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

February 9, 1977

Mr. Richard K. Major
Assistant Engineer (Intern)
ACRS Staff

CERTIFICATION OF THE MINUTES OF THE ACRS REACTOR SAFETY STUDY WORKING GROUP SUBCOMMITTEE MEETING - JANUARY 4, 1977 - WASHINGTON, D.C.

I certify that, to the best of my knowledge and belief, the minutes of the January 4, 1977 meeting of the ACRS Reactor Safety Study Working Group Subcommittee, issued February 9, 1977 are an accurate record of the proceedings of that meeting.

J H Arnold
J.H. Arnold, Chairman
ACRS Reactor Safety Study Working Group

Feb 10, 1977
DATE:

Meeting Date: 1/4/77
Date Issued: 2/9/77

MINUTES OF THE ACRS
REACTOR SAFETY STUDY WORKING GROUP MEETING
WASHINGTON, D.C.
JANUARY 4, 1977

On January 4, 1977, the Advisory Committee on Reactor Safeguards Reactor Safety Study Working Group met in Washington, D.C. to continue the review of WASH-1400 (NUREG-75/014), "An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants". The notice for this meeting appeared in the Federal Register, Vol. 41, No. 226 - Monday, November 22, 1976; the Federal Register, Vol. 41, No. 223 - Thursday, December 2, 1976; and the Federal Register, Vol. 41, No. 248 - Thursday, December 23, 1976 (Enclosures 1-3). There were no requests received from members of the public to make oral or written statements. Enclosure 4 is a list of Attendees/Participants for the Working Group Meeting. Mr. John C. McKinley was the designated federal employee present at this meeting.

EXECUTIVE SESSION (OPEN)

The Working Group Chairman, Mr. John Arnold, asked for opening comments from the Working Group members present. Dr. Okrent responded with a listing of some of the points he wanted to see discussed, they were as follows:

1. What constitutes an acceptable risk in society from technologies like nuclear power? What is accepted from other technologies; is it and should it be the same?

2. Can one subdivide risk into hazard and probability, and then examine the hazard independent of the probability?

3. If the quantitative results of WASH-1400 are correct as stated, and furthermore, if the two reactors studied are representative of 100 reactors with regards to the probability of a core melt, is this determination of consequences versus probability acceptable to society as an average risk?

4. Would the results be acceptable if the best estimate was the same as in WASH-1400 but the uncertainty was a factor of 30 in each direction? Or a factor of 100 in each direction, instead of a factor of 5 which is reported in WASH-1400?

5. Would the results be acceptable if the best estimate for 100 reactors gave a risk 10 times greater or 100 times greater?

6. Would the results of WASH-1400 be acceptable if all sites resembled the most heavily populated sites?

7. If the results are acceptable for the first 100 reactors, should the next 300 be better? If so, by how much?

8. Can reactors be designed to yield a decrease by a factor of 10 in overall core melt probability? If so, should they be?

9. Can mitigating factors be implemented which reduce the consequences by a factor of 10, on the average? If so, should they be?

10. Are there implications of WASH-1400 on site selection from considerations other than health effects to the surrounding population from airborne radioactivity?

11. How is the NRC Staff using WASH-1400? From time to time one sees the licensing staff say some initiator according to WASH-1400 is overall a small contributor. Have they independently verified the study? Or have they independently verified that aspect of the study that they are quoting as part of a decision concerning some licensing matter?

12. Do the results of the study provide the current risk acceptance criteria of the nuclear licensing staff? If so, what are they using, a best estimate?

13. Are there any implications in the statements that arise from states like New Jersey, that Class 9 events should be included more formally in nuclear licensing practice?

14. Are there any comments on how the opinions expressed by president-elect Carter should be factored into reactor licensing?

MEETING WITH REPRESENTATIVES OF THE ENVIRONMENTAL PROTECTION AGENCY (OPEN)

Dr. William D. Rowe, Deputy Assistant Administrator for Radiation Programs of the U.S. Environmental Protection Agency, made the EPA's presentation before the Working Group. The complete text of the statement made before the Working Group is included as Enclosure 5, along with some of the documents referenced in this statement. Additional documents provided to the Working Group are items 1 and 2 of Enclosure 13. Only two major areas of disagreement between EPA and the RSS group exist, one is a factor of 4 in latent cancer health effects, and the other is an increase by a factor of 10 in the probability of a BWR scram failure. This latter difference may be resolved in the next several months. A general concern on the part of EPA is the improper application of the results, models and techniques of the Reactor Safety Study. In order to ensure the study is not misused, EPA commented that NRC and its study group must maintain a high degree of control on its use, at least within the NRC, and must be quick to document its misuse by the public.

MEETING WITH REPRESENTATIVES OF THE DEPARTMENT OF THE INTERIOR

Representatives of the Department of the Interior stated they were awaiting departmental approval of their comments on the final version of WASH-1400. They estimated that these comments would be ready for transmittal to the NRC later in January. Two major comments made were WASH-1400 does not pay sufficient attention to conditions involving groundwater and seismology of the sites considered in the study. The representatives of the Department of the Interior said that sites of the greatest seismic activity had not been analyzed, they felt results cannot be extended to one hundred reactors without a geological study. The RSS doesn't recognize different hydro-geologic conditions between sites. Finally, WASH-1400 does not contain estimates of the loss in dollar value of the plant.

Further points were made during a question and answer period. The members of the RSS Group and members from the Department of the Interior had not met face to face. Comments have been exchanged in writing only. When asked by Dr. Okrent whether the Department of the Interior has had a chance to comment on the liquid pathway generic study, they said they had. Copies of comments prepared by the Department of the Interior on the revised draft environmental impact statement for the Atlantic Generating Station and the draft environmental statement and draft liquid pathway generic study were furnished to the Working Group (Enclosure 13, items 3 and 4).

The RSS Group also noted that the postulated post-accident analyses assume the core remains stationary in the ground for the purposes of dose calculations and does not represent a suggested course of action following an accident.

MEETING WITH PROFESSOR J. YELLIN (OPEN)

The bulk of Prof. Yellin's comments are contained in a prepared and written statement. The statement was read to the Working Group and copy of this presentation is included as Enclosure 6. Basically, Prof. Yellin feels the probability and consequence calculations used in WASH-1400 cannot be used for determining reactor design or site selection criteria. Prof. Yellin questions the "fault-tree", absolute probability approach used in WASH-1400. He feels there are at least two outstanding issues with regards to the probability approach: 1) the difficulties involved in making the inclusive listing of failure sequence which is essential to any absolute probability approach; and 2) the necessity for estimating "common-mode", interactive failure probabilities. Prof. Yellin feels the absolute probability approach is not feasible and recommends alternative methods for assuring and judging the adequacy of present provisions for light water reactor safety.

Two suggestions of Prof. Yellin's for alternative methods were: 1) employing passive means for limiting accident consequences; 2) attempting to evaluate nuclear accident probabilities by comparing the reliability of analogous nuclear and non-nuclear safety systems. Prof. Yellin also presented five graphs taken from EPA's consultant report showing cumulative percentage vs. failure rates in slides 7-11, for various circumstances. He wanted comments from the Office of Nuclear Regulatory Research on the contents of these plots. These plots which appear to show that the assessed ranges, actually input into the WASH-1400 model, are considerably different from those which naively be derived from the data itself. Mr. Arnold questioned the feasibility of comparing similar systems in independent industry and nuclear systems with respect to events of very low probability because of the long time necessary to acquire a significant data base.

MEETING WITH PROFESSOR F. von HIPPEL

Prof. von Hippel's remarks are contained in Enclosure 12. This enclosure also contains the viewgraphs used to highlight his presentation. Prof. von Hippel explained his involvement with the RSS to the Working Group. He participated in the American Physical Society (APS) Light Water Reactor Safety Study during the course of which his subcommittee reviewed the treatment in the RSS of the long term consequences of reactor accidents. He discussed the usefulness of the final report in testimony before the Subcommittee on Energy and the Environment of the House Interior Committee, and has reviewed the treatment of short term consequences of reactor accidents in the final RSS study for the New Jersey Department of Environmental Protection, the New York City Commission on Public Health, and the California Energy Resources Conservation and Development Commission.

Prof. von Hippel stressed the importance of peer review in his remarks. He noted that although he had not had a chance to adequately review the new analysis contained in the final report, he believes that the numbers in the final report are of the right order of magnitude.

Prof. von Hippel made several recommendations, he felt the RSS was not yet truly useful for policy-making purposes. He felt outside reviews should be commissioned for certain parts of the analysis. He also felt there were a number of areas where additional work will have to be done. These include a detailed study of the vulnerability of plants to earthquake damage, developing an understanding of problems which would be encountered if it were necessary to decontaminate large areas, calculating strong upper bounds on the probabilities of large consequence accidents, etc.

MEETING WITH PROFESSOR H. LEWIS

One area identified as a point of conflict between the APS and the RSS was the latent cancer fatalities calculations. However, following a face to face meeting with members of the RSS major differences were resolved in the consequence model.

In general, Dr. Lewis feels the report goes a long way towards quantifying accident sequences. He also recognized that common mode failures were not treated in a way which is satisfactory to all. He noted that he lacks confidence in the absolute value of the probabilities in the Rasmussen report. Dr. Lewis also said that learning by experience, as a means of sharpening analysis, is the only way in which the safety of complex systems can be dealt with realistically. Once again, the necessity of peer group review was supported. When asked whether regulation has enhanced or decreased the margins of safety which might have been achieved without regulation; Dr. Lewis said regulation has unquestionably enhanced safety. Dr. Lewis said that in the long term the greatest threat to reactor safety comes from personnel failures both in the form of quality assurance and in operator response, exacerbated by complacency after a long period in which there has been no accidents which threaten the public.

GENERAL DISCUSSION WITH PARTICIPANTS AND THE NRC STAFF

Mr. Saul Levine, Acting Director of NRR, emphasized that the RSS did not purport to be useful for making policy decisions, and is not being used for that purpose by the NRC.

ADDITIONAL DOCUMENTS

Additional documents made available to the Working Group during the meeting are listed in Enclosure 13.

The meeting was adjourned at 4:35 p.m.

NOTE:

A complete transcript of the open sessions of this meeting is on file at the NRC Public Document Room at 1717 "H" Street, N.W., Washington, D.C. or can be obtained from ACE Federal Reporters, Inc., 415 Second Street, N.E., Washington, D.C. (202) 547-6222.

Enclosure 1

and the Project Management Corporation for a permit to construct this nuclear power plant. In particular, this meeting will concern aspects of a core disruptive accident and of thermal hydraulics. Notice of this meeting appears elsewhere in this issue.

**Reactor Safety Study*, December 8, 1976, Washington, DC to continue the review of WASH-1400 (NUREG-75/014), "An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants." Notice of this meeting appears elsewhere in this issue.

**North Anna Power Station, Units 1 and 2*, rescheduled from December 8, 1976 to January 5, 1977.

**Emergency Core Cooling System*, December 20, 1976, Washington, DC to discuss technical aspects associated with plenum filling following a loss-of-coolant accident.

**Emergency Core Cooling System*, December 21, 1976, Washington, DC (rescheduled from November 6, 1976) to review EXXON Nuclear Company, Inc. analytical models formulated to meet current ECCS criteria for fuel fabricated by EXXON for pressurized water reactors with ice condensers and for nonjet-pump boiling water reactors, and to review the application of these models to the Donald C. Cook, Unit No. 1 and the Oyster Creek, Unit No. 1 Nuclear Power Plants.

**Davis-Besse Nuclear Power Station, Unit 1*, December 21, 1976, Washington, DC to review the application of the Toledo Edison Company for an operating license.

**Donald C. Cook Nuclear Power Plant, Unit 1*, December 22, 1976, Washington, DC to continue the review of the EXXON Nuclear Company, Inc. fuel reload, the related emergency core cooling system analysis, and other items to determine if the plant should be allowed to operate at a 100% power level following refueling.

**Regulatory Guides*, January 5, 1977, Washington, DC to review working papers regarding future Regulatory Guides and proposed changes to existing Guides.

**North Anna Power Station, Units 1 and 2*, January 5, 1977, Washington, DC to develop information for consideration by the ACRS in its continuing review of the application of the Virginia Electric and Power Company for a license to operate North Anna Power Stations, Units 1 and 2.

**Cherokee Nuclear Station, Units 1, 2, and 3, and Perkins Nuclear Station, Units 1, 2, and 3*, January 10, 1977, Charlotte, NC to review the application of the Duke Power Company for a permit to construct these Units.

**Seismic Activity*, February 8-9, 1977, Washington, DC, to discuss Appendix A to 10 CFR 100 and the derivation of earthquake response spectra.

FULL COMMITTEE MEETINGS

December 9-11, 1976

*General Electric Standard Safety Analysis Report (GESSAR-238 / GESSAR 251)—Preliminary Design Approval.

January 6-8, 1977

Agenda to be announced.

Dated: November 18, 1976.

JOHN C. HOYLE,
Advisory Committee Management Officer.

[FR Doc.76-34502 Filed 11-19-76;8:45 am]

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS: REACTOR SAFETY STUDY WORKING GROUP

Meeting

In accordance with the purposes of sections 29 and 182 b. of the Atomic Energy Act (42 U.S.C. 2039, 2232b.), the ACRS Reactor Safety Study Working Group will hold a meeting on December 8, 1976 in Room 1146, 1717 H St., NW., Washington, D.C. 20555. The purpose of this meeting is to continue the review of WASH-1400 (NUREG-75/014), "An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants."

The agenda for the subject meeting shall be as follows:

WEDNESDAY, DECEMBER 8, 1976

8:30 a.m.-9 a.m. The Working Group will meet in closed Executive Session, with any of its consultants who may be present, to explore their preliminary opinions, based upon their independent review of WASH-1400, regarding matters which should be considered during the open session in order to formulate a Working Group report and recommendations to the full Committee.

9 a.m. until conclusion of business. The Working Group will meet in open session to hear presentations from and hold discussions with individuals and various organizations who commented on the Reactor Safety Study Report, and from the NRC Staff regarding the final version of the Report and the current and future efforts of the Study Group.

At the conclusion of the open session, the Working Group will meet in closed session to exchange advice, opinions and recommendations regarding the Study. During this session Working Group members and consultants will discuss their opinions and recommendations on these matters.

I have determined, in accordance with subsection 10(d) of Pub. L. 92-463, that it is necessary to conduct the above closed sessions to protect the free interchange of internal views in the Working Group's deliberative process (5 U.S.C. 552(b)(5)). Separation of factual material from individuals' advice, opinions and recommendations while closed Executive Sessions are in progress is considered impractical.

Practical considerations may dictate alterations in the above agenda or schedule. The Chairman of the Working Group is empowered to conduct the meeting in a manner that, in his judgment, will facilitate the orderly conduct of business, including provisions to carry over an incompleted open session from one day to the next.

With respect to public participation in the open portion of the meeting, the following requirements shall apply:

(a) Persons wishing to submit written statement regarding the agenda items may do so by providing a readily reproducible copy to the Working Group at the beginning of the meeting. Comments should be limited to safety related areas within the Working Group's purview.

Persons desiring to mail written comments may do so by sending a readily reproducible copy thereof in time for consideration at this meeting. Comments postmarked no later than December 1, 1976 to Mr. J. C. McKinley, ACRS, NRC, Washington, D.C. 20555 will normally be received in time to be considered at this meeting.

(b) Those persons wishing to make an oral statement at the meeting should make a written request to do so, identifying the topics and desired presentation time so that appropriate arrangements can be made. The Working Group will receive oral statements on topics relevant to its purview at an appropriate time chosen by the Chairman of the Working Group.

(c) 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 on December 7, 1976 to the Office of the Executive Director of the Committee (telephone 202/634-1371, Attn: Mr. J. C. McKinley) between 8:15 a.m. and 5 p.m., e.s.t.

(d) Questions may be propounded only by members of the Working Group and its consultants.

(e) The use of still, motion picture, and television cameras, the physical installation and presence of which will not interfere with the conduct of the meeting, will be permitted both before and after the meeting and during any recess. The use of such equipment will not, however, be allowed while the meeting is in session.

(f) A copy of the transcript of the open portion of the meeting will be available for inspection on or after December 15, 1976 at the NRC Public Document Room, 1717 H Street, NW., Washington, D.C. 20555.

Copies of the minutes of the meeting will be made available for inspection at the NRC Public Document Room, 1717 H Street, NW., Washington, D.C. 20555 after March 8, 1977. Copies may be obtained upon payment of appropriate charges.

Dated: November 17, 1976.

JOHN C. HOYLE,
Advisory Committee Management Officer.

[FR Doc.76-34501 Filed 11-19-76;8:45 am]

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS: SUBCOMMITTEE ON RESOLUTION OF GENERIC ITEMS

Meeting

In accordance with the purposes of Sections 29 and 182b. of the Atomic Energy Act (42 U.S.C. 2039, 2232b.), the ACRS Subcommittee on Resolution of Generic Items, will hold a meeting on December 7, 1976 in Room 1047, 1717 H Street, NW., Washington, D.C. 20555. The purpose of this meeting is to review the status of generic items identified by the ACRS and to determine if any new items should be added to the list.

The agenda for subject meeting shall be as follows:

TUESDAY, DECEMBER 7, 1976

8:30 a.m.-9 a.m. The Subcommittee will meet in closed Executive Session, with any of its consultants who may be present, to explore their preliminary opinions, based upon their independent review of safety reports, regarding matters which should be

Enclosure 2
JCM

investigator, arbitrator or other duly authorized official engaged in investigation or settlement of a grievance, complaint, or appeal filed by an employee. A record from this system of records may be disclosed to the United States Civil Service Commission in accordance with the agency's responsibility for evaluation and oversight of Federal personnel management.

A record from this system of records may be disclosed to officers and employees of a Federal agency for purposes of audit.

A record from this system of records may be disclosed to officers and employees of the General Services Administration in connection with administrative services provided to this agency under agreement with GSA.

PUBLIC COMMENT ON ADDITIONAL "ROUTINE USES"

Written comments concerning the additional "routine uses" are invited from interested persons pursuant to 5 U.S.C. 552a(e)(11). Comments may be presented in writing to the Office of the Secretary, United States International Trade Commission, 701 E Street NW., Washington, D.C. 20436. All comments received not later than December 15, 1976, will be considered. In the absence of Commission action to the contrary, the proposed "routine uses" will become effective December 30, 1976.

Issued: November 30, 1976.

By order of the Commission.

KENNETH R. MASON,
Secretary.

[FR Doc.76-35659 Filed 12-1-76;8:45 am]

NATIONAL COMMISSION ON ELECTRONIC FUND TRANSFERS

REVISED NOTICE OF MEETING

The National Commission on Electronic Fund Transfers intends to conduct its meeting of December 3, 1976, which was previously announced in the FEDERAL REGISTER (41 FR 52345) in closed session. At this meeting the Commissioners will discuss testimony which they have been invited to present before the United States Senate. The Commission has initiated procedures to obtain a written determination of closing pursuant to Section 10(d) of the Federal Advisory Committee Act. Inquiries should be directed to Ms. Janet Miller, 202/254-7400.

Dated: December 1, 1976.

JAMES O. HOWARD, Jr.,
General Counsel.

[FR Doc.76-35759 Filed 12-1-76;11:50 am]

NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS REACTOR SAFETY STUDY WORKING GROUP

Meeting Postponed

The December 8, 1976 meeting of the ACRS Reactor Safety Study Working Group, announced in FR Vol. 41, November 22, 1976, page 51478, has been postponed to January 4, 1977 to accommodate the schedules of invited participants.

Dated: November 29, 1976.

JOHN C. HOYLE,
Advisory Committee Management Officer.

[FR Doc.76X5440 Filed 12-1-76;8:45 am]

[Docket No. 50-324]

CAROLINA POWER AND LIGHT CO.

Issuance of Amendment to Facility Operating License

The U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 22 to Facility Operating License No. DPR-62, issued to Carolina Power & Light Company (the licensee), which revised Technical Specifications for operation of the Brunswick Steam Electric Plant, Unit No. 2 (the facility) located in Brunswick County, North Carolina. The amendment is effective as of its date of issuance.

The amendment revises the limiting conditions for operation and surveillance requirements for safety related shock suppressors (snubbers).

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR § 51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated October 5, 1976, (2) Amendment No. 22 to License No. DPR-62, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. and at the Southport Brunswick County Library, 109 W. Moore Street, Southport, North Carolina 28461. A copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 15th day of November 1976.

For the Nuclear Regulatory Commission.

A. SCHWENCER,
Chief, Operating Reactors Branch #1, Division of Operating Reactors.

[FR Doc.76-35349 Filed 12-1-76;8:45 am]

[Docket No. 50-324]

CAROLINA POWER AND LIGHT CO.

Issuance of Amendment To Facility Operating License

The U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 23 to Facility Operating License No. DPR-62, issued to Carolina Power & Light Company (the licensee), which revised Technical Specifications for operation of the Brunswick Steam Electric Plant, Unit No. 2 (the facility) located in Brunswick County, North Carolina. The amendment is effective as of its date of issuance.

This amendment reduces the operating limit minimum critical power ratio to 1.23 for fuel exposures of less than 6000 megawatt-days per ton, and lowers the rod block monitor setpoint to 106%.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR 51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated August 11, 1976, (2) Amendment No. 23 to License No. DPR-62, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. and at the Southport Brunswick County Library, 109 W. Moore Street, Southport, North Carolina 28461. A copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 10th day of November 1976.

For the Nuclear Regulatory Commission.

A. SCHWENCER,
Operating Reactors Branch #1, Division of Operating Reactors.

[FR Doc.76-35350 Filed 12-1-76;8:45 am]

[Docket Nos. 50-237, 50-249, 50-254 and 50-265]

COMMONWEALTH EDISON CO. AND IOWA-ILLINOIS GAS AND ELECTRIC CO.

Issuance of Amendments to Facility Operating Licenses

The U.S. Nuclear Regulatory Commission (the Commission) has issued

E closure - 3

National Science Foundation announces the following meeting:

Name: Science for Citizens Advisory Committee.

Date & time: January 14, 1977–9 a.m. to 6 p.m., January 15, 1977–9 a.m. to 1 p.m.

Place: Rm. 651, National Science Foundation, 5225 Wisconsin Avenue NW., Washington, D.C.

Type of meeting: Open.

Contact person: Ms Rachelle Hollander, Assistant Program Manager, National Science Foundation, Office of Science and Society, Washington, D.C. 20550, telehpone 202-282-7770.

Purpose of committee: To provide advice and recommendations concerning the development of the Science for Citizens Program.

Summary minutes: May be obtained from the Committee Management Coordination Staff, Division of Personnel and Management, Rm. 248, National Science Foundation, Washington, D.C. 20550.

Agenda: Items for discussion will include:

Purposes of the Committee.

Report to the Congress on the implications of NSF assistance to nonprofit citizen organizations.

Public Service Science Internships.

SFC-sponsored forums, conferences, and workshops.

Future meetings and activities.

M. REBECCA WINKLER,
Acting Committee Management Officer.

DECEMBER 20, 1976.

[FR Doc.76-37715 Filed 12-22-76;8:45 am]

NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, REACTOR SAFETY STUDY WORKING GROUP

Change of Meeting Agenda

The January 4, 1977 meeting of the ACRS Reactor Safety Study Working Group announced in FR 41, December 20, 1976, page 55394, will begin at 8:30 a.m. with an open (instead of closed) Executive Session. All other matters pertaining to this meeting remain the same.

JOHN C. HOYLE,
Advisory Committee Management Officer.

DECEMBER 21, 1976.

[FR Doc.76-37938 Filed 12-22-76;9:49 am]

[Docket No. 50-313]

ARKANSAS POWER & LIGHT CO.

Issuance of Amendment to Facility Operating License

The U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 16 to Facility Operating License No. DPR-51, issued to Arkansas Power & Light Company (the licensee), which revised Technical Specifications for operation of the Arkansas Nuclear One—Unit No. 1 (the facility) located in Pope County, Arkansas. The amendment is effective ninety (90) days following the date of its issuance.

The amendment revised the provisions in the Technical Specifications relating to Administrative Controls [...] facility.

The application for the am[...] complies with the standards and [...] ments of the Atomic Energy Act [...] as amended (the Act), and the C[...] sion's rules and regulations. T[...] mission has made appropri[...] as required by the Act and the C[...] sion's rules and regulations in [...] Chapter I, which are set for[...] license amendment. Prior pub[...] of this amendment was not [...] since the amendment does no[...] a significant hazards consider[...]

The Commission has determ[...] the issuance of this amendment [...] result in any significant envir[...] impact and that pursuant to [...] § 51.5(d)(4) an environment[...] statement or negative declar[...] environmental impact apprais[...] be prepared in connection with [...] of this amendment.

For further details with respe[...] action, see (1) the applica[...] amendment dated December 10 [...] September 30, 1976, (2) Amend[...] 16 to License No. DPR-51, and [...] Commission's related Safety E[...] All of these items are available f[...] lic inspection at the Commiss[...] lic Document Room, 1717 H Str[...] Washington, D.C. and at the A[...] Polytechnic College, Russellvill[...] sas 72801. A single copy of item[...] (3) may be obtained upon re[...] dressed to the U.S. Nuclear R[...] Commission, Washington, D.C. 20[...] tention: Director, Division of Op[...] Reactors.

Dated at Bethesda, Maryland, t[...] day of December, 1976.

For the Nuclear Regulatory C[...] sion.

DENNIS L. ZIEM[...],
Chief, Operating Re[...] Branch No. 2, Division o[...] erating Reactors.

[FR Doc.76-37371 Filed 12-22-76;8[...]]

[Docket No. 50-318]

BALTIMORE GAS AND ELECTRI[...]

Granting of Relief From ASME S[...] Inservice Inspection (Testing) [...] ments

The U.S. Nuclear Regulatory C[...] sion (the Commission) has gra[...] from certain requirements of th[...] Code, Section XI, "Rules for I[...] Inspection of Nuclear Power Pla[...] ponents" to Baltimore Gas and [...] Company. The relief relates to [...] service inspection (testing) pro[...] the Calvert Cliffs Nuclear Pow[...] Unit 2 (the facility) located in [...] County, Maryland. The ASME C[...] quirements are incorporated by re[...] into the Commission's rules and [...] tions in 10 CFR Part 50. The re[...] effective as of its date of issuance.

The relief consists of allowin[...] nate methods of determinin[...] hydraulic and mechanical charact[...]

December 23

Advisory Committee on Reactor Safeguards
Meeting of the
Reactor Safety Study Working Group
January 4, 1977
Washington, D. C.

ATTENDEES/PARTICIPANTS

ACRS

J. Arnold, Chairman
D. Okrent, Member
R. Wilson, Consultant
J. McKinley, Designated Federal Employee
R. Major, ACRS Staff

NRC STAFF

K. Murphy
R. Vollmer
H. Denton
E. Held
I. Wall
J. Murphy
S. Levine
W. Vesely

PUBLIC

F. Rowsome - Bechtel
R. Sohaffstall - G.E.

U.S. EPA

W. Ellett
W. Thomasson
J. Swift
W. Rowe
P. Davis

U.S. Department of the Interior

L. Stone
G. Stoertz
E. Meyer

MIT

J. Yellin

Univ. of California

H. W. Lewis

Princeton University

F. von Hippel
J. Beyea

STATEMENT OF

Dr. William D. Rowe

Deputy Assistant Administrator for Radiation Programs

Environmental Protection Agency

Before the

Working Group on the Reactor Safety Study

Advisory Committee on Reactor Safeguards

United States Nuclear Regulatory Commission

January 4, 1977

INTRODUCTION

Mr. Chairman, members of the Committee, I am pleased to have this opportunity to provide the status of the Environmental Protection Agency's (EPA) views on the Nuclear Regulatory Commission sponsored study - the Reactor Safety Study, WASH-1400. First, allow me to briefly present a summary of our interest and involvment in the determination of risks associated with reactor operation.

Following the famous Calvert Cliffs Court decision in the summer of 1971, regarding the National Environmental Policy Act of 1969, staff representing EPA, the Atomic Energy Commission and the President's Council on Environmental Quality (CEQ) met to discuss the appropriate means of addressing several generic impacts associated with reactor operation and support activities. The evaluation of environmental risks associated with reactor accidents was one of the generic impacts considered. At this time we indicated that we believed a quantitative evaluation of the risks associated with reactor accidents, including those more severe than the so called design basis accidents, should be undertaken. In the meantime, we would accept a generic, qualitative assessment of the accident probabilities in individual impact statements. Further, we indicated that the Atomic Energy Commission should prepare a report providing the technical bases for the assumptions used in assessing the consequences of those reactor accidents considered in individual plant environmental assessments, that is the assumptions given in Appendix A to Annex D to 10 CFR Part 50.

The Atomic Energy Commission initiated the Reactor Safety Study in the summer of 1972 to estimate quantitatively the risks to the public of reactor accidents, in particular the very low probability, potentially high consequence accidents. The results of the study, as you know, were released for comment as a draft report in August 1974. At this time, we initiated our review of the (draft) WASH-1400 and the review by Intermountain Technologies, Incorporated, of Idaho Falls, Idaho, under contract to provide us with technical assistance in the review of the detailed inplant systems analyses, engineering assumptions, and of the fault tree and event tree analyses. We undertook this extensive effort because we consider the Reactor Safety Study to be a critical document relative to the potential environmental and public health impact of nuclear power.

The scope of our contractor's review called for them to evaluate the entire (draft) WASH-1400 and then, based on the preliminary conclusions, to identify areas critical to the results of the study for more detailed assessment.

The results of EPA's initial review of (draft) WASH-1400 were published in a letter to the Atomic Energy Commission in November 1974, including the initial comments from our contractor. The EPA comments dealt primarily with the consequence model and overall study results. Also, we identified the following areas, which our contractor would emphasize in his detailed evaluation:

In BWR's:

The Reactor Protection System and Transients

In PWR's:

Electric Power Systems
High Pressure Injection System
Small Break LOCA's
Loss of Power Transient
Low Pressure Injection System
Low Pressure Recirculation System

Release-Determining Conditions

Conditions Prior to Meltdown
The Core Meltdown Calculation
Containment Response

In April 1975, we received our contractor's final report on (draft) WASH-1400. In August 1975, we forwarded to the newly formed Nuclear Regulatory Commission our final comments on (draft) WASH-1400, including our contractor's detailed report. We subsequently published an EPA report entitled "Reactor Safety Study (WASH-1400): A Review of the Draft Report," (EPA-520/3-75-012), which was a compilation of all our comments, including those from our contractor.

Following the publication of the (final) WASH-1400 by the Nuclear Regulatory Commission in October 1975, EPA initiated a review of the report to determine the manner in which our comments on the draft report were addressed. As part of this effort, we had Intermountain Technologies, Inc. review the responses to their criticisms of the draft report. As a result of the extensive revisions to the (draft) Reactor Safety Study and the incorporation of a complex, new consequence model, our task was more rigorous than had been envisioned. Therefore, the Agency's comments on the (final) report, including input from our contractor, were not completed until June 1976.

On June 11, 1976, I testified before the Subcommittee on Energy and the Environment, Committee on Interior and Insular Affairs, U.S. House of Representatives concerning our findings on the Final Reactor Safety Study. Since then, my staff has received additional information from the Nuclear Regulatory Commission in the form of informal draft responses to EPA comments and verbal discussions. Following my appearance here, I shall transmit a copy of my presentation to Mr. Saul Levine with the intent of providing a final clarification of the record regarding our conclusions on the (final) Reactor Safety Study.

Before addressing our detailed comments on the (final) Reactor Safety Study, I will provide our perspective of what the study represents and its limitations. The Reactor Safety Study provided a quantitative estimate, within certain error bounds, of the risks to the public from certain large accidents that might occur at nuclear power plants. It, thus, provides a considerable advance in our understanding of the probability and consequences of large reactor accidents. We believe that the Reactor Safety Study is of great value in the development of reactor safety and in the development of methodology for assessing risks. Further, the methodology used provided a systematized basis for obtaining useful assessments of the accident risks where empirical or historical data are presently unavailable. However, the total risks from reactors, the nuclear fuel cycle and from competing energy sources have yet to be quantified.

We have taken note of the limits to the scope of the study and limitations to the applicability of the study's results and methodology, that is (1) they apply to the first 100 light-water reactors and (2) apply only to operations over the next five years. For the purpose of the study, we concur in these constraints, and we do not believe the applicability of the study's results can be transferred beyond these constraints to offshore power plants, to other reactor technologies (such as liquid metal fast breeder reactors), to other time periods (such as beyond the next 5 years), or to other conditions of plant operation, wherein it is necessary to account for the greater frequency of failures in start-up testing or for gradual degradation or upgrading in plant safety over plant lifetime. Similarly, because of the manner of averaging over many sites, the study's results cannot be considered more than a rough approximation of the risk to any population group near a specific nuclear power plant site.

Our direct utilization of the Reactor Safety Study is with regard to our review of individual power plant environmental statements. We believe that it is important to examine plant-specific design and site differences to quantify the applicability of the results in the Reactor Safety Study to other nuclear plants. My staff has undertaken a preliminary analysis of the accident analysis data prepared for individual LWR environmental statements. We have found that the primary factor which impacts on the level of the consequences given in the environmental statements is population (density and distribution). Other significant variables, of course, are plant size and meteorology, mainly as related to the minimum site boundary distance. The NRC has utilized standardized parameters, which do not reflect differences in plant-engineered safety features nor site-specific meteorology, in making the accident analyses in environmental impact statements (EIS). Thus, the results in environmental statements cannot provide extensive new information without further site-specific analyses. In the past, we have considered this accident analysis data in anticipation of a generic treatment. We are now concerned, based on these newer analyses, that our present reliance on a generic treatment of design basis accidents in environmental statements may no longer be applicable. As we proceed to review this matter further, including more detailed analyses of the results of our study, it would be appropriate for the NRC to develop a plan for incorporating, in environmental statements, consideration of site-and-plant specific parameters in assessing the risks at individual nuclear facilities.

Properly, the Reactor Safety Study did not provide an assessment of the level of acceptable risks. Comparison with other types of risk is useful for providing a perspective on nuclear risks, but it is not a substitute for a determination of an acceptable level of risk. Upon completion of EPA's review of (final) WASH-1400, we expressed our view in a letter of July 2, 1976, to Mr. Lee V. Gossick, that since we now have an assessment of the risk, it is time for the Nuclear Regulatory Commission to proceed to the next, logical step, that is to make a determination of the level of risks which will serve as a criterion of acceptability of the level of required plant safety. We noted that this type of decision is already being made, perhaps improperly, on an ad hoc basis in certain licensing actions; for example, the use of a level of maximum probability for reactor protection system failure, in essence a finding of "safe enough." Subsequently, we met on September 7, 1976, with Mr. Ben Rusche and other NRC staff to discuss the concept, but

Mr. Gossick's reply of November 18, 1976, did not directly address the main point -- the need for an assessment of the level of acceptable risks of nuclear power reactors, which we have reiterated in a letter of December 20, 1976. I will be glad to provide copies of these three letters to the Working Group. (ATTACHED)

We believe the determination of the levels of acceptable risks must include early and broad participation by a cross section of our societal interests. We recognize that this is a complex and difficult task, but we are convinced that it is necessary that such an opportunity be provided for the ultimate acceptance of nuclear power as an effective means of meeting our energy needs. Once a level of acceptable risk has been determined, then the Nuclear Regulatory Commission would be able to proceed with the definite determinations of whether the present generation of light-water reactors are safe enough and whether present siting practices and emergency response plans are adequate.

We have suggested to the NRC that a generic environmental impact statement (EIS) or a rulemaking would be an appropriate vehicle for arriving at a determination of the acceptable level of risk. A generic EIS could incorporate a cost-benefit analysis which could consider the cost of increased engineered safety systems, siting alternatives, and upgrading of emergency response capability, and the effectiveness of these approaches in reducing risk. We believe that the NRC should make a public commitment, which we anticipated in the reply to our July 2, 1976, letter, to undertake a program to arrive at a measure of the level of acceptable risks.

EPA COMMENTS ON THE (FINAL) REACTOR SAFETY STUDY

The Environmental Protection Agency undertook an extensive review of the Reactor Safety Study because we consider it to be a critical document relative to the potential environmental and public health impacts of nuclear power. The review was intended to provide constructive criticism on the report, which would be beneficial to the Nuclear Regulatory Commission and others who may undertake further work in risk assessment. Our comments were particularly directed at providing greater confidence that the best and most valid quantitative estimates of reactor accident risks may be obtained and that these estimates may be understood and used properly. Our comments, hopefully, will assist in achieving these objectives.

EPA provided extensive, detailed comments on the (Final) Reactor Safety Study, which have been published as an EPA report - "Reactor Safety Study (WASH-1400): A Review of the Final Report," (EPA-520/3-76-009). Our comments covered the entire WASH-1400, but those comments which indicated potential for a significant change in the magnitude of the calculated risks fell into three areas - the health effects model, the evacuation model, and the engineering considerations, in particular those associated with the BWR common mode failures during anticipated transients without scram. These comments will be emphasized in some detail later. The other comments were for clarification, were editorial, or were otherwise minor in nature relative to having a possibility of significantly impacting the results of the study.

HEALTH EFFECTS

In our previous assessment, we indicated that if the ~~late~~ latent somatic health effects were calculated in accordance with EPA's recommendations, the latent cancers indicated by WASH-1400 would increase by a factor of 2 to 10. This difference was a result of the study's assumption of reduced cancer risk from low dose or low dose rate exposures and the misapplication of risk estimates made in the NAS-BEIR Report; that is, the Reactor Safety Study utilized the lowest of the Academy's risk estimates as the upper bound of risk. In addition, the Agency had less extensive comments pertaining to acute effects and the assumptions made in assessing the risks of thyroid disease and genetic disorders due to radiation.

Since our review of the (final) study was released in June, our staff has reviewed informal material on the study's health effects model, provided us in draft form, and have met with the study's specialist on health effects to discuss our comments. We also published a report "Estimates of the Cancer Risk Due to Nuclear-Electric Power Generation" (Technical Note ORP-CSD-76-2)*, which provides our best estimate of risks of latent cancer deaths from radioactivity released as a result of nuclear-electric power production. I can provide copies of this report to the Working Group if you desire.

Based upon our current evaluations and information available, we have been able to narrow and refine our previous judgment and now we believe that on the average the Reactor Safety Study has underestimated the latent cancer deaths by a factor of four. The reasons for this difference are (1) the study's use of the BEIR Report's lowest estimates of dose effects as upper bound estimates rather than averaging both absolute and relative risk estimates, as done by the BEIR committee; and (2) reduction of BEIR risk estimates for low dose or low doses rates by a factor of 5. EPA does not agree that a prudent basis for reducing BEIR risk estimates by a factor of five for either low doses or low dose rates exists at this time, i.e., rodent data is insufficient. The Agency recognizes this is a judgmental decision and has given the reasons for its opinion in the report on cancer risk previously cited and in the recently published final environmental statement for the Uranium Fuel Cycle Standards (EPA 520/4-76-016),* which is available to the Working Group. In addition the Agency has initiated a contract with the National Academy of Sciences to have their BEIR committee study this problem in depth and report their recommendations to EPA.

The Agency also believes the study's estimate of death due to acute radiation injury is low. While the Agency agrees that the study's estimate of death with minimal care is well documented, projections of the number of deaths following supportive therapy are far less convincing. The assumption made in the study that supportive therapy would increase survival from 0.5% to 50% following a 560 rem dose needs further consideration. As indicated in the study, substitution of 340 rem for 560 rem as the lethal dose for 50% of the population would increase the number of acute fatalities by a factor of 3 or 4, which is within the range of uncertainty for acute effects given in the study.

The EPA staff and the Reactor Safety Study staff have agreed that the remaining differences between the two Agencies with respect to thyroid cancer and genetic effects are relatively minor. Though the two staffs cannot agree completely on appropriate risk estimates for a study of this type, the Agency has been pleased by the frankness with which the study staff has considered its comments on the final report.

EVACUATION MODEL

Our overall conclusions regarding the Reactor Safety Study's model for evacuation and remedial actions taken following reactor accidents identified two primary deficiencies. The first was the application of a constant 25 mile evacuation sector for all core melt accidents. This, we indicated, is inconsistent with present and planned emergency preparedness practices. This could have the effect of underestimating the consequences of accidents less severe than the worst core melt situation.

The other major criticism related to the duration of exposure prior to and during evacuation and the evacuation model used (e.g., evacuation speeds and effectiveness). The Reactor Safety Study's narrative on the evacuation model lacked important descriptive information and was confusing in the details presented. As a result we concluded, based on our interpretation of the information in the study, that the maximum possible, though not the most likely, impact of the deficiencies in the evacuation model would be an increase in the predicted risks by a factor of seven.

During the past several months, we have interacted with the Nuclear Regulatory Commission via discussions of our comments and interagency task forces on emergency preparedness planning. As a result of these efforts, we believe that the substantative issues we raised on the evacuation model in the (final) Reactor Safety Study have been resolved. The maximum factor of 7 error we indicated was based on a misinterpretation of information in the study. We now believe, in view of the intent of the study, that its evacuation model, which was neither intended nor designed to serve as emergency preparedness planning guidance, represents as adequate an effort as could have been derived for the purpose of the study. We agree with the use, for the Reactor Safety Study, of one model for all core melt accidents, on the grounds that the reactor operator would not know the degree of severity of the imminent core meltdown. However, we caution that care must be taken that the model and results are not misused by emergency planning agencies as being applicable bases for emergency preparedness purposes.

EPA issued a set of Protective Action Guides about the same time that the (final) Reactor Safety Study was released. We believe that these Protective Action Guides should be used in the design of emergency response plans. Further, we believe, as we understand the Nuclear Regulatory Commission staff does, that emergency plans, including evacuation, should be developed in such a manner that the areas of evacuation could be expanded if the post accident assessments warrant. At present, there is no evacuation plan that extends much beyond the low population zone derived from the requirements of 10 CFR 100. However, state and local governments are being encouraged to develop their response plans to include all the basic equipment, procedures, and to train key personnel in their response organizations so that a foundation would exist for expanding the emergency response areas if a larger accident should occur.

In summary, the criticisms regarding the evacuation model, which have the potential of substantatively impacting on the results of the Reactor Safety Study, have been resolved.

ENGINEERING CONSIDERATIONS

Our review of the (final) Reactor Safety Study identified many areas where additional information, clarifications or corrections were justified but the important areas of concern centered on the following subjects: (1) the BWR common mode failure relative to anticipated transients without scram; (2) PWR containment failure pressure and time to containment failure; (3) human reliability; (4) ECCS functionability and adequacy for small loss-of-coolant accidents; and (5) the applicability of the results to the first 100 PWR's and BWR's in addition to those specifically modeled by the study. We further indicated that the only deficiency which apparently has a potential for significantly impacting on the risk estimates presented by the study was the evaluation of the failure probability for the BWR anticipated transient without scram, which we estimated could have underevaluated the risks by as much as a factor of 10. We further indicated, based on bounding estimates on potential changes indicated by our other criticisms, that individually they could not change the overall risks by more than a factor of about 3, which is within the error bounds claimed in the study.

We believe that, except for the BWR anticipated transient without scram problem, the other comments have been satisfactorily resolved, either by informally transmitted information or through staff discussions. Some of these comments were shown to be of minor significance to the overall study results by use of sensitivity analyses, and in some cases we have agreed to disagree, recognizing that the differences in opinion are based on judgment or lack of definitive information, but do not impact on the overall conclusions of the study. The important comments in each category will be discussed more extensively below.

The NRC has presented several different arguments to justify their analyses of the probability for BWR transient without scram. The basic issue is the probability assigned to common mode failures involving three or more control rods. Also, we have been shown a preliminary, new analysis of operating data which has been developed by the safety study staff regarding control rod failures. We understand that their current work will be published as a paper in June. We believe that the new analysis may provide a real basis for us to resolve the differences concerning the probability for control rod failures. However, it is premature to reach conclusions until we have had an opportunity to analyze the formal paper. Until that time, we believe that there is no definitive basis for modifying our previous comments. Thus, we continue to disagree until further information is available.

Based on informal information prepared by NRC in response to our concerns and discussions between our staffs, the potential changes in the PWR containment failure pressure and time to containment failure concerns have been shown to be insignificant to the overall results of the study.

It was concluded that even if EPA were correct in their assessment of human reliability relative to the switch over of the containment sump valves to the recirculation mode, the effect on the study results would be minor. If fact, there are convincing arguments that even for a large loss of coolant accident, when the minimum action time would be in the range of 30 minutes, this switch-over would be accomplished since the valve positions are annunciated and written procedures would be available to direct the appropriate action. For small pipe breaks there would be even more time for correct actions.

Our concern with the ECCS modeling capability and variability of results was directed primarily at the tone and completeness of the study discussion. The NRC has discussed this with us and we understand each other's perspectives. We agree it is not critical to the overall results of the study.

Finally, we were concerned about the selection of the Surry and Peach

Bottom plants as being representative of the first 100 light water reactors to be operated. Thus, we requested that studies be undertaken to show the applicability of the Reactor Safety Study results to the plants of different designs. The NRC addressed this in part in that they believe the variability of results due to design variation among PWRs and among BWRs will not be as great as the variability between PWRs and BWRs. Further, the NRC has indicated they plan further assessments in this subject. However, thus far they have not provided details of their ongoing efforts in this area.

This point deserves stress, that those performing further work in assessment of nuclear power plant accident risks should not ignore any deficiency in the Reactor Safety Study simply because it has been concluded that refinement in that specific case would not make a significant change in the overall results published in WASH-1400. With another nuclear power plant design, having a different set of safety systems, the same deficiency may be important.

Some of the deficiencies reflect shallowness in the state-of-knowledge. The 5-year update of the Reactor Safety Study should be able to increase confidence in the results by providing better analyses in these areas, as a result of research being performed and as a result of development of improved analytical techniques.

RECOMMENDATIONS

In our previous comments on the Reactor Safety Study, we have made several recommendations which we believe are still valid and are itemized below. Further, we have noted that the Reactor Safety Study identified several areas where additional work is needed and in some cases indicated that additional work is underway. We believe that the NRC should document in one brief paper each area that was identified to need further work and indicate their plans for accomplishing the work. In addition, as we previously indicated and the NRC has committed to do, we believe that the details of the Reactor Safety Study's consequence model should be made available as soon as possible. Our previous recommendations were (1) NRC should provide verification of the applicability of the study results to a broad spectrum of light-water reactors; (2) NRC should update the risk analyses as more operational information and improved analytical techniques are developed; (3) NRC should utilize the WASH-1400 techniques as appropriate in safety evaluation activities; (4) NRC should evaluate nuclear power reactor incidents which actually occur and place them into meaningful perspective relative to the Reactor Safety Study; and (5) the methodology of the Reactor Safety Study should be extended to the evaluation of floating nuclear power plants, LMFBR's, HTGR's and LWBRs, as they are demonstrated to be viable energy alternatives and as sufficient information becomes available.

We have further recommended to the NRC that there should be an assessment of the level of acceptable risks for electric power generation. We believe that, if nuclear power is to be accepted as an important means of meeting our energy needs in the future, it is essential to arrive at a determination of the level of acceptable risk. To accomplish this task it will be necessary to incorporate methods to enable a broad spectrum of our societal interests to be considered in the determination. Once this has been accomplished, then the NRC will be able to make judgments as to "how safe is safe enough" with regard to the cost-effective application of engineered safety features and siting practices.

Similarly, energy policy decision-making will then have a guide post of acceptable risk for use in planning to meet our energy needs by the most risk free means.

We further recommend that the responsible Federal agencies work cooperatively to quantify the risks associated with the viable energy alternatives and their fuel cycles. Also, as new alternatives are shown to be available, risk analysis should be applied to determine their acceptability.

In summary, we believe that our concerns with the Reactor Safety Study may now be focused on two technical points -- a factor of 4 in latent cancer health effects and a maximum factor of 10 in the probability of BWR scram failure. This latter difference may be resolved in the next several months. One other general concern, which we know the Reactor Safety Study staff shares, is the proper application, or more importantly the improper application, of the results, models and techniques of the Reactor Safety Study. In order to ensure the study is not misused, the NRC and its study group must maintain a high degree of control on its use, at least within the NRC, and should be quick to document its misuse by the public.

Notes on Statement for ACRS Jan 4, 1977

1. By "significant change in the RSS overall results," we mean an order of magnitude.

2. When we refer to the results of the RSS, or the overall results, we mean the overall results as indicated by Figures 5-10 through 5-16 of the Main Report of WASH-1400. We do not give credence to such numbers as the 1 in 5 billion individual chance per year of fatality from nuclear reactor accidents, given in Table 1-1 of the Executive Summary of WASH-1400, because this number is not supported with appropriate explanation and may be another example of the deficiencies in the presentation of results. We note that although the RSS claimed in various places uncertainties of factors of 2 to 5, and occasionally 10, this value decreased from 1 in 300 million in draft WASH-1400 to 1 in 5 billion in final WASH-1400 with no explanation of the reason for the decrease. We commented on this but received no response from the NRC.

3. Although we have established some confidence that changes at the points where we questioned the analyses in WASH-1400 would individually change the estimate of the overall results by less than an order of magnitude (in most cases, by less than a factor of 3), a number of the deficiencies remain unresolved. It may well be that the practical approach is to leave their resolution for the 5-year update of WASH-1400. However, while we endorse the overall results (those given in Figures 5-10 through 5-16 of the Main Report) of WASH-1400 suitably modified to include a better assessment of health effects and BWR transients, we do not have confidence in the uncertainties which WASH-1400 ascribes to the results. A major cause of our lack of confidence in the uncertainties is the lack of resolution of deficiencies even though they are individually insignificant.