

ADDENDUM
to
MEMORANDUM OF UNDERSTANDING
between
U.S. NUCLEAR REGULATORY COMMISSION
and
ELECTRIC POWER RESEARCH INSTITUTE
on
COOPERATIVE NUCLEAR SAFETY RESEARCH

Seismic Issues Associated with Reactor Coolant System Piping

Background

The U.S. Nuclear Regulatory Commission (NRC) and the Electric Power Research Institute (EPRI) signed a Memorandum of Understanding (MOU) on November 25, 1997, to allow and encourage cooperation in nuclear safety research, which provides benefits for both NRC and industry. These benefits include technical information exchange and cost sharing, whenever such cooperation and cost sharing can be accomplished in a mutually beneficial manner.

Purpose

The NRC has had numerous initiatives underway to make improvements in its regulatory requirements that would reflect current knowledge about reactor risk. The overall objectives of risk-informed modifications to reactor regulations include:

- (1) Enhancing safety by focusing NRC and licensee resources in areas commensurate with their importance to health and safety;
- (2) Providing NRC with the framework to use risk information to take action in reactor regulatory matters, and
- (3) Allowing use of risk information to provide flexibility in plant operation and design, which can result in reduction of burden without compromising safety, improvements in safety, or both.

In stakeholder interactions, one candidate area identified for possible revision was emergency core cooling system (ECCS) requirements in response to postulated loss-of-coolant accidents (LOCAs). The NRC considers that large break LOCAs to be very rare events. Requiring reactors to conservatively withstand such events focuses attention and resources on extremely unlikely events. This could have a detrimental effect on mitigating accidents initiated by other more likely events. For this and related reasons, the NRC is considering rulemaking to modify 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling for Light Water Cooled Nuclear Power Reactors," in order to provide an alternative set of risk-informed requirements with which licensees may voluntarily choose to comply in lieu of meeting the current emergency core cooling system requirements in 10 CFR 50.46.

The proposed rule would divide the current spectrum of LOCA break sizes into two regions.

The division between the two regions is delineated by a "transition break size" (TBS)^[1]. The first region includes small size breaks^[2] up to and including the TBS. The second region includes breaks larger than the TBS up to and including the double-ended offset guillotine break (DEGB) of the largest RCS pipe. Pipe breaks in the smaller break size region are considered more likely than pipe breaks in the larger break size region. Consequently, each region will be subject to different ECCS requirements, commensurate with likelihood of the break.

The NRC approach for the selection of the TBS is to use the frequency estimates of various degradation-related pipe breaks as a starting reference point. The frequencies for degradation-related breaks represent generic information, broadly applicable for indicating the trend of the frequency as the break size increases. There are other important considerations in estimating overall frequencies, in addition to the degradation-related frequency estimates, including:

- a. LOCAs caused by failure of active components, such as stuck-open valves and blown out seals or gaskets; and,
- b. seismically-induced LOCAs, both with and without material degradation.

Seismically-induced break frequencies vary from plant to plant because of site seismicity and design considerations and are affected by the amount of degradation occurring prior to postulated seismic events. The NRC is conducting a scoping study to evaluate seismic-induced break frequencies to provide an additional basis to confirm the selection of the TBS. This study is also aimed at identifying an approach which a licensee may implement, on a plant-specific basis, to use the proposed rule.

Objectives

Considerable seismic research has been accomplished by both the NRC and industry. EPRI has been leading the industry's research in this area. Several past studies have generated data and information that is germane to the above issue. In addition, the industry, through EPRI, may have or be able to generate information such as plant models, seismic analysis results, and experimental data, which can be used independently by both parties to develop estimates of break sizes and by the NRC to develop the regulatory basis for the proposed rule.

Therefore, the objective of this collaborative effort is to enable and expedite the exchange of technical information, to encourage participation in program reviews and to avoid unnecessary replication of research tasks between industry and NRC. The specific objectives of this cooperative program are to:

1. ensure the timely exchange of information on past, planned and ongoing activities;
2. ensure the sharing of data needed by the NRC and EPRI research programs;
3. ensure the timely sharing of research results and tools; and,
4. develop data needed to support risk-informed applications.

¹ Different TBSs for pressurized water reactors (PWRs) and boiling water reactors (BWRs) are being established due to the differences in design between these two types of reactors.

² "Break" in the term "TBS" does not mean a DEGB; rather, it relates to an equivalent opening in the reactor coolant boundary.

Scope and Plan

This program includes a wide variety of collaborative activities (including information exchange meetings, support for expert panels, jointly-sponsored experiments) aimed at achieving the preceding objectives. The program elements are as follows:

1. Programmatic Information Exchange. Both parties will exchange information concerning the objectives, milestones, and planned approaches for each party's ongoing seismic research tasks.
2. Technical Information Exchange. Both parties will facilitate the exchange of technical information needed to satisfactorily complete each party's seismic research tasks. This includes the support of working meetings between researchers (on an agreed upon as-needed basis), responding to data requests, and the timely exchange of research results and seismic tools.
3. Other Parties. Recommendations concerning the participation of other parties (domestic and international) will be developed jointly and presented to management during program and management review meetings, as needed.

All EPRI data subject to commercial or other use restrictions will be reviewed by NRC in accordance with the addendum to the EPRI/NRC Memorandum of Understanding of Cooperative Nuclear Safety Research entitled "Treatment of NRC Proprietary and EPRI Commercial Information:" to determine whether the public interest in disseminating information generated through the use of NRC funds is adequately protected in light of the EPRI use restrictions. In those cases where the NRC makes an affirmative determination, the cooperative research may proceed on that basis. In those cases where the NRC does not make such an affirmative determination, NRC will return the EPRI data and the project will be suspended pending further consideration by EPRI of the proposed use restrictions. Should the parties fail to agree on appropriate use restrictions, the project will not proceed.

Some of these program elements may be investigated mainly by either the NRC or EPRI, while others may be investigated collaboratively. In any event, the NRC and industry will not draw joint conclusions as to the application of the data to regulation, which shall be done independently. However, as warranted, NRC will complete an analysis of the data and results that is independent of industry/EPRI analysis. This cooperative research program does not require that EPRI provide NRC with evaluations, analysis, assessments, or recommendations on seismic issues.

Cost and Schedule

The costs of this cooperative program (above and beyond the costs of the existing nuclear materials R&D programs of both parties) are associated with the support of: (a) semi-annual cooperative R&D program review meetings, (b) management program review meetings, (c) working meetings between researchers, (d) responses to data requests, and (e) the activities identified above. Additional costs will be incurred if other parties (especially international parties) are added to the program. EPRI and NRC are responsible for their own costs in implementing this Addendum. With respect to any of NRC's cost responsibilities, this agreement is subject to the availability of appropriated funds.

The activities to be performed under this project may be funded individually or collectively by the NRC and EPRI. Accordingly, the NRC and EPRI must coordinate proposed contract actions prior to either party entering into an agreement. To avoid confusion and maintain consistent project direction, the project managers will discuss matters related to project direction prior to the performance of the activities by the contractor.

Period of Performance:

The initial period of performance will be October 1, 2005 to December 31, 2006, to be extended if beneficial to both the NRC and EPRI.

Project Direction and Coordination:

All technical interactions will be managed through a single designated point of contact for each party – the assigned Project Manager. Technical meetings to coordinate this effort and to assess progress will be arranged through the respective project managers for each organization. Schedules for program reviews will be distributed at least 30 calendar days in advance of the meeting, and agendas will be distributed 15 calendar days in advance of the meetings. The project managers will disseminate reports and other information about the programs to relevant individuals within their respective organizations. The project managers are:


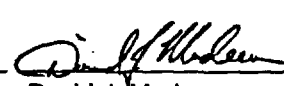
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Dispute

If a dispute arises out of or relating to this Agreement, or any breach thereof, the parties will first attempt to settle the dispute through direct negotiation between the respective project managers. If such dispute cannot be settled by the respective project managers, the dispute shall be submitted to the Director of the Office of Nuclear Regulatory Research, USNRC, and the Vice President and Chief Nuclear Officer, EPRI.

AGREEMENT

	10/1/05		10/01/05
Carl J. Paperiello	Date	David J. Modeen	Date
Director		Vice President and Chief Nuclear Officer	
Office of Nuclear Regulatory Research			
U.S. Nuclear Regulatory Commission		Electric Power Research Institute	