



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

May 6, 1987

CRGR JF
Meeting # 114

(3)

MEMORANDUM FOR: Edward L. Jordan, Chairman, CRGR
Robert M. Bernero, MNSS
James H. Sniezek, NRR
Denwood F. Ross, RES
T. T. Martin, RI
Joseph Scinto, OCG

THRU: John E. Zerbe
Assistant for CRGR Operations, AEOD

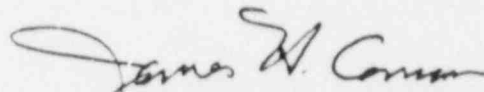
FROM: James H. Conran
Senior Program Manager, AEOD

SUBJECT: SUMMARY AND ISSUE IDENTIFICATION CRGR
AGENDA ITEMS, MEETING NO. 114

Enclosed for your information and use are CRGR staff summaries for the following CRGR review items:

- (a) Proposed Bulletin, "Thinning of Pipe Walls in Nuclear Power Plants"
- (b) Proposed Long-Term Resolution to the IGSCC Problem in BWR Piping

These matters are scheduled for CRGR review at Meeting No. 114 on Thursday, May 7, 1987 in Room 6507 MNBB at 1:00-4:00 p.m.


James H. Conran
CRGR Staff

Enclosures:
As stated

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Summary and Issue Identification
CRGR Agenda Item - Meeting No. 114
May 7, 1987

IDENTIFICATION

Proposed IE Bulletin 87-xx, "Thinning of Pipe Walls in Nuclear Power Plants"

OBJECTIVE

The staff has requested that CRGR review and recommend to the EDO approval for issuance of a bulletin requesting all holders of operating licenses or construction permits to provide information concerning their programs for monitoring the thickness of pipe walls in condensate, feedwater, steam, and connected high energy systems and in safety-related systems fabricated of carbon steel.

BACKGROUND

The package submitted for review by CRGR was transmitted by memorandum dated April 10, 1987 J.M. Taylor to J.E. Zerbe; that package included the following documents:

1. Proposed IE Bulletin 87-xx, "Thinning of Pipe Walls in Nuclear Power Plants"
2. Response to Section IV.B of the CRGR Charter
3. Cost-Benefit Analysis for Proposed Bulletin
4. Memorandum, dated April 2, 1987, E.L. Jordan to Distribution, "Licensee Secondary Pipe Wall Thinning Monitoring Programs"

DISCUSSION/ISSUES

The proposed bulletin is an NRC response to the Surry pipe rupture event. It's purpose is to provide the staff with better information on which to base a decision regarding whether it is necessary to impose additional requirements for in-service inspection/monitoring of pipe wall erosion. As noted in Background Item 4. above, industry attention to this issue subsequent to the Surry incident in general has been quite substantial, but there remain questions and concerns regarding the efforts of specific licensees. In this regard:

1. The Committee may wish to discuss with the staff what is known currently about ongoing licensee actions resulting from industry initiatives (e.g.,

INPO, NUMARC, EPRI, etc.) in order to determine whether generic or plant specific action by NRC is more appropriate in the current circumstances. Generic action, as proposed by the staff here may interfere with and/or duplicate licensee actions already underway, and could be interpreted as implicit criticism that industry initiatives (that should be supported where possible) are inadequate. If only a few licensees are recalcitrant or deficient in their voluntary response to the problem indicated by the Surry incident, and they are already known, perhaps plant specific actions by NRC would be seen more clearly as supportive of the technical adequacy (as contrasted to the enforceability) of industry initiatives.

2. The Committee may wish to pursue the following specific questions regarding the alternative cost-benefit analysis provided in connection with this proposal:
 - a. In view of the significant industry efforts initiated following the Surry event to study further the problem of pipe wall thinning in the systems/configurations of concern to NRC in proposing this action, is it reasonable to assume that the additional monitoring requirements anticipated in the staff's analysis will actually contribute to an 80% reduction in thinned wall pipe rupture frequencies in the future? (See Background Item 3. at p.4.) That assumption drives the staff's cost-benefit calculation strongly toward the highly favorable conclusions presented in the review package. Use of a more realistic contribution (e.g., say 10%-20%) would make the proposed action much more of a toss-up from the viewpoint of cost-benefit justification.
 - b. In their analysis of onsite benefits, the staff assumes that every single phase rupture results in a single fatal injury. (See Background Item 3. at p.5.) Even granting that this estimate is reasonable, the Committee may wish to discuss with the staff the appropriateness of including this consideration in their cost-benefit analysis, in a manner that suggests strongly that, as a matter of policy, it has been decided finally that NRC is responsible for regulating such non-radiological occupational safety hazards.

by Jim Conran

OF

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Summary and Issue Identification
CRGR Agenda Item - Meeting No. 116
June 10, 1987

IDENTIFICATION

Proposed 50.54(f) Information Request Regarding Loss of Decay Heat Removal Function at PWR's with Partially Drained Reactor Coolant Systems (Mid-Loop Operation)

OBJECTIVE

The staff has requested that the CRGR review, on an accelerated basis, a proposed 50.54(f) information request in order to more fully evaluate the "loss of RHR during mid-loop operation" syndrome which has occurred (and in some cases, reoccurred repeatedly) 37 times now at 15 operating nuclear power stations. Following the latest mid-loop event at the Diablo Canyon facility on April 10, 1987, in which boiling occurred in the core 85 minutes after loss of decay heat removal function in a partially drained and depressurized reactor coolant system and with containment integrity broken, the staff has come to regard the mid-loop syndrome as a safety-significant unanalyzed event that requires increased attention on an accelerated schedule. Accelerated treatment by CRGR, and appropriate response by licensees in 60 days, will allow the staff to complete the accelerated review process currently envisioned by April 30, 1988.

BACKGROUND

1. The document package submitted for review by CRGR in this matter was transmitted by memorandum dated June 2, 1987, T.E. Murley to E. Jordan; it included the following documents as enclosures:
 - a. Attachment 1 "Response to Requirements for Content of Package Submitted for CRGR Review"
 - b. Attachment 2 Proposed 50.54(f) Generic Information Request Letter, and enclosures as follows:
 1. Enclosure 1 - "Information Pertinent to Loss of RHR Systems While in Mid-Loop Operation"
 - c. Attachment 3 NRC Information Notice 87-37, "Loss of Decay Heat Removal During Low Reactor Coolant Level Operation"
 - d. Attachment 4 Table 1 - "Chronology of 37 Loss of DHR Events Attributed to Inadequate RCS Level"
2. Related documents, not transmitted to CRGR with the review package by the sponsoring office, but considered by the CRGR staff in connection with the preparation of this issue sheet, included:

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- a. Memorandum, dated May 18, 1987, E. Jordan to T.E. Murley and E.S. Beckjord, "Loss of Decay Heat Removal Function at Pressurized Water Reactors with Partially Drained Reactor Coolant Systems"
- b. AEOD Case Study Report, AEOD/C503, dated December 1985, "Decay Heat Removal Problems at U.S. Pressurized Water Reactors"

DISCUSSION/ISSUES

1. The proposed 50.54(f) letter appears to go well beyond a mere information request. In effect, in its current form, it constitutes imposition of an unacknowledged backfit of a new staff position, resulting from a new interpretation of an existing regulation (i.e., GDC-34). More specifically, the proposed information request requires of licensees assessments, analyses, operational procedures information, etc., not heretofore required, in order for the staff to be able to conclude that there is reasonable assurance that the licensees will operate their facilities within approved design/licensing bases.

The staff asks (in Background Item 1.b.1, at pp. 2-3) for extensive "descriptions" of: 1) circumstances and plant conditions involved in mid-loop operations, 2) instrumentation and alarms and other plant equipment used in mid-loop operations, 3) containment closure conditions observed by licensees during mid-loop operations, 4) procedural guidance pertinent to control of normal and off-normal plant conditions and the activities of operations personnel during normal and recovery type mid-loop operations, and 5) the analysis bases for 3 & 4 preceding. In scope and content the "descriptions" requested do not differ much from the analyses of design basis events, and the procedures for dealing with them, that are currently required explicitly for licensing. The staff goes on to state (in Background Item 1.a, last sentence of paragraph 1) that such "descriptions" are now necessary to assure safe operation in this mode. That is a regulatory posture/position that has never been taken before by the staff; the staff has not until now required review of such analyses and procedures "...to assure safe operation in this mode."

Clearly then, even though the proposed action does not involve any new requirements in the regulations, the staff's interpretation of what licensees must do to demonstrate compliance with the existing regulations (e.g., GDC-34) has changed; and the staff has spelled out in the proposed information request package their new position on what is required minimally now to reasonably assure safe operation...(to be specific, extensive new analyses of this heretofore unanalyzed event/syndrome, and a new level of awareness among licensees of the safety significance of mid-loop operation as reflected in detailed, procedural guidance for operations personnel. Imposition of such a new position is a backfit under 10CFR50.109; and the burden is on the staff to fully justify the backfit.

2. The staff states in Background Item 1.a (see paragraph 2) that licensees would be expected to supply detailed descriptions of plant conditions during mid-loop operation, procedures required for this mode of operation (including restrictions and analytical bases that apply), information on training for this type of plant evolution, etc,...all at a "minimal" cost.

The Committee should discuss with the staff the basis for that estimate in view of the following statement in an AEOD evaluation of this same problem (see Background Item 2.a., at p. 2, paragraph 4):

"Generally, procedures for operation during modes 3, 4, and 5 are of an ad hoc nature, scant or even nonexistent. Similarly, procedures for recovery from a loss of DHR are not necessarily well thought out. In addition, operators may not be trained in recovery from a loss of DHR...etc., etc., etc."

Are the sponsoring office staff unaware of these AEOD assessments? Do they disagree with them? If not, what is the basis for estimating "minimal" costs for licensees who will obviously have to develop the extensive analyses and procedures they are "expected" to provide in response to the proposed "request"? Did the staff coordinate with utility or other industry groups in developing the cost estimates provided to CRGR? If not, why not in an instance such as this in which those most directly impacted by the proposed action will not have the opportunity to comment during a public comment period? In this same vein, the Committee may wish to discuss with the staff other detailed in-house cost estimates also made by AEOD in Background Item 2a. relating to this issue. Specifically, a) why were these cost estimates not provided to CRGR in connection with this review? On the basis of AEOD's look at this issue, what would be the cost involved for licensees to develop from scratch the extensive information requested in the proposed letter? What would be the benefits, in general terms, with regard to reduction in core damage frequency and risk?

3. The Committee may wish to discuss with staff the relationship of this proposed action to USI A-45. In Background Item 2.a., AEOD seeks to suggest that it would be reasonable and feasible to integrate the results of their AEOD Case Study on loss of DHR in the mid-loop operation mode (i.e., Background Item 2.b.) with USI A-45. Has the sponsoring office staff considered integrating the immediate proposed action, and any anticipated follow-on actions, with that USI? If not, why not?
4. The only real supporting information provided to CRGR in connection with this proposed action is the data in Table 1 (i.e., Background Item 1.d.). With obvious reference to the Table 1 data, the staff states in Background Item 1.b. (see p. 2, second sentence of last paragraph) the following:

"This topic has been addressed in numerous communications with the licensees. Yet, events continue to occur at a rate of several per year."

The implication is that there has been no improvement in the rate of occurrence of mid-loop events as a result of previous regulatory actions of lesser impact (e.g. issuance of IN's, issuance of AEOD case studies, etc.); so more drastic action is called for now in order to get proper licensee attention to a serious continuing problem. The data provided in Table 1, however, can be interpreted as indicating a general trend of improvement in some important aspects of licensee performance with regard to this problem, even among licensees who were serious repeat offenders in earlier years. For example, summarizing the data in Table 1 in terms of total events per year yields the following:

| <u>Year</u> | <u>Events/Yr</u> |
|-------------|--------------------|
| 1977 | 1 |
| 1978 | 4 |
| 1979 | 2 |
| 1980 | 3 |
| 1981 | 2 |
| 1982 | 7 |
| 1983 | 5 |
| 1984 | 6 |
| 1985 | 3 |
| 1986 | 2 |
| 1987 | <u>2</u> (to date) |

37 Total for PWR's, 1977-1987

Clearly, the peak rate of occurrence for mid-loop events of concern to the staff occurred in the 1982-1984 timeframe. The rate of occurrence has dropped off sharply since then; and it could certainly be argued that that decrease occurred in response to previous staff communications to the licensees. Further indication of responsiveness on the part of the licensees with regard to the staff's concern in these areas is the observation in the transmittal letter for this package that several licensees have already taken additional actions voluntarily in response to recent informal communications from the staff on this topic.

Similarly, summarizing the Table 1 data in terms of events per station, with attention given also to year of occurrence, yields the following:

| <u>Facility</u> | <u>No. of Events</u> | <u>Year(s) of Occurrence</u> |
|------------------|----------------------|------------------------------|
| North Anna | 8 | 1982, 1983, 1984 |
| Trojan | 6 | 1977, 1978, 1981, 1984 |
| Beaver Valley | 5 | 1978, 1980 |
| McGuire | 4 | 1982, 1983 |
| Sequoyah | 3 | 1983, 1985, 1987 (115°F) |
| Zion | 2 | 1984, 1985 (157°F) |
| Sub-total | <u>28</u> | |
| Millstone | 1 | 1979 |
| Salem | 1 | 1979 |
| Surry | 1 | 1983 |
| DC Cook | 1 | 1984 |
| ANO-2 | 1 | 1984 |
| Catawba | 1 | 1985 (175°F) |
| San Onofre | 1 | 1986 (210°F) |
| Waterford | 1 | 1986 (170°F) |
| Siablw | 1 | 1987 (220°F) |
| Sub-total | <u>9</u> | |
| Total PWR Events | 37 | |

From this presentation of the data, it is apparent that the great preponderance of events of concern to the staff in this matter (i.e. 76%) are accounted for by a relatively small number of licensees (i.e. six), who have experienced repetitions of mid-loop operation problems. This could reasonably be taken as indication of an attitude of sloppiness on the part of the operating staff, or possibly indication of management problems, affecting only a few individual licensees. If so, these are the kinds of problems that more appropriately should be dealt with on an individual licensee or plant specific basis (to focus recognition of responsibility and accountability), rather than by penalizing all PWR licensees with a generic backfit action (that tends to distribute or dilute accountability).

With regard to the six licensees who have experienced repeat events, there is clear indication in the Table 1 data of significant improvement in performance. The most serious offenders from the viewpoint of repetitions of such events (e.g. those who experienced 4 or more events) have not experienced a problem during the last three calendar years. And even at the two stations in the repeat category where such events have recurred during the last three years, the data seems to indicate proper operating staff performance during the most critical period of mid-loop operation (i.e., when decay heat levels were high enough to result in very high core coolant temperatures, near or exceeding boiling).

As a general statement, it seems equally valid to conclude from the data presented in Table 1, that there may be a residual mid-loop operations concern at a few facilities, to be dealt with on a licensee specific basis, as it is to conclude (as the staff apparently has) that there is a broader generic problem that is continuing-or-escalating, and that must be dealt with by imposing a significant backfit.

5. The Committee may wish to discuss with the staff why BWRs are not included in the scope of this proposed action. Have there been no such events at BWR facilities? Are BWR decay heat removal systems inherently much more reliable, or are BWR operating staff training and performance much superior in this area? If the reason for excluding BWRs is that no such events have occurred in BWR facilities, why are B&W plants included? (There are no B&W plants included in the Table 1 data.)
6. The Committee may wish to discuss with the staff the minimum changes to the wording of the package submitted for CRGR review in this matter that would qualify the proposed "information request" as an information request only (rather than a de facto backfit, as indicated above). It appears that the minimum changes would be along the lines of the following in the areas indicated:
 - a. The wording of Background Item 1.a should be changed in Section 1 to make clear that a new staff position is not being imposed, as indicated in the Issue 1 discussion above.
 - b. The wording of Background Item 1 should be changed in Section 2. to make clear what the staff intends by the term "minimal" cost for licensees in developing an acceptable response to this request, e.g.,

- Can a licensee's response provide only a description of information already available at the sites (e.g., existing analyses, procedures, etc.), or does the staff expect licensees to develop such analyses/procedures if none now exist?
 - Would a response simply to the effect that "...we have no such information..." be considered an acceptable response to the proposed 50.54 request letter? Would any action be taken to shutdown the facilities of licensees responding thus?
- c. The wording of the proposed Generic Information Request Letter should be revised to reflect the changes indicated in a) and b) above. For example, the wording after the first sentence in the last paragraph of page one of that letter could be changed to read as follows:

"The staff believes that prudently this condition should be more fully considered to determine if additional requirements are warranted in this area. Accordingly, we request that you provide any existing safety assessments of operation during...including any existing procedural guidance...(or any other information relevant to these concerns that you wish to develop and submit voluntarily). Information most useful to the staff in deciding whether any additional new requirements should be imposed is in the following areas: ...(continue at the top of page 2. with no change).

If the staff's assessment of the situation is such that they do not believe that such a revised information request is adequate for safety, then the proper course of action would appear to be to proceed immediately to impose explicitly any properly justified backfit deemed necessary for protection of public health and safety.