ACRS-1803

DATE ISSUED: 12/19/80

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1/19/81

ACRS MINUTES OF THE
RELIABILITY AND PROBABILISTIC ASSSESSMENT SUBCOMMITTEE MEETING
DECEMBER 3, 1980
WASHINGTON, DC

The ACRS Subcommittee on Reliability and Probabilistic Assessment met in Washington, DC on December 3, 1980. The purpose was: to review the FY 82 budget and programs of the Division of Systems and Reliability Research (DSRR); and to review replies to ACRS comments on DSRR research programs.

ACRS members present were D. Okrent - Chairman, W. Kerr and J. Ebersole.

Presentations were made by Messers. Rowsome, Vesely, Cullingford, and Blond from the Division of Systems and Reliability Research. No written or oral statements were received from the public.

Attachments include the meeting agenda and a list of documents supplied to the Subcommittee.

DSRR Replies to ACRS Comments in NUREG-0699 and FY 82 Budget

Mr. Rowsome, DSRR Assistant Director, presented replies to ACRS comments in NUREG-0699. Items discussed incuded the following:

1. Improved Decay Heat Removal System: This work includes a review of European DHR systems, and one or two conceptual designs. Mr. Rowsome indicated he doesn't view the subject as being underfunded or particularly important. Dr. Okrent commented that this item constitutes only a small fraction of the DSRR budget, and that the level of effort appears to be greatly deficient. Dr. Kerr asked why no reliability goal exists for DHR, and, how can one not have a reliability goal to guide the work.

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2. IREP: Work started in October, 1980 and will finish in the Spring 1982. In two years, all plants will have performed an IREP-type study. Limitations of IREP include: no consideration of fire, flood, sabotage; only complete component failures are assumed rather than degraded states; common mode failures are not adequately treated; and construction errors are not included. Dr. Okrent noted that IREP should not be treated as a panacea that will be applicable to all questions.

   Dr. Okrent asked whether issuing procedures for performing IREP studies may result in common-mode deficiencies in the studies. The answer given was that procedures are necessary and helpful. Dr. Okrent also asked how quality and adequate peer review will be assured. The only quality assurance being given to the studies is that the plant is correctly portrayed. The reports may not be given any peer review prior to being issued, rather, review would be left up to the readers. Dr. Okrent indicated that the IREP reports should list those items that were excluded from consideration.

3. GDC and Single Failure Criteria: It was noted by Drs. Okrent and Kerr that control systems are not being given sufficient emphasis by DSRR.

4. Improved Safety Systems: This topic is being deemphasized because there is insufficient merit to studying conceptual designs, it was said. For example, flow capacity is the primary parameter of interest in investigating the possible value of a vented filtered containment. The Zion/Indian Point study, which utilized WASH-1400 scenarios and the MARCH code, demonstrated that vented-filtered containments provide only marginal reductions in risk, Mr. Rowsome indicated. It was noted, however, that vessel failure is modeled in MARCH as being sudden and catastropic. There is considerable doubt that this would be the actual failure mode.

   Dr. Okrent cautioned against basing decisions upon MARCH. He also noted that RES has a history of not supporting research on Class 9 accident mitigation features. Efforts in this area should be increased as ACRS

recommended, not cut back. Dr. Okrent requested a letter from DSRR that details exactly what is being done on mitigation feature research. Also requested were: an analysis performed by DSRR on reactor vessel thermal shock; and interoffice documents sent or received by DSRR that affect DSRR programs and decisions.

Methodology and Data Branch

Mr. Vesely, Methodology and Data Branch Chief, gave an overview of current programs. The four major areas are: (1) facilitate use of risk analysis in licensing; (2) operational data evaluation; (3) safety goals; and (4) methodology development. Item 2 includes revamping the NPRDS.

Work on the FLOE code, which calculates flood risk, is being deemphasized. It is felt that probabilistic analysis is not a useful tool for this problem, as many contributors to flood risk change considerably with time.

Dr. Okrent urged that DSRR perform a careful treatment of uncertainties whenever they provide risk estimates for decision-making purposes.

Reliability and Human Factors Branch

Mr. Cullingford, Reliability and Human Factors Branch Chief, discussed programs in this decision unit. He noted that NRC is too hardware oriented. Programs that were discussed included:

- Training NRR in utilization of reliability and risk analysis methods. Drs. Okrent and Kerr requested copies of the training material that will be used.

- Evaluation of NRC waste management standards and comparison with EPA standards. Dr. Okrent requested a memorandum by Sandia on this subject.

- Human Factors Society review of information needs of the operator.

Consequence Analysis

Mr. Blond described programs in Consequence Analysis. These include: uncertainty analysis; trajectory modeling; property damage; health effects; liquid pathways; emergency planning; and a survey of consequence analyses of non-nuclear hazards.

DSRR Support of Upcoming Rulemaking

Mr. Rowsome summarized activities in support of rulemaking. He noted that NRC views DSRR as a service organization. DSRR is not expected to provide leadership in initiating programs.

DSRR activities include:

- Examination of weaknesses in General Design Criteria and Standard Review Plans.

- Survey of reliability engineering in other industries.

- Possible improvements to the Single Failure Criteria and the set of Design Basis Accidents.

Dr. Okrent inquired: exactly how does DSRR expect to contribute to the rulemaking effort; and how would DSRR go about estimating the probability of, for example, reactor vessel failure.

The Subcommittee inquired where additional money could be useful to DSRR. Mr. Rowsome listed: (1) Human reliability; (2) Rulemaking support; (3) Mark II containment risk assessment; and (4) a next generation WASH-1400 type risk assessment effort; as being some areas where increased efforts would be worthwhile.

Future Meetings:

No meetings are scheduled at this time.

Reliability and Probablistic Assessment Meeting of December 3, 1980

## List of Documents

1. IREP Procedures and Schedule Guide
2. DSRR replies to ACRS comments in NUREG-0699 - 10 slides
3. IREP - 4 slides
4. Systems Development Programs - 5 slides
5. Methodology and Data Branch Programs - 6 slides
6. Systems and Reliability Analysis - 3 slides
7. Human Factors Programs - 13 slides

- TENTATIVE PRESENTATION SCHEDULE -

Reliability and Probabilistic
Assesssment Subcommittee
Room 1167, 1717 H St., N.W.
Washington, D.C.
December 3, 1980

| | Organization Speaker | Presentation Time | Approx. Time |
|---|---|---|---|
| Meeting with the NRC Staff and Consultants | | | |
| 1.0 Subcommittee Chairmans Opening Remarks (Open Session) | | | 8:45 am |
| 2.0 FY 82 Budget Discussion (Closed Session) | | | |
| 2.1 Response to Committees General Comments in NUREG-0699 on Decision Unit No. 8 | RSR/SRR | 30 min | 8:50 am |
| 2.2 Methodology Development (Item 8a) | RSR/SRR | 10 min | 9:30 am |
| °Response to Committees Specific Comments on Item 8a | | | |
| °Proposed Budget | | | |
| °Key Issues, Programs, Status | | | |
| 2.3 Reliability and Human Error Data Analysis (Item 8b) | RSR/SRR | 10 min | 9:50 am |
| °Response to Committees Specific Comments on Item 8b | | | |
| °Proposed FY 82 Budget | | | |
| °Key Issues, Programs, and Status | | | |

- TENTATIVE PRESENTATION SCHEDULE -

| | Organization Speaker | Presentation Time | Approx. Time |
|---|---|---|---|
| 2.4 Systems Analysis (Item 8c)<br>°Response to Committees Specific Comments on Item 8c<br>°Proposed FY 82 Budget<br>°Key Issues, Programs, Status | RSR/SRR | 10 min | 10:10 am |
| Coffee Break | | | 10:30 - 10:40 am |
| 2.5 Consequence Analysis (Item 8d)<br>°Response to Committees Specific Comments on Item 8d<br>°Proposed FY 82 Budget<br>°Key Issues, Programs, and Status | RSR/SRR | 10 min | 10:40 am |
| 3.0 Long Range Budget for Systems and Reliability Analysis (Closed Session) | RSR/SRR | 10 min | 11:00 am |
| 4.0 Executive Session (Closed Session)<br>4.1 Discuss the Preparation of Draft Section of Systems and Reliability Analysis (Line Items 8a through 8d) of Report to Congress on FY 82 Budget | RSR/SRR | | 11:20 am |

- TENTATIVE PRESENTATION SCHEDULE -

| | | Organization Speaker | Presentation Time | Approx. Time |
|---|---|---|---|---|
| 5.0 | Use of Probabilistic Assessment in Upcoming Rulemaking Procedures (Open Session) | RSR/SRR | 10 min | 11:40 am |
| 6.0 | How to Modify Single Failure Criteria (Open Session) | RSR/SRR | 10 min | 12:00 pm |
| 7.0 | Interim Reliability Evaluation Program (Open Session) | RSR/SRR | 20 min | 12:20 pm |
| | °Procedure and Schedule (Phase II) | | | |
| | °Phase III/NREP Studies | | | |
| | °Recent Results | | | |
| | Adjournment | | | 1:00 pm |

PROJECT STATUS REPORT
ACRS SUBCOMMITTEE MEETING
RELIABILITY AND PROBABILISTIC ASSESSMENT
DECEMBER 3, 1980

Purpose and Comments (Research Budget Decision Unit No. 8)

1. The purpose of the meeting will be to discuss the FY 82 Budget for Decision Unit No. 8 and to prepare a Draft Chapter for the Committee's Report to Congress for this item. It does not appear that we will have a written OMB markup of the FY 82 budget in time for the meeting; however, the NRC Staff will discuss the unofficial OMB markup.

2. The Subcommittee will continue discussions on the IREP program and use of probabilistic assessment in Rulemaking. Attached is a copy of the procedure and schedule for the six plant IREP program. The Staff will also discuss the NREP, which is a continuation of IREP to be performed by industry for the remainder of the nuclear plants.

3. The NRC Staff will discuss whether the existing single failure criterion establishes an appropriate level of safety or whether it should be supplemented with some other deterministic or probabilistic criteria.

4. The Probabilistic Analysis Staff (PAS), has been renamed the "Division of System and Reliability Research (SRR)." They should no longer be referred to as "PAS." Bob Bernero is the Division Head. Bernero will be out of town on December 3rd and Frank Rowsome will be filling in for him at the meeting.