



General Electric

Brookhaven National Lab.

J. Fox  
D. Foreman  
R. Villa  
W. Gilbert  
J. Maxwell  
D. Hawkins  
B. Gou

K. Shiu

March 27, 1985

The first day of the meeting dealt with plant security considerations. The entire meeting was closed to the public. Dr. Mark chaired the security session.

The Subcommittee noted that as they review GESSAR II they could be approving a plant which could be operating, fifty years or more into the future. Consideration of possible conditions which might be found in the world fifty years hence should have an influence on the design of security measures for GESSAR II in the present review.

Dr. David Ericson, Sandia, presented a review of LWR Sabotage studies. Included in his presentation were nuclear power plant design concepts, damage control for sabotage mitigation, components vulnerability and design changes, insider protection, and BWR insights. Plant design alternatives which can increase a plant's resistance to sabotage were reviewed.

Mr. W. Gilbert of General Electric Company discussed GESSAR II sabotage considerations. GESSAR II is designed to meet regulatory requirements. GESSAR II also has protection features including: access control, equipment design and layout, damage control, and sabotage mitigation. It was noted that only access control has a solely safeguards function. The other features which contribute to sabotage protection have additional reasons for being included in the plant design.

Currently requirements for protection against radiological sabotage include: vital equipment located behind two physical barriers, controlled access, and a control room that is bullet resistant. Currently, GE does not feel additional measures for plant security are warranted until required by the NRC.

The NRC Staff explained that they monitor the intelligence community for any threat to nuclear plants. If the Staff feels there is a threat to a plant, they can and will take immediate actions to counter the threat.

The Subcommittee suggested additional consideration be given to the types of strategies that could be used for sabotage protection. The use of bunkering and hardening plant equipment was discussed. The contribution UPPS could make to sabotage mitigation was questioned since design details for the system have yet to be produced.

The Subcommittee also discussed security system interface parameters for the GESSAR II plant. Interface parameters supplied to the applicant were reviewed. These interface items include ingress points, personnel and material traffic routes, and the GESSAR II communications system design.

General Electric noted that for the GESSAR II design, there are five self-sufficient heat-removal systems in five security areas. Equipment separation provides added protection against sabotage.

March 28, 1985:

The Staff discussed the current status of the severe accident policy statement. Currently the staff would be willing to issue an FDA for a future design which meets the standard review plan and has considered severe accidents in a PRA. GESSAR II would be in this position after the severe accident policy is finalized. However, no C.P. or O.L. would be issued to a plant referencing the GESSAR II design until the completion of the Staff and ACRS review. Following Staff and ACRS approval the Staff's current thinking is that the FDA would be valid for 5 years.

Design Certification would be valid for 10 years; this step requires rulemaking to approve the design. GE has indicated they would not pursue certification. They are seeking the 5 year FDA.

Both GE and independently the Staff and their consultant have evaluated a comprehensive list of design modifications. GE's evaluation of the 80 plus items is contained in NEDE-30640. The results of the Staff and their consultant (RDA) review are contained in NUREG/CR documents.

Currently the Commission's policy regarding standardization allows an FDA applicant to define the scope of a new design. It requires those applicants whose scope of design is less than a complete plant to define the interfaces between the design and the balance of plant. The Staff's review assures the adequacy of interface requirements, and if necessary will identify other items which they believe to be important to safety.

Mr. Jack Fox of GE presented an update on the status of the Ultimate Plant Protection System (UPPS). GE has committed to provide UPPS on the GESSAR II design. Currently the design is in the conceptual phase. Design details will be deferred until the first applicant references GESSAR II. It is predicted that UPPS will reduce the overall risk of core damage by a factor of 10.

GE was questioned about a scenario where the reactor core was without water for an extended period of time. When water became available again, should it be used to flood the core? GE believes they have some documentation which leads to the conclusion to always add water to the core. The Staff believes this question is being addressed in the severe accident research program. Dr. Okrent requested the documentation that addresses this issue.

Dr. Shiu of BNL noted that the Staff had asked BNL to explore the potential benefits of the UPPS system. The look was limited to the conceptual design GE has produced for the system. Refinements in the UPPS design could alter the BNL results. BNL believes an automated Category 1 system gives a greater reduction in core melt frequency (a

factor of 3) than an operator activated non-seismically designed system which adds little reduction to the frequency of core damage.

Dr. Kastenberg, RDA, discussed value/impact issues relating to mitigation devices. He explained both RDA and GE use the ratio method of measuring value/impact which examines person-rem averted divided by system cost. Occasionally the inverse of this ratio is also used. Differences between GE and RDA on cost estimates can be accounted for by the fact that the RDA value/impact calculations do not include property cost or use, the costs associated with using nuclear grade material, or the cost of construction financing among others. By adding the costs RDA had previously excluded, RDA and GE estimates of items such as large chilled filter systems more closely agree.

RDA calculated benefit by adding the risk reduction per year contributed by a particular feature and added it over an assumed 40 year plant life. No discounting of health effects was used. A levelized cost is used which takes the cost of an accident times the frequency times the life of the plant. The effect of discounting the cost of improvements with a discount rate up to 10 per cent would lower the cost of making an improvement by a factor of three to six. RDA does not believe discounting should be used when screening possible improvements and in dealing with health effects. RDA has recommended the Staff not use discounting.

D. Kunsman of Sandia Laboratories reported on preliminary work that has been done on Grand Gulf an operating Mark III, BWR-6 plant. The work is entitled severe accident risk rebaselining and risk reduction program. A report on this work is scheduled to be released this summer. The program will evaluate benefits and costs of various safety options, considering the cost of reactor accidents and the cost of safety options. This report will consider both onsite as well as offsite costs of an accident. It is felt that large financial risk is dominated by on-site cost and not off-site cost. The uncertainty band is potentially greater for off-site costs than it is for total costs.

In closed session Mr. Knecht of GE presented a summary of GE's Value/Impact analysis and basis. GE believes their approach is more realistic than RDAs and accounts for more benefits. Among approach differences in analytical methods between GE and the Staff are: GE discounts health effects, gives more credit for pool scrubbing, and uses risk reduction factors. Value benefits GE claims include reduced off-site costs and reduced utility losses which are due in large part to the effects of pool scrubbing. GESSAR was compared to a list of 73 possible design improvement concepts, 23 were already in the GESSAR II design. Three concepts had cost benefit ratios below 5. These three concepts were ten hour station blackout provisions, the ultimate plant protection system and improved maintenance procedures.

GE noted there are not containment performance criteria for severe accidents. It was also felt to be reasonable not to assume safety grade equipment in determining costs of design improvements. Dr. Okrent suggested that based on the PRA, thought be given to containment performance criteria.

Dr. Hankins, GE, discussed some of the limitations and uncertainties associated with the PRA. Accident initiators with frequencies less than  $10^{-8}$  are considered insignificant contributors to core damage frequency and risk. Some limitations and uncertainties include the fact that sabotage is treated deterministically. Sensitivity studies have showed only a small effect associated with considering a range of plant sites. Regarding design and construction errors adequate methodology to include these effects in the PRA is non-existent. The PRA has no basemat penetration failure mode; the aim is to maximize airborne releases. Human error is treated according to guidance in the "Handbook of Human Reliability Analyses" A.D. Swain/H.E. Guttman.

Mr. Michelson requested a copy of an analysis of an ex-containment LOCA for the reactor water cleanup system. Mr. Michelson is concerned over a scenario where the isolation valves in the system fail to close.

Mr. Maxwell, GE, made a presentation on the external events of floods and fires. Fire protection equipment is part of GE's scope of supply for the nuclear plant. GE calculated a frequency of core damage of   as the highest probable frequency due to fire and concluded it is acceptable. The adequacy of the design was confirmed by a fire-hazard analysis on a room by room basis. Regarding floods, GE has performed studies to confirm that floods are confined to the area of initiation and the consequences of internal floods are acceptable. GE concludes the highest probability of core damage due to flooding is   which is acceptable.

Friday, March 29, 1985

Mr. Etherington was also concerned that high probability low impact events would equal low probability of occurrence high health impact events in a value impact analysis. GE noted the frequency of occurrence is taken into account and judgement is used in plant design. Mr. Etherington felt some weighting for high probability events should be considered.

During the Subcommittee's introduction to the third day of the session, a brief discussion of the effect of economic loss to health took place. A correlation between life expectancy and standard of living (which could increase with cheap electric power) would add perspective to value/impact studies if such a relationship could be quantified.

Mr. Hardin of the NRC briefly reviewed the role of pool scrubbing for the subcommittee. He noted that pool scrubbing is considered in all accident scenarios except those involving a severe earthquake. The Staff believes their estimates of decontamination factors (DFs) for GESSAR are conservative, however due to uncertainties in the particle size distribution, refinements in DFs have not been made. Pool bypass situations under study include an RHR line break, a RCIC steamline break and bypass resulting from a severe earthquake.

In closed session ACRS consultant Mike Bohn discussed the results of his review of the General Electric GESSAR seismic risk assessment. He compared the GE analysis to the BNL (NRC Staff's consultant) analysis. There is a factor of 200 difference between the results obtained by GE and the Staff. Dr. Bohn accounts for the differences due to differences in assumptions that underlie each analysis. He noted that if GE had used the same fragility values BNL had used, the GE and BNL analyses would be nearly the same.

In the BNL analysis relay chatter contributes 51% of the total core damage frequency. Dr. Bohn felt this was conservative since it was assumed there was no time delay protection in the circuits; secondly it is assumed a momentary contact will lock the circuit; and no credit is taken for solid state devices which can probably undergo higher levels of acceleration without accidentally energizing.

In closed session D. Knecht of GE presented a summary of GE's position on relay chatter. Sandia's expressed concern was that relay chatter causes a common mode failure. All ECCS systems would be lost and there would be insufficient time to reset trips. GE believes common mode relay chatter effects are avoided by equipment diversity and ease of trip reset. It was further noted the GESSAR II designs is basically solid state except for switchgear protective relays.

Dr. Bob Gou of General Electric made a presentation on seismic structural fragilities. The main emphasis was on foundation fragilities, foundation sliding and rocking. It was noted soft soil is excluded because of soil bearing capacity requirements. The foundation sliding mode governs. However, GE claims foundation sliding does not cause simultaneous failure of the drywell, containment and shield building. Relative displacement resulting from building sliding is very unlikely to fail all interconnecting piping. A core cooling avenue would remain.

Dr. Okrent discussed presentations for upcoming full ACRS meetings. He also noted that he expects to hold at least one more subcommittee meeting following the Staff's issuance of SSER-4.

The meeting was adjourned at 12:07 p.m.

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NOTE: A transcript of the open portions of the meeting is on file at the NRC Public Document Room at 1717 H St., NW., Washington, D.C. or can be obtained at cost from ACE Federal Reporter, Inc., 444 N. Capitol St., Washington, D.C. 20001, Telephone (202) 347-3700.

**EFFECTIVE DATE:** March 4, 1985.

**FOR FURTHER INFORMATION CONTACT:** Ada R. Kimsey, Office of the Clerk of the Board, Merit Systems Protection Board, (202) 853-7200.

**SUPPLEMENTARY INFORMATION:** With the publication of Volume 13, *Decisions of the United States Merit Systems Protection Board*, covering the period January through March 1983 (see 49 FR 49188), the Board ceased publication of its final orders and precedential interlocutory orders. Of the series of Board decisions volumes, Volume 12 (October through December 1982), as well as Volume 13, is in print. Both may be obtained from the Superintendent of Documents. The ordering information is: Volume 12: stock number 062-000-00017-1, \$16, and Volume 13: stock number 062-000-00018-0, \$11.

The Board continues to publish *The Digest*, a monthly summary and listing of opinions and orders, and "Federal Employee Appeals Decisions," quarterly microfiche with paper index of initial decisions issued in its 11 regional offices. Further, the Board has published a special microfiche edition of initial decisions resulting from the air traffic controller strike of 1981: "Federal Employee Appeals Decisions. Air Traffic Controller Cases."

Meanwhile, researchers may contact the following organizations which offer a variety of services regarding Board decisions:

- Federal Merit Systems Reporter, Labor Relations Press, 1725 K St., NW., Washington, D.C. 20006, (202) 833-1122**
- FLITE (Federal Information Through Electronics),<sup>1</sup> HQUSAF/JAS, Denver, CO 80279-5000, (303) 370-7531, AUTOVON: 926-7531**
- The Hawkins Merit Systems Protection Board Service, Hawkins Publishing Co., Inc., Suite 220, 933 N. Kenmore St., Arlington, VA 22201, (703) 525-9090**
- Lexis, Mead Data Central, 1050 Connecticut Ave., NW., Suite 1090, Washington, D.C. 20036, (202) 785-3550**
- Merit Systems Protection Board Case Service, Information Handling Services, 1700 N. Moore St., Suite #100, Arlington, VA 22209, (703) 524-9802**
- United States Merit Systems Protection Board Reporter, West Publishing Co., P.O. Box 84528, St. Paul, MN 55164-0528, 1-800-328-9352**

Dated: February 28, 1985.

<sup>1</sup> FLITE is available only to Federal agencies.

For the Board,  
Herbert E. Ellingwood,  
Chairman.  
[FR Doc. 85-5120 Filed 3-1-85; 8:45 am]  
BILLING CODE 7860-01-8

## NUCLEAR REGULATORY COMMISSION

### Advisory Committee on Reactor Safeguards Combined Extreme External Phenomena, Structural Engineering, and Diablo Canyon; Open Meetings

The ACRS Subcommittees on Extreme External Phenomena, Structural Engineering, and Diablo Canyon will hold a combined meeting on March 21 and 22, 1985, at the Pacifica Hotel, 6161 Centinela Avenue, Culver City, CA.

The entire meeting will be open to public attendance.

The agenda for the subject meeting shall be as follows:

*Thursday, March 21, 1985—8:30 a.m. until the conclusion of business*  
*Friday, March 22, 1985—8:30 a.m. until the conclusion of business*

The Subcommittees will discuss the status of the NRC Staff seismic design margins programs and PG&E's program plan for a seismic reevaluation of Diablo Canyon.

Oral statements may be presented by members of the public with the concurrence of the Subcommittee Chairman; written statements will be accepted and made available to the Committee. Recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify the ACRS staff member named below as far in advance as is practicable so that appropriate arrangements can be made.

During the initial portion of the meeting, the Subcommittee, along with any of its consultants who may be present, may exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions with representatives of the NRC Staff, its consultants, and other interested persons regarding this review.

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by a prepaid telephone call to

the cognizant ACRS staff member, Mr. Elpidio E. Igne (telephone 702/634-1413) between 8:15 a.m. 5:00 p.m., e.s.t. Persons planning to attend this meeting are urged to contact the above named individual one or two days before the scheduled meeting to be advised of any changes in schedule, etc., which may have occurred.

Dated: February 28, 1985.  
Morton W. Libarkin,  
Assistant Executive Director for Project Review.  
[FR Doc. 85-5194 Filed 3-1-85; 8:45 am]  
BILLING CODE 7860-01-8

### Advisory Committee on Reactor Safeguards Combined Subcommittees on GESSAR II, Reliability, and Probabilistic Assessment and Safeguards and Security; Notice of Meetings

The ACRS Subcommittees on GESSAR II, Reliability and Probabilistic Assessment and Safeguards and Security will hold a combined meeting on March 27, 28 and 29, 1985, at the Sandia National Laboratory, Albuquerque, NM.

To the extent practical the meeting will be open to public attendance. However, portions of the meeting will be closed to discuss proprietary information relating to the GESSAR probabilistic risk assessment and plant security.

The agenda for subject meeting shall be as follows:

*Wednesday, March 27, 1985—8:30 a.m. until the conclusion of business*  
*Thursday, March 28, 1985—8:30 a.m. until the conclusion of business*  
*Friday, March 29, 1985—8:30 a.m. until the conclusion of business*

The Subcommittees will continue their review of GESSAR II for a Final Design Approval applicable to future plants, and review design features for protection against sabotage at commercial nuclear power reactors. The principal topics to be discussed are plant security and the GESSAR II and probabilistic risk assessment.

Oral statements may be presented by members of the public with the concurrence of the Subcommittee Chairman; written statements will be accepted and made available to the Committee. Recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify

the ACRS staff member named below as far in advance as is practicable so that appropriate arrangements can be made. During the initial portion of the meeting, the Subcommittee, along with any of its consultants who may be present, may exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions with representatives of the NRC Staff, its consultants, and other interested persons regarding this review.

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by a prepaid telephone call to the cognizant ACRS staff member, Mr. Richard Major (telephone 202/634-1414) between 8:15 a.m. and 5:00 p.m., e.s.t. Persons planning to attend this meeting are urged to contact the above named individual one or two days before the scheduled meeting to be advised of any changes in schedule, etc., which may have occurred.

Dated: February 27, 1985  
 Morton W. Libarkin,  
 Assistant Executive Director for Project Review.  
 (FR Doc. 85-5196 Filed 3-1-85, 8:45 am)  
 BILLING CODE 7590-01-01

**Advisory Committee on Reactor Safeguards Subcommittee on Electrical Systems; Open Meeting**

The ACRS Subcommittee on Electrical Systems will hold a meeting on March 20, 1985, Room 1046, 1717 H Street, NW, Washington, DC.

The entire meeting will be open to public attendance.

The agenda for the subject meeting shall be as follows:

Wednesday, March 20, 1985—8:30 a.m. until the conclusion of business

The Subcommittee will discuss recent NRC actions related to diesel generator reliability.

Oral statements may be presented by members of the public with the concurrence of the Subcommittee Chairman; written statements will be accepted and made available to the Committee. Recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify

the ACRS staff member named below as far in advance as is practicable so that appropriate arrangements can be made.

During the initial portion of the meeting, the Subcommittee, along with any of its consultants who may be present, may exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions with representatives of the NRC Staff, its consultants, and other interested persons regarding this review.

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by a prepaid telephone call to the cognizant ACRS staff member, Mr. M. El-Zeftawy (telephone 202/634-3267) between 8:15 a.m. and 5:00 p.m., e.s.t. Persons planning to attend this meeting are urged to contact the above named individual one or two days before the scheduled meeting to be advised of any changes in schedule, etc., which may have occurred.

Dated: February 27, 1985  
 Morton W. Libarkin,  
 Assistant Executive Director for Project Review.  
 (FR Doc. 85-5196 Filed 3-1-85, 8:45 am)  
 BILLING CODE 7590-01-01

**Advisory Committee on Reactor Safeguards Subcommittee on Class 9 Accidents; Open Meeting**

The ACRS Subcommittee on Class 9 Accidents will hold a meeting on March 14, 1985, Room 1046, 1717 H Street, NW, Washington, DC.

The entire meeting will be open to public attendance.

The agenda for the subject meeting shall be as follows:

Thursday, March 14, 1985—1:00 p.m. until 7:00 p.m.

The Subcommittee will discuss New York Power Authority's Source Term studies.

Oral statements may be presented by members of the public with the concurrence of the Subcommittee Chairman; written statements will be accepted and made available to the Committee. Recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify

the ACRS staff member named below as far in advance as is practicable so that appropriate arrangements can be made.

During the initial portion of the meeting, the Subcommittee, along with any of its consultants who may be present, may exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions with representatives of the NRC Staff, its consultants, and other interested persons regarding this review.

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by a prepaid telephone call to the cognizant ACRS staff member, Mr. A. Wang (telephone 202/634-3267) between 8:15 a.m. and 5:00 p.m., e.s.t. Persons planning to attend this meeting are urged to contact the above named individual one or two days before the scheduled meeting to be advised of any changes in schedule, etc., which may have occurred.

Dated: February 27, 1985  
 Morton W. Libarkin,  
 Assistant Executive Director for Project Review.  
 (FR Doc. 85-5197 Filed 3-1-85, 8:45 am)  
 BILLING CODE 7590-01-01

**Advisory Committee on Reactor Safeguards Subcommittee on Reliability Assurance; Open Meeting**

The ACRS Subcommittee on Reliability Assurance will hold a meeting on March 19, 1985, Room 1046, 1717 H Street, NW, Washington, DC.

The entire meeting will be open to public attendance.

The agenda for the subject meeting shall be as follows:

Tuesday, March 19, 1985—8:30 a.m. until the conclusion of business

The Subcommittee will begin its investigation of valve reliability. Programs under way by various NRC offices will be discussed. A presentation by industry on methods to enhance the reliability of motor operated valves is anticipated. The Subcommittee Will also discuss several operational occurrences that involved the failure of valves. It is expected that the Subcommittee will plan its future activities.

Oral statements may be presented by members of the public with the concurrence of the Subcommittee

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D. C. 20555

October 17, 1985

MEMORANDUM FOR: Jim McKnight  
Document Control Systems

FROM: Beverly Roberts *BR*  
Advisory Committee on Reactor Safeguards

*g*  
The attached ACRS Documents are being provided to you for listing on the accessions list. Please forward to the Public Document Room.

Attachments:  
As Stated

ACRS MEETING MINUTES AND CONSULTANT REPORTS

- CT-1819 Tien ltr 090985 to Boehnert, Comments on the ECCS Subcte Meeting held 082785 PDR 101785
- CT-1820 Shepherd ltr 091085 to Savio, Comments on the Hydrogen Control for River Bend PDR 101785
- ACRS-2292 ACRS Subcte Meeting Minutes on Class 9 Accidents held 031485 PDR 101785
- ACRS-2298 ACRS Combined Subcte Meeting Minutes on GESSAR II, Reliability and Probabilistic Assessment, and Safeguards and Security held 0327-2985 PDR 101785
- ACRS-2312 ACRS Subcte Meeting Minutes on Safeguards and Security held 050785 PDR 101785
- ACRS-2328 ACRS Combined Subcte Meeting Minutes on Waste Management and Site Evaluation held 0618-1985 PDR 101785
- ACRS-2330 ACRS Subcte Meeting Minutes on Human Factors held 062085 PDR 101785
- ACRS-2335 ACRS Subcte Meeting Minutes on A Long Range Plan for the NRC held 0710-1185 PDR 101785
- ACRS-2336 ACRS 303rd Meeting Minutes held 0711-1385 PDR 101785
- ACRS-2340 ACRS Subcte Meeting Minutes on Reactor Radiological Effects held 073184 PDR 101785
- ACRS-2342 ACRS Subcte Meeting Minutes on Class 9 Accidents held 080185 PDR 101785
- ACRS-2343 ACRS Subcte Meeting Minutes on Class 9 Accidents held 080285 PDR 101785
- ACRS-2348 ACRS Combined Subcte Meeting Minutes on ECCS/Fluid Dynamics held 080785 PDR 101785
- ACRS-2354 ACRS Subcte Meeting Minutes on Human Factors held 0917-1885 PDR 101785