

ACRS SUMMARY MATRIX OF 2002 LETTERS AND OUTCOMES

ACRS Letter	Main Message	EDO/Commission Response	Timeliness	Effectiveness	Follow-up Action
<p>#1 Risk-Informed Activities in the Office of NMSS, dated January 14, 2002</p>	<p>(1) Staff should move ISA process systematically in the direction of quantitative risk assessment to enhance the overall understanding of total system risk. (2) 10 CFR Part 70 should be modified to be more risk-informed. (3) Staff should revise App. A to SRP Chapter 3 to provide guidance on the explicit treatment of dependent failures. (4) SRP Chapter 3 and App. A should be revised to stress the importance of total risk, that is, aggregate risk. (5) Staff should encourage licensees to utilize data and data treatment methods in ISA to account for uncertainties and to move assessments in the direction of increased quantification. (6) Staff should be encouraged to increase the use of risk assessment techniques in implementing ISAs to facilitate the transition to a transparent and quantitative process.</p>	<p>(1) Plans to modify guidance to allow the staff to quantify certain sequences on a case-by-case basis. (2) Plans to prepare guidance on using failure rate data in reviewing ISA and ISA summaries. (3) Plans to enhance SRP Chapter 3 and App. A incorporating discussion on dependent failures. (4) Subpart H of 10 CFR Part 70 and ISA guidance in SRP Chapter 3 are adequately risk informed to ensure safety at fuel cycle facilities, and requiring quantitative risk assessments for all processes is not warranted and would place unnecessary burden on fuel cycle licensees. However, it may be prudent for the licensees and the staff to determine risks for certain high-risk accident sequences. (5) Plans to encourage licensees to use "available" quantitative data and quantitative assessment of uncertainties.</p>	<p>Timely. ACRS/ACNW completed the review in accordance with the staff's schedule.</p>	<p>Mostly effective. The EDO agreed with most of the ACRS/ACNW recommendations.</p>	<p>The ACRS/ACNW responded to the EDO in a letter dated April 29, 2002, stating that during future meetings, ACRS/ACNW would like to discuss the treatment of dependant failures, risk-informing accident sequence sets, criteria and guidance used by licensee panels in making decisions, and the progress in adopting PRA principles.</p>

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<p>#2 The Revised Reactor Oversight Process, dated February 13, 2002.</p>	<p>(1) Although the Committee concurs with the staff's response to ACRS comments and recommendations included in its October 12, 2001, letter, it continues to believe that some of the threshold values for risk-based performance indicators (PIs) are not meaningful. (2) It is important that the thresholds adequately reflect the levels at which NRC will take action and the urgency with which this action will be taken. Some of the current thresholds do not do this. Also, further discussion is needed regarding the assessment of concurrent findings. (3) In addition, a discussion is needed regarding performance deficiencies and apparent conflicts and discrepancies between elements of the ROP which are risk-informed (e.g., significance determination process) and those that are performance-based (e.g., PIs).</p>	<p>(1) The staff understands and appreciates the issues raised by the ACRS and shares with the Committee the desire to make further improvements to the ROP. (2) The staff will continue to seek ACRS comments on the ROP and will continue to discuss and work with the Committee on its concerns.</p>	<p>Timely. ACRS expressed its concerns at its earliest possible convenience so as to enable the staff to factor the Committee's concerns into the ROP activities.</p>	<p>Effective. EDO has shared with the Committee the desire to make further improvements to the ROP and committed to work with the Committee on its concerns.</p>	<p>ACRS plans to continue to meet with the staff to discuss staff activities related to improvements to the ROP during future meetings.</p>

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<p>#3 Review and Evaluation of the Nuclear Regulatory Commission's Safety Research Program, dated February 14, 2002</p>	<p>(1) In April 2001, the ACRS completed a comprehensive and detailed review of the RES safety research programs. RES has made a number of adjustments. However, the bulk of the RES programs has not changed significantly. Therefore, the ACRS has decided not to issue a detailed report in 2002. (2) The ACRS plans to follow RES and industry programs related to future designs, which will be a major focus of the 2003 ACRS report. (3) A significant question, should the NRC develop a new licensing approach for new reactor designs needs to be addressed on an urgent basis. (4) Regardless of the licensing approach selected, the agency needs to revisit existing criteria and guidelines that may not be appropriate for the characteristics of the new reactor concepts being proposed. (5) Uncertainty criteria to allow setting appropriate limits on defense-in-depth requirements may need to be developed for new designs. (6) Although RES has recognized the merit of developing formal approaches to support the agency's decisionmaking process, it has not initiated any work in this area.</p>	<p>(1) The staff is preparing an advanced reactor research plan using the ACRS recommendations and the challenges identified in NUREG/CP-0175, proceedings of the ACRS workshop on Future Reactors, and will provide the plan to the ACRS for review. (2) RES will explore the feasibility of applying the formal decision-making methods in its work. As an initial step, RES is examining key aspects of formal decisionmaking approaches in its work related to performance-based regulation.</p>	<p>Timely. Committee provided its report to the Commission well ahead of the schedule specified in the SRM.</p>	<p>Effective. The ACRS review was effective and enabled the RES management to focus its efforts and budget. The staff plans to use ACRS comments and recommendations as significant input to prepare an advanced reactor research plan.</p>	<p>ACRS plans to follow RES and industry programs related to future reactor designs. Also, it plans to review the advanced reactor research plan.</p>

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<p>#4 Reevaluation of the Technical Basis for the Pressurized Thermal Shock (PTS) Rule, dated February 14, 2002.</p>	<p>(1) The PTS Reevaluation Project is extensive and appears to be technically sound. (2) If the results of the ongoing analyses of the reactor pressure vessels for selected PWRs indicate that when the current PTS screening criterion is reached, the frequency of throughwall cracking of the vessels would be orders of magnitude below the acceptance criteria for vessel failure specified in RG.1.154, then the current PTS criterion may be overly conservative. (3) When the factors that have large impacts on the failure frequency of the reactor vessel have been identified, they should be scrutinized appropriately. (4) In addition, the Committee asked additional information on: (a) How dynamic events associated with MSLB event will affect the assumed responses of the operators and the plant? (b) How the staff intends to address the variance narrowing associated with histogram sampling? (c) How the sensitivity of the results to changes in reactor operating power and fuel burnup rates will be addressed?</p>	<p>(1) Using the error-forcing context described in NUREG-1624, the staff considered the entire context (e.g., audible distractions, alarm nuisance, and personnel injuries) of the MSLB event on the reactions of the operating crew. The staff concluded that there is high probability of successful action by the crew. (2) The staff is assessing the degree to which its current calculational procedures may contribute to variance narrowing. If found under-estimation of the variance in the frequency levels, the staff will use an alternative numerical technique. (3) The staff believes that the effects of operating power level, burnup level, and MOX fuel are adequately addressed in the PTS Reevaluation Study. (4) The staff and its contractors are preparing a report on the technical basis for the flaw distribution and will discuss the report with the ACRS in the future.</p>	<p>Timely. ACRS completed its review to support the staff's schedule.</p>	<p>Effective. In general, the EDO agreed with the ACRS recommendations. Additionally the EDO provided clarification of the issues raised by the committee. The staff will continue to meet with the ACRS to report and obtain ACRS views on the progress made in completing the PTS Reevaluation Project.</p>	<p>ACRS plans to review further progress on the PTS Reevaluation Project, including the report on the technical basis for the flaw distribution.</p>

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<p>#5 Core Power Uprate for Arkansas Nuclear One, Unit 2, dated March 14, 2002</p>	<p>(1) The Entergy application for a power level increase from 2815 Mwt to 3026 Mwt for ANO-2 should be approved. (2) The process used by the staff and the Applicant was comprehensive enough to identify the important issues associated with PWR power uprates. The process would be greatly improved by the availability of a standard review plan to guide both staff and the Applicant. (3) The process used by the Applicant to perform the Reload Safety Analysis appears to be appropriate. Because this is the first large power uprate for a PWR, the staff should review the Reload Safety Analysis for the transitional core reloads to ensure that the plant will operate in compliance with the regulations.</p>	<p>(1) The staff has initiated an effort to determine if a SRP Section is needed to guide future uprate reviews in response to ACRS and Commission direction. (Note: staff is developing a "Review Standard" to address this matter. ACRS will review this Standard later this year.) (2) The staff will evaluate the need to audit and review plant-specific reload evaluations on a case-by-case basis. (3) The ANO-2 is not a transitional core, thus, a separate reload review is not needed. [EDO also provided response to Added Comments made by G. Apostolakis relative to use of Human Reliability Analysis models.]</p>	<p>Timely. The Committee completed its review in accordance with the schedule specified in the CTM.</p>	<p>Effective. ACRS recommendation prompted the staff to initiate an effort to develop a Review Standard for use by the staff in reviewing future power uprate applications.</p>	<p>ACRS will review the staff's proposed Review Standard for use by the staff on future uprate reviews.</p>

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<p>#6 Confirmatory Research Program on High-Burnup Fuel, dated March 14, 2002.</p>	<p>(1) NRR's withdrawal of its support to the confirmatory research on high-burnup fuel means that it is willing to claim fuel used in PWRs is capable of sustaining energy inputs of up to the regulatory limit of 280 cal./g. There is experimental evidence that high-burnup fuel cladding can be ruptured and fuel dispersed with energy inputs much lower than the regulatory limit. Scant evidence is available to show that high-burnup fuels in BWRs can survive energy inputs produced by power oscillations of an ATWS event, even if this event is arrested. (2) NRR's assertion that the confirmatory research on high-burnup issues is no longer relevant adversely impacts developing a strong technical basis for these matters and on gaining public confidence. (3) EDO should review this matter and provide the ACRS with the rationale behind NRR's decision to withdraw its support to the confirmatory research on high-burnup fuel.</p>	<p>(1) The staff plans to continue its dialogue with the Committee on high-burnup fuel issues. (2) The staff plans to keep the Committee involved in its forthcoming review of the EPRI topical report on reactivity insertion accidents. (3) In the future, the staff plans to provide a comprehensive discussion of fuel integrity at high burnups.</p>	<p>Timely. ACRS provided its views very promptly.</p>	<p>Effective. ACRS interaction was early and prompt. ACRS views and concerns made the staff reevaluate its decision. Some of the Commissioners discussed ACRS concerns with the staff during the Commission meeting with the staff on NRC Safety Research Program.</p>	<p>ACRS plans to continue its discussion of this matter with the staff during future meetings.</p>

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<p>#7 Core Power Uprate for Clinton Power Station, Unit 1, dated March 14, 2002.</p>	<p>(1) The proposed constant-pressure power uprate of 20%, from 2894 Mwt to 3473 MWt, for the Clinton Power Station should be approved. (2) The staff's extensive reviews of codes, inputs, and methods for analysis of design-basis accidents at the uprated plant make acceptable the exceptions taken by the licensee to the approved power uprate methodologies for such analyses. (3) The AmerGen program to monitor piping expected to suffer from significant flow-assisted corrosion should be rigorously conducted and its importance should be communicated to NRC staff inspecting the uprated Clinton Power Station.</p>	<p>(1) The staff is continuing to improve its reviews of extended power uprate applications. A public lessons-learned workshop was held on March 19, 2002, to discuss the recent extended power uprate applications and reviews. (2) The staff also has communicated with Region III regarding the potential impact of the uprate on flow-assisted corrosion (FAC), and is developing power uprate inspection procedure which will include a procedure addressing inspection of the licensee's FAC program.</p>	<p>Timely. The Committee completed its review in accordance with the schedule specified in the CTM.</p>	<p>Effective. Timely completion of ACRS review enabled the staff to approve the power uprate request for Clinton Power Station within the established schedule. As a result of Committee's recommendation, the staff is developing procedures to inspect the licensee's FAC program.</p>	<p>ACRS plans to review the staff's proposed Review Standard for use by the staff on future uprate reviews. ACRS may also review the proposed procedures to inspect licensee's FAC Program.</p>

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<p>#8 Phase 2 Pre-Application Review for AP1000 Passive Plant Design, dated March 14, 2002.</p>	<p>(1) The staff has made a competent review of the Phase 2 issues. (2) ACRS agrees that the proposal by Westinghouse to use design acceptance criteria (DAC) for piping design should be approved. (3) Staff's positions on the other pre-application review issues should also be approved. (4) RES should further investigate acceptable ranges of ratios of Pi-groups for use in scaling. (5) The ad hoc introduction of compensating processes to tune codes to the integral test data should be discouraged.</p>	<p>(1) The staff agrees with most of the ACRS recommendations, but is silent on the recommendation that ad hoc introduction of compensating processes to tune codes to the integral test data be discouraged. (2) The staff plans to document its assessment of the DAC issue in a Commission paper and make it publically available. (3) RES plans to discuss its response to the ACRS recommendation that "RES further investigate acceptable ranges of ratios of Pi-groups for use in scaling," during a future meeting of the Thermal-Hydraulic Phenomena Subcommittee.</p>	<p>Timely. ACRS completed its review in accordance with the CTM schedule.</p>	<p>Effective. ACRS was very effective in providing its views to the staff and Westinghouse representatives early in the process. The ACRS provided its conclusions to the Commission in a timely manner for decisionmaking regarding the Phase 2 pre-application review of the AP1000 plant design.</p>	<p>ACRS plans to review the design certification application and related matters during future meetings. It also plans to discuss RES response to the ACRS recommendation regarding investigations of acceptable ranges of Pi-groups for use in scaling.</p>

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<p>#9 Proposed Rulemaking and Associated Guidance for Risk-Informing the Special Treatment Requirements of 10 CFR Part 50 (Option 2), dated March 19, 2002</p>	<p>(1) Criteria for SSC categorization by the integrated decision-making panel (IDP) should be made explicit and should include consideration of risk metrics that supplement CDF and LERF. (2) SSC categorization performed with a more complete set of risk metrics may allow the elimination of additional treatment requirements for components in risk-informed safety class RISC-3 (safety related, low safety significant). (3) Rigor in the treatment of uncertainties in PRA should be made consistent with the current capabilities of PRA software and data.</p>	<p>(1) Agrees with the ACRS recommendation regarding criteria for IDP and made some comments to NEI on this matter on February 2, 2002, during its review of NEI 00-04. The staff will discuss this topic with the Committee after receiving the revised version of NEI 00-04. (2) Agrees that consideration needs to be given to the issues of long term containment integrity and inadvertent release of radioactive materials. However, instead of developing metrics for these aspects, the staff expects NEI to incorporate guidance into NEI 00-04 for IDP to consider these risks in categorizing the safety significance of SSCs. (3) Although the staff believes that rigorous treatment of uncertainties is important, licensees do not need this rigor as long as they recognize the impact of uncertainties on the results. Further, to the staff's knowledge, the use of uncertainly analysis in the determination of importance measures is not a standard feature of PRA software packages. Staff plans to address the factor issue in the proposed final rule.</p>	<p>Timely. The Committee completed its review in accordance with the CTM schedule.</p>	<p>Mostly Effective. The staff agrees with the majority of the ACRS recommendations and agreed to address some of the issues in the proposed final version of the rule.</p>	<p>ACRS plans to review the proposed final version of the rule along with the revised NEI 00-04 document at future meetings.</p>

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<p>#10 GE Nuclear Energy Licensing Topical Report (LTR), NEDC-33004P, "Constant Pressure Power Uprate" (Revision 1), dated April 17, 2002</p>	<p>The constant-pressure power uprate methodology should be approved for application to BWR power increases up to 20% of original licensed thermal power.</p>	<p>(1) The staff will issue a Safety Evaluation (SE) approving use of the LTR, with one caveat. The SE will state that the GE position with regard to the need for Large Transient Testing (LTT) (i.e., LTT is not necessary) will be held in abeyance, pending further staff action on this matter. (2) Regarding the Committee's comments pertaining to the conduct of audits of plant reload analyses, the staff states that the need for such audits will be considered on a case-by-case basis. Audits of the methodology supporting BWR plant licensees' extended power uprates will continue (as stated by NRR during the Committee's review of the LTR).</p>	<p>Timely. Committee Review met the schedule specified in the CTM</p>	<p>Effective. The issue of LTT will be considered further, given a DPV on this issue and interest expressed by the Committee on this matter. Staff plans to take action regarding audits of plant reload analyses in response to ACRS recommendation.</p>	<p>ACRS will likely review the staff's action with regard to resolution of the LTT issue. [Note: NRR withdrew approval of CPPU Topical via August 12, 2002, letter. ACRS will likely review the ultimate resolution of this issue.]</p>

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<p>#11 Report on the Safety Aspects of the License Renewal Application for the Turkey Point Nuclear Plant, Units 3 and 4, dated April 19, 2002.</p>	<p>(1) The FPL application for renewal of the operating licenses for Turkey Point, Units 3 and 4 should be approved. (2) The programs instituted to manage aging-related degradation are appropriate and provide reasonable assurance that Turkey Point, Units 3 and 4 can be operated in accordance with their licensing bases for the period of extended operation without undue risk to the health and safety of the public. (3) The staff should document its position on the contribution to total risk from external events such as storm surge from category 5 hurricanes.</p>	<p>(1) The staff has developed a proposed Commission paper recommending issuance of the Turkey Point, Units 3 and 4 renewed licenses. (2) The staff's position on contribution to total risk from external events is documented in its SER dated March 15, 1972.</p>	<p>Timely. The Committee completed its review in accordance with the CTM schedule.</p>	<p>Effective. Timely completion of ACRS review resulted in the issuance of renewed licenses for Turkey Point, Units 3 and 4 in a timely manner. The EDO stated that "the Committee's timely review helped the staff in maintaining the review schedule." The Committee was also very effective in addressing the concerns raised by a public citizen and ensuring resolution of those concerns by the staff.</p>	<p>The Committee plans to discuss the Staff's generic resolution of voids in the concrete containment walls in the near future.</p>
<p>#12 PHEBUS-FP Program, dated May 8, 2002</p>	<p>(1) PHEBUS-FP program is an outstanding example of an international cooperative research. (2) PHEBUS-LOCA and PHEBUS-2K programs promise to provide pertinent data to NRC. (3) Participation in these follow-on programs will yield important data not otherwise obtained, but will require commitment to long-term research efforts.</p>	<p>(1) The staff agreed with the ACRS that PHEBUS-FP Program provided valuable data for validating severe accident analysis computer codes. (2) Currently, the staff is evaluating the technical aspects of PHEBUS-LOCA and PHEBUS-2K Programs. (3) The staff will keep the ACRS informed of its decision to participate in the PHEBUS-LOCA and PHEBUS-2K Programs.</p>	<p>Timely. ACRS review will enable the RES staff to coordinate its effort on these programs.</p>	<p>Effective. ACRS performed its review proactively and provided its views to the staff. The staff agrees with the ACRS views and plans to make a decision about participating in the PHEBUS-LOCA and PHEBUS-2K Programs.</p>	<p>ACRS plans to continue its follow-up on this matter during future meetings, including the staff's decision on whether to participate in the PHEBUS-LOCA and PHEBUS-2K Programs.</p>

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<p>#13 Core Power Uprate for the Brunswick Steam Electric Plant, Units 1 & 2, dated May 10, 2002.</p>	<p>(1) The Carolina Power and Light Company application for an increase in core thermal power from 2558 MWt to 2923 MWt (an increase of 14.3%) for the Brunswick Steam Electric Plant, Units 1 and 2 should be approved. (2) The staff should assess the need for more detailed thermal-hydraulic models of the core, replacing the current “averaging” approaches, to complement present neutronic analyses that model the wide variation in fuel composition and power level throughout the core. (3) The Brunswick power uprate application was not risk-informed, yet a PRA was submitted. The staff did not review the PRA in detail even though it is part of the record. Improvements in PRA quality may be discouraged as long as important decisions such as granting power uprates are made by accepting PRAs without criticism because the application is not risk-informed.</p>	<p>(1) The staff has approved the power uprate application for the Brunswick Steam Electric Plant, Units 1 and 2 on May 31, 2002. (2) The staff will continue to perform audits [i.e., onsite checking of licensee calculations as part of the technical review process] of supporting calculations for extended power uprates. (3) The staff will continue to consider the need for independent calculations. As part of its effort to develop a review standard for power uprates, the staff will establish specific and predictable criteria to determine when and what type of independent calculations should be performed. (4) Even though the Brunswick power uprate application was not risk-informed, the licensee used risk information to gain additional insights into the integrated effects of EPU on the plant. The staff reviewed the risk information provided by the licensee to ensure that no risk-significant vulnerabilities would be created by the EPU.</p>	<p>Timely. Committee Review met the schedule specified in the CTM.</p>	<p>Effective. Review effective in communicating ACRS positions on issues of need for staff’s independent review, and need for staff audit of core reload analyses.</p>	<p>ACRS will re-view the proposed Review Standard for use by the staff in reviewing power uprate applications.</p>

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<p>#14 Policy Issues Related to Advanced Reactor Licensing, dated June 17, 2002</p>	<p>(1) The RES staff has identified appropriate policy issues and posed questions that must be addressed to resolve them. (2) The existing NRC positions on some of these policy issues should be reevaluated because of new perspectives on risk-informed regulation and defense in depth, as well as the new reactor designs that may be proposed. (3) The need for greater specificity in the application of defense in depth should be made a separate overarching issue.</p>	<p>The staff agrees with the ACRS recommendations, and has incorporated the issue of defense in depth as a separate overarching issue in SECY-02-0139.</p>	<p>Timely. ACRS completed its review to support the staff's schedule to submit the SECY paper to the Commission.</p>	<p>Effective. The ACRS was very effective in providing its views to the RES staff regarding this matter early in the process. The issue of defense in depth was made a separate overarching issue in the SECY paper, as recommended by the Committee. Timely completion of ACRS review enabled the staff to submit the SECY paper to the Commission in a timely manner.</p>	<p>ACRS plans to continue its follow-up on this matter during future meetings.</p>

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<p>#15 Proposed Technical Assessment of Generic Safety Issue-168, "Environmental Qualification of Low-Voltage Instrumentation and Control Cables", dated June 17, 2002</p>	<p>(1) Agrees with the staff's conclusions that the current equipment qualification (EQ) process for low-voltage I&C cables is adequate for the duration of the current license term of 40 years. (2) A discussion of the treatment of the I&C cables during the license renewal term should be included in the generic communication recommended by RES. (3) The staff should encourage the industry to perform further developmental work on techniques for monitoring I&C cables. (4) Five members provided additional comments, stating that the staff should consider additional examinations of cable integrity as part of the ongoing work on mechanical loads and vibrations associated with main streamline breaks and other design-basis accidents.</p>	<p>The staff agrees with the recommendations of the Committee. However, the staff does not agree that additional cable testing should be performed for other design basis events (e.g., main steam line breaks) as recommended by some members in the additional comments.</p>	<p>Timely. ACRS completed its review in accordance with the staff's schedule.</p>	<p>Effective. The ACRS was very effective in providing its views to the RES staff regarding this matter early in the process, which enabled RES to proceed with the next step in the process to provide recommendations to NRR for resolving GSI-168.</p>	<p>ACRS plans to review the proposed NRR resolution of GSI-168. Also, the ACRS plans to meet with the staff to discuss cable testing for other design-basis events.</p>

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<p>#16 Proposed Revision to 10 CFR 10.50.48 Endorsing NFPA-805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants", dated June 17, 2002.</p>	<p>(1) The staff should proceed with issuing the proposed rule for public comment, consistent with the rule-making plan schedule. (2) The implementation guidance, including the approved techniques for performing PRAs and fire modeling, must require methods and models commensurate with the levels of risk, while being careful to not create unnecessary barriers to the use of the Standard.</p>	<p>(1) Agrees with the Committee's recommendation that the proposed rule be issued for public comment. (2) While proceeding with the rulemaking, the staff will be cognizant of the cautionary note in the ACRS report that the PRA methods and fire models that the NRC approves for implementing the rule must be "commensurate with the levels of risk, while being careful to not create unnecessary barriers to the use of the Standard."</p>	<p>Timely. ACRS completed its review in accordance with the staff's schedule.</p>	<p>Effective. The ACRS was very effective in providing its views to the RES staff regarding this matter early in the process, which enabled the staff to proceed with the next step in the process.</p>	<p>ACRS plans to review the proposed final risk-informed and performance-based fire protection rule in the future.</p>
<p>#17 Recommendations Proposed by the Office of Nuclear Regulatory Research for Resolving Generic Safety Issue-189, "Susceptibility of Ice Condenser and Mark III Containments to Early Failure from Hydrogen Combustion During a Severe Accident", dated June 17, 2002.</p>	<p>RES should complete the additional analysis to quantify the uncertainties prior to providing the technical assessment results to NRR, and NRR should factor the uncertainties into the final resolution of GSI-189.</p>	<p>The staff agrees with (1) The ACRS that there are a number of uncertainties associated with the resolution of this issue and it plans to complete additional analyses to better understand these uncertainties. (2) The staff plans to provide the findings to the ACRS in the future.</p>	<p>Timely. ACRS completed its review in accordance with the staff's schedule.</p>	<p>Effective. The ACRS was very effective in providing its views to RES staff regarding this matter early in the process. As a result of ACRS recommendation, the staff has agreed to complete additional analyses to quantify uncertainties.</p>	<p>ACRS plans to review the results of the additional analyses in the future.</p>

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<p>#18 Vessel Head Penetrations and Vessel Head Degradation, dated June 20, 2002</p>	<p>(1) Vessel Head Penetration (VHP) Nozzle Cracking Action Plan is sufficiently comprehensive to allow management of cracking issues associated with Alloy 600. (2) Agrees with the staff's conclusion that there are no other plants with conditions similar to Davis-Besse. (3) Questions regarding inspection techniques and frequencies should be resolved prior to issuing another generic communication. (4) Corrosion rates in low-alloy steel adjacent to VHPs should be determined to help define inspection frequencies.</p>	<p>(1) The staff plans to keep the Committee informed of any changes to the VHP Nozzle Cracking Action Plan. (2) The staff acknowledges the potential benefits of resolving questions related to specific inspection techniques and frequencies prior to issuing another generic communication. Because of the completion date for the industry development of technical bases for the proposed inspection techniques and frequencies is uncertain coupled with the staff's belief that visual inspections alone are not sufficient at this time for inspecting VHPs in high susceptibility category plants, the staff believes that it is appropriate to issue a generic communication to PWRs at this time. (3) Research efforts are currently in the planning stage by RES to further investigate wastage/corrosion rates of low alloy steel.</p>	<p>Timely. The Committee completed its review in accordance with the staff's schedule.</p>	<p>Effective. ACRS has been very effective in providing its views to staff on this issue and informing the Commission of its conclusions and recommendations. This has resulted in very positive outcomes in that it has helped staff to refine its products and approaches to this issue.</p>	<p>ACRS plans to continue its review of staff and industry activities on this matter during future meetings.</p>

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<p>#19 Draft Advanced Reactor Research Plan, dated July 18, 2002</p>	<p>(1) The plan is not yet complete in the sense that it does not establish resources, schedules, and milestones. (2) Given the current status of the PBMR, the research for HTGRs should focus on generic issues and GT-MHR concept. (3) The development of fission product release models for TRISO fuels should be the key research need for the gas-cooled-reactor concepts. (4) Since a well-defined framework for risk-informed regulations can help prioritize the research, the work on the framework should be given higher priority. (5) A risk-informed approach for selecting design-basis events and choosing acceptance criteria for new designs needs to be developed. (6) Additional consideration should be given for fuel coolant interactions (steam explosions). (7) Because there is a general need for large-scale integral testing of new concepts, the staff should evaluate the utility of the proposed concept of "licensing by test."</p>	<p>The staff agrees with the ACRS comments and plans to address them in the near future, with the exception of the issue on licensing by test. Regarding this issue, the staff states that the so-called "licensing by test" concept has not been formally proposed for NRC evaluation.</p>	<p>Timely. ACRS completed its review in accordance with the staff's schedule.</p>	<p>Effective. The ACRS was very effective in providing its views and comments to the RES staff regarding the plan early in the process.</p>	<p>ACRS plans to continue its follow-up on this matter during future meetings.</p>

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#20 Risk Metrics and Criteria for Re-evaluating the Technical Basis of the Pressurized Thermal Shock Rule, dated July 18, 2002	The proposed options for PTS acceptance criteria do not properly reflect the potential impact of air-oxidation source terms on risk	The staff acknowledges the ACRS concern but does not provide a resolution. The staff will discuss this matter further with the ACRS.	Timely. The Committee completed its review in accordance with the staff's schedule.	Effective. The Committee identified a significant technical issue early in the process.	ACRS plans to continue its discussion of this matter with the staff during future meetings.

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ACRS Letter	Main Message	EDO/Commission Response	Timeliness	Effectiveness	Follow-up Action
<p>#21 Draft Final Revision 1 to Regulatory Guide 1.174 and to Chapter 19 of the Standard Review Plan, dated July 23, 2002.</p>	<p>(1) Rev. 1 to RG 1.174 and the associated SRP Chapter 19 should not be issued until more substantive changes are made. (2) Both RG 1.174 and Chapter 19 should emphasize that all sources of risk from internal and external initiators during low-power and shutdown (LPSD), as well as full-power, operations must be included in the risk assessment. If bounding estimates of the risk contribution from plant modes not rigorously analyzed are used, justification of the estimates should be provided. (3) RG 1.174 and SRP Chapter 19 should state that changes to the licensing basis will, in general, require PRAs that conform at least to Category 2 of the American Society of Mechanical Engineers (ASME) Standard [and the comparable category of the future American Nuclear Society (ANS) Standards for external events and LPSD operations] and a Grade 3 of the industry peer review process.</p>	<p>(1) The staff does not agree with the ACRS recommendation not to issue Rev. 1 to RG 1.174 and SRP Chapter 19. The staff believes that changes in Rev. 1 are improvements to these documents and that both staff and licensees would benefit from Rev. 1 publication. (2) Additional changes to RG 1.174 and SRP Chapter 19 would require detailed interaction with all stakeholders to determine their resolution and implementation. (3) The staff plans to meet with the Committee, in the near future, to discuss, in detail, the Committee's concerns.</p>	<p>Timely. The ACRS completed its review in accordance with the staff's schedule.</p>	<p>Not fully effective. The staff disagrees with the ACRS recommendation to delay publication of Rev. 1 to RG 1.174 and SRP Chapter 19 until more substantive changes are made. Regarding ACRS recommendations 2 and 3, the staff states that Rev. 1 to RG 1.174 and SRP Chapter 19 is not related to these recommendations.</p>	<p>ACRS plans to continue its review of this matter. The PRA Subcommittee will meet in the near future to assess the PRA peer review process. The ACRS will also review, DG-1122, "Determining the Technical Adequacy of PRA Results in Risk-Informed Activities."</p>

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<p>#22 Human Factors and Human Reliability Analysis Research Plans, dated September 24, 2002.</p>	<p>(1) RES research programs on Human Factors and Human Reliability Analysis (HRA) are well directed toward meeting agency needs. However, these programs need to be refined further. (2) The Human Reliability Analysis Program needs to articulate its long-term vision of the technology necessary to the agency. This vision should include the availability of a well-validated model for quantifying individual and team error rates. (3) The past focus on overt, individual errors of omission is being augmented to include latent human errors and needs to be expanded to address explicitly team interactions both in the control room and elsewhere in the plant. (4) Human Factors and Human Reliability Analysis programs should be expanded to search for leading indicators of degradation in human performance, both at the individual and group levels. (5) The NRC should consider development of a control room simulator devoted to support research on human factors and human reliability.</p>	<p>The staff agrees with the ACRS and will continue to articulate its long-term vision for HRA technology development. The staff will also continue to include control room team measures, work on errors from personnel outside control room, and a research simulation. The staff cited DOE workshop for consideration of a control room simulator. The staff will determine the feasibility of cooperating in this effort with DOE.</p>	<p>Timely. The ACRS completed its review in accordance with the staff's schedule.</p>	<p>Effective. The ACRS was very effective in providing its views to RES regarding this matter early in the process. ACRS comments and recommendations are expected to help RES in refining the Human Factors and Human Reliability Analysis research programs.</p>	<p>ACRS plans to continue its discussion with the staff on the Human Factors and Human Reliability Analysis research programs during future meetings.</p>

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ACRS Letter	Main Message	EDO/Commission Response	Timeliness	Effectiveness	Follow-up Action
<p>#23 Draft Regulatory Guide DG-1120 and Standard Review Plan Section 15.0.2 Concerning NRC Reviews of Transient and Accident Analysis Methods, dated October 1, 2002.</p>	<p>DG-1120 and SRP Section 15.0.2 should be issued for public comment subsequent to reconciliation of the minor differences between Section 5 of DG-1120 and Section 6 of the SRP Section 15.0.2.</p>	<p>The staff has modified Section 6 of the SRP Section 15.0.2 to make it consistent with Section 5 of DG-1120.</p>	<p>Timely. Committee completed its review in accordance with the CTM schedule.</p>	<p>Effective. Committee interacted with the staff periodically and provided advice in the development of these documents. As recommended by the Committee, the staff reconciled the minor differences between the RG and SRP.</p>	<p>ACRS plans to review proposed final versions of these documents after reconciliation of public comments.</p>
<p>#24 Confirmatory Research Program on High-Burnup Fuel, dated October 17, 2002</p>	<p>(1) RES has a well-organized and leveraged program of confirmatory research on the behavior of high-burnup fuel. (2) A consensus has emerged that the energy input that will rupture fuel cladding in a reactivity insertion accident is much less than that implied by the criteria in existing Reg. Guide and decreases with increasing fuel burnup at least above 40 GWd/t. (3) RES is nearing resolution of the issues of reactivity insertion events in high-burnup fuel and has initiated experimental investigations of high-burnup fuel under conditions of design-basis LOCAs. The ACRS remains concerned that the time-temperature conditions used in the study of high-burnup fuel during design-basis LOCAs may not reveal phenomena unique to high-burnup fuel.</p>	<p>The staff agrees with the ACRS comments and expects to provide a documented analysis to quantify the margins in about a year. In addition, the staff plans to add some tests with more realistic temperature conditions in the study of high-burnup fuel during design-basis LOCAs.</p>	<p>Timely. The ACRS provided its views ahead of the staff's schedule.</p>	<p>The ACRS was very effective in providing its views to RES, NRR, and EPRI regarding this matter early in the process. As a result of ACRS comments, the staff plans to provide a documented analysis to quantify margins. Also, it plans to add some tests with realistic temperature conditions in the study of high-burnup fuel during design-basis LOCAs.</p>	<p>ACRS plans to discuss RES plans to explore the risk consequences of taking the fuel to high levels of burnup, which is not addressed in the confirmatory research program on high-burnup fuel. Also, it plans to review the staff's analysis to quantify the margins.</p>

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<p>#25 Draft Report, "Guidance for Performance- Based Regula- tion," dated Oc- tober 17, 2002</p>	<p>Agrees with (1) The staff's proposal to publish the guidance as a NUREG/BR report. (2) However, before issuing the new guidance, the staff should provide more extensive discussion of safety margins and performance parameters.</p>	<p>The EDO response described the following modifications to the draft report to address ACRS comments: (1) Provided additional examples in Section 3.2 under "Process Steps" to clarify identification of safety functions and safety margins in the context of specific regulatory issues. (2) Revised illustrative examples to be more current with recent evaluations and Federal Register notices on proposed rules. (3) Added an Appendix B that enables the document to be self-standing by offering supplementary guidance for more complex issues, especially on the subject of performance parameters.</p>	<p>Timely. In SECY-01-205 the staff stated its plan to complete the proposed NUREG/BR by the end of FY 2002. The ACRS completed its review to accommodate the staff's schedule.</p>	<p>Effective. As a result of ACRS recommendations, the staff has revised the document to provide more extensive discussion of safety margins and performance parameters.</p>	<p>ACRS plans to review the changes upon receipt of the revised NUREG/BR report and to continue to meet with the staff to discuss further progress on performance-based regulation.</p>

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<p>#26 Recommendations Proposed by NRR for Resolving Generic Safety Issue - 189, "Susceptibility of Ice Condenser and Mark III Containments to Early Failure From Hydrogen Combustion During a Severe Accident," dated November 13, 2002</p>	<p>(1) Features to resolve GSI-189 should be incorporated into affected plants through plant-specific severe accident mitigation guidelines (SAMGs). (2) The NRC staff should develop guidance on how uncertainties are to be evaluated and considered in regulatory analysis decisions.</p>	<p>EDO has not yet provided its responses.</p>	<p>Timely. The Committee completed its review in accordance with the staff's schedule.</p>	<p>Very effective. As a result of the Committee's recommendations, the staff has completed additional analyses, which included consideration of uncertainties.</p>	<p>ACRS plans to review the proposed final resolution of GSI-189.</p>
<p>#27 Draft SECY paper on Policy Issues for non-light water reactor designs, dated December 13, 2002</p>	<p>The staff has identified seven key policy issues and provided options for resolving them. The ACRS agrees with the staff's recommended options. The ACRS also commends the staff on its effort and look forward to further interactions.</p>	<p>EDO has not yet provided its response.</p>	<p>Timely. The ACRS provided its views to the staff early on in the process, and prior to the submission of the SECY Paper.</p>	<p>Very effective. The staff welcomed the ACRS views on this matter to include in the final version of the SECY paper.</p>	<p>ACRS will continue its follow-up on this matter during future meetings.</p>

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<p>#28 Framatome ANP S-RELAPS Realistic Large-Break Loss-of-Coolant Accident Code, December 20, 2002.</p>	<p>(1) The S-RELAP5 code should be approved for application to large-break LOCA analyses. (2) Staff should confirm that zirconium oxide spallation during a LOCA isn't a significant phenomenon that needs to be modeled in realistic codes. (3) Staff should continue to accept the treatment of the break size as a statistical variable. (4) Future submittals of this code should include: improved documentation understood by technically knowledgeable reviewers, assessment of the sensitivity of code predictions to terms in the momentum equations, and, comprehensive nodalization studies. (5) Staff should investigate ways to facilitate updating of the compute platforms on which approved codes can be run. (6) Staff should perform independent audit calculations as part of its assessment of vendor codes. Use of the NRC TRAC-M code will facilitate this matter.</p>	<p>EDO has not yet provided its response.</p>	<p>Timely. The Committee completed its review in accordance with the CTM schedule.</p>	<p>Effective. As a result of the Committee's review, Framatome has committed to revising its documentation for S-RELAP5. The effectiveness of other ACRS recommendations will be assessed after receiving the EDO response.</p>	<p>The ACRS will follow-up on Recommendation 4 above, during review of future Framatome code application submittals. Recommendations to 2, 3,5 & 6 will be followed up with the NRC staff, pursuant to the EDO's response on these matters.</p>

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ACNW	Advisory Committee on Nuclear Waste
ACRS	Advisory Committee on Reactor Safeguards
ANO	Arkansas Nuclear One
ANSI	American National Standards Institute
ANS	American Nuclear Society
ASME	American Society of Mechanical Engineers
ATWS	Anticipated transient without scram
BWR	Boiling water reactor pressure
CDF	Core damage frequency
CFR	Code of Federal Regulations
CPPU	Constant pressure power uprate
CTM	Chairman's Tasking Memorandum
DAC	Design acceptance criteria
DG	Draft (regulatory) guide
DOE	Department of Energy
DPV	Differing Professional view
EDO	Executive Director for Operations
EPRI	Electric Power Research Institute
EQ	Equipment qualification
EPU	Extended power uprate
FAC	Flow-assisted corrosion
FPL	Florida Power & Light Company
GE	General Electric
GSI	Generic safety issue
GT-MHR	Gas Turbine-modular Helium Reactor
HTGR	High Temperature Gas Cooled Reactor
HRA	Human reliability analysis
I&C	Instrumentation & control
IDP	Integrated decisionmaking panel
ISA	Integrated safety analysis
LERF	Large early release frequency
LOCA	Loss-of-coolant accident
LPSD	Low-power and shutdown
LTR	Licensing topical report
LTT	Large transient testing
MSLB	Main steamline break
MOX	Mixed oxide
Mwt	Megawatt thermal

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NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NMSS	Office of Nuclear Material Safety and Safeguards
NRR	Office of Nuclear Reactor Regulation
PBMR	Pebble Bed Modular Reactor
PI	Performance indicator
PRA	Probabilistic risk assessment
PTS	Pressurized thermal shock
PWR	Pressurized water reactor
RISC	Risk-informed safety class
RES	Office of Nuclear Regulatory research
ROP	Reactor Oversight Process
RPV	Reactor pressure vessel
RG	Regulatory guide
SAMGs	Severe accident mitigation guidelines
SE	Safety evaluation
SER	Safety evaluation report
SRM	Staff Requirements Memorandum (from Commission)
SRP	Standard Review Plan
SSCs	Structures, systems, and components
VHP	Vessel head penetration