UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 12, 1988

MEMORANDUM FOR: Frank J. Miraglia, Associate Director
for Inspection and Technical Assessment
Office of Nuclear Reactor Regulation

FROM: Dennis M. Crutchfield
Acting Associate Director for Projects
Office of Nuclear Reactor Regulation

SUBJECT: PROPOSAL FOR NRR MANAGEMENT MEETING ON BIG PHILOSOPHICAL ISSUES (October 3 and 4)

Enclosure 1 identifies certain key licensing issues which, due to their policy implications require the Executive Team review and guidance, so that the staff can proceed with their review of the evolutionary standard plants. The list has been developed and reviewed by the NRR staff. Some decisions can be deferred until the applicant's technical bases can be considered. However, the following items would be better resolved by early senior management involvement.

Our approach as requested by T. Murley is to set aside the afternoon of October 3 and 4 to have appropriate organizational units make a short presentation on each issue. To this end, we have identified the source of each issue, the cognizant unit and the desired date for resolution.

The following issues are in the category in which early management involvement would be productive:

19. Scope of Design
20. Scope of Staff Review
21. Application of Backfit Rule
22. Application of SRP
23. System 80+ - New FDA vs Revised FDA
6. BWR Main Steamline Valves and Leakage Control
30. High Pressure Decay Heat Removal System
3. Source Term for Accident Analysis

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OM-6 MEETING + OM-9

The other issues, listed by priority as follows, are in a category in which decisions are desired by January to February 1989.

11. Physical Security
12. Safety Classification of Equipment
14. Fire Protection
17. Implementation of Severe Accident Policy
5. Tornado Design
7. Type C Containment Leak Rate
13. Station Blackout
33. Hydrogen Control Features
34. ATWS
18. Containment Volume
15. Core Melt vs Core Damage
8. Emergency Diesel Generators
16. Use of Fiber Optics and Multiplexing and Computer Control
1. Leak-Before-Break Methodology
2. Operating Basis Earthquake and Dynamic Analysis Methods
4. Equipment Seismic Qualification By Experience
9. PRA
10. Analysis for Severe Accidents
25. Staff Preference for Turbine Generator Output Breaker
26. Improved Battery Systems
27. The Use of Battery and Electrical Monitoring Systems
32. 60 Year Life
28. Alternate AC Source for Station Blackout
29. Improved Offsite Power Feed Systems
24. Boric Acid Corrosion Resistant Bolting
31. Technical Specifications

Dennis M. Crutchfield
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Acting Associate Director for Projects
Office of Nuclear Reactor Regulation

Enclosure: As stated

cc: L. Shao
J. Roe
B. Grimes
C. Rossi
F. Congel
E. Beckjord
B. Morris
W. Houston
A. Thadani
J. Richardson

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Rec'd 9/12/88

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09/09/88	09/09/88	09/09/88	09/09/88	09/12/88

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09/9/88	09/9/88	09/9/88	09/ /88	09/ /88

SIGNIFICANT TECHNICAL ISSUES
WHICH ARE LIKELY TO ARISE DURING THE
REVIEW OF THE EVOLUTIONARY ALWR PLANTS

1. Leak-Before-Break-Methodology The Broad Scope Rule Change for GDC-4 (52 FR 41288, October 27, 1987) is the subject of proposed new SRP Section 3.6.3, which EPRI considers to be inconsistent with the intent of the Rule change. EPRI's position is that the localized dynamic effects of pipe ruptures should be deleted from the design basis for containment structures and the ECCS for systems in which LBB is demonstrated to apply and that only pipe whip and jets from systems for which LBB is not demonstrated should be included in design of containment structures and ECCS. The basic design pressure and temperature for the containment, and the sizing basis for the ECCS, would still be obtained from the traditional guillotine LOCA/MSLB analyses.

   Source of Issue - EPRI Optimization Proposal
   Lead Responsibility - EMTB
   Support Responsibility - EMEB
   Desired Date of Resolution - 12/31/88

2. Operating Basis Earthquake and Dynamic Analysis Methods EPRI proposed an OBE of one-third the SSE in its generic site envelope instead of one-half, which is required in 10 CFR 100, Appendix A. The staff (Speis, 6/6/86) agrees that the OBE should not control the design of safety systems and intends to make an appropriate rule change at some future date, but no action to that effect appears likely soon. Revisions to the ASME are being considered by industry which may eliminate the OBE from controlling design. Westinghouse proposes a 0.3 g SSE with 0.1 g OBE.

   Source of Issue - EPRI Optimization Proposal
   Lead Responsibility - NRR/EGSB
   Desired Date of Resolution - 12/31/88

3. Source Term for Accident Analyses EPRI proposes to use improved (more realistic) source terms that are reasonably conservative. This approach is expected to result in prediction of significantly reduced offsite dose consequences. The staff is in general agreement with this objective. Revision of SRP 6.5.2 on PWR spray additives is planned and a new SRP 6.5.5, giving credit to BWR suppression pools as fission product scrubbing, is proposed. Revisions of RGs 1.3 and 1.4 have been postponed. The lead responsibility on G.I.83, "Control Room Habitability", has been transferred from NRR to RES.

   Source of Issue - EPRI Optimization Proposal
   Lead Responsibility - RES/SAIB
   Support Responsibility - NRR/PRAB
   Desired Date of Resolution - 10/30/88

4. Equipment Seismic Qualification by Experience USI A-46 on this subject has been resolved for operating plants but no action has been taken by RES for application to new plants as proposed by EPRI.

Source of Issue -	EPRI Optimization Proposal
Lead Responsibility -	NRR/EGSB
Desired Date of Resolution -	12/31/88

5. Tornado Design The staff declined to accept ANSI/ANS 2.3-1983 criteria as an alternative to RG 1.76 but has developed somewhat reduced wind speed criteria based on a staff sponsored study of tornado statistics (NUREG/CR-4461).

Source of Issue -	EPRI Optimization Proposal
Lead Responsibility -	NRR/EGSB
Support Responsibility -	NRR/PRPB
Desired Date of Resolution -	12/31/88

6. BWR Main Streamline Valves and Leakage Control BWRs are currently required to incorporate a leakage control system (LCS) to ensure the low leakage characteristics of the MSIVs in the event of a design basis LOCA. The ALWR Requirements Document (Chapter 3) includes a utility requirement to provide a non-safety-related alternative leakage processing pathway consistent with those evaluated in NUREG-1169. It will also specify that the allowable leakage is to be determined in a manner consistent with methodologies in NUREG-1169 and that the MSIV leakage for the final installed test shall be less than 50% of the allowable value. EPRI's position is currently under review.

Source of Issue -	EPRI Optimization Proposal
Lead Responsibility -	NRR/SPLB
Support Responsibility -	NRR/EMTB
Desired Date of Resolution -	12/31/88

7. Type C Containment Leakage Rate In Chapter 5 of the ALWR Requirements Document, EPRI proposes that the maximum interval between type C tests be 30 months to accommodate a refueling interval of 24 months. This would require a change in Appendix J which presently limits the interval to 24 months. EPRI's proposal is under review.

Source of Issue -	EPRI Optimization Proposal
Lead Responsibility -	NRR/SPLB
Support Responsibility -	NRR/OTSB
Desired Date of Resolution -	12/31/88

8. Emergency Diesel Generators Westinghouse currently proposes two separate emergency diesel generators, each to be sized to handle 100% of the load requirements. There is under consideration a proposal to have four emergency diesel generators, each to be sized to handle 50% of the load requirements. The ACRS appears to favor four diesels. The Westinghouse PRA indicates use of four 50% DGs would modify the failure probability from $1.5X10^{-5}$ to $0.9x10^{-6}$. Westinghouse has indicated a willingness to modify the design should the customer request it.

Source of Issue - RESAR SP/90
Lead Responsibility - NRR/SELB
Desired Date of Resolution - 12/31/88

9. PRA A PRA will be developed for each design. For operating plants and plants proposed for specific sites, it is normal practice to consider external events which are site specific events in the Level III PRA. Since the designs of the ALWR projects will not have specific sites, the external events will be defined in terms of risks which are projections from design envelopes and characteristics of generic sites. The Level III PRA is highly dependent upon on the external events (in that the external event contribution to the plant risk will normally be the dominant contributor) and will only be as good as the estimates of the external events. PRAs will need to include external events. Risks to public, i.e., probability of dose levels at plant sites boundaries, will be difficult to estimate without considering external events. Also the staff believes ALWR PRAs should include probabilistic fire analysis, probabilistic internal flood analysis, and seismic analysis using the Seismic Margins Study methodology. In order for the PRAs to reflect the relative risk of each design, the ALWR FDA applicant should design as large a fraction of the plant as possible. Where interfaces occur between the FDA applicant's portion of plant design and the balance of plant, the applicant must give careful attention to defining the redundancy, diversity, independence, and reliability requirements that the interfacing systems must meet.

Source of Issue - RESAR SP/90, CESSAR-DC, ABWR
Lead Responsibility - RES/PRAB
Support Responsibility - NRR/PRAB
Desired Date of Resolution - 12/31/88

10. Analysis For Severe Accidents The staff does not have an approved integral code for severe accident progression. CE, Westinghouse and GE intend to use the industry developed MAAP code. The staff has already indicated concerns about the application of the MAAP code. Will the staff take on the review of the MAAP code? At least the staff will have to become knowledgeable of the code. What analyses will the staff use to verify the scenarios proposed by the applicants? The staff indicates that CORSOR can be used to verify MAAP. Also MARCH, MERGE and CORCON will be useful.

Source of Issue - RESAR SP/90, CESSAR-DC, ABWR
Lead Responsibility - RES/PRAB
Support Responsibility - NRR/SPLB, NRR/SRXB, NRR/PRAB
Desired Date of Resolution - 12/31/88

11. Physical Security Westinghouse and GE have proposed some design considerations for physical security. However, Westinghouse does not intend to perform a sabotage assessment of the design as they originally committed. CE has not yet given us much indication of their program. In addition, since much of the CE System 80+ design is the current System 80 design, how much design for physical security and sabotage can we really expect? How much are we going to require? Issues such as consideration for insider sabotage are not yet defined in the systems' design. Westinghouse wants to defer further consideration of sabotage protection to the Final Design stage to ensure meeting any imposed regulatory requirements, which does not seem in keeping with the Severe Accident Policy regarding applicants proposing early resolution of generic issues. We think early consideration of design criteria and evaluation of designs for sabotage protection will be far more effective than trying to improve protection later using security systems only. Also, improved physical separation of trains is claimed by Westinghouse as providing improved protection against sabotage. This would require barriers between trains which is not consistent with their response to one of the fire protection issues.

Source of Issue - RESAR SP/90, ABWR, CESSAR-DC, NRR/DRIS
Lead Responsibility - NRR/RSGB
Desired Date of Resolution - 12/31/88

12. Safety Classification of Equipment Westinghouse proposes to use ANSI 51.2 instead of ANSI 18.2. The staff has indicated that this would be unacceptable and Westinghouse is currently assessing its position.

Source of Issue - RESAR SP/90
Lead Responsibility - NRR/SPLB
Support Responsibility - NRR/SRXB, NRR/SELB, NRR/SICB
Desired Date of Resolution - 12/31/88

13. Station Blackout Westinghouse has proposed a non-safety grade dedicated pump to provide cooling water for the Reactor Coolant Pump Seals. The RCP seals were the major concern for station blackout. Will the Westinghouse proposal be acceptable? SRXB staff believe APWR FDA applicants will need to address alternative design options (those chosen and those discarded) for assuring a RCP seal LOCA does not occur following station blackout. This issue should be according to the proposed SBO rule.

Source of Issue - EPRI Generic Issue
Lead Responsibility - NRR/SELB
Support Responsibility - NRR/SPLB
Desired Date of Resolution - 12/31/88

14. Fire Protection The current guidance on fire protection is oriented to operating plants. These criteria were developed after the plants were built and accepted as built conditions. As a consequence recent PRA's have shown that fire is a significant contributor to core melt (i.e., a minimum separation of 20 feet and plant specific exemptions are the prime means for acceptance). With the ALWR plants the applicants should be looking at designs for fire protection such as complete separation and the use of fire barriers. Since the Systems 80+ design is a revision of System 80, we are not sure yet if the design has considered this. Westinghouse has proposed use of 20 feet separation without fire barriers. The staff has indicated this design is not acceptable for ALWR plants. Smoke control was not addressed in the prior guidance but can be a significant factor in inhibiting operator action.

Source of Issue - P.ESAR SP/90
Lead Responsibility - NRR/ECEB
Desired Date of Resolution - 12/31/88

15. Core Melt vs Core Damage It appears that the licensing review bases for the standard designs will require a containment conditional failure probability of less than one in ten weighted over credible core damage sequences. This will require the staff to differentiate between core damage and core melt sequences and define their probabilities. In the GESSAR II review, the staff assumed that all core damage leads to core melt and eventually to containment failure.

Source of Issue - GE-ABWR
Lead Responsibility - NRR/SRXB
Support Responsibility - RES/PRAB, NRR/PRAB, NRR/PRPB
Desired Date of Resolution - 12/31/88

16. The Use of Fiber Optics and Multiplexing and Computer Control GE, W and CE intend to use fiber optics and multiplexing and computer controls in the instrumentation and control systems. The staff expects the difficulty in the review will be scheduling manpower given the recent reduction in contractor support budgets.

Source of Issue - NRR/SIGB
Lead Responsibility - NRR/SIGB
Desired Date of Resolution - 12/31/88

17. Implementation of Severe Accident Policy RES is developing criteria for implementation of the Severe Accident Policy and a rule, 10 CFR 52, of requirements for the Severe Accident Policy. Neither are expected to be completed in time to support the current ALWR Design Certification schedules. Management must be willing to proceed with the review of the designs, make decisions and proceed towards design certification with case-by-case resolution of Severe Accident Policy issues. Meanwhile Severe Accident Issue topic papers, proposed resolutions for USIs and

GSIs, and optimization issues will be submitted by CE and GE for their designs. Westinghouse has submitted resolutions for USIs and GSIs and have raised some of the issues discussed in the topic and optimization issues papers. In addition, without the criteria and rule developed, ACRS review of the applications will be at best ad hoc. It should be noted that the Severe Accident Policy makes special mention of protection against insider and outsider sabotage, and thus these issues should be considered early in the design.

Source of Issue - NRR/PDSNP
Lead Responsibility - RES/SAIB
Support Responsibility - NRR/SPLB, NRR/SRXB, NRR/PRAB, RES/PRAB
Desired Date of Resolution - 12/31/88

18. Containment Volume The proposed ABWR containment is smaller than the GESSAR II containment and is likely to become a major issue. Also, CE has not yet proposed a containment volume.

Source of Issue - GE-ABWR
Lead Responsibility - NRR/SPLB
Support Responsibility - NRR/ECEB
Desired Date of Resolution - 12/31/88

19. Scope of Design Westinghouse and GE propose to provide designs which represent approximately 75% of the total plant. CE appears to propose only approximately 55% of the total plant. The System 80+ design consists of the NSSS, containment, control room, emergency feedwater system and "functional requirements" of the BOP. Is such a limited scope acceptable? It would appear that the Standardization Policy accepts this; however, for an applicant who references the system, it could mean another two years of review for a license. With so little of CESSAR 80+ actually being designed by CE, it will be very difficult, if not impossible, for CE to estimate system reliability and System 80+ core melt frequency.

Source of Issue - NRR/PDSNP
Lead Responsibility - NRR/PDSNP
Support Responsibility - NRR Executive Team & Staff
Desired Date of Resolution - 10/31/88

20. Scope of Staff Review Should the scope of review for all designs be consistent? The RESAR SP/90 and the ABWR appear to have a complete review. However, CE's System 80+ is identified as a revision of the System 80 design. CE has indicated that much of the System 80+ design will not have to be reviewed. Only the revisions will need review. The ICSB staff believe that the interconnection between the System 80 design and the System 80+ design will require the review of a larger percentage of the total design against the SRP. They estimate this to be about 40%.

Source of Issue - NRR/PDSNP

Lead Responsibility - NRR/PDSNP
Support Responsibility - NRR Executive Team & Staff
Desired Date of Resolution - 10/31/88

21. Application of the Backfit Rule Since the System 80+ design is a revision of the System 80 and the FDA for Design Certification will be an amended FDA for FDA-2, CE could invoke the backfit rule on any changes the staff would impose.

Source of Issue - NRR/PDSNP
Lead Responsibility - NRR/PDSNP
Support Responsibility - NRR Executive Team & Staff
Desired Date of Resolution - 10/31/88

22. Application of the SRP RESAR SP/90 and ABWR will be reviewed against the current SRP and will conform to the requirements of 10 CFR 50.34(g). The CE System 80 was submitted before July 1981, the date of the implementation of the SRP; however, it was reviewed against the SRP in effect throughout the review. CE's concept of the System 80+ is that it is a revision of the System 80 and, therefore, we only need to review the revisions against the current SRP. In March 1982 CE indicated by letter that the SRP for System 80 was not applicable. There are those in NRR who believe that System 80+ should meet the current SRP and 10 CFR 50.34(g) completely including the requirement to identify deviations from the SRP and to perform an evaluation that demonstrate "How the alternative proposal provides an acceptable method of complying with those rules or regulations of the Commission, or portion thereof, that underlie the corresponding SRP acceptance criteria.".

Source of Issue - NRR/PDSNP,ECEB
Lead Responsibility - NRR/PDSNP
Support Responsibility - NRR Executive Team & Staff
Desired Date of Resolution - 10/31/88

23. System 80+ - New FDA vs Revised FDA Since CE has indicated that the System 80+ design is only a revision of the System 80 design, than the FDA for design certification will be an amended FDA of FDA-2.

Source of Issue - NRR/PDSNP
Lead Responsibility - NRR/PDSNP
Support Responsibility - NRR Executive Team & Staff
Desired Date of Resolution - 10/31/88

24. Boric Acid Corrosion Resistant Bolting EPRI provided no discussion of the potential of boric acid corrosion of primary boundary bolting. The staff identified boric acid corrosion as a significant safety issue per NRC Information Notice Nos. 82-02, 82-06, and 86-108 (including Supplements 1 and 2).

Source of Issue - NRR/EMTB
Lead Responsibility - NRR/EMTB
Desired Date of Resolution - 12/31/88

25. Staff Preference for Turbine Generator Output Breaker The staff prefers the use of a turbine generator output breaker to eliminate designs incorporating fast transfer of AC power from the unit auxiliary transformer to the startup transformers. The regulations presently permit either design.

Source of Issue - NRR/SELB
Lead Responsibility - NRR/SELB
Desired Date of Resolution - 1/30/89

26. Improved Battery Systems Regulations presently require only two class 1E batteries. The staff believes significant improvements can be made which are already implemented in many new plants as follows: (a) Four class 1E batteries, one for each channel of RPS logic to reduce the potential for plant trips, (b) At least one non-class 1E battery system from failures in non-class 1E equipment, (c) Two switchyard batteries and chargers to assure proper switchyard breaker operation for a D.C. failure, (d) One additional battery and charger which could be connected to each battery bus, one at a time, to allow on-line equalizing charge of class 1E batteries without tieing buses to other divisions or supplying a bus from a charger alone. These requirements would maintain separation, reduce outages and eliminate D.C. equipment being subject to the higher voltage of the equalizing charge.

Source of Issue - NRR/SELB
Lead Responsibility - NRR/SELB
Desired Date of Resolution - 1/30/89

27. The Use of Battery and Electrical Monitoring Systems SICB prefers the use of a comprehensive battery and electrical system monitoring system to assure immediate notification of battery and electrical system problems and to provide for post event sequence analysis.

Source of Issue - NRR/SELB
Lead Responsibility - NRR/SELB
Desired Date of Resolution - 1/30/89

28. Alternate AC Source for Station Blackout SELB favors the provisions of a gas turbine connectable to each of the ESF diesel generator buses as an alternate AC source to resolve station blackout concerns and to minimize emergency power source unavailability.

Source of Issue - NRR/SELB
Lead Responsibility - NRR/SELB
Desired Date of Resolution - 1/31/89

29. Improve Offsite Power Feed Systems Regulations presently require two feeds from the switchyard (offsite power) to the onsite class 1E distribution system. As a minimum, this may be met by one feed to each of two class 1E divisions of buses. A better design would provide for feeding both divisions from each of two offsite feeds providing for a more reliable and versatile preferred power system.

Source of Issue - NRR/SELB
Lead Responsibility - NRR/SELB
Desired Date of Resolution - 1/30/89

30. High Pressure Decay Heat Removal System The staff favors incorporating a high pressure decay heat removal system into the ALWR designs.

Source of Issue - NRR/DOAE
Lead Responsibility - NRR/DOAE
Support Responsibility - NRR/SLPB
Desired Date of Resolution - 10/31/88

31. Technical Specifications Technical Specifications (TS) for the ALWRs should reflect the new approaches stemming from staff implementation of the Interim Commission Policy Statement on Technical Specifications. However, based on staff experience in developing TS for the NTOL plants from the Standard Technical Specifications, and the number of plant-specific changes encountered, certifying the ALWR technical specifications in a rule will inhibit their adaptability and lead to numerous exemption requests.

Source of Issue - NRR/OTSB
Lead Responsibility - NRR/OTSB
Desired Date of Resolution - 3/30/89

32. 60 Year Life Several of the IEEE Standards that we expect the licensees to reference, particularly for environmental qualification, are written for 40 year applications. A commitment by a licensee to meet the IEEE Standards, as accepted in past FSARs, will not be enough to qualify the plant. An acceptable method must be established to justify the use of standards and guidelines designed for 40 years being extrapolated out to 60 years.

Source of Issue - NRR/SELB
Lead Responsibility - NRR/SELB
Desired Date of Resolution - 1/30/89

33. Hydrogen Control Features Hydrogen control features should be considered early in the review process.

Source of Issue - NRR/SRXB
Lead Responsibility - NRR/SRXB
Support Responsibility - NRR/ECEB
Desired Date of Resolution - 12/31/88

34. ATWS Enhanced ATWS mitigation features should be considered early in the review process.

Source of Issue - NRR/SRXB
Lead Responsibility - NRR/SRXB
Support Responsibility - NRR/SICB
Desired Date of Resolution - 12/31/88