

PDR-016



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

DEC 04 1984

Mr. Lindsay Audin  
One Everett Avenue  
Ossining, NY 10562

IN RESPONSE REFER  
TO FOIA-84-839

Dear Mr. Audin:

This is in partial response to your letter dated October 25, 1984, in which you requested, pursuant to the Freedom of Information Act, copies of six categories of specified documents.

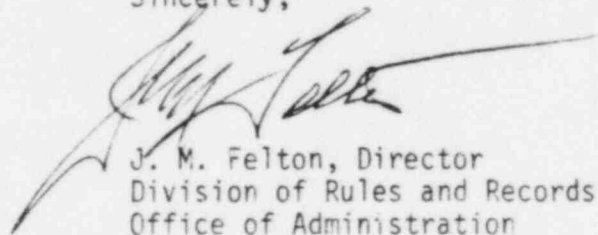
The documents listed on enclosed Appendix A are being placed in the Public Document Room (PDR), 1717 H Street, NW, Washington, DC 20555. The documents will be filed in PDR folder FOIA-84-839 under your name.

A search of our files indicates that the NRC is not in possession of the document identified at item number four of your request, but you may be able to obtain a copy by writing to the following address.

Oak Ridge Technical Information Center  
P.O. Box 62  
Oak Ridge, TN 37830

The staff is continuing to search for additional documents subject to your request. We will notify you upon completion of the search.

Sincerely,



J. M. Felton, Director  
Division of Rules and Records  
Office of Administration

Enclosure: As stated

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APPENDIX A

- ITEM 1: MEMORANDUM FOR CARL MICHELSON FROM NORMAN HALLER, SUBJECT: MPA STAFF COMMENTS - MEMORANDUM TITLED "STATISTICAL/PROBABILISTIC CURIOSITIES IN NUREG-0572, 'REVIEW OF LICENSEE EVENT REPORTS (1976-1978)'" -- W/ATTACHMENTS - DATED: 3/28/80 (6 PAGES)
- MEMORANDUM FOR RUSCHE/MINOGUE FROM LEVINE, SUBJECT: RESEARCH INFORMATION LETTER-9. HIGH TEMPERATURE OXIDATION OF ZIRCALOY FUEL CLADDING IN STEAM -- W/ATTACHMENT - DATED: 3/14/77 (17 pages)
- ITEM 2: PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE - PNO-III-83-79 - DATED: 8/26/83 (1 page)
- PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE - PNO-V-83-36 - DATED: 8/31/83 (1 page)
- ITEM 3: LETTER FROM FELTON TO PASCHALL, SUBJECT: RESPONSE TO FOIA REQUEST FOR THREE LISTED REPORTS - DATED: 3/16/84 (1 page)
- ITEM 6: MEMORANDUM FOR ODEGAARDEN FROM LAKE, SUBJECT: DOE APPLICATION FOR MODEL NO. MH-1A, DATED SEPTEMBER 7, 1982 - DATED: 2/17/83 (5 pages)
- MEMORANDUM FOR ODEGAARDEN FROM WILLIAMS, SUBJECT: DOE APPLICATION FOR MH-1A SPENT FUEL CASK REVIEW OF OPERATING PROCEDURES, ACCEPTANCE TESTS, AND MAINTENANCE PROGRAM - DATED: 2/23/83 (2 pages)
- SELECTED PAGES FROM COMPUTER PRINTOUT REGARDING HEATING 6 OUTPUT FOR THE MH-1A - (18 pages)

MAR 28 1980

MEMORANDUM FOR: Carl Michelson, Director  
Office for Analysis and Evaluation  
of Operational Data

FROM: Norman M. Haller, Director  
Office of Management and Program Analysis

SUBJECT: MPA STAFF COMMENTS -- MEMORANDUM LED "STATISTICAL/  
PROBABILISTIC CURIOSITIES IN NUREG-0572, 'REVIEW OF  
LICENSEE EVENT REPORTS (1976 - 1978)'" DATED  
MARCH 21, 1980

In response to your memo of March 21 on the April 22 ACRS meeting, attached are my staff's comments on NUREG-0572. I believe they are significant because (1) they point out what we believe are technical problems in the document, e.g., a misleading table and a possible error in a probability statement, and (2) these comments were brought up prior to publication and yet went unresolved.

We have noticed concerns voiced in recent Commission meetings about the frequency of use or general utility of ACRS reports. We should be especially sensitive, I think, to resolving staff comments prior to publication if we intend to encourage usage.

If we have further comments relating to your memo, we will forward them by April 11 as you requested.

Norman M. Haller, Director  
Office of Management and Program Analysis

Attachment:

Moore memo to Haller, 3/21/80

Distribution  
R.Moore/RF  
D.Hartfield/RF  
N.Haller/RF  
Central Files

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CONTACT:

Roger Moore, 2-7851  
Dick Hartfield, 2-7834

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

MAR 21 1980

MEMORANDUM FOR: Norman M. Haller, Director, Office of Management and Program Analysis

THRU: Harold S. Bassett, Director, Division of Information, Analysis and Planning, MPA

FROM: Roger H. Moore, Chief, Applied Statistics Branch, MPA  
and David Rubinstein, Applied Statistics Branch, MPA

SUBJECT: STATISTICAL/PROBABILISTIC CURIOSITIES IN NUREG-0572, "REVIEW OF LICENSEE EVENT REPORTS (1976 - 1978)"

When we first contemplated the issue addressed herein, we were inclined to send these comments directly to Max Carbon (ACRS Chairman in September 1979, when the subject was issued) and to Dade Muller (Chairman of the Subcommittee given on page B-1 of the report). We have decided instead to seek your advice on the proper step(s) to take.

Neither the NRC nor the ACRS should produce such obviously flawed reports -- especially when they are so easily remedied. The correct analyses are quite simple, and there seems to be little justification for the incorrect portions to have survived into the final version. It is disconcerting that reviews of an early draft of the report identified and criticised shortcomings such as those mentioned below.

Our attention was drawn to the report on March 7, 1980 when it was used as an example of the way one might study and evaluate Licensee Event Reports. In particular, we were shown and are concentrating on the report's Appendix E, "Statistical Analysis of LERs: A Trial Study." As examples of the easily avoided ambiguities and flaws, consider:

- 1) There appears to have been no adjustment for exposure times of the "newer" units. More specifically, the table below appears on page E-12.

~~005270~~ 822 XA

GROUP IV: Newer BWRs (commercial operation after January 1, 1976)

Total = 3

<u>Nuclear Power Plant</u>	<u>Reportable Occurrences</u>	
	<u>30-day</u>	<u>2-week</u>
Browns Ferry-3	58	12
Brunswick-1	211	9
E.I. Hatch-2	65	12
<u>Average</u>	<u>111.3</u>	<u>11.0</u>

One immediate conclusion from this version of the information is that Browns Ferry-3 and E.I. Hatch-2 are comparable.

If, however, we incorporate exposure time (the number of years of operation, as recorded in NRC's "Gray" Book), we obtain a considerably different impression.

<u>Nuclear Power Plant</u>	<u>Reportable Occurrences</u>		<u>Exposure Time (yrs)</u>	<u>Events Per Reactor-Year</u>	
	<u>30-day</u>	<u>2-week</u>		<u>30-day</u>	<u>2-week</u>
Browns Ferry-3	58	12	2.40	24.17	5.00
Brunswick-1	211	9	2.23	94.62	4.04
E.I. Hatch-2	65	12	0.49	132.65	24.49
<u>Totals</u>	<u>334</u>	<u>33</u>	<u>5.12</u>	<u>65.23</u>	<u>6.45</u>

Now E.I. Hatch-2 clearly appears to be worst -- about 5 times as bad as Browns Ferry-3.

We suggest that the second table gives a better summary, especially because it explicitly displays rates of occurrence -- and this is done without recourse to so-called sophisticated statistical inference methodology.

- 2) Some of the other difficulties stem from the report's failing to explicitly state its models and/or the probabilistic assumptions underlying the analyses. Although one may reasonably infer that the numbers of LERs were treated as Poisson random variables, the distribution theory for computing certain probabilities is left in doubt.
- 3) No matter which of several possible models might have been chosen, the quantifications of some probability statements appear wrong.

- a) For instance, referring to the paragraph in the middle of page E-2, the assumption of 13.5 events per year does not yield 11 and 16 as "the most probable one-year outcome for two units." Rather, 13 and 13 provides the "most probable" pair of results, assuming independence of two Poisson random variables.
- b) Similarly, at the end of the same paragraph, the statement of "no more than one chance in a million," so far as we can determine, really should be stated as approximately one chance in 25,000. The difference is worth noting.

At this moment we have neither the inclination nor the time to belabor the report in fine detail. Nor would we argue with the assertion that the report gives about the right qualitative feel most of the time. Nevertheless, the report is unnecessarily fuzzy and appears to contain a number of quantitative errors.

Two concerns are obvious:

- a) Some of the curious results NUREG-0572 might be misleading or misused.
- b) ACRS and NRC loose credibility if they do not handle elementary statistics properly.

Roger H. Moore

David Rubinstein

cc: H. S. Bassett