



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

MAR 24 1981



MEMORANDUM FOR: W. E. Vesely, RES
L. R. Abramson, MPA
A. El-Bassioni, NRR
D. Rubinstein, MPA
J. W. Johnson, RES
F. F. Goldberg, RES

FROM: Leslie E. Lancaster
Methodology and Data Branch
Division of Systems and Reliability Research, RES

SUBJECT: MINUTES OF THE PROBABILITY AND STATISTICS
RESEARCH REVIEW GROUP (PSRRG)

This meeting was held on the 18th of March 1981 in the Willste Building with the following members in attendance:

W. E. Vesely
L. E. Lancaster
J. W. Johnson
L. R. Abramson
D. Rubinstein
A. El-Bassioni

1. The general charter of the PSRRG was discussed. This discussion was a continuation from the 6th of February 1981 meeting. The discussed version of the Proposed General Charter is contained in the agenda announcement for the meeting (attached).

The members agreed that the tasks as outlined in this Proposed General Charter will be too time consuming to accomplish. Therefore, the members agreed to spend more time on the wording. For example, the wording should imply that certain tasks can be cut off from further discussion at the discretion of the members, but guided by Research.

Hence, each member will send a handwritten version to the undersigned two weeks before the next meeting. The undersigned will combine the different versions, again as a Proposed General Charter, and the discussion will continue at the next meeting.

2. Priorities on action items and group accomplishments were discussed. The priorities should be set by Research as they arise. On the average, we will have a meeting every six weeks. Before discussing any topic, at least one member should be familiar with the topic. When necessary we should invite the project director to discuss the report prior to the discussion.

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3. The ASA Ad Hoc Committee on Nuclear Regulatory Research was discussed. We set up a meeting with the chairman, Dr. Carl Bennett, on the 30th of March 1981, to discuss the June ASA meeting. At the 30 March meeting with Dr. Bennett, we would like to discuss, for example, the details of having ASA review the Zion report. We would have to narrow the scope and have them look at the methodology in general and specific applications of the Bayesian techniques.
4. Appendix A to the NPRDS report by Idaho was discussed. The project director, Bob Dennig, sat in on the discussion. The discussion centered in on how to handle the case with unequal exposure times.
5. The Kansas State Reports on Bayesian techniques were discussed. Dr. Dallas Johnson and Dr. George Milliken from KSU will visit on the 20th of April 1981 for an all day question and answer workshop. It was decided to have them present an overview on their on-going projects for this fiscal year.
6. On the 24th of March, 1981 Dr. Milton Sobel will discuss a proposal to the PSRRG on an application of some of his work to systems reliability. It was decided to leave the discussion with Dr. Sobel open and informal. On a request by one of the members for some of his work, Dr. Ram Uppuluri recommended that we look at their 1979 book, "Selected Tables of IMS," Volume 4. This book contains 83 pages of introduction and examples of tables.
7. Atwood's common cause reports were discussed. C. Atwood has applied his computer package to pumps and to diesel data. It was commented that a paper by Flemming would be a helpful reference.
8. The next meeting was tentatively set for either the 20th of April 1981, after the KSU visit or the 22nd of April 1981 from 9:00 until 11:30 AM. For the next meeting, the tentative agenda is:
 - o Charter
 - o KSU
 - o In Plant Data
 - o ASA
 - o The Zion Report
 - o Easterling's draft on the Estimation of Accident Sequence Probabilities

Leslie E. Lancaster
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Enclosure: As Stated

cc: R. Minogue, RES
R. Bernero, Res
Public Document Room



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MAR 23 1981

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FROM: Leslie E. Lancaster
Methodology and Data Branch
Division of Systems and Reliability Research, RES

SUBJECT: AGENDA FOR THE PROBABILITY AND STATISTICS
RESEARCH REVIEW GROUP MEETING

1. The next meeting will be held on Wednesday, the 18th of March 1981, in the Willste Building, room 130 from 9:00 AM until 11:30 AM.
2. The agenda or discussion items for this meeting, time permitting, will be as follows:
 - a. Charter

We shall continue the discussion from the last meeting, and, as agreed, a first cut at the Proposed General Charter is as follows:

Proposed General Charter

1. To review reports on selected methodologies, approaches, techniques, and formulation of data bases and models used for probabilistic, statistical, and risk analyses written in-house or by contractors for the Nuclear Regulatory Research Office and available for use to the overall NRC agency.
2. To check the validity of the values of assessed statistical parameters assigned in probabilistic, statistical, and risk analysis as recommended by the Nuclear Regulatory Research Office.
3. To review contractor proposals utilizing probabilistic, statistical, and risk techniques, formulations, and approaches to be carried out by the Nuclear Regulatory Research Office and to comment on a selective basis.

4. When appropriate, to publish documents, including minority opinions, authored as a group or write-ups on review group discussions for the Nuclear Regulatory Research Office and the public document room.

b. Priorities

We need to discuss the priorities of the action items given in the general charter. What procedures should be set up so that the review group can act in consonance?

c. ASA Ad Hoc Committee on Nuclear Regulatory Research

The committee meets with NRC on 11-12 June 1981 for the third meeting. We need to discuss a proposed agenda for this meeting. The discussion should be aimed at an agenda for focusing the committee efforts towards solving some of our problems.

Any ideas on a mechanism or procedure for a good working interface between the committee and the NRC Research Program? Carl Bennett has mentioned several times that this committee is a new experience for ASA.

d. Appendix A to the NPRDS Report by Idaho

Read pages 44-48. Of concern is the case with unequal exposure times. Are other techniques available? Can related work be found in the literature? So far Idaho has not tested the canned packages on any risk data. Therefore, does anyone know of any problems that could arise or are there any obvious mistakes in the report that could cause problems?

e. The KSU Bayesian Project

We hope to get both Dallas Johnson and George Milliken from KSU to give us a question and answer workshop on the project in mid-April. What questions need to be answered at this workshop? Of interest is the choice of conditional priors, simulation studies, and various diagnostics. It may be helpful to KSU to give them a list of questions beforehand.

In the draft NUREG/CR-KSU-2075c on page 54 if you work thru the mathematics for the case when $T_j = T$ for all j , then you will find that the estimates are constrained by $S_F^2 > \bar{F}$. However, since F has a Poisson distribution, $S_F^2 = \bar{F}$. NRC is working on a modified version using the harmonic mean and it worked well in a current simulation study. Does anyone know of other techniques or other problem areas in the KSU report?

f. Dr. Milton Sobel

Dr. Sobel will give a 45 minute presentation followed by a question and answer session on Tuesday the 24th of March 1981 from 1:00 to 3:30 PM. He will discuss his proposal on an application of his work on hypergeometric analogues of incomplete Dirichlet integrals to a reliability analysis of series-parallel systems. The meeting will be held in the Willste Building, room 110.

Any ideas on how to focus the discussion or shall we leave it wide open?

g. Common Cause

The ASA Ad Hoc committee has some favorable comments on Atwood's NUREG. However, they also mentioned that in applications it was always considered after the fact and that we need some practice to see if it is a reasonable model. Any ideas?

Also, of some concern would be to have a discussion on how Atwood could write an executive summary on his report (EGG-EA-5289) so a lay-person could easily read it or use the computer package.

3. Some items for future meetings

- a. The Zion report
- b. Easterling's draft on the Estimation of Accident Sequence Probabilities.
- c. In-Plant report
- d. Prescribed Procedures.

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