

November 10, 1978

EPRI

Dr. Stephen Lawroski, Chairman;
Members of the
Advisory Committee on Reactor Safeguards
Nuclear Regulatory Commission
Washington, D. C. 20555

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Gentlemen:

I have recently had access to the testimony of the 222nd General Meeting of the Committee. In reading the Thursday October 5th volume I have discovered several misstatements concerning work done by EPRI and its contractors and presented before the ATWS subcommittee on August 1st and before the full committee on September 8th of this year.

The first two errors by Mr. Branworth (p 114) and Mr. Corcoran (p 213) are relatively minor but in fact ascribe statements to EPRI which were not made. The third point (pp 240 ff) concern the Lewis Committee report and the implication of a difference of position between Mr. Loewenstein and myself concerning the adequacy of the WASH 1400 analysis of scram failure visavis that is NUREG 0460. The final two points are serious misstatements of EPRI research and the EPRI presentations to the ACRS subcommittee on ATWS and the full committee; these misstatements were made by Mr. Thadani (p 277 ff) and Mr. Mattson (p 280). I believe that it is important to correct all such errors of fact so that the committee can make decisions based on accurate records and data.

- 1) On page 114 Mr. Branworth suggests that the EPRI studies (as presented in Attachment 1 and 2) verify an unreliability of $\sim 10^{-10}$ for failure of rods to insert. While it is correct to say that the Easterling model which we used (Attachment 2, pp 14-16) can indeed be made to show 10^{-10} reliabilities for the failure of 50-60 rods to insert we did not do so, nor did we discuss such a situation. We did discuss the probability of 30 rods failing to insert at 99% confidence level which yielded an unreliability of 2×10^{-5} /demand.
- 2) On page 213 Mr. Corcoran states that the "electronic unreliability as calculated by the NRC staff and EPRI is somewhere 10^{-4} ". While it is correct to say that the EPRI work included a recalculation of the staff numbers in order to exhibit the specific (and generally weak) bases on which such a number was based, it is incorrect to imply that EPRI agrees or accepts such a number. The EPRI calculation as described on pages 2-4 of the presentation to the ACRS Working Group on July 1 (Attachment 1), and on pages 6-11 of the presentation to the full committee on September 8 (Attachment 2) finds an electronic unreliability of 3.2×10^{-6} /demand. The

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Lawroski from Lellouche
November 10, 1978
Page 2.

data base for this later number is far firmer than that of the staffs as can be seen from a detailed breakdown of the historical record as given in Attachment 3 points 1-4.

- 3) On page 240 Mr. Okrent brings the Lewis Committee reports' comments on ATWS into the record and implies that Mr. Loewenstein (a member of the Lewis Committee) and I must have some difference of opinion since the Lewis report states ATWS is a greater risk than WASH 1400 indicates.

First I would point out that the Lewis report is not a consensus. As far as the ATWS statements are concerned we believe they are not validatable and made that clear to Mr. Lewis. Indeed our position is that NUREG 0460 produces no significant difference in result from that obtained by WASH 1400 and so stated in a review of a later draft of the report (cover letter and portions of draft report review included as Attachment 4). Indeed since NUREG 0460 rejects almost all the extant historical data (points 1-4 Attachment 3) it can only be considered a gross upper bound.

- 4) On page 277 Mr. Thadani states correctly that I made two presentations (Attachment 1 and 2) but implies incorrectly that the content of the two presentations was different. They were not; they were identical in content and conclusion except that during the last five minutes of the full committee presentation I raised certain points on value/impact not touched on in the subcommittee presentation. To rediscuss the essential misstatements made on p. 278 concerning the presentations would take excessive space. I can only urge you to read the presentations. Essentially what was presented was:

1. The historical record (Attachment 3) shows the electronic unreliability to be $<3.2 \times 10^{-6}/d$ at 50% confidence based on experience. Carl Bennett, the subcommittee statistical consultant, in his letter of August 10 (Attachment 5) to Mr. Kerr has stated that there is no numerical problem with the calculation of the EPRI number. Of course there is always the political problem of accepting the existing plant data used to calculate it (see also pp 2-5, Attachment 1, and pp 6-10, Attachment 2).
2. Modeling based on a realistic number of rods needed to fail (5 for BWR's, 30 for PWR's), of the WASH 1400 type or of the Vesely/Easterling types, yield numbers consistent with the historical record estimate for the unavailability of the scram system and simultaneously significantly overpredict the number of few-rod failures that have actually occurred (pp 5-7, Attachment 1; pp 11-17, Attachment 2) that is to say such modeling is significantly conservative.

Lawroski from Lellouche
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Page 3.

3. The frequency of anticipated transients of significance is ~ 0.6 for PWR's and ~ 3.5 for BWR's (EPRI NP801 ; pp 7-12 Attachment 1; pp 17-22 Attachment 2; points 5a,b Attachment 3).
4. The ATWS probability is $\sim 2 \times 10^{-5}$ /year for BWR's and $\sim 3 \times 10^{-6}$ /year for PWR's at 99% MTC. (See also pp 12-14 Attachment 1; pp 22-23 Attachment 2).
- 5) Mr. Mattson on p. 280 implies that the Lewis Committee conclusion backs up the staff and confounds the EPRI analyses. Unfortunately he misstates the facts. The method used by the staff is nothing more or less than the method used by EPRI. It is an estimation procedure based on Chi-square analysis and is precisely the method used by EPRI to reach a historical record estimate of $< 3.2 \times 10^{-6}/d$ at 50% confidence (pp 2-5 Attachment 1, pp 6-10 Attachment 2, points 1-4 Attachment 3). It is impossible to understand Mr. Mattsons confusion on this matter excepting only that he has not read either the ACRS record or the written documents presented to the ACRS.

There appears to be some sort of confusion concerning disagreements among "honorable" men. On the contrary I believe quite strongly that this is not a correct representation of the facts. There is an extant body of data. It is, essentially, represented by points 1-3 of Table 1 of Attachment 3. There is no disagreement as to methodology (see Bennett in Attachment 5) the disagreement is on acceptability of the factual testing rate, scram rate, and number of reactor years applicable. Excepting only the naval data the rest of the factual data is readily validatable and is significantly different from what the staff states it to be.

I believe it is in the interest of the country to request validation of the components of the staff calculation visavis the actual behavior of the plants.

Yours Very Truly,



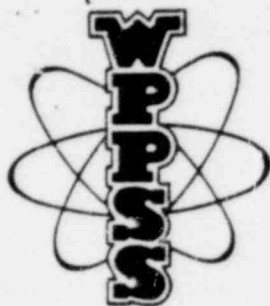
G. S. Lellouche
Program Manager
Nuclear Power, Safety &
Analysis Department

GSL:av

Attachments

AT extremely for your R

FROM R.G. Cockrell, Mgr. Engineering Division Wash. Pub. Power Supply Sys.		DATE OF DOCUMENT 12/18/78	DATE RECEIVED 12/26/78	NO DSS:131
		LTR ☒	MEMO	REPORT ☐
		ORIG ☒	CC	OTHER ☐
TO Roger J. Mattson, Director Division of Systems Safety ONRR		ACTION NECESSARY ☒ NO ACTION NECESSARY ☐		CONCURRENCE ☐ COMMENT ☐
				DATE ANSWERED BY 1/10/79
CLASSIF	POST OFFICE	FILE CODE		
	REG NO	ATWS WPPSS No. 2		
DESCRIPTION - Must Be Unclassified		REFERRED TO	DATE	RECEIVED BY
ATWS Cost Estimates - WPPSS Nuc. Project No. 2		A. Thadani/R. Tedesco	12/27	D. Bunch
		Distributed to:		R. Fraley, ACRS (21)
		E. Case		P. Boehnert, ACRS
		R. Mattson		T. Novak
		V. Stello		<u>R. Tedesco</u>
		F. Schroeder		A. Thadani
		REMARKS Return original yellow ticket and copy of incoming w/copy of reply to Ann Haikalas.		S. Hanauer
		M. Ernst		Central/Docket File
		B.J. Youngblood		NRC PDR



Washington Public Power Supply System
A JOINT OPERATING AGENCY

P. O. BOX 988 3000 GEO. WASHINGTON WAY RICHLAND, WASHINGTON 99352 PHONE (509) 375-5000

December 18, 1978
EDM-RGC-78-356

12/27 Yellow Ticket
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VK

Dr. R. J. Mattson, Director
Division of Systems Safety
U. S. Nuclear Regulatory Commission
Washington D. C. 20555

Subject: ATWS COST ESTIMATES -
WPPSS NUCLEAR PROJECT NO. 2

Dear Dr. Mattson:

I and members of my staff appreciated the opportunity to meet with you and your staff in conjunction with other industry representatives on December 6 to discuss ATWS cost estimates. We are of the opinion that the exchange was very beneficial and provided a better understanding of the impact of various ATWS fixes for all concerned.

As a result of our involvement in the ATWS issue over the past several months, we have developed the attached cost estimates for various levels of system modifications to accommodate an ATWS event. As we noted in our presentation to the ACRS Subcommittee on ATWS in October, we consider ATWS to be a Licensing issue and not a plant safety concern.

The attached cost estimates are based on our interpretation of what may be requested by the staff to satisfy your concerns regarding ATWS. The levels we have addressed include the 13 items contained in your November 15 letter to the Atomic Industrial Forum (Mr. John Ward, Chairman, Committee on Reactor Licensing and Safety). We have not independently addressed each item of your letter, but have instead attempted to incorporate them into systems which cover a spectrum of fixes ranging from justification of the existing design to an ultra-conservative mitigation system per NUREG-0460. All assumptions, definitions and the overall bases for cost estimates are included in the attachment.

Should you desire further information regarding our cost estimating methods, we would be pleased to discuss the subject with you, or to cooperate with the AIF in preparing an industry presentation on cost estimating methods.

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

JAN 29 1979

A. Thadani

MEMORANDUM FOR: Harold R. Denton, Director
Office of Nuclear Reactor Regulation

FROM: Roger S. Boyd, Director
Division of Project Management, NRR

SUBJECT: CONFLICTS OF NUREG-0460 IMPLEMENTATION PLAN
WITH COMMISSION POLICY STATEMENTS ON
STANDARDIZATION

In the ATWS meeting on January 24, 1979, a number of questions were raised concerning the differences between the implementation plan of NUREG-0460 Volume 3 and that proposed in the memo C. Heltemes to W. Gammill dated January 11, 1979. Some of these questions really focused on the central question regarding the specific nature of the NRC's standardization policies, and whether or not the implementation plan of NUREG-0460 Volume 3 would be considered consistent with those policies.

The Standardization Branch has reviewed the recent Commission policy statements from this viewpoint, and believes that the NUREG-0460 implementation conflicts with the NRC standardization policies. SB has the following comments:

(1) Reference Systems

SB believes the clear intent of the Commission's policy on standardization is that standard plants are to have a common design. For example, the June 1977 policy statement stated that the FDA-1 was

"Acceptable for referencing by operating license applicants who have previously referenced the PDA on which the FDA-1 is based, and remain in effect until those referencing applications have resulted in the granting of operating licenses or have been disqualified for good cause as reference applications."

This statement implies that the PDA/FDA plants were to be a common design, and that approval of final design via the FDA would cover all plants unless there were unusual circumstances severe enough to disqualify a plant as a standard.

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DUPLICATE

The question on ATWS modification is not whether to backfit an ATWS fix to standard plants, but whether we should impose different ATWS fixes for applications that reference valid three-year PDA's, and subsequently, the FDA-1 at the OL stage.

The implementation plan proposed in NUREG-0460 would require plants referencing valid PDA's to have different fixes:

<u>Per NUREG-0460 Volume 3</u>	<u>Alternative 3</u>	<u>Alternative 4</u>
CESSAR-238 NI	4 units	2 units
CESSAR	6 units	11 units
<u>Per SB Recommendations</u>	<u>Alternative 3</u>	<u>Alternative 4</u>
CESSAR-238 NI	6 units	-
CESSAR	17 units	-

In this regard, it can be noted that the NUREG-0460 implementation plan makes no distinction between custom and standard plants, and thus, there is no relationship between this plan and expiration dates of PDA's. The SB recommendation would permit all plants referencing the three-year PDA to retain a common design. Since the Commission has endorsed the imposition of Category II, III, and IV matters on the extended PDA's, the SB recommendation involving applying an Alternative 4 fix to the extended PDA's is consistent with the Commission's standardization policy. Thus, the SB recommendation treats the PDA extensions and the forward reference of the FDA for CP applications as different reference designs while maintaining all plants referencing valid three-year PDA's to be common.

Further, in approving the August 1978 Policy Statement, the Commission specifically emphasized a need for the staff "... to more effectively limit changes to approved standard designs to those required for public health and safety." Thus, it would seem that in requiring two different fixes for an approved design, the staff may be making or implying a finding that an Alternative 4 fix is required for public health and safety for a given plant design in some cases, but in other cases, an Alternative 3 fix is acceptable; i.e., that the Alternative 4 fix is required for some plants of common design but not required for others of the same design, in order to assure public health and safety. It is our understanding from comments at the meeting that this is not the case.

JAN 29 1979

(2) Duplicate Plants

We also believe that the clear intent of the Commission's policy is that duplicate plants are to have a common design. For example, the August 1978 Policy Statement stated:

"A document termed the final duplicate design approval, or FDDA, will be included in the SER for each application referencing the duplicate plant final design. The FDDA will be applicable to any docketed operating license application referencing the duplicate plant final design, and for which the construction permit was based on referencing of the duplicate plant preliminary design, unless disqualified for good cause as a standard design application. An extensive delay in construction of the plant with an application for an operating license much later than normally expected, could, for example, constitute one such good cause."

However, the implementation schedule of NUREG 0460 would require duplicate plants to have different fixes:

<u>Per NUREG 0460 Volume 3</u>	<u>Alternative 3</u>	<u>Alternative 4</u>
Cherokee 1, 2 & 3	3 units	-
Perkins 1, 2 & 3	-	3 units

The SB recommendation is that all units of Cherokee and Perkins implement the Alternative 3 fix.

Since the Perkins units reference the CESSAR PDA reference system, these units are included in the total for Alternative 3 presented above for the reference systems. Thus, they do not represent additional units.

(3) Replicate Plants

As for reference plants and duplicate plants, we believe the Commission policy intended that replicate plants have, to the degree practical, a design common to the base plant. For example, the August 1978 policy statement stated:

"The matters referred to in items (7) and (8) above, (these refer to RRRC Category II and III matters) are applicable to the base plant and it is preferred that, if practical, they be resolved on the base plant with required changes replicated on the replicate plant."

JAN 29 1979

However, the implementation plan of NUREG 0460 Volume 3 would require different fixes for the replicate plant from the base plant:

Per NUREG 0460 Volume 3

<u>Base/replicate</u>	<u>Alternative 3</u>	<u>Alternative 4</u>
Millstone/Jamesport	Millstone 3	Jamesport 1 & 2
Byron/Marble Hill	Byron 1 & 2	Marble Hill 1 & 2
Seabrook/New England	Seabrook 1 & 2	New England 1 & 2
Koshkonong/Haven	-	Haven
Palo Verde/Palo Verde	Palo Verde 1, 2 & 3	Palo Verde 4 & 5

Per SB Recommendation - All replicate plants would have the same fix as the base plant - except for Haven, which is not a true example of replication. However, in terms of substance, this consideration is not very important, since all replicate plants, except Palo Verde 4 & 5, are W units and for these units there is no design difference between Alternative 3 and Alternative 4. Thus, there should be no change in risk for the W units between Alternative 3 or Alternative 4. In addition, Palo Verde 4 & 5 references the CESSAR reference system covered in the totals for Alternative 3 fix under reference systems (item 1) above and thus, these units do not represent additional units.

Thus, dropping the W units from consideration, the SB recommendation actually involves the shifting of thirteen units (11 CESSAR and 2 GESSAR-238 NI) from Alternative 4 to Alternative 3. This number is believed to be so small as to be well within the band of uncertainty, with regard to the overall risk in terms of public health and safety.

Based on our review of the Commission's policy statements we believe the following points should be considered:

- (1) The Commission's policy on standardization supports the concept that imposition of new regulatory requirements should permit standard designs to remain common from plant to plant.
- (2) The Commission is very concerned with the manner in which the staff applies new regulatory requirements to approved standard designs. This remains an open matter as far as we know.

JAN 29 1979

- (3) The NUREG-0460 implementation plan conflicts with the Commission's standardization policy.

In light of the above, we believe the implementation plan delineated in Option 6 of the memorandum C. Heltemes to W. Gammill dated 1/11/79, generally summarized in this memo, should be adopted for standard plants.

Beyond consideration of the above recommendation, several other thoughts are worth considering.

1. Regardless of your decision in this matter it is essential that the effect on standardization be considered knowingly.
2. It is important that any Commission paper on this matter deal specifically with the impact on standardization.
3. An effort to resolve the question of deciding that all standardized plants should abide by Alternative A should, in itself, be considered vis-a-vis its impact on standardization. If we are to signal the industry that, in hindsight, they would have been better off with custom plants, then that same signal would serve to so advise them for the future.
4. We thought enough of standardization to update and revitalize our policy. To police it we created a separate Standardization Branch. The effort on this issue, reflected in the January 11 memo and this memo, is a fine example of the Standardization Branch doing its job.

Original signed by:

Roger S. Boyd

cc: E. Case
R. Mattson
R. DeYoung
V. Stello

Roger S. Boyd, Director
Division of Project Management
Office of Nuclear Reactor Regulation

DISTRIBUTION:
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NRR RDG
SB RDG
W. Kane
J. Heltemes
W. Gammill
D. Ross
R. Boyd

F. Schroeder
A. Thadani
D. Vassallo

OFFICE	DPM:SR	DPM:SR	DPM:SR	DPM	DPM
SURNAME	W. Kane:ms	COHeltemes	WPGammill	DFRoss	RSBoyd

FROM R. Cockrell Washington Public Power Supply System (WPPSS)		DATE OF DOCUMENT 1/2/79	DATE RECEIVED 1/8/79	NO DSS-132
TO Dr. R. J. Mattson		LTR X	MEMO	REPORT OTHER
CLASSIF		ORIG X	CC	OTHER
POST OFFICE REG NO.		ACTION NECESSARY ☒	CONCURRENCE ☐	DATE ANSWERED BY 1/22/79
DESCRIPTION (Must Be Unclassified)		NO ACTION NECESSARY ☐	COMMENT ☐	
FILE CODE ATWS WPPSS Nos. 1/4				
REFERRED TO		DATE	RECEIVED BY	DATE
ATWS Cost: WPPSS Nuclear Projects Nos. 1/4		A. Thadani	D. Bunch	
ENCLOSURES		cc: R. J. Mattson	R. Fraley, ACRS (21)	
		R. B. Minogue	P. Boehnert, ACRS	
		S. H. Hanauer		
		NRC PDR	T. Novak	
		E. Case	R. Tedesco	
		V. Stello	RSB File	
REMARKS Please return original yellow ticket with copy of response to Ann Haikalis. (Orig. ltr to Central File.)		F. Schroeder	Docket File	
		M. Ernst		
		B.J. Youngblood		

U. S. NUCLEAR REGULATORY COMMISSION

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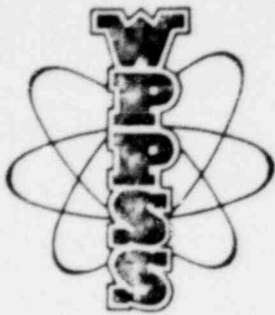
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Washington Public Power Supply System
A JOINT OPERATING AGENCY

P. O. Box 968 3000 GEO. WASHINGTON WAY RICHLAND WASHINGTON 99352 PHONE (509) 375-5000

March 21, 1980

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: ANTICIPATED TRANSIENTS WITHOUT SCRAM FOR LIGHT WATER REACTOR
NUREG 0460 VOL. 4 - FOR COMMENT

Dear Mr. Denton:

The purpose of this letter is to correct an error in the subject document with respect to information provided to the NRC by the Washington Public Power Supply System.

NUREG 0460, Vol. 4, at Page 59, contains the following quotation with respect to plant modification recommended by the NRC Staff: "A review of cost estimates from the Washington Public Power Supply System, January 2, 1979 letter to R. Mattson, shows the indirect cost to be considerably less than the direct cost."

Our letter of January 2, 1979, did not address indirect cost. In fact, the letter very clearly listed the following as one of the assumptions used in preparing the cost estimates:

- "3) The cost estimates include only direct costs; i.e., design, procurement, and installation of equipment, and do not take into account other Owners' costs such as replacement fuel costs, testing and startup, radiation exposure, etc. These indirect costs in most cases outweigh direct costs."

We trust that the appropriate corrections will be made to NUREG 0460, Vol. 4 before it is printed in final form.

Very truly yours,

D L Renberger

D. L. Renberger
Assistant Director - Technology

ew

cc: Dr. S.H. Hanauer, NRC
Mr. A. Thadani, NRC
Dr. W. Kerr, ACRS

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800326489

*Copy for Pittiglio
and D. Nash.*

*Larry,
Please tell me
this is not so. I need
your thoughts + facts.
Ashok*



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

DEC 6 1979

MEMORANDUM FOR: A. Thadani, Task Manager, A-9
THRU: Karl Kniel, Chief, Core Performance Branch, DSS *KK*
FROM: Ralph O. Meyer, Leader, Reactor Fuels Section,
Core Performance Branch, DSS
SUBJECT: FUEL FAILURE CRITERIA FOR ATWS RULEMAKING

It is our understanding that a proposed rule on anticipated transients without scram (ATWS) is to be submitted to the Commission early in 1980 and that the rule will contain information of the sort presented in Appendix of NUREG-0460, Vol. 2. Section IV.5 of that appendix sets forth some proposed acceptance criteria and assumptions to be used in the calculation of radiological consequences.

Because the fuel rod cladding serves as the first barrier to fission product release, the first step in a dose calculation for a postulated ATWS requires an estimation of the number of rods that will fail (i.e., that will experience cladding perforation or rupture). We have provided you with guidelines for ATWS fuel failure prediction in memoranda spanning the last 1 1/2 years or so. Those guidelines were also presented in Appendices XIV to XVII of NUREG-0460, Vol. 2. Earlier this year, we restated our position (memorandum, Meyer to Thadani, January 26, 1979) so that you could provide the industry with guidelines for the "early verification" effort.

Our fundamental requirement has been, and continues to be, that all relevant fuel rod failure criteria, whether of thermal/hydraulic or mechanical origin, should be taken into account in the calculation of radiological consequences. In most cases, existing failure criteria and models are adequate for use in ATWS fuel behavior analyses. As you know, however, we have had difficulty in dealing with pellet/cladding interaction (PCI) because we have lacked acceptable criteria and models. Consequently, our position regarding the calculation of CPI-initiated failure for ATWS has been as follows:

1. For PWRs, we have stated that the number of rods that fail due to PCI should be calculated, but we had not specified how this was to be done. We had assumed that the vendors would submit PCI failure estimates and models for us to review, but we have received nothing in this area.

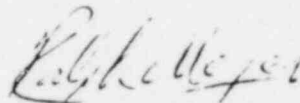
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2. For BWRs, we have stated that the number of rods calculated to be in boiling transition, which is relatively large (~10 to 17%) for a MSIV-closure ATWS, would be likely to encompass the number that would fail due to PCI (in part, because not all rods in boiling transition are sure to fail).

The above-stated position stemmed from the fact that, while we believed that there was a significant probability of PCI failure during power-increasing ATWS events, we did not have a PCI model for use in reactor regulation. With the development of the Battelle Northwest PROFIT model, however, that deficiency has been eliminated. We, therefore recommend that the purposed ATWS rule be phrased to require the calculation of PCI-initiated fuel failure for events involving power increases, and that in lieu of an approved vendor model, calculation should be made with a model to be provided by NRC. Because of the need for judgment and flexibility in using a PCI model, the rule should not specify further details regarding the particular model to be used, but PROFIT will be available in case we need it.

To effect as much consistency as possible regarding the treatment of PWRs and BWRs, the above position should apply to both types of reactors. Because the BWRs also have a large number of rods that are calculated to fail on the basis of thermal/hydraulic criteria, and because we believe it would be overly-conservative to add those rods to the number calculated to fail by PCI, we recommend that the larger of the two estimates should be used in the dose calculation. (Note that for PWRs this is not an issue since no rods are currently calculated to be in DNB for any power-increasing PWR ATWS).

Except for the modifications indicated above, the remainder of our ATWS fuel failure recommendations remain unchanged.



Ralph O. Meyer, Leader
Reactor Fuel Section
Core Performance Branch
Division of Systems Safety

cc: S. Hanauer
R. Mattson
R. Denise
F. Cherny
F. Akstulewicz
M. Tokar
K. Kniel

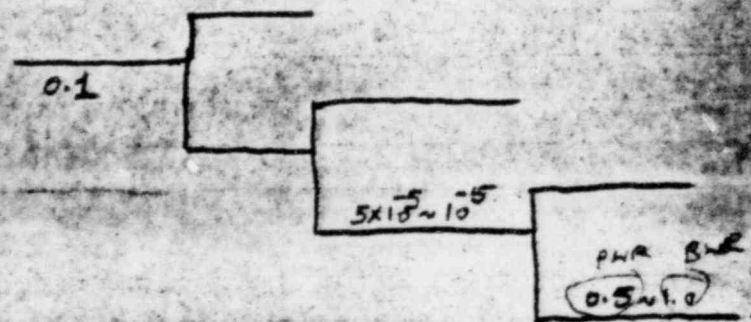
Hole in the proposed Rule.
ATWS & EQ loads - Government?

IDEA

Alt. #3 - Has Prevention
Combination of Earthquake resulting in
a transient, the needed duration
time for the earthquake to significantly
increase ATWS loads is unlikely

Because of prevention
consider earthquake with a return
period of 10 years.

Earthquake AT WS IC MS



NUREG-0460 Alt. #3
 $10^{-6} \sim 6 \times 10^{-6} \sim 2 \times 10^{-5}$
Options

- Show EQ ~ 10 Yrs $\Rightarrow$ AT
- After shocks duration too short such that the loads do not occur at the same time
- Estimate loads and add to ATWS

Alt. #4 - No Prevention

Consider $1/100$ yr earthquake but no SF
 $0.025 \times (10^{-4} \sim 10^{-5})$ $2.5 \times 10^{-6} \sim 2.5 \times 10^{-7}$
NUREG-0460 - 10^{-6}
except consequential
ie no SF in Ant. Fed



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

OCT 3 1979

NOTE TO: A. Thadani ✓

FROM: F. Cherny

SUBJECT: ATWS RULE - COMMENTS

Reference: Your 09/24/79 note to S. Hanauer and its attachment dated 03/29/79

Rather than making detailed comments on the draft "Commission Paper Outline" attached to your note, I have a number of general comments, some of which relate to the mechanical equipment area solely and a few of which spill over into other areas also. The comments are listed in no particular order, but are simply numbered and put down as they have come to mind.

1. Value/Impact Consideration - I have not ever read completely through the write-up in Appendix XII of Volume 2 to NUREG-0460; however, I think that this will have to be improved upon in some areas before transmittal to the Commission in support of the ATWS rule. For operating plants I would imagine we would have to address the cost of exposure to radiation for personnel that would make the necessary hardware modifications to the primary system. Also the cost of additional equipment modifications - whatever they turn out to be - that will be required due to the addition of the 40 yr. earthquake load requirement will somehow have to be addressed.
2. It appears at this point in time that by early next spring - target for submittal of proposed rule to Commission - we will be getting little or no information from the vendors regarding Alternative 4 plants. I personally don't believe we will get any. I suggest in order to simplify our present task i.e., drafting some kind of a meaningful rule - that we give serious consideration to drafting a rule at this time that would apply solely to the Alternative 3 plants. This approach would "fix" ATWS for most operating plants and all those due to receive an OL for the next several years. The rule could simply say that for plants whose CP issue date is after January 1, 1978 (Alternative 4 plants) ATWS mitigation criteria are in preparation. The few Utilities that have Alternative 4 plants could be sent a letter stating that the design of their plant must include whatever hardware is required to mitigate ATWS in compliance with the criteria discussed for such plants in Volume 3 of NUREG-0460,

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OCT 3 1979

A. Thadani

- 2 -

that an ATWS rule for such plants is in preparation (give target date for completion), and ask the Utilities to support a generic verification effort for these plants. With this approach the Commission could go to Congress and report that ATWS has been "resolved" for operating plants and those due to receive OL's in the next several years and that for the rest of the plants under construction ATWS is "being fixed."

Additionally, with this approach, I could envision that at least for the Alternate 1 plants, it might be possible to issue the type of rule that R. Mattson had hoped we could use for all the plants.

3. What are we doing about Alternate 2 plants?
4. Mechanical Equipment Requirements for Proposed Rule - Based on discussions we've had with the vendors and the letters they've recently sent in, it is almost impossible to tell what conclusions, if any, we will have formed on equipment by the end of 1979. If we're going to start writing a rule now, I would think the only thing worth spending time on for mechanical components would be to extract some of the very general Alternative 3 requirements from Vol. 3 of NUREG-0460 for the rule. The associated Reg. Guide would have to contain quite a bit of the information on mechanical components that's contained in the attachment to the Mattson February 15 letter.

F. Cherny
F. Cherny

cc: J. P. Knight
R. J. Bosnak
S. Hanauer
M. Aycock
B. D. Liaw
K. Desai



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

April 21, 1980

NOTE TO: A. Thadani
FROM: D. Nash
SUBJECT: ATWS V-I SUMMARY

Enclosed is the summary Value-Impact analysis for use in the Commission Paper. We have gone back to NUREG-0460 Volume 2, Appendix XII and derived new value estimates based upon a 1980 reference date and the most recent ATWS probabilities of which we are aware. The value estimates in this paper are somewhat different than those presented in Appendix XII or the submittals to ACRS. In addition, an error was found in the ACRS submittals which was corrected. Within the range of accuracy of these figures there are no changes in our overall comparisons of values to impacts.

A handwritten signature in cursive script, reading "Darrel Nash", is positioned above the typed name.

Darrel A. Nash, Leader
Technology Assessment Section
Cost-Benefit Analysis Branch, DSE

Enclosure:
As stated

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