SEP 10 1985

MEMORANDUM FOR: Robert B. Minogue, Director
Office of Nuclear Regulatory Research

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

SUBJECT: SCHEDULE FOR RESOLVING AND COMPLETING GENERIC ISSUE NO. 119 - PIPING REVIEW COMMITTEE RECOMMENDATIONS

The resolution for Generic Issue No. 119, "Piping Review Committee Recommendations" is a regulatory impact issue for which technical resolutions have been identified as discussed in the evaluation provided in Enclosure 1. Since you are taking the actions necessary to resolve this issue in accordance with your memorandum to W. Dircks, dated July 30, 1985, we have not prioritized this issue.

However, in your July 30, 1985 memorandum, you agreed that the resolution of this issue would be monitored by the Generic Issue Management Control System (GIMCS). The information needed for this system is indicated on the enclosed GIMCS information sheet (Enclosure 2). Normally, the information needed should be provided within six weeks.

The enclosed evaluation will be incorporated into NUREG-0933, "A Prioritization of Generic Safety Issues," and is being sent to the regions and other offices, the ACRS, and the PDR for comments on the technical accuracy and completeness of the prioritization evaluation. Any changes as a result of comments will be coordinated with you. However, the schedule for the resolution of this issue should not be delayed to wait for these comments.

The information requested should be sent to the Safety Program Evaluation Branch, DST. Should you have any questions pertaining to the contents of this memorandum, please contact Louis Piani (24563).

FOIA-88-464
A/2

Original Signed by
H. R. Denton

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Enclosures:
1. Prioritization Evaluation
2. Generic Issue Management Control System

cc: See next page

OFFICE	SPEB	SPEB	BC/SPEB	D/DST	Actg D/DE	DD/NRR	D/NRR
SURNAME	RRiggs/sm:jm	LRiani	WMinners*	TSpeis*	JKnight*	DEisenhut	HDenton
DATE	8/19/85	8/20/85	8/22/85	8/23/85	8/30/85	9-9-	9/10

AD/I:DST
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8/22/85

D/PPAS
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See previous concurrences.*

cc w/o Enclosure 2:
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ENCLOSURE 1

PRIORITIZATION EVALUATION

GENERIC ISSUE ISSUE NO. 119

"PIPING REVIEW COMMITTEE RECOMMENDATIONS"

ISSUE 119: PIPING REVIEW COMMITTEE RECOMMENDATIONS

Historical Background

In Reference 1, the Executive Director for Operation (EDO) requested a comprehensive review of NRC requirements in the area of nuclear power plant piping. In response to this request, the NRC Piping Review Committee (PRC) was formed to review and evaluate current regulatory requirements to provide recommendations on where and how the NRC should modify current requirements, and to identify areas requiring further action. The scope of the PRC review covered those pipes that are in the safety-related systems and those high-energy lines important to safety in new and operating nuclear power plants. With respect to postulated pipe break, the scope covered all high-energy lines.

An NRC steering committee consisting of members from the Offices of RES, NRR, IE, and ELD was formed to review and develop a plan for implementing the changes recommended in the PRC report (Reference 2). The steering committee agreed to focus their attention on the recommended research and regulatory changes designated in the PRC report (Reference 2) as Category A (high priority) recommendations. The PRC recommended research and regulatory changes were restructured by the steering committee (combining of research and regulatory recommendations) to form nine tasks to be addressed by the NRC implementation plan (Ref. 3).
This issue deals with five of the nine tasks contained in the NRC implementation plan. These five tasks primarily consist of NRR regulatory actions and some closely related research efforts. The remaining four tasks of the NRC implementation plan relate only to research activities and are therefore not part of this issue.

119.1 Piping Rupture Requirements and Decoupling of Seismic and LOCA Loads

Description

This task combines two PRC Category A regulatory recommendations with one PRC Category A research recommendation. The designations of the three PRC recommendations are: 1) leak-before-break (A-1), 2) decoupling of seismic and LOCA loads (A-5), and 3) completing research on decoupling (A-4). The resolution of this task will effect all LWRs.

One part of the task involves rulemaking changes to the General Design Criterion 4 (GDC-4) in Appendix A of the 10CFR50 to redefine the need to consider the dynamic effects of pipe breaks. A proposed rule to modify GDC 4 was published in the Federal Register on July 1, 1985. This rule change codifies leak-before-break technology but is limited to only the primary loop piping of PWRs. A broad scope rule dealing with all high energy piping in all LWRs is to be published in the Federal Register in November 1985. Revisions to SRP 3.6.1 and SRP 3.6.2 are needed to eliminate the postulation of arbitrary intermediate breaks. The second part of this task would relax the requirement to consider LOCA and seismic loads simultaneously. Revision of SRP 3.9.3 will be needed to decouple seismic and pipe rupture loads in the mechanical design of components and their supports.

Safety Significance

The current GDC-4 requirement and Section 3.6.2 of the SRP pertaining to postulated double-ended-guillotine break (DEGB) of the largest pipes and postulated arbitrary intermediate pipe breaks need to be changed to include more realistic criteria and to allow consideration and acceptance of validated analysis methods. The requirements of the current GDC-4 have led to a situation where protective devices have been added to forestall events that are extremely unlikely. These protective devices that have been

designed for the extremely unlikely events could, however, reduce safety and increase worker radiation exposures from normal operations and more likely design basis considerations.

Section 3.9.3 of the SRP currently requires that piping systems and associated components be designed for the combined effects of an SSE and a LOCA. There has never been a well-developed rational basis for this requirement. The evolution of seismic design requirements and the calculations of pipe rupture loads have significantly increased the resultant loads obtained by combining these effects. However, field evaluations of piping at conventional power plants and petrochemical facilities have indicated that ruptures in piping of the type found in nuclear power plants do not occur during severe earthquakes. Therefore, relaxation of these requirements should not affect plant or public safety.

The resolution of this task will effect all LWRs.

119.2 Piping Damping Values

Description

This task combines PRC regulatory recommendation A-2 (modify seismic damping values used in seismic designs), and PRC research recommendation B-3 (complete research on damping tests).

This task constitutes a two-level approach; namely, a short-term, and a long-term plan. The resolutions could effect all LWR plants. The short-term action will rely on revision of Regulatory Guide 1.84 as the vehicle for NRC endorsement of ASME Code Case N-411. The long-term action will result in the revision of Regulatory Guide 1.61 and SRP 3.9.2 to incorporate not only ASME

Code Case N-411, but also new positions on pipe damping for high-frequency loads and for time-history analyses.

The short-term endorsement of the ASME Code Case N-411 would be restricted to seismic response analysis, but not time-history analysis. The long-term action will result in extensive changes to SRP 3.9.2 and to Regulatory Guide 1.61 to provide more comprehensive guidance on pipe damping for both seismic and BWR hydrodynamic loadings. Criteria for other non-seismic dynamic loads could also be addressed in the SRP 3.9.2 revision.

Safety Significance

In general, dynamic piping response would be more accurately predicted if higher piping damping values were used than those identified in the current regulatory guide. The use of higher damping values will result in nuclear plant piping systems having significantly less snubbers and supports and an overall better balance of design considering all piping loads. A significant decrease in the numbers of snubbers and supports will allow better inspection of equipment and components at significantly reduced occupational radiological exposures.

119.3 Decoupling the Operating Basis Earthquake (OBE) from the Safe Shutdown Earthquake (SSE)

Description

The task corresponds to PRC regulatory recommendation A-3 (decouple OBE from SSE). 10CFR100, Appendix A, Section V(a)(2), stipulates: "The maximum vibratory ground acceleration of the OBE shall be at least one-half the maximum vibratory ground acceleration of the SSE." Therefore, the current requirement implies the coupling of the two earthquake design levels, the SSE and OBE. In development of the current regulations, it was assumed that the SSE would control the design in nearly all aspects, and that the OBE would

serve as a separate check of those systems where continued operation was desired at a lower level of ground motion. However, in practice, the assumed load factors, damping, stress levels and service limits have caused the OBE, rather than the SSE, to control the design for many systems including concrete and steel structures and nuclear piping. In addition, seismic design for OBE accounts for certain safety-related factors such as fatigue and seismic anchor movement that are not considered in the design for the SSE.

Decoupling of the OBE from the SSE or modification of the associated load factors, etc., would impact the design of new plants, extending well beyond piping considerations. The action required to resolve this task includes: (1) rulemaking to amend and revise Appendix A to 10CFR Part 100 to permit decoupling of the OBE and SSE, and incorporate the use of probabilistic methodology in earthquake design, (2) revising and developing Regulatory Guides, (3) updating pertinent sections of the Standard Review Plan, and (4) advising various code committees to revise appropriate codes and guides to reflect changes in the regulations.

A complete listing of the Regulatory Guides and SRPs that may be affected by this task will be identified during the review phase of this task and the related tasks contained in the broader scope NRC implementation plant defined in Reference 3.

Safety Significance

There is no technical basis for coupling the OBE with the SSE. Designing the piping systems to the SSE is the primary means of ensuring safety. Additional margin is provided by specifying the OBE and thus the level at which inspections will be required before continued operation would be permitted. The more realistic approach of using specific probabilities (return periods) for OBEs and the decoupling of the OBE levels and frequencies from those of the SSE will allow assurance of public safety to be placed on a more rational basis.

119.4 BWR Piping Materials

Description

This task corresponds to the PRC recommendation A-4 to replace regular grade 316SS and 304SS materials in BWR recirculation piping with an alloy resistant to intergranular stress corrosion cracking (IGSCC). The NRR staff action related to this task involves preparation of Revision 2 to NUREG-0313, "Technical Report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping," and evaluating each licensees actions to comply with Revision 2.

Safety Significance

IGSCC in BWR piping has occurred in a range of pipe over the last 25 years resulting in major reactor outages. The risk studies reported in Reference 2 indicate that pipe failures, even assuming the higher rates due to IGSCC, would not be a major contributor to core melt and public risks. However, use of materials more resistant to IGSCC should significantly reduce levels of in-service inspections and reactor outage times. Therefore, plant outages and recurring occupational radiation exposures could be significantly reduced by resolution of this task.

119.5 Leak Detection Requirements

Description

This task corresponds to PRC regulatory recommendation A-6 (leak detection requirements). To accomplish this task, additional data are necessary to further validate and improve existing leak-rate prediction analyses. Of particular interest would be investigation and improvement of local leak detection systems such as acoustic emission monitors or moisture-sensitive

tapes. These latter techniques may be important for establishing the validity of leak-before-break at specific locations in certain piping systems.

The task requires a combination of two approaches. One, the surveying of operating plants to determine the adequacy of existing leak detection systems, and the other involves completion of the research recommended by the PRC and applying the results of the research to regulatory requirements. Subsequent to the completion of key elements of the research effort, the regulatory actions may include the following:

- Identify required changes to tech specs, e.g., (a) unidentified leakage limits for BWRs and PWRs in the context of locating and detecting leakage from cracks with margin, (b) adequacy of surveillance requirements and calibration of systems, (c) alarms, (d) consistency of tech specs, (e) new systems or different detection system combinations, and (f) forward and backfit considerations.

- Revise SRP 5.2.5 and R.G. 1.45.

- NUREG-0313, Revision 2.

Resolution of this task may, to various degrees, affect all light-water reactors (LWRs).

Safety Significance

No direct safety significance can be attributed to this task. However, knowledge of the leak rates associated with various postulated through-wall crack lengths and confidence in the ability to detect leakage in a timely manner is an important element of the leak-before-break concept that eliminates the postulated double-ended guillotine break.

Conclusions

This issue primarily involves changes to Regulatory Rules, and revisions to Regulatory Guides and Standard Review Plans. No significant change in public safety will result from resolution of this issue. However, resolutions to the various tasks are expected to result in less complex and more realistic approaches to piping design and operation in nuclear power plants. The results should yield more efficient regulatory practices, improve plant piping systems designs, increase plant reliabilities, and decrease occupational radiation exposures associated with inspections and repairs. The NRC steering committee has agreed that, based on the information provided in Reference 2 (NUREG-1061), this work should continue on a schedule consistent with high-priority issues. Therefore, this issue is a Regulatory Impact issue for which possible resolutions have been identified. RES will take the lead for resolution of this issue, with assistance from other NRC Offices, as defined in Reference 3.

References:

1. Memorandum from W. Dircks (EDO) to H. Denton (NRR) and R. Minogue (RES), August 1, 1983.

2. NUREG-1061, "Report of the U.S. Nuclear Regulatory Commission Piping Review Committee," April 1985.

3. Memorandum from R. Minogue (RES) to W. Dircks (EDO), July 30, 1985.

ENCLOSURE 2

GENERIC ISSUE MANAGEMENT CONTROL SYSTEM

The Generic Issues Management Control System (GIMCS) provides appropriate information necessary to manage safety related and environmental generic issues through technical resolution and completion. For the purpose of this management control system technically resolved is defined as the point where the staff's technical resolution has been issued. Generally, speaking, this occurs when the technical resolution has been incorporated into one or more of the following:

(a) Commission policy statement/orders
(b) NRC Regulations
(c) Standard Review Plan
(d) Regulatory Guide
(e) Generic Letter

GIMCS is part of an integraded system of reports and procedures that would manage generic safety issues, TMI-related issues, and proposed new generic issues through the stages of prioritization, technical resolution, development of new criteria, review and approval, public comments, and incorporation into the Standard Review Plan (SRP), as appropriate. NUREG-0933 provides an evaluation for a recommended priority listing based on the potential safety significance and cost of implementation for each issue; NRR Office Letter Number 40 provided procedures and criteria for adding new generic issues to the system; and GIMCS provides proposed scheduling for resolving and completing issues on the prioritized listing. GIMCS will provide information to manage and control issues that are ranked High-priority generic issues, Medium-priority generic issues, issues for which possible resolution has been identified for evaluation, issues for which a technical resolution is available (as documented by memorandum, analysis, NUREG, etc.), and issues designated by the Director of NRR as issues for which resources have been made available for resolution and completion. Issues ranked as either "Low" or "Dropped" are not allocated resources, therefore, there is no resolution to be tracked by GIMCS.

Some new generic issues prioritized and processed in accordance with NRR Office Letter No. 40 may not have resources allocated for resolution and completion. These issues will be listed in GIMCS as inactive issues. These will generally be Medium priority issues that have no safety deficiency demanding high-priority attention, but there is a potential for safety improvements or reduction in uncertainty of analysis that may be substantial and worthwhile. Efforts for resolution of these issues will be planned, over the next several years, but on a basis that will not interfere with the resolution of High-priority generic issue work or other high priority work. Thus, some (Medium) generic issues will be inactive until such time as resources become available to resolve the various issues. As resource allocations are directed at issue resolution, they will become active. The detailed schedule for resolving and completing the generic issue will be developed and monitored by the management control system.

Management and control indicators used in GIMCS are defined as follows:

1. Item No. - Generic Issue Number.

2. Issue Type - Safety, Environmental or Regulatory Impact High, Note 1 or Note 2 (From NUREG-0933), Medium.

3. Action Level - Degree of management attention need to process generic issues in accordance with established schedules
   - L1 - No management action is necessary
   - L2 - Division Director action is necessary
   - L3 - Director NRR action is necessary

4. Office/Div/Br - 1st listed has lead responsibility for resolving issue, others listed have input to resolution.

5. Task Manager - Name of assigned individual responsible for schedule updating.

6. Tac Number - Each issue should be assigned a TAC #.

7. Title - Generic Issue Title.

8. Work Authorization - Who or what authorized work to be done on generic issue.

9. Contract Title - Provide Contract Title (if contract issued).

10. Contractor Name/ FIN No. - Identify Contractor Name and FIN Number (as appropriate). If contract is not yet issued, indicate whether the contract is included in the FIN plan.

11. Work Scope - Describes briefly the work necessary to technically resolve and complete the generic issue.

12. Affected Documents - Identifies documents that the technical resolution will be incorporated into to identify new criteria.

13. Status - Describes current status of work.

14. Problem/Resolution - Identifies potential problem areas and describes what actions are necessary to resolve them.

15. Technical Resolution - Identifies detailed schedule of milestone dates that are required for completing the issue through the issuance of the SRP revision or other change that documents requirements.

Milestones - Selected significant milestones. The "original" schedule remains unchanged. Changes in schedule are listed under "Current". Actual completion are listed under "Actual".

TYPICAL MILESTONES

Other Division Involvement	Original	Current	Actual
o Date information requested from Division			
o Date received from Division			
Contractor Information			
o Proposal Solicited			
o Proposal Evaluated and Accepted			
o Contract Schedule, if applicable			
o Testing Schedule, if applicable			
o Draft NUREG/CR report from contractor/consultant			
Staff review of draft NUREG/CR report			
Value Impact Statement prepared (coordinated with SPEB and RRAB as applicable)			
Final report prepared by Division (include SPEB preliminary comments and SRP revision)			
---------- 2 wks			
Final report forwarded to DST for processing			
---------- 2 wks			
CRGR Package to NRR Director for Review			
---------- 1 mo			
OMB Clearance obtained concurrently if applicable			

Review Package to CRGR

---------- 1 mo

CRGR review and EDO approval completed

---------- 1 mo

Federal Register Notice of Issuance of SRP for Public Comment

---------- 3 mo

Division review of public comments completed

---------- 2 wks

Comments incorporated and transmitted to DST for processing

---------- 2 wks

Final CRGR package to NRR Director for review

---------- 1 mo

Review Package to CRGR

---------- 1 mo

CRGR review and EDO approval completed

---------- 1 mo

Federal Register Notice of Issuance of SRP

GENERIC ISSUE MANAGEMENT CONTROL SYSTEM

Issue Number	Issue Type	Action Level	Office/Div/Br	Task Manager	Tac No
		Active-L1	NRR/	TBP	TBP

Title ----------

Work Authorization --- Memorandum to from H. R. Denton dated

Contract Title ------- To Be Provided.

Contractor Name/
FIN No. ---------- To Be Provided.

Work Scope ---------- To Be Provided.

Affe[illegible] Documents --- To Be Provided.

Status ---------- To Be Provided.

Problem/Resolution --- To Be Provided.

Technical Resolution - To Be Provided.

Milestones	Original	Current	Actual
New Issues - Schedule To Be Developed			

As of First Quarter FY-84

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SURNAME ▶						
DATE ▶						

SEP 10 1985

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