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REPORTS:

The following reports to Dale E. Klein, Chairman, NRC, from Graham B. Wallis, Chairman, ACRS:

1. **Draft Final Regulatory Guide DG-1145, Combined License Applications for Nuclear Power Plants (LWR Edition)**, dated December 12, 2006

LETTERS:

The following letters to Luis A. Reyes, Executive Director for Operations, NRC, from Graham B. Wallis, Chairman, ACRS:

1. **Proposed Revision to Standard Review Plan Section 13.3, "Emergency Planning,"** dated December 15, 2006 (ML063520450).
2. **Draft Final Regulatory Guide 1.207 (DG-1144), "Guidelines for Evaluating Fatigue Analyses Incorporating the Life Reduction of Metal Components Due to the Effects of the Light-Water Reactor Environment for New Reactors,"** dated December 18, 2006 (ML063600095).

MEMORANDA:

The following memoranda to Luis A. Reyes, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS:

1. **Proposed Revisions to Standard Review Plan Sections in Support of New Reactor Licensing**, dated December 15, 2006
2. **Anonymous Letter Concerning Changes to 10 CFR Part 52 Rulemaking Package (SECY-06-0220)**, dated December 8, 2006

APPENDICES

- I. *Federal Register Notice*
- II. Meeting Schedule and Outline
- III. Attendees
- IV. Future Agenda and Subcommittee Activities
- V. List of Documents Provided to the Committee

MINUTES OF THE 538th MEETING OF THE
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
December 7-9, 2006
ROCKVILLE, MARYLAND

The **538th** meeting of the Advisory Committee on Reactor Safeguards (ACRS) was held in Conference Room 2B3, Two White Flint North Building, Rockville, Maryland, on **December 7-9, 2006**. Notice of this meeting was published in the *Federal Register* on **November 15, 2006** (71 FR **66561**) (Appendix I). The purpose of this meeting was to discuss and take appropriate action on the items listed in the meeting schedule and outline (Appendix II). The meeting was open to public attendance.

A transcript of selected portions of the meeting is available in the NRC's Public Document Room at One White Flint North, Room 1F-19, 11555 Rockville Pike, Rockville, Maryland. Copies of the transcript are available for purchase from Neal R. Gross and Co., Inc. 1323 Rhode Island Avenue, NW, Washington, DC 20005. Transcripts are also available at no cost to download from, or review on, the Internet at <http://www.nrc.gov/ACRS/ACNW>.

ATTENDEES

ACRS Members: Dr. Graham B. Wallis (Chairman), Dr. William J. Shack (Vice Chairman), Mr. John D. Sieber, (Member-at-Large), Dr. Said Abdel-Khalik (via teleconference), Dr. George E. Apostolakis, Dr. J. Sam Armijo, Dr. Sanjoy Banerjee, Dr. Mario V. Bonaca, Dr. Michael Corradini, Dr. Thomas S. Kress, Mr. Otto L. Maynard, and Dr. Dana A. Powers. For a list of other attendees, see Appendix III.

I. Chairman's Report (Open)

[Note: Dr. John T. Larkins was the Designated Federal Official for this portion of the meeting.]

Dr. Graham B. Wallis, Committee Chairman, convened the meeting at 8:30 A.M. He announced in his opening remarks that the meeting was being conducted in accordance with the provisions of the Federal Advisory Committee Act. In addition, he reviewed the agenda for the meeting and noted that no written comments or requests for time to make oral statements from members of the public had been received. Dr. Wallis also noted that a transcript of the open portions of the meeting was being kept and speakers were requested to identify themselves and speak with clarity and volume. He discussed the items of current interest and administrative details for consideration by the full Committee.

II. Draft Final Regulatory Guide, DG-1145, "Combined License Applications for Nuclear Power Plants" (Open)

[Note: Mr. David C. Fischer was the Designated Federal Official for this portion of the meeting.]

The Committee met with representatives of the U.S. Nuclear Regulatory Commission staff to discuss DG-1145, "Combined License Applications for Nuclear Power Plants." Mr. Eric Oesterle, Office of Nuclear Reactor Regulation, said that DG-1145 provides a roadmap to help Combined License (COL) applicants identify the appropriate content of a COL

application submitted under 10 CFR Part 52. He said that while industry initially developed COL application guidance for a “base case” scenario (NEI-04-01), the staff recognized the need for more comprehensive guidance for COL applicants. Consequently, DG-1145 is structured to address COL applications that reference an early site permit (ESP), a certified design (CD), neither, or both. DG-1145 is meant to be consistent with proposed final revisions to 10 CFR Part 52 and with the new and revised Regulatory Guides and Standard Review Plan (SRP) Sections being developed in support of new reactor licensing. DG-1145 was developed based on the guidance previously published in Regulatory Guide 1.70, “Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition),” but was updated based on operating experience (as reflected in NRC Bulletins and Generic Letters), draft industry guidance in NEI-04-01, lessons learned from Design Certification (DC) and ESP reviews, and guidance in advanced reactor SECY Papers and related staff requirements memoranda. There was extensive industry involvement in the development of DG-1145. There were monthly workshops on specific portions of DG-1145 between March and September 2006. Approximately 500 industry comments were received on early drafts of the document. A “work-in-progress” draft of the entire document was made publicly available on the NRC’s website by June 30, 2006. DG-1145 was issued for a formal 45-day public comment period on September 7, 2006 (71 FR 52826).

Mr. Oesterle described the format and structure of DG-1145. Section C provides the guidance on the content of COL applications. Part C.I provides guidance for a COL applicant that references neither a CD nor an ESP (consistent with proposed 10 CFR Part 52.79). This Part is further subdivided, by chapters and similar to the way a Final Safety Analysis Report (FSAR) is organized. However, a new introductory subsection and a new subsection on probabilistic risk assessment (PRA) were added. Dr. Apostolakis said that it was not clear from reading DG-1145 when certain information would be available (e.g., certain PRA related information). Part C.II provides additional technical guidance (consistent with proposed 10 CFR Part 52.80). Part C.II is further subdivided to address: PRA; Inspection, Tests, Analyses, and Acceptance Criteria (ITAAC); and Environmental Reports. Mr. Oesterle explained that this section will need to be revised to reflect the fact that the latest Part 52 rule no longer requires the submittal of a PRA. Part C.III provides guidance for a COL applicant that references just a CD as well as those that reference both a CD and an ESP. This section also provides guidance related to ITAAC, design acceptance criteria (DAC), and COL Action Items. Part C.IV provides guidance on miscellaneous topics associated with a COL application [e.g., operational programs, limited work authorizations, generic issues, regulatory treatment of non-safety systems (RTNSS)]. Mr. Oesterle said that the information needed to get a COL will generally consist of information provided for the CD, information provided to get an ESP, and remaining information (e.g., plant-specific design information, information on operational programs). Dr. Wallis questioned how much the ACRS would need to be involved with the review of the remaining information. Dr. Powers questioned whether any of the COL applications would be for a “green field” site. Mr. Colaccino, Office of New Reactors (NRO), said that the vast majority of the proposed COL application sites have operating reactors adjoining the sites.

Mr. Oesterle also provided a brief status of the development of DG-1145. He said the public comment period closed on October 23, 2006, and that approximately 700 individual comments were received. The staff is currently working to resolve the public comments. He emphasized that DG-1145 will be revised to comport with the final revision to 10 CFR Part 52 as approved by the Commission. Mr. Oesterle said that there is a process in place to ensure consistency between DG-1145 and the proposed Regulatory Guide and SRP Section updates. The staff

plans to publish DG-1145 as Regulatory Guide 1.206 after incorporation of public comments and final issuance of the Part 52 rule. The staff is considering additional public forums to update external stakeholders on Regulatory Guide 1.206 prior to publication. Dr. Wallis asked if there would be substantive changes to DG-1145 based on public comments. Mr. Oesterle said that the number of substantive changes would be minimal. Mr. Maynard expressed concern that DG-1145 referenced some old NRC generic letters which contained guidance that he said should be more directly incorporated into DG-1145. Dr. Apostolakis said that he wanted to see DG-1145 again before it was issued as a final Regulatory Guide.

Mr. Harrison, NRR, described the guidance contained in DG-1145 related to PRA and severe accident evaluations. He said that the proposed 10 CFR 52 rulemaking included a requirement for COL applicants to submit a plant-specific PRA to the NRC for review. After completion of DG-1145, the NRC position changed to accept the industry comment to delete this requirement. Rather, final 10 CFR Part 52 now requires that the PRA be maintained available for staff inspection at the applicant's office. The requirement to submit the PRA was deleted throughout Part 52, including the existing requirement for design certification applications. Mr. Harrison said that DG-1145 will need to be revised to reflect the change in the NRC position. Specifically, he said that the majority of the guidance currently in Section C.II.1 (PRA) will need to be incorporated into C.I.19 (FSAR Chapter 19). Since FSAR Chapter 19 is a qualitative, summary description of the PRA, results, insights, uses, etc., staff audits will be necessary to fully understand, review, and confirm the bases for the PRA results and insights and adequacy for the PRA uses/applications [e.g., RTNSS, Reliability Assurance Program (RAP)]. Mr. Harrison said that the requirement to submit a design-specific or plant-specific PRA with the DC or COL application is separate and distinct from the requirement to submit PRA updates to the NRC.

Mr. Harrison stated that the basis for the PRA guidance in DG-1145 is taken from the following: NRC Policy Statements, SECY Papers and related SRMs; experience with design certification reviews for CE System 80+, ABWR, AP-600, and AP-1000; and 10 CFR 52.79 PRA/Severe Accident requirements. Dr. Abdel-Khalik asked if the staff could issue a COL without doing an audit of the applicant's PRA. Mr. Rubin, NRR, said that the staff could possibly get the required information via requests for additional information (RAIs). However, Mr. Saltos, NRR, added that staff would have likely already done an audit of the PRA for the referenced certified reactor design. Dr. Kress said that he thought the PRA should be part of the COL applicant's licensing basis.

Mr. Harrison said that the staff intends to use the applicant's PRA and severe accident evaluations to conclude that nine objectives (derived from NRC Policy Statements, SECY Papers, and related SRMs) are met. Several of the objectives are used to identify and assess the balance of preventive and mitigative features (including operator actions) such that the plant design reflects a reduction in risk compared to existing plants (contemporary with the Severe Accident Policy Statement of 1985). Several other objectives are in support of specific uses and applications of the PRA results for programs [e.g., RTNSS, ITAAC, COL and interface requirements]. Mr. Harrison outlined the regulatory guidance provided in DG-1145 to assist COL applicants in the development of Chapter 19 of the FSAR. Dr. Apostolakis asked that the briefing focus more on technical issues, such as using large release frequency (LRF) as a metric as opposed to large early release frequency (LERF) when reviewing a COL applicant's PRA. Dr. Apostolakis asked where LRF was defined and where 10^{-6} per year came from. Mr. Rubin said that LRF and 10^{-6} came from Commission guidance from the 1990's during the

staff's review of evolutionary and advanced reactor designs. He added that the severe accident decision metrics of 10^{-6} per year for LRF (i.e., baseline PRA and not delta change criteria) and conditional containment failure probability of 0.1 are only applied for new reactor licensing and are not living metrics. Dr. Kress noted that the conditional containment failure probability is weighted by the core damage frequency.

Mr. Sieber noted that DG-1145 basically embraces a lot of existing regulatory guidance, codes, and standards, rules, and other documents, and provides a roadmap for applicants with respect to what has to be in a COL application. He said that from that standpoint, there is nothing new in DG-1145.

Dr. Apostolakis asked how the uncertainties associated with a COL applicant's PRA would be addressed. Mr. Harrison said that applicants for design certifications have done fairly extensive sensitivity studies and uncertainty analyses to get an idea of the magnitude of the uncertainties in the calculations. Mr. Saltos clarified that for the design certification reviews, the staff identified areas of uncertainty and then did sensitivity studies to see how the uncertainties could impact the results. They took these sensitivity study results into account in their decision making (e.g., to identify design changes or operational requirements).

Mr. Oesterle summarized several of the more significant public comments on DG-1145. The first major comment was that some of the information requested in DG-1145 would not be available at the time of COL application or even during the COL application review phase. For example, battery characteristic curves will not be available until batteries have been procured which will be after submittal of the COL application and could likely be after issuance of the license. A second major comment was that some of the information requested in DG-1145 was not applicable to passive plant designs. For example, the guidance in Chapter 8 did not provide any specific requirements for offsite AC power systems for passive plant designs that rely on Class 1E batteries for emergency power and non-safety related diesel generators for battery charging. A third major comment was that Sections C.II and C.III of DG-1145 requested design information from the COL applicants in some areas that have already been certified. For example, the guidance in Chapter 9 of Section C.III requests information that should already have been addressed in a certified design, such as DG support systems. Another major issue related to information that was either not available at the time the COL application was submitted or that required an update to verify that as-built or as-procured information conformed with the certified design. Several public comments suggested that construction inspections rather than ITAAC are the more appropriate verification mechanism.

Mr. Oesterle said that, based on the public comments, the staff is considering having applicants identify those areas where information will be provided later, or will be updated, and having them to propose methods for so doing. The staff is also considering putting additional guidance in DG-1145 for plants that incorporate passive safety systems.

Mr. Maynard expressed concern over some apparent inconsistencies in the level-of-detail of the guidance provided in various sections of DG-1145. He also questioned the staff's need for certain information in the COL application (e.g., organization charts, resumes). Dr. Banerjee questioned the meaning of the word "limiting" in Chapter 15 of DG-1145. He also said that the guidance in this chapter is unclear, particularly for cases where there is not a lot of experience.

Mr. Oesterle agreed to consider individual member comments (provided to the staff in advance of the November 30, 2006 Future Plant Design Subcommittee meeting) in revising DG-1145.

Committee Action

The Committee issued a report to the Chairman on this matter, dated December 12, 2006, recommending that the final rule, 10 CFR Part 52, retain the requirements that a design-specific PRA be submitted with the design certification application and that a plant-specific PRA be submitted with the COL application. The Committee also recommended that DG-1145 be issued as a final Regulatory Guide after the staff ensures that it is consistent with the final rule 10 CFR Part 52 and with the Regulatory Guides and SRP Sections/Chapters being revised or developed in support of new reactor licensing. The Committee asked that it be informed of any significant changes made to this Guide prior to publishing it in final form.

III. Draft Final Regulatory Guide 1.207 (DG-1144), "Guidelines for Evaluating Fatigue Analyses Incorporating the Life Reduction of Metal Components Due to the Effects of the Light-Water Reactor Environment for New Reactors" (Open)

[Note: Mr. Charles G. Hammer was the Designated Federal Official for this portion of the meeting.]

The Committee met with representatives of the NRC staff, the American Society of Mechanical Engineers (ASME), and AREVA to discuss the draft final Regulatory Guide 1.207 (DG-1144), "Guidelines for Evaluating Fatigue Analyses Incorporating the Life Reduction of Metal Components Due to the Effects of the Light-Water Reactor Environment for New Reactors." The staff from the Office of Nuclear Regulatory Research (RES) and their contractor, Argonne National Laboratory (ANL), presented the objective, technical basis, and regulatory positions related to Regulatory Guide 1.207. Representatives of ASME and AREVA provided comments related to the need for the regulatory guide and its potential impact on the industry.

The staff of RES and ANL developed Regulatory Guide 1.207 based on an NRR User Need Request 2005-004 to develop guidance for determining fatigue life in the light water reactor (LWR) environments in supporting reviews of applications that the agency expects to receive for new reactors. The staff stated that this regulatory guide was categorized as high priority and needed to be completed by March 2007.

Mr. Hipolito Gonzalez, RES, and Mr. Omesh Chopra, ANL, described the development and technical basis for Regulatory Guide 1.207. The ASME Boiler and Pressure Vessel Code Section III fatigue design curves were developed in the late 1960s and early 1970s and are based on tests conducted in laboratory air environments at ambient temperatures. However, the Code does not explicitly account for potential degradation in the fatigue properties attributable to exposure to LWR coolant environments. Recent fatigue test data and analyses have demonstrated conclusively that LWR environments have a significant impact on the fatigue life of reactor structural materials. To address this effect, the staff has selected an environmental correction factor, F_{en} , to account for LWR environments. By definition, F_{en} is the ratio of fatigue life of the material in a room temperature air environment to its fatigue life in a LWR coolant environment at operating temperature. To incorporate environmental effects into the fatigue evaluation, the fatigue usage is calculated using ASME Section III Code procedures, and the fatigue usage is multiplied by the correction factor. In license renewal applications,

applicants have used this methodology to evaluate the fatigue usage of materials in Class 1 components.

The F_{en} methodology that the staff considers acceptable is described in Regulatory Guide 1.207. NUREG/CR-6909, "Effect of LWR Coolant Environments on the Fatigue Life of Reactor Materials," provides the technical basis for this methodology. In developing the underlying models, ANL researchers analyzed existing data to predict fatigue life as a function of temperature, strain rate, dissolved oxygen level in water, and sulfur content of the steel. A Second issue addressed by Regulatory Guide 1.207 is the non-conservatism of the current ASME stainless steel air design curve. Recent evaluations of stainless steel and nickel alloy fatigue test data demonstrate that the ASME design curve is non-conservative in the mid-to-high cycle fatigue range. NUREG/CR-6909 provides a new stainless steel air design curve and the technical basis for the new curve. In addition, the staff evaluated the incorporation of the F_{en} approach methodology in fatigue analyses for Ni-Cr-Fe alloys and concluded that the new fatigue design curve proposed for austenitic stainless steels also adequately represented the fatigue behavior of these alloys.

There were several comments on Regulatory Guide 1.207 provided by Mr. Bryan Erler, ASME, and Mr. Robert Gurdal, AREVA. These comments were that the existing ASME design curves and methodology are adequate, that there is no need for a new regulatory guide, that the new guide will result in more detailed and costly analysis in the design of new plants, and that the use of the new guide will also result in the need for an excessive number of snubbers and pipe whip restraints.

Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter dated December 18, 2006, recommending that Regulatory Guide 1.207 be issued as final. The Committee suggested that the staff interact with ASME in the development of a Code Case related to reactor coolant environmental effects on fatigue.

IV. Proposed Revisions to Standard Review Plan Section 13.3, "Emergency Planning" (Open)

[Note: Ms. Maitri Banerjee was the Designated Federal Official for this portion of the meeting.]

The Committee met with representatives of the NRC staff and the Nuclear Energy Institute (NEI) to discuss proposed revisions to NUREG-0800, Standard Review Plan, Section 13.3, "Emergency Planning."

The staff developed the proposed revision in cooperation with the Department of Homeland Security (DHS), and the Federal Emergency Management Agency (FEMA) to ensure up-to-date guidance is available to the staff to review new reactor licensing applications. The staff discussed the rationale behind the proposed changes to the SRP, which was issued for public comments.

Mr. Dan Barss, NSIR, began the presentation by describing the process of new reactor licensing embedded in 10 CFR Part 52 that which was the impetus behind a complete rewrite

of the SRP Section. The regulatory standards for the Emergency Preparedness (EP) program remained the same as provisions were made to incorporate the 10 CFR Part 52 process. For the staff to arrive at a reasonable assurance finding before a license could be issued, the staff needs to ensure that adequate measures will be in place following the proposed onsite and offsite EP plans such that upon occurrence of an emergency condition at the reactor site there is reasonable assurance that public will be protected. The staff pointed out that dose reduction --and not complete dose avoidance-- is the goal of the EP regulations and the SRP.

The staff described the elements of the regulatory requirements and guidance contained in Regulatory Guide 1.101 which references the jointly developed NUREG-0654 (FEMA-REP-1) and endorses the industry document NEI 99-01. The SRP Section describes the information that needs to be provided and reviewed by the staff at various stages of the licensing process. The staff described the use of emergency planning inspections, tests, analyses and acceptance criteria (EP-ITAAC) which would address the features of a complete and integrated EP plan that cannot be described in the required detail at the time of the application. The criteria in the EP-ITAAC need to be met before initial fuel loading with a hearing opportunity provided to petitioners contesting it.

The Members questioned how the staff would determine the acceptability of local government's participation in the offsite plan in support of an early site permit application. The staff responded that existing standards and guidance are extended to the new reactor licensing process, even if some local authorities may decline to participate.

Regarding the staff's efforts to learn from other Countries' EP program and activities, the Members noted the benefit of learning from the good practices of Countries with major nuclear programs.

Some Committee ACRS members noted the need to develop guidance on planning for severe external events, like a major earthquake, that wipes out the infrastructure including the transportation and communication network. The staff indicated that planning for such events is not yet considered and it is assumed that the local authorities will use the available infrastructure in protecting people. The staff also mentioned their effort in seeking "lessons learned" from recent major public evacuation events.

Mr. Alan Nelson, NEI, discussed the industry comments on SRP Section 13.3. One of their concerns was that lack of detailed guidance regarding FEMA review of the offsite plan could generate many requests for additional information from the NRC reviewers and delay the application approval process. Mr. Nelson then described the NEI task force on EP of advanced light water reactor designs and the current effort in developing emergency action levels for passive reactors.

Committee Action

The Committee issued a letter to the Executive Director for Operations on this matter dated December 15, 2006, recommending that NUREG-0800, SRP Section 13.3, "Emergency Planning," be issued.

V. State-of-the-Art Reactor Consequence Analysis Project (Open)

[Note: Mr. Hossein Nourbakhsh was the Designated Federal Official for this portion of the meeting.]

The Committee met with representatives of the NRC staff to discuss the status of the staff's efforts associated with the state-of-the-art reactor consequence analysis (SOARCA) project. The staff briefed the Committee on a number of topics related to this project including plans for MELCOR and MACCS code improvement, plant grouping, and selection of scenarios to use for consequence analysis. The staff also briefed the Committee on its plan for a site-specific simulation of offsite emergency response for this project.

Mr. Robert Prato, Office of Research (RES), started the presentation by describing the status for MACCS2 code improvements. He stated that only 8 of 10 MACCS 2 code improvements are being implemented. The wet deposition model aerosol size dependency and angular resolution are not being implemented as a part of MACCS 2 code improvements. Mr. Prato continued his presentation by discussing how the staff is evaluating scenarios selection using core damage frequency. He stated that the unavailability of full-scope level-2 PRAs for all plants, limits the staff ability to select scenarios based on release frequency.

Mr. Randolph Sullivan briefed the Committee on site-specific simulation of offsite emergency response for SOARCA project.

The Members had many questions regarding the technical details of this study and how uncertainties will be addressed. The Members agreed that the technical details be discussed in a subcommittee as the process and calculations further develops.

Committee Action

This was an information briefing. The Committee plans to continue its review of this project as further progress is made by the staff.

VI. Proposed Revisions to Regulatory Guides and Standard Review Plan Sections in Support of New Reactor Licensing (Open)

[Note: Mr. David C. Fischer was the Designated Federal Official for this portion of the meeting.]

The Committee discussed "high-priority" Regulatory Guides and SRP Sections that which are being revised or developed in support of new reactor licensing. The Committee identified five SRP Sections that it decided not to review (i.e., proposed Revision 3 to SRP Section 2.3.3, "Onsite Meteorological Measurements Program"; proposed Revision 2 to SRP Section 3.2.1, "Seismic Classification"; proposed Revision 2 to SRP Section 3.2.2, "System Quality Group Classification"; proposed new SRP Section 3.13, "Threaded Fasteners - ASME Code Class 1, 2, and 3"; and proposed new SRP Section 17.4, "Reliability Assurance Program"). The Committee's decision is documented in a memorandum dated December 15, 2006, from John T. Larkins, ACRS Executive Director to Luis A. Reyes, NRC Executive Director for Operations.

Dr. Corradini recommended that the Committee not review SRP Section 2.3.1, Regional Climatology. However, Dr. Powers expressed concern that looking solely at historical records may not be adequate to predict extremes of weather. Dr. Powers agreed to take a closer look at the proposed revision to SRP Section 2.3.1 to see if it adequately addressed his concern.

The Committee decided to consider whether the ACRS should review several other non-high-priority SRP Sections [e.g., , SRP Section 3.11, "Environmental Qualification of Mechanical and Electrical Equipment; SRP Section 6.1.2, Protective Coating Systems (Paint) - Organic Materials"; SRP Section 6.2.7, "Fracture Prevention of Containment Pressure Boundary"; and SRP Section 6.5.5, "Pressure Suppression Pool as a Fission Product Cleanup System"]. The Committee noted that it had completed its review and/or consideration of all of the high priority SRP Sections provided by the staff.

Committee Action

The Committee plans to conduct an accelerated review of all Regulatory Guides and SRP Sections that which are determined to warrant ACRS review.

VII. Subcommittee Report on Thermal-Hydraulic Phenomena

[Note: Mr. Ralph Caruso was the Designated Federal Official for this portion of the meeting.]

The Chairman of the Thermal-Hydraulic Phenomena Subcommittee provided a report to the Committee summarizing the results of the December 5, 2006 meeting with the NRC staff and its contractors concerning the development of the TRAC/RELAP5 Analytical Computational Engine (TRACE) computer code. Members expressed concern about the state of the code documentation and noted that the staff's progress in establishing the TRACE code as the standard NRC tool for evaluating light water reactor behavior is slow. The staff described its response to an anonymous letter that had been received by the Committee concerning the numerical solution scheme for the code. Members noted that the staff's efforts to address the underlying technical issues raised in the anonymous letter should be improved

Committee Action

The Committee plans to consider a letter to the Executive Director for Operations on this matter during its February 2007 meeting.

VIII. Election of ACRS Officers for CY 2007

[Note: Mr. John T. Larkins was the Designated Federal Official for this portion of the meeting.]

The Committee elected William J. Shack as ACRS Chairman, John D. Sieber as ACRS Vice Chairman, and Mario V. Bonaca as Member-at-Large for the Planning and Procedures Subcommittee for CY 2007.

IX.. Executive Session (Open)

[Note: Dr. John T. Larkins was the Designated Federal Official for this portion of the meeting.]

A. RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

[Note: Mr. Sam Duraiswamy was the Designated Federal Official for this portion of the meeting.]

The Committee discussed the response from the NRC Executive Director of Operations (EDO) to ACRS comments and recommendations included in recent ACRS reports:

- The Committee considered the EDO's response of November 27, 2006, to comments and recommendations included in the October 25, 2006 ACRS letter on the draft final NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications." The Committee decided that it was satisfied with the EDO's response.
- The Committee considered NRR's response of December 1, 2006, to the November 6, 2006 memorandum from the ACRS Executive Director regarding the Browns Ferry Nuclear Plant, Unit 1 - Extended Power Uprate Application and Supplemental Application. The Committee decided that it was satisfied with the NRR's response.
- The Committee considered the EDO's response of December 6, 2006, to comments and recommendations included in the November 27, 2006 ACRS Report on the Safety Aspects of License Renewal Application for the Palisades Nuclear Plant. The Committee decided that it was satisfied with the EDO's response.

B. Report on the Meeting of the Planning and Procedures Subcommittee (Open)

The Committee heard a report from the ACRS Chairman and the Executive Director, ACRS, regarding the Planning and Procedures Subcommittee meeting held on December 6, 2006.

The following items were discussed:

Review of the Member Assignments and Priorities for ACRS Reports and Letters for the December ACRS meeting

Member assignments and priorities for ACRS reports and letters for the December ACRS meeting were discussed. Reports and letters that would benefit from additional consideration at a future ACRS meeting were discussed.

Anticipated Workload for ACRS Members

The anticipated workload for ACRS members through March 2007 was discussed.

The objectives were:

- Review the reasons for the scheduling of each activity and the expected work product and to make changes, as appropriate
- Manage the members' workload for these meetings
- Plan and schedule items for ACRS discussion of topical and emerging issues

During this session, the Subcommittee also discussed and developed recommendations on items requiring Committee action.

Staff Requirements Memorandum

The Committee discussed Staff Requirements Memorandum (SRM) dated November 8, 2006, resulting from the ACRS meeting with the NRC Commissioners on October 20, 2006. In this SRM the Commission stated the following:

1. As licensing under Part 52 continues, the Committee should advise the Commission on effectiveness and efficiency of staff's implementation of lessons learned in areas it has reviewed, for example, the development of guidance documents for early site permits.
2. The Committee should provide its views to the Commission on staff's efforts related to digital instrumentation and controls. The Committee should consider potential means for providing reasonable backup, if appropriate.
3. The ACRS should provide its views to the Commission with respect to staff's work on technology neutral licensing framework with a focus on ensuring the value of such an approach versus the development of a licensing framework for specific designs, such as a high temperature gas cooled reactor or a liquid metal cooled reactor.
4. The ACRS should provide the Commission with its recommendations and basis for areas in which NRC should perform additional long term research.
5. The Committee should work with the staff and external stakeholders to evaluate the different Human Reliability models in an effort to propose either a single model for the agency to use or guidance on which model(s) should be used in specific circumstances.

Global Nuclear Energy Partnership

On February 6, 2006, the Secretary of Energy announced a \$250 million FY 2007 budget request to launch the Global Nuclear Energy Partnership (GNEP). GNEP has four main goals: (1) reduce America's dependence on foreign sources of fossil fuels and encourage economic growth; (2) recycle nuclear fuel using new proliferation-resistant technologies to recover more energy and reduce waste; (3) encourage prosperity, growth and clean development around the world; and (4) utilize the latest technologies

to reduce the risk of nuclear proliferation worldwide. As envisioned, GNEP will require NRC involvement in licensing several new facilities including a reprocessing facility, a fast flux liquid metal burner reactor, a fuel fabrication facility, a waste vitrification facility, and interim storage facility.

In SECY-06-0066 dated March 22, 2006, the staff requested that the Commission approve plans to address the regulatory and resource implications associated with GNEP. In an SRM, dated May 16, 2006, the Commission directed the staff to develop a conceptual licensing process for GNEP facilities, including review of the one-step licensing provisions for enrichment facilities and features of nuclear power plant combined licensing under Part 52 (i.e., construction authorization and operating license hearing process, design certification process, and early site permitting process). The Commission also noted in the SRM that the ACRS and ACNW could help in defining the issues most important to licensing, inspecting, and ultimate decommissioning of reprocessing and related fuel-cycle facilities.

The staff has prepared a SECY (currently in inter-Office concurrence) on its conceptual licensing approach for the GNEP facilities. NMSS staff plans to brief the ACNW on the SECY paper during the December 2006 ACNW Full Committee Meeting. Areas of primary interest include:

- Conceptual licensing approach for the Advanced Burner Reactor (ABR). The ABR is expected to be a 1000MWt sodium cooled fast flux reactor designed to burn transuranic waste (TRUs) in order to reduce the amount of radiological waste entering the geological repository. The staff has developed a conceptual approach to licensing the ABR. The approach and associated regulatory infrastructure needed to implement the approach will be of significant interest to the Commission.
- Conceptual licensing approach for the spent nuclear fuel reprocessing facility. Part 50 still remains the current regulatory framework for licensing reprocessing facilities, although it primarily pertains to licensing light water reactors. The NRC has not licensed a reprocessing facility in for over 30 years. A joint letter by ACRS/ACNW, dated January 14, 2002 raised concerns over the use of integrated safety assessment (instead of PRA) for licensing similar facilities under 10 CFR Part 70. Unless the staff moves to PRA to risk-inform the process, the ISA versus PRA issue will also be a concern for reprocessing facilities.

FY2006 ACRS Letter Matrix

As required by the Commission, the ACRS/ACNW Office needs to submit a summary matrix of the FY2006 ACRS reports. This will involve summarizing the recommendations included in the ACRS reports and letters. This summary matrix is included as part of the ACRS/ACNW Operating Plan submitted to the Commission annually. In order to avoid violation of the ACRS Bylaws, the Committee should authorize the ACRS Executive Director or his designee to summarize the recommendations in the ACRS reports and letters.

Nuclear Safety Research Forum-2007

As a followup to the recent Quadripartite Meeting, Dr. Wallis received a letter from

Commissioner Soda, NSC, inviting an ACRS member to give a keynote address at the Nuclear Safety Research Forum-2007, scheduled to be held on Friday, March 9, 2007, in Tokyo, Japan. This is a domestic meeting intended for Japanese audience with two keynote speakers, one from ACRS and another from NEA. The focus of this meeting is on research in the field of aging management and material degradation at nuclear power plants.

Dr. J. Sam Armijo is interested in participating in the meeting and would like to expand the trip to include visiting organizations and laboratories in Japan, whose activities are focused on reactor materials degradation research.

Report by Dr. Powers on the ANS Meeting Session on Sump Blockage and GSI-191

Dr. Powers, who attended the 2006 Winter Meeting of the American Nuclear Society (ANS), prepared the attached report on the Session involving the discussion of sump blockage and GSI-191.

List of Research Topics for ACRS Quality Assessment in FY2007

RES has provided a list of eight topics for the ACRS quality assessment in FY2007. These topics are not consistent with the criteria established in 2004. The Committee needs to revisit the process used by RES in identifying topics.

If the Committee is not satisfied with the topics proposed by RES, we can ask RES to provide another list of topics. The Committee normally selects a list of four topics for assessment. However, only two topics were selected for assessment in 2006. In view of the fact that the ACRS will be preparing its biennial report to the Commission on the overall NRC Safety Research Program in 2007, the Committee should consider selecting only two topics for quality assessment in FY2007.

Election of ACRS Officers for CY 2007

The Committee will elect Chairman and Vice-Chairman for the ACRS and Member-at-Large for the Planning and Procedures Subcommittee during the December 7-9, 2006, ACRS meeting. During the November meeting, the members were requested to inform the ACRS Executive Director in writing by November 24, 2006, if they do not wish to be considered for any or all of the Offices. So far, two Members have notified the ACRS Executive Director that they do not wish to be considered for all of the Offices.

Subcommittee Report on TRACE Code

The ACRS Subcommittee on Thermal-Hydraulic Phenomena held a meeting on December 5, 2006 to discuss the activities associated with the development of the TRACE computer code. It would be helpful to the Committee if the Subcommittee Chairman provides a brief report to the Committee summarizing issues and concerns of the Subcommittee and future course of action.

Member Issue

Informal ACRS Meetings with the Staff

In an email dated November 30, 2006, Dr. Powers raised some concerns about the informal meetings between the NRC staff and some ACRS members. The Committee discussed this subject.

C. Future Meeting Agenda

Appendix IV summarizes the proposed items endorsed by the Committee for the **539th** ACRS Meeting, **February 1-3, 2007**.

The **538th** ACRS meeting was adjourned at on **5:15 PM, December 8, 2006**.