

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

**FIRE RISK (Revision 3)**

I. Introduction

This Addendum to Memorandum of Understanding (the "Addendum") is entered into by and between the U.S. Nuclear Regulatory Commission (the "NRC") and the Electric Power Research Institute, Inc. ("EPRI") effective as of the date of signature of the last of the parties to execute this Addendum (the "Effective Date"). NRC and EPRI are parties to that Memorandum of Understanding on Cooperative Nuclear Safety Research dated March 14, 2007 (the "MOU"). Pursuant to the MOU, the parties agreed to encourage cooperation in nuclear safety research, which provides benefits for the NRC, the nuclear power industry (the "Industry"), and the public.

This Addendum describes a cooperative research and development program in the area of nuclear power plant (NPP) fire risk assessment (FRA) research and development (R&D) between EPRI and the NRC's Office of Nuclear Regulatory Research (NRC-RES). This addendum replaces the previously signed Addendum on Fire Risk dated October 30, 1998, Addendum on Fire Risk (Rev. 1) dated May 18, 2001, and Addendum on Fire Risk (Rev. 2) dated January 14, 2009 between NRC-RES and EPRI.

The NRC-RES and EPRI are currently supporting a number of efforts aimed at enhancing the state-of-the art knowledge of the contributors to fire risk and improving current FRA techniques and applications. NRC also has a research program aimed at improving FRA methods, tools, data, and insights. NRC and EPRI have previously collaborated on activities to improve the technology for assessing the risk from circuit failure issues, guidance for using fire models, and fire PRA methodologies. EPRI FRA activities include work in the areas of fire events data collection and evaluation, fire modeling (including code comparisons), improved FRA techniques and applications, and performance-based fire protection methods development. EPRI previously developed a collaborative effort with Nuclear Electric Insurance Limited (NEIL) for the collection and sharing of fire event data, and has performed research supporting the development by the Nuclear Energy Institute (NEI) of a risk-informed approach for addressing fire-induced circuit failure issues. EPRI and NRC have independently participated on a National Fire Protection Association committee developing a risk-informed, performance-based standard for nuclear power plant fire protection (NFPA 805); in a revision to the fire protection Significance Determination Process; and on an ANS committee for the Fire Probabilistic Risk Assessment Standard (ANS 58.23-200)

## II. Goals & Objectives

The objective of the ongoing NRC-RES and EPRI fire R&D programs is the improvement of FRA methods, tools, data, and technical information useful to the regulator and industry. Objectives of this cooperative program include the following:

1. To ensure the timely exchange of information (e.g., objectives, milestones) on planned and ongoing research activities to foster collaboration and prevent duplicate activities;
2. To ensure the sharing of technical data needed by the NRC-RES and EPRI R&D programs;
3. To ensure the timely sharing of R&D results and tools;
4. To improve FRA data needed to support risk-informed applications; and
5. To improve capabilities of current and advanced FRA methods and tools.
6. To actively collaborate on mutually beneficial experimental projects.

## III. Scope and Plan

This program includes a wide variety of collaborative activities (including information exchange meetings, support for expert panels, jointly-sponsored projects and 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 their ongoing FRA R&D tasks. This activity has been in place since 1998.
2. Technical Information Exchange. Both parties will facilitate the exchange of technical information needed to satisfactorily complete each party's FRA R&D tasks. This includes the support of an annual fire risk research program review meeting (ongoing since 1998), to be hosted by each party on an alternating basis. It also includes 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 FRA tools.
3. Jointly-sponsored and Cooperative Projects. NRC-RES and EPRI will pursue work on the following projects.
  - A. Fire Risk Assessment (FRA).

EPRI and NRC-RES will continue to participate in joint activities to provide improved guidance on conducting state-of-the-art FRAs using the methods, tools, and data developed under the NRC Fire Risk Research Program, EPRI Fire Technology Program, joint research conducted as part of other projects under this Addendum, as well as other pertinent research programs within the two organizations. Collaboration includes projects such as an update to EPRI 1011989 - NUREG/CR-6850, "Fire PRA Methodology for Nuclear Power Facilities," document lessons learned and insights from the application of fire PRA methodologies, including examination and updating of PRA results based on applicable operational data, and develop a Low Power/Shutdown Fire Risk Methodology.

B. Fire Modeling.

The NRC-RES and EPRI will continue to jointly participate in a number of activities intended to develop guidance for NPP fire protection risk assessment engineers in the use of fire modeling, particularly in performance-based/risk-informed applications. Collaboration includes projects such as Fire Model Validation and Verification, and Fire Model Users Guide.

C. Human Reliability Analysis (HRA)

NRC-RES and EPRI will continue to work jointly to build upon the HRA guidance provided in NUREG/CR-6850/EPRI 1011989. This work will develop the methodology and guidance, building upon existing HRA methods, for performing detailed HRA for the human actions credited in a fire PRA for achieving safe shutdown under post-fire conditions.

D. Seminars/Workshops

NRC-RES and EPRI will collaborate to conduct seminars and workshops in the following areas, FRA following the NUREG/CR-6850 (EPRI 1011989) methodology, and fire modeling seminars that will use information jointly developed by the NRC-RES and EPRI and documented in NUREG-1934 (EPRI 1019195).

All EPRI data and materials subject to commercial or other use restrictions will be submitted to the NRC under a general affidavit addressing all documents, data and materials to be shared with the NRC pursuant to this Addendum and requesting that such documents, data and materials be withheld from disclosure to the public pursuant to 10 C.F.R. §2.390 as provided in the MOU. Should the NRC reject EPRI's request to withhold the EPRI data or materials from public disclosure, the project will not proceed.

E. Testing

Technical collaboration on testing will be pursued for projects that are producing data to improve the state-of-the-art knowledge for the application of FRA. For which collaboration will produce an enhanced end product.

F. Data Collection Sharing

There are numerous databases available to EPRI that would improve the understanding and quantification of FRA. NRC-RES and EPRI will collaborate on data collection and analysis projects as appropriate.

All EPRI data and materials subject to commercial or other use restrictions will be submitted to the NRC under a general affidavit addressing all documents, data and materials to be shared with the NRC pursuant to this Addendum and requesting that such documents, data and materials be withheld from disclosure to the public pursuant to 10 C.F.R. §2.390 as provided in the MOU. Should the NRC reject EPRI's request to withhold the EPRI data or materials from public disclosure, the project will not proceed.

IV. Period of Performance

The initial period of performance will be from the Effective Date through September 30, 2016, to be extended or revised in writing if mutually agreeable to EPRI and NRC.

V. Project Direction and Coordination:

All technical interactions will be managed through a single designated point of contact for each party (the "Project Contacts"). Technical meetings to coordinate this effort and to discuss project progress will be arranged through the respective Project Contacts. The Project Contacts are:

<b>NRC:</b> Mark Henry Salley Chief, Fire Research Branch Office of Nuclear Regulatory Research Mail Stop CSB C4A07M Washington, DC 20555-0001 301-251-7613 <a href="mailto:MarkHenry.Salley@nrc.gov">MarkHenry.Salley@nrc.gov</a>	<b>EPRI:</b> Ken Canavan Senior Manager, Plant Technology Group Electric Power Research Institute, Inc. 1300 West WT Harris Blvd Charlotte, NC 28262-2867 704-595-2731 <a href="mailto:kcanavan@epri.com">kcanavan@epri.com</a>
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VI. Cost and Schedule

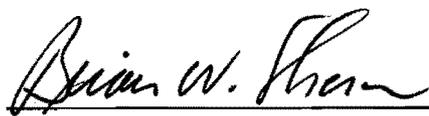
EPRI and the NRC are responsible for their respective costs in implementing this Addendum. The costs of this cooperative program (above and beyond the costs of the existing FRA R&D programs of both parties) are associated with the support of a) annual FRA cooperative R&D program review meetings, b) working meetings between researchers, c) responses to data requests, and d) the activities identified under Item III.3 above. Additional costs may be incurred if other parties (especially international parties) are added to the program. Key milestones, contingent upon the availability of adequate funding, follow. This Addendum does not obligate any funds and its implementation is subject to the availability of appropriated funds.

<u>Dates</u>	<u>Task</u>	<u>Milestone</u>
In Process		Revision 3 of the Fire Risk Addendum
Spring 2010		NRC/EPRI management meeting
1998 - 2016	A	Fire Risk Assessment
2007 - 2016	B	Fire Modeling
2007 - 2016	C	Human Reliability Analysis (HRA)
2007 - 2016	D	Seminars/Workshops
2008 - 2016	E	Testing
2010 - 2016	F	Data Collection

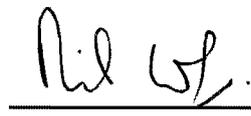
VII. Dispute

If a dispute arises out of or relating to this Addendum or any breach thereof, the parties will first attempt to settle the dispute through direct negotiation between the Project Contacts. If such a dispute cannot be settled by the Project Contacts, the dispute shall be submitted to the Senior Management Contacts (as defined in the MOU) for resolution.

AGREEMENT

 7/2/10

Brian W. Sheron, Director  
Office of Nuclear Regulatory Research  
U.S. Nuclear Regulatory Commission

 7-27-10

Neil Wilmshurst  
Vice President, Nuclear  
Electric Power Research Institute