

# **NEPO PROGRAM REVIEW**

**Presentation to NERAC**

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## **Implementation of FY 2002 NEPO Program**

### **Program Re-direction**

- **In response to September 11, funds from NEPO FY2002 are being diverted to support Threat Assessment/Mitigation tasks based on the initial EPRI/NEI efforts currently underway and to develop a road map for future R&D work related to nuclear power plant security.**

- **The tasks will be funded through \$400,000 that was held back as contingency funds and the withdrawal of currently approved FY 02 tasks totaling about \$600K. The current plan is to discontinue the following projects:**

- 3-8.5: Cable Condition Monitoring Database**

- 5-117: R&D Needs to Address Potential Vulnerabilities Arising From Transmission Grid Voltage Inadequacies**

- 5-204: Qualification of Commercial Digital Components for Replacement of Obsolete Equipment in Nuclear Safety Systems**

- 5-235: Dissolution of Fuel Cladding Oxide in High Duty PWRs**

- **Net added funding assigned to NEPO by DOE was ~\$0.5 million of the \$2 million FY 02 increase provided by Congress; The reductions prevented the funding of projects:**

- 3-29: Motor Rewind Insulation System Development and Qualification for Harsh Environments**

- 3-212: Aging Data for Long-term Reliability of SSCs**

- **5-202: Guidelines for the Monitoring of Aging I&C System Electronic Boards**

- **5-229: Guidelines for Wireless Technologies**

## **Benefits of NEPO R&D**

- **The primary objective of NEPO is to help assure that current plants continue to deliver safe, adequate, and affordable energy to up to 60 years of plant life by:**
  - **resolving open issues related to aging mechanisms and by applying new technologies to improve the cost-effectiveness and predictability of the life cycle management process, and**
  - **developing and applying the best technology to enhance plant safety, reliability, and productivity.**
  
- **The NEPO projects have been formulated to make the maximum contribution to this objective. A diagram of the links between the projects and the objective has been prepared for aging research.**
  
- **The DOE and EPRI staff have prepared summaries of the NEPO R&D done to date, including identification of the reports that have been issued.**

## **Summary of NEPO Results**

- **Zinc addition to the primary coolant of PWRs can reduce dose rates and mitigating PWSCC effects, including reactor vessel head cracking. Experiments have shown that the zinc additive will not precipitate at operating temperatures, clearing the way for its use in PWR plants.**
- **Identified three NDT techniques that can be deployed for in-situ measurements of irradiation-induced swelling in PWR core internals fabricated from austenitic stainless steels: eddy current, ultrasonic, and electropotential methods.**
- **Developed an improved screening basis for evaluating the likelihood of thermal cycling in PWR branch line piping.**
- **Provided technical justification for reducing current ASME Code stress intensification factors for tees and branch connections.**
- **Provided guidelines for addressing fatigue environmental effects (i.e., effects of reactor water coolant environment, fatigue of pressure boundary components, frequency of pipe leakage) as well as for fatigue management during the extended operating life.**
- **Obtained results to provide to support licensing applications for an increase in maximum fuel burnup.**
- **Established that connector sealing systems can prevent moisture entry to coaxial cables during severe accident conditions and identified procedures to assure correct assembly of the connector during installation.**
- **Developed training aids for use in training personnel in assessing the aging of cables for low-voltage instrumentation, control, and power, using visual/tactile methods.**

## **Summary of NEPO Results (Cont'd)**

- **Developed a pilot application, for safety-related applications, of the acceptability of a commercially available smart pressure transmitter with broad applicability as a replacement for obsolete analog transmitters. The method has potential evaluating commercial grade digital equipment to assess its adequacy for nuclear safety applications.**
- **Up-dated the guide to address and resolve digital up-grade issues in the design, evaluation, and licensing processes. A failure analysis-based approach is provided to manage risk related to digital-specific issues, including software common cause failures and the use of defense-in-depth and diversity evaluations to confirm that adequate backups exist.**
- **Developed the Human Performance Assistance Package (HPAP) for identifying and applying leading indicators of human performance to an organization, consisting of three components: Proactive Assessment of Organizational and Workplace Factors (software), Leading Indicators of Organizational Health (developed from existing data), and Corrective Action Research and Evaluation (software). The software was tested successfully in a nuclear plant**
- **Developed two techniques for proactive management intervention to respond quickly to rapidly initiating corrective-action processes: Proactive Assessment of Organizational and Workplace Factors, a software assessment program, and Leading Indicators of Organizational Health, a set of non-software self-assessment measures.**

## **Prospects for FY 2003**

- **DOE has zeroed out NEPO in its FY 2003 budget submission.**
- **EPRI and its Nuclear Power Council (NPC), made up of senior nuclear utility executives, are disappointed by this decision.**
- **The following actions are being taken:**
  - **The Nuclear Energy Institute has testified to Congress that NEPO should be restored at the \$15 million level for FY 2003.**
  - **The NPC is preparing a letter to Congress recommending that NEPO be continued at the level of \$15 million.**
  - **EPRI is sponsoring on its own the annual NEPO Workshop to gain input for purposes of identifying the most valuable projects that should be pursued in FY 2003. The Workshop will be held in Charlotte in May. A FY 2003 project concept solicitation and selection process has been defined and is being distributed to potential workshop attendees.**
  - **Copies of the NEI testimony (excerpt), NPC letter draft, and a draft of the project solicitation/selection process are being provided to NERAC.**

## **Operating Plant Subcommittee Comments**

- **The on-going NEPO projects are being carried out competently, are producing valuable results, and are benefiting from input from the Nuclear Regulatory Commission, the National Labs, INPO, and the universities, as well as from the nuclear utilities.**
- **The program to date is meeting the needs originally identified by the President's Committee of Scientific and Technical Advisors (PCAST) when it recommended that the NEPO program be initiated.**
- **DOE is urged to maintain its support for a continuation of NEPO.**