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

Digital Instrumentation and Control and Human Factors

I. Introduction

This Addendum to the Memorandum of Understanding (the Addendum) is entered into by and between the U.S. Nuclear Regulatory Commission (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). The NRC and EPRI are parties to that Memorandum of Understanding on Cooperative Nuclear Safety Research (the MOU, found under Enclosure 1). Pursuant to the MOU, the parties agreed to encourage cooperation in nuclear safety research, which provides benefits for NRC, the nuclear power industry (the Industry), and the public.

This Addendum to the MOU is authorized pursuant to Section 31 of the Atomic Energy Act (AEA) and/or Section 205 of the Energy Reorganization Act (ERA). The roles, responsibilities, terms, and conditions of this Addendum to the MOU should not be interpreted in a manner inconsistent with and shall not supersede applicable Federal laws and regulations.

This Addendum describes a cooperative research and development program in the area of nuclear power plant (NPP) digital instrumentation and control (I&C) and human factors (HF) research and development (R&D) between EPRI and the NRC's Office of Nuclear Regulatory Research (RES).

II. Objectives

The objective of the ongoing RES and EPRI digital I&C and HF R&D programs is the improvement of digital I&C and HF methods, tools, data, and technical information useful to the NRC and the industry. The specific objective of this cooperative program is to share information (e.g., objectives, milestones, technical data, and results) on and/or costs related to planned and ongoing research activities where appropriate and mutually beneficial.

This cooperative program has the following specific objectives:

- Ensure the timely exchange of information (e.g., objectives, milestones) on planned and ongoing research activities.

- Ensure cooperation in sharing information and/or costs, where appropriate and mutually beneficial, related to technical data needed by the RES and EPRI R&D programs.

- Develop I&C analysis methods, tools, and/or data to support licensing of digital I&C systems.

- Ensure the timely sharing of R&D results and tools.

- Assess the capabilities of current and advanced I&C technology, methods, and tools.

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:

- Programmatic Information Exchange. Both parties will exchange information concerning the objectives, project scopes, milestones, planned approaches, and schedules for their ongoing digital I&C and HF R&D tasks.

- Technical Information Exchange. Both parties will facilitate the exchange of technical information between researchers and project managers. This technical exchange is particularly important in cases where, to avoid unnecessary duplication of research, EPRI and RES agree to a division of effort on the basis of complete exchange of research results. It also includes support of working meetings between researchers (on an agreed upon as-needed basis).

- Collaborative Research for I&C Issues. EPRI and RES are supporting a number of initiatives aimed at improving the implementation of digital I&C and HF in commercial nuclear facilities. Cooperative efforts will include but not be limited to the following research areas:

    - Technical elements related to fundamental design principles and modernization of NRC's regulatory infrastructure related to I&C.

    - Digital I&C system operational experience, inventory, characterization, and analysis of digital I&C systems in nuclear and other industries using safety critical equipment.

    - Security of digital I&C systems, cyber security assessment methods, lessons learned from operating experience, impact of security vulnerabilities on safety systems.

    - Digital I&C operator and human factors issues including time responses for manual actions, adequacy of controls & displays, computerized procedures, soft controls, and effects of degraded I&C on human performance.

- Other Parties: EPRI and RES will solicit participation of other nuclear industry groups in this effort. Recommendations concerning the participation of other parties, whether

domestic or international, will be jointly developed and reviewed with EPRI and RES management.

- Future Collaboration Areas: Additional digital I&C and HF activities to be Identified and added as appropriate—EPRI and RES will continue to jointly participate, when appropriate, in the identification of additional areas of mutual interest for joint collaborative activities that will be added to this Addendum.

All technical information will be managed through a designated point of contact for each party and will be held as confidential by US NRC RES per the terms of this MOU.

IV. Period of Performance

The initial period of performance will be from the effective date through September 30, 2021, to be extended in writing if mutually agreeable to EPRI and RES.

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:

NRC I&C: Ian Jung Chief, Instrumentation, Controls and Electrical Engineering Branch Office of Nuclear Regulatory Research U.S. Nuclear Regulatory Commission NRC Human Factors: Sean Peters Chief, Human Factors and Reliability Branch Office of Nuclear Regulatory Research U.S. Nuclear Regulatory Commission	EPRI: Robert Austin Program Manager Electric Power Research Institute, Inc. 1300 West W.T. Harris Boulevard Charlotte, NC 28262 704-595-2029 raustin@epri.com

VI. Costs and Schedule

EPRI and RES are responsible for their respective costs in implementing this Addendum. This addendum does not create any binding obligation or enforceable right of action of any kind on the part of either party. This Agreement does not obligate any funds and is subject to the availability of appropriated funds.

The costs of this cooperative program (above and beyond the costs of the existing digital I&C and HF R&D programs of both parties) are associated with the support of (1) working meetings among researchers and (2) management review meetings for the purpose of programmatic and technical information exchange, and identification of collaborative R&D projects. These meetings will be held on an as-needed basis.

Until such time as specific collaborative projects are identified and agreed to, no specific milestones have been established.

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 the Project Contacts cannot settle such a dispute, the dispute shall be submitted to the Senior Management Contacts (as defined in the MOU) for resolution.

AGREEMENT

/RA/	**9/28/16**
Michael F. Weber	Date
Director of Nuclear Regulatory Research	
U.S. Nuclear Regulatory Commission	

/RA/	**9/30/16**
Neil Wilmshurst	Date
Vice President and Chief Nuclear Officer	
Electric Power Research Institute	