making risk-informed decisions.

In SECY-98-300, the NRC proposed that risk-informed changes be considered for 10CFR50 (Option 3). Subsequently, the NRC has supported several risk-informed initiatives. Applications actively under discussion include modifying special treatment requirements for low safety significant components and redefining the upper-bound break sizes for the design basis large break LOCA.

The Westinghouse Owners Group (WOG) views the July 1, 2004 Staff Requirements Memorandum and the staff's conceptual rule as positive steps toward implementation of Option 3 that will result in safety benefit and also reduce the unnecessary regulatory burden associated with the current design basis pipe break.

In recent years, the WOG has devoted considerable resources to the realization of the safety and economic benefits of risk-informing LBLOCA. The WOG evaluations have been based on elimination of pipe breaks larger than six-inch effective diameter (about 28 square inches) from the design basis. It has been assumed that all plant modifications based on this change to the design basis would need to be justified using Regulatory Guide 1.174 and that there would be no requirement to continue to analyze LBLOCA. Mitigation capability for LBLOCA under severe accident management would still be maintained.

The WOG has concluded that redefinition of large break LOCA (removing breaks with greater than a six-inch effective diameter from the design basis) should have substantial safety and economic benefit.

Safety Benefits

A risk-informed rule change has the potential for removal of excessive requirements on safety related systems and components. This will create an opportunity for both safety improvement and cost reduction. For example, if the largest design basis LOCA is a six-inch break, then:

- Relaxation in fuel design requirements could result in significant benefits to fuel utilization that would reduce the number of fuel assemblies required. This would in turn result in a large benefit to public health and safety by reducing the number of spent fuel assemblies that have to be handled, transported, and stored.
- The containment spray system may not need to be automatically actuated for LOCAs. Low pressure safety injection pumps may not have to start automatically. This has the benefit of extending the time to refueling water storage tank (RWST) depletion and switchover to containment sump. This will avoid or delay the need to switch over to recirculation as well as lessen debris transport to the sump and increase the margin for NPSH during recirculation.
- Accumulators may no longer be needed to mitigate design basis events, and perhaps actuation pressures can be optimized or staggered to extend accumulator usefulness in the mitigation of severe accidents.

- Changes, such as those above, may reduce overall plant risk and improve the significance determination process (SDP) margin. Certain safety related equipment will become less important, and the risk significance (color code) of some SDP related events will be lessened. Also the reduced risk significance of components can lead to reduced cost via Option 2.

The WOG intends to develop guidance to help plants identify and implement cost-beneficial and safety-beneficial design and operations improvements. The intent is to identify candidate design and operational changes based on a review of equipment, procedures, and Technical Specifications affected by the change in status of the LBLOCA event. The list of items will be reviewed to identify candidate changes that will potentially reduce plant risk. This list will be screened to determine those items that will receive a detailed cost benefit evaluation and further consideration for implementation.

Table 1 provides examples of expected safety benefits, along with the potential impacts of the August 3 draft rule language on those safety benefits.

Response to NRC Questions

In order to complete the regulatory analysis for the proposed rule, the NRC has requested information about the potential costs and benefits of the 10 CFR 50.46 rule change and has asked stakeholders to respond to several questions at a public meeting held on August 17, 2004.

Westinghouse Owners Group responses to the NRC's questions are provided in Table 2. These responses are based on WOG evaluations which assumed that breaks larger than six-inch effective diameter (about 28 square inches) would be eliminated from the design basis. It was assumed that all plant modifications based on this change to the design basis would need to be justified using Regulatory Guide 1.174 guidance and that there would be no requirement to continue to analyze LBLOCA.

Overall, for a rule change consistent with the July 1, 2004 SRM, applications of LBLOCA redefinition should be overwhelmingly cost-beneficial with payback periods of a few months or less of plant operation. However, the NRC's August 3 draft rule language includes indications that the costs of analysis, licensing and monitoring may be substantially higher than the WOG assumed in their cost-benefit evaluation. The draft rule language also indicates that the maximum break size may be considerably larger than the size assumed by the WOG and larger than the size corresponding to the WOG's interpretation of the 1E-05 initiating event frequency recommended in the July 1, 2004 SRM. This larger maximum break size will reduce both the safety benefits and the economic benefits.

Table 2 provides responses to the NRC's questions along with comments regarding the potential impact of the current draft rule language.

Table 1 –Safety Benefits of Risk Informed LBLOCA

	Safety Benefit (based on July 1, 2004 SRM)	Potential Impact of Aug 3, 2004 Draft Rule Language
Improved Focus on Safety Significant Items		
A1	More focusing on safety significant work; e.g., no LBLOCA compliance issues, LBLOCA analysis, and less training on the double-ended guillotine break (DEGB), will enable engineers and operators to work on risk-significant plant issues and become better trained on more significant events. More realistic Technical Specification treatment will ease operational burdens and enable operators to better focus on safety significant activities.	Additional thermal hydraulic analyses are required to implement the proposed rule, and it appears that a new beyond transition break model will be required. Consequently, the analytical benefit is significantly diluted.
A2	Will facilitate more streamlined procedures for LOCA. Will allow focus on a smaller set of equipment needed to maintain safety functions. For example, having less automatically actuated equipment will reduce the potential for failure of an unneeded component (e.g., a low-pressure safety injection (LPSI) pump) that could divert an operator's attention from more important mitigation actions.	Potential benefit appears to be significantly reduced because of the proposed break size.
A3	Elimination of Technical Specification shutdown requirement associated with Containment Spray would reduce the likelihood of forced shutdown and associated thermal cycle on plant.	Potential benefit appears to be significantly reduced because of the proposed break size.
A4	Lower Peak Containment Pressure can be used in analyses and testing. ILRT and LLRT test pressure P_a is based on LOCA and can therefore be lowered. This results in reduced potential for failure of tested components, increased operating margin, and less likelihood of a challenge to the plant, all of which are safety benefits.	Larger break size may minimize this benefit
A5	Modification to Accumulator acceptable parameter ranges (boron concentration, water volume, cover pressure) would reduce likelihood of forced shutdown and resulting thermal cycle on plant. This reduces the potential for unnecessary challenges to the plant, which is a safety benefit.	Larger break size may minimize this benefit

	Safety Benefit (based on July 1, 2004 SRM)	Potential Impact of Aug 3, 2004 Draft Rule Language
A6	Increases in Allowed Outage Times for Accumulators and other equipment will reduce the potential for unnecessary plant shutdowns and reduce the number of operational and thermal transients. This reduces the potential for unnecessary challenges to the plant, which is a safety benefit.	Larger break size may minimize this benefit.
A7	There will be opportunities to reduce worker exposure. For example, ALARA benefits will result from changes in testing scope.	Larger break size may minimize this benefit.
Better Utilization of Equipment		
B1	Modifications to Containment Spray actuation setpoints and logic will increase the refueling water storage tank (RWST) inventory available for core cooling, therefore extending the time to recirculation, and reducing the potential for debris transport during the recirculation phase. This will also improve ECCS net positive suction head (NPSH) margin because SI pumps are not competing with CS pumps.	Does not appear to be available because there is no relief from GDC-38. In addition, the 14 inch break size may minimize this benefit.
B2	Modifications to Low Pressure Safety Injection setpoints and logic will increase the RWST inventory available for high pressure safety injection and reduce the potential for debris transport during the recirculation phase.	Potential benefit appears to be significantly reduced because of the proposed break size.
B3	Accumulators may no longer be needed to mitigate design basis events, and perhaps actuation pressures can be optimized or staggered to extend accumulator usefulness in mitigating severe accidents.	Larger break size may minimize this benefit; however, this would be offset somewhat by not having to consider single failure for breaks larger than the transition break size.
B4	Changes to diesel generator load sequencing may potentially reduce grid disturbances following a reactor trip; minimize potential for double sequencing following LOOP. This is a safety benefit because plant challenges from LOOP are much more likely than LBLOCA.	Larger break size may minimize this benefit.
B5	Changing ECCS Flow balancing requirements will increase ECCS effectiveness for the more probable events.	Potential benefit appears to be significantly reduced because of the proposed break size.

	Safety Benefit (based on July 1, 2004 SRM)	Potential Impact of Aug 3, 2004 Draft Rule Language
B6	Potential easing of the flow rate for performing the full-flow testing and verification should reduce the need for teardown and rebuilding of Sump Isolation Valves and RWST Isolation Valves which is a source of valve unreliability.	Larger break size may minimize this benefit.
Improved Fuel Management		
C1	Increased design margin for fuel may result in longer fuel cycles. This would result in fewer thermal cycles on the plant and in fewer spent fuel assemblies that require storage and transport.	There may be increased PCT margin in the design basis analysis from reducing the maximum break size to 14" which would allow increased peaking factors and improved fuel utilization; however the larger break size may minimize this benefit. Increased requirements for analysis will increase the cost of the benefit. Lack of controls on potential backfit may add too much risk/uncertainty for the necessary long-term commitment for fuel cycle design.
C2	Increased fuel design margin may result in more economical power uprates, which reduces the need for new plants. Adverse environmental emissions from non-nuclear generating plants are avoided, which is a public health and safety benefit.	Larger break size may minimize this benefit. Increased requirements for analysis will increase the cost of the benefit. Lack of controls on potential backfit may add too much risk/uncertainty for the necessary long-term commitment for fuel cycle design.
C3	In increase in core peaking factors (FQ or deltaH) will provide greater flexibility to fuel designers when attempting to reduce neutron flux at the vessel wall. This may result in a corresponding reduction in risk from pressurized thermal shock.	Larger break size may minimize this benefit.
C4	Wider axial power operating bands would also result in less operator reactivity manipulations and potentially fewer rod related accidents.	Larger break size may minimize this benefit.
Improved Margin		
D1	Increased margin from peak containment pressure to maximum containment pressure for LOCA limited plants.	Larger break size may minimize this benefit.

	Safety Benefit (based on July 1, 2004 SRM)	Potential Impact of Aug 3, 2004 Draft Rule Language
D2	There would be greatly improved margin on CCW / SW Temperature Limits. This reduces the potential for unnecessary challenges to the plant, which is a safety benefit.	Larger break size may minimize this benefit.
D3	More design and operating margin will be available for HVAC issues driven by LOCA, including control room and auxiliary building rooms (plant specific).	Larger break size may minimize this benefit. In addition, it appears that single failure and LOOP still apply to the GDCs for these systems.
D4	Containment EQ Temperature Profile Relaxation will provide increased operational margins which will reduce the potential for unnecessary shutdowns. This reduces the potential for unnecessary challenges to the plant, which is a safety benefit.	Larger break size may minimize this benefit.
D5	Can increase capacity factor by providing increased operating margin for hot summer months. Increased operating margin results in fewer plant maneuvers to stay within discharge temperature requirements.	Larger break size may minimize this benefit. In addition, it appears that single failure and LOOP still apply to the GDC for these systems.
D6	More Technical Specification margin associated with LOCA mitigation components reduces the chance of Technical Specification required shutdown and increases reliability. There will be fewer challenges to the plant, which is a safety benefit.	This benefit is based on the assumption that TS operability determination will be based on a smaller design basis break. If TS are still considered to apply for ECCS mitigation capability for breaks larger than the transition break, then single failure need not be considered and only one of two ECCS trains would be required by TS for mitigation of breaks larger than the transition break size.
Improved Equipment Reliability		
E1	Diesel generator start time will be increased beyond 10 seconds, which increases diesel reliability, reduces wear and the need for invasive troubleshooting.	Does not appear to be available because draft language does not address single failure in GDC-17 and retains LOOP/LOCA for large breaks.
E2	Motor operated valves will have more realistic test requirements and will be more reliable thereby reducing potential challenges to the plant and improving safety.	Does not appear to be available because draft language does not address single failure in GDC-17 and retains LOOP/LOCA for large breaks.

	Safety Benefit (based on July 1, 2004 SRM)	Potential Impact of Aug 3, 2004 Draft Rule Language
E3	Increasing the Containment Isolation Valve required closure time would generally make the valves more reliable, because there would be fewer determinations of inoperability and unnecessary shutdowns. Plant reliability and safety would be enhanced.	Larger break size may minimize this benefit.
E4	Some ECCS performance criteria can be relaxed, including pump and valve response time requirements, thus increasing equipment and plant reliability and operating margins and reducing the potential for unnecessary shutdowns. This reduces the potential for unnecessary challenges to the plant, which is a safety benefit.	Larger break size may minimize this benefit; however, this would be offset somewhat by not having to consider single failure for breaks larger than the transition break size.

Table 2 - Response to NRC Questions

	Question	Response (based on July 1, 2004 SRM)	Comments (based on Aug 3 draft language)
1	(a) Estimate the number and type of plants that might pursue this voluntary option	The Westinghouse Owners Group has identified LBLOCA Redefinition as the highest priority regulatory issue facing the industry. WOG has not surveyed its membership to determine how many would implement a modification based on LBLOCA redefinition. However, the members have supported the WOG program, so it is expected that most PWRs (>75%) will ultimately perform one or more applications of LBLOCA Redefinition. It would be reasonable to expect that a large percentage of PWRs would have pursued a WOG concept for simple removal of the larger break sizes from the UFSAR design basis with no associated plant modifications. Very little PRA and TH analysis was expected to be needed to support such a change since it did not involve any plant modifications and the plant would retain its fundamental mitigation capability. Depending on how the revised rule is written, we would expect 50% of PWRs to apply LBLOCA Redefinition to changing required EDG start time, and up to 25% of PWRs to apply LBLOCA Redefinition to achieve a 2.5% power uprate.	Because the benefits are reduced by larger TBS (See Note 1) and the costs are increased by the draft rule language regarding analysis (See Note 2), licensing and monitoring requirements, fewer licensees would be expected to implement risk-informed LBLOCA. The draft rule language does not appear to support the WOG option of simply eliminating the requirement to maintain a LBLOCA analysis and not perform any associated plant modifications. Unless the rule language is revised with respect to GDC-17 and single failure associated with LOOP-LOCA, it does not appear that changing EDG start time is supported. The reduction in the design basis break size may still support changes in peaking factors such that power uprates are facilitated for some stations.

	Question	Response (based on July 1, 2004 SRM)	Comments (based on Aug 3 draft language)
	(b) Estimate the costs of performing the ECCS reanalyses at these plants	The WOG has estimated that total plant specific implementation would cost between $700K and $1M per unit. A minimal application to only eliminate the requirement to maintain LBLOCA analyses without any physical changes to the plant was expected to cost considerably less.	The draft rule language indicates that the costs that the WOG assumed to be one time costs might instead become continuing costs to maintain quasi-design basis LBLOCA analyses. The draft rule language does not appear to support the WOG option of simply eliminating the requirement to maintain a LBLOCA analysis and do no associated plant modifications.
2	(a) Provide the estimated number and types of plant design changes that would be permitted by the ECCS reanalyses at these plants (on a per unit basis)	WOG has identified several cost effective applications including: • Relaxation of EDG and ECCS start time • Increases in peaking factors • Potential for 1% to 3% uprating • Reduced analysis cost • Accumulator test and maintenance changes • Avoidance of LBLOCA related generic issues and letters	The draft rule language related to TBS size and analysis requirements reduces or eliminates the benefit of each of the identified applications. Relaxation of the EDG start time does not appear to be supported by the conceptual rule language. Increases in peaking factors that would support improved fuel utilization and uprates may still be achievable, but will not be as beneficial with the larger TBS. Reduced analysis cost does not appear to be achievable. The larger break size may not allow the relaxation of the requirements on the accumulators. The larger break size will not be as effective in avoiding the potential for LBLOCA related generic issues, although the less restrictive analytical requirements for breaks larger than the TBS will probably still be of some value.
	(b) Estimated costs of any decision analyses associated with such design changes.	(Included in the above section 1b)	See 1b above.

Question			Response (based on July 1, 2004 SRM)	Comments (based on Aug 3 draft language)
3	Estimate the costs of additional analyses (apart from the ECCS reanalyses) required by the proposed rule to determine the acceptability of the above design changes.	(1) cost of updating PRAs to reflect the new design	This is included in the above section 1b. This is application specific. In most cases, PRA updates were not expected to be substantial.	These costs may be higher due to monitoring requirements and the need to support maintenance of the quasi-design basis large LOCA analyses.
		(2) cost of updating PRAs to meet the PRA quality and scope requirements	For most applications PRA scope and quality should not be an issue. E.g., Large pipe breaks are not significant contributors to Seismic (See Note 3), Fire or Shutdown (See Note 4) risk.	The conceptual rule is relatively prescriptive in its codification of PRA requirements. For a relatively simple application, the PRA requirements in the rule may be too burdensome.
		(3) costs of analyses to determine compliance with the risk acceptance criteria and the defense-in-depth criteria.	This is included in 1b above. Generally, a risk-informed application per RG-1.174 may cost between $50K and $200k per unit.	The conceptual rule will most likely require most licensees to perform new thermal-hydraulic analyses for breaks larger than the TBS. NRC review and approval of the analyses will be required. The added cost in the development of the new model and getting NRC approval could be as much as $500K/licensee.
4	Estimate the number and types of plant design changes (on a per unit basis) that would meet the acceptance criteria for the additional analyses.		WOG has identified several applications that are expected to meet acceptance criteria for risk-informed applications. These include: • Relaxation of EDG and ECCS start time • Increases in peaking factors • Potential for 1% to 3% uprating • Reduced analysis cost • Accumulator test and maintenance changes • Avoided LBLOCA related generic issues and letters	The draft rule language related to TBS size and analysis requirements reduces or eliminates the benefit of each of the identified applications. Increased requirements for analysis will adversely affect the benefit. Lack of controls on potential backfit may add too much risk/uncertainty for the necessary long-term commitment for fuel cycle design.

	Question	Response (based on July 1, 2004 SRM)	Comments (based on Aug 3 draft language)
5	Estimate the costs of implementing the plant design changes that meet the acceptance criteria for the additional analyses.	These costs are included in 1b above. Implementation for many of the applications involves relatively inexpensive changes to procedures and requirements rather than to hardware.	See 1b above. Additional costs will be incurred in the maintenance required for the additional analytical model.
6	Estimate any operational costs and/or savings resulting from implementing the above design changes.	The following are examples of savings per unit from applications of LBLOCA Redefinition • Relaxation of EDG and ECCS start time (100K/yr.) • Increases in peaking factors (100-300K/yr.) • Potential for 1% to 3% uprating (1700-2800K/yr.) • Reduced analysis cost (50-300K/yr.) • Accumulator test and maintenance changes (17K/yr.) • Avoided LBLOCA related generic issues and letters (75K/yr.)	See the response to Question 2. The draft rule language related to TBS size and analysis requirements reduces or eliminates the benefit of each of the identified applications. Current language in the rule appears to preclude any savings from relaxing EDG start time. Power uprates or improved fuel utilization from increased peaking factors may still result in significant savings or revenue increases. The monitoring requirements described in "Step 3: Define implementation and monitoring program" appear to impose a significant additional burden that was not considered in the implementation costs. It appears to impose Appendix B corrective action criteria on non-safety equipment. Implementation of these requirements will likely add several hundred man-hours to the annual cost of the corrective action program.

	Question	Response (based on July 1, 2004 SRM)	Comments (based on Aug 3 draft language)
7	Estimate any anticipated changes in licensee information collection, reporting, and retention burden that could result if this rulemaking is implemented.	The only substantial burden, aside from that imposed by RG1.147, should be the need for a model to demonstrate ability to mitigate breaks beyond the TBS.	PRA updates where CDF or LERF changes by 20% require a report to the NRC. These may be common (and of little use since 20% is not very significant), although the cost is probably modest. NRC added a new reporting requirement for 0.4% oxidation changes for breaks less than or equal to the TBS. It is expected that this requirement will trigger more reporting than the current PCT reporting requirement (See Note 5). A major issue is the way the revised regulation is worded. Any change to the ECCS model will require a license amendment. Up to now, we could make these changes without prior NRC approval as long as we met 50.59(c)(8). Those license amendments could cost a licensee upwards of $20,000/yr in NRC review fees and are likely to be needed to support refueling outage schedules.

Notes:

1. The WOG recommends that the NRC select a six-inch effective break diameter (about 28 square inches) as the transition break size for the large LOCA. This is consistent with the break size assumed in most plant PRAs and shown to have a small contribution to plant risk. This break size will provide assurance that cost effective applications will be viable and break size will remain reasonably stable as more operating experience is accumulated. The requirement that all applications of the risk-informed 10CFR 50.46 must meet the guidance of Regulatory Guide 1.174 assures that plant risk will be controlled and health and safety of the public will be protected.

   The WOG believes that the TBS should not be arbitrarily doubled to account for double-ended guillotine breaks (DEGB). Instead the TBS should be applied as a slot break (with an effective break size equal to the TBS) for piping that is larger than the TBS. For the connected piping with a diameter equal to or smaller than the TBS, the complete severing of the pipe should be considered.

One of the most significant risk insights from the Probabilistic Risk Assessments that have been conducted over the past three decades is that large break LOCA is a very small contributor to plant risk. PRAs have shown that plant risks are dominated by small LOCAs and transient events involving loss of electrical power. Most PRAs model large break LOCAs to include all breaks that are larger than a five or six inch effective break diameter and show that the plant risk from these break sizes is very small.

The Commissioners' July 1, 2004 Staff Requirements Memorandum (SRM) recommends that the staff base the transition break size on the results of the expert elicitation process and that the appropriate break size should be based on the break size that has mean frequency of occurrence of 1.0E-5 per year. The expert elicitation process determined that the current day estimate of the break size with a mean frequency of 1.0E-5 per year is between a three-inch effective break diameter and a seven-inch effective break diameter. Based on linear interpolation of effective break diameter vs. mean frequency, the 1.0E-5 effective break diameter is less than 4.8 inches.

To provide margin to assure reasonable regulatory stability, the industry is taking steps to identify and deal with known and new degradation mechanisms. In addition, the WOG recommends that the transition break size be selected to provide some margin above the 4.8 inch break that the expert elicitation process has identified as having a 1.0E-5 frequency. The WOG recommends a six-inch effective break diameter for the TBS.

2. FSAR LOCA Analysis is based in part on a history of agreements that have been worked out between the industry and the NRC, based on generic sensitivity studies and engineering evaluations. Among these are agreements on what the limiting break locations are within the Reactor Coolant System. The draft rule language and Staff presentations at the August 17, 2004 meeting indicate that the NRC Staff intends to require a full re-analysis of breaks at all locations to identify the limiting locations. The WOG recommends that the currently analyzed break locations form the basis for analyses going forward.

   The top of page 6, the Draft Rule Conceptual Basis states, "LOCA analyses for break sizes equal to or smaller than the transition size should be applied to all locations in the reactor coolant system; e.g., for pipes whose inside pipe diameter is larger than the transition break size, breaks up to the transition break size must be analyzed to find the limiting break locations." US vendors currently have approved LOCA analysis methods that only look at specific break locations. (In the case of Westinghouse, only cold leg breaks between the pump and the vessel are looked at.) Taken literally, this quote would seem to re-open the whole question of limiting break location/size, and consequently re-open currently approved Evaluation Models to a re-licensing process.

3. Seismic PRAs have typically found that LBLOCA is not a significant contributor to seismic risk. LBLOCAs are typically either screened out from further consideration based on ruggedness of the piping, or they are assumed to lead directly to core damage since any seismic event that would cause a large LOCA would also destroy mitigation equipment.

   The intent of large break definition is to influence how the operation and maintenance of certain equipment might be allowed to change without substantially increasing risk. For making judgments about equipment that is related to mitigation of large LOCA, the event to be considered should be the large LOCA that this equipment is designed to mitigate; in other words, the design basis event large LOCA.

It is important to consider the notion of a "design basis event." Not all conceivable events are design basis events. For example, reactor vessel rupture is not a design basis event. This exceedingly unlikely event would pose a challenge that ECCS systems are not designed to meet. Similarly, large seismic events are not design basis events. The large reactor coolant piping is so rugged that any seismic event severe enough to cause a large rupture would also disable the ECCS. Such an event is not designed for and is not a design basis event. Therefore, it is recommended that for the purpose of large break LOCA redefinition, that the size vs. frequency for seismically induced large pipe breaks should not be directly combined with the size vs. frequency estimates for the design basis large LOCA that will be analyzed for redefinition.

4 The WOG recommends that for the purpose of large break LOCA redefinition, that the size vs. frequency for pipe breaks occurring while the reactor is shutdown should not be combined with the size vs. frequency estimates for the design basis large LOCA that will be analyzed for redefinition. The event of concern is the design basis event that is normally referred to as large break LOCA and is typically analyzed as part of each plant safety analysis and presented in the plant FSAR. This design basis event does not include pipe breaks that may occur during decommissioning or during refueling operation where the condition of the reactor and safety systems may be very different from those considered in the FSAR analyses. These other plant conditions may still need to be considered but not in the same context as the design basis event that is normally referred to as large LOCA.

5 The NRC Staff proposal that requires additional reporting for analysis results showing a 0.4% change in local clad oxidation is not specifically related to LBLOCA Redefinition. Since predicted clad oxidation is more variable than predicted PCT, we expect that more reporting will be required. In order to account for this higher variability, we recommend that a value of 2.0% be used to trigger reporting.

The NRC's proposed oxidation basis is that it is the same ratio as the PCT threshold; i.e., 0.4%/17% ~ 50F/2200F. This seems arbitrary. A more reasonable basis would be to ratio, but only over the range of temperatures at which oxidation becomes significant (i.e., 1800F and above). This would give (50F/(2200F - 1800F)) * 17% = 2.1%. Therefore 2% would be a reasonable threshold.