

April 14, 2006

## **NRC REPORT**

### **1.0 Key Topics**

#### **1.1 License Renewal**

Updating of License Renewal Guidance Documents (LRGDs) - The LRGDs consist of GALL report, SRP-LR, RG 1.188, and NEI 95-10. These guidance documents were developed for the license renewal (LR) review process to be more effective and efficient. It has been in use for LR application since 2001. Based on the experience gained from LR review process, the applicants and the staff have been finding a need for upgrading the documents to address newly identified aging components, emerged new technical issues, and revisions to various aging management programs (AMPs). For this effort, the industry has been very responsive by standardizing their LR application format to gain further efficiency and to reduce the time spent on reviewing LR applications. The LRGDs updating process required the public and industry participation on the basis and justification for the updating all the changes and documenting the basis thereof. The final LRGDs (revision 1) were completed on 9/30/2005.

- Applications Currently Under Review
  - Browns Ferry, Units 1,2, and 3 (Ready to be issued)
  - Brunswick 1 & 2
  - Nine Mile Pt. 1 & 2
  - Palisades
  - Monticello
  - Oyster Creek
  - Pilgrim
  - Vermont Yankee
- Future Submittals of Applications
  - Susquehanna Units 1 and 2 - July - September 2006
  - Entergy Plant - July 2006
  - Wolf Creek - September 2006
  - Fitzpatrick July 6
  - Entergy Jan 2007
  - Beaver Valley Jan - March 2007
  - Vogtle Jan 2007

#### **1.2 10 CFR 50.69**

A regulatory guide is expected to be issued soon (RG 1.201)

#### **1.3 Fire Protection Rulemaking**

FPL intends to adopt the NFPA performance-based fire protection standard, NFPA 805. Duke Power's Oconee and Progress Energy's Harris are the pilot plants for the new regulation.

An NRC team performed its first NFPA 805 pilot observation visit of transition activities at Oconee and Harris, in November 2005.

Generic Communications necessary to clarify regulatory expectations issued in final or draft form.

Draft Reg Guide DG-1139 for NFPA 805 was issued for public comment. A SRP for NFPA 805 updates are planned.

Industry appears to be separating into three groups:

1. Plants that plan to achieve compliance via NFPA 805 (37 plants)  
25 Appendix R, 12 non-App R; 31 PWR, 6 BWR; Region 1 - 3 plants (out of 26), Region 2 - 16 plants (out of 33), Region 3 - 11 plants (out of 24), Region 4 - 7 plants (out of 21)
2. Plants waiting to learn from the NRC/Industry NFPA 805 pilot experience
3. Plants who plan to maintain their deterministic FP licensing basis.

The staff recommended to the Commission that the draft rule on post-fire operator manual actions be withdrawn (10 CFR 3G(2)).

The staff extended the public comment period for its draft generic letter on post-fire safe shutdown circuit analysis spurious actuations until Feb 6, 2006.

#### 1.4 Risk-Informed Regulation Implementation Plan:

The staff provided to the Commission an update of the risk-informed regulation implementation plan (see SECY-04-199 dated October 28, 2005)

#### 1.5 Power Upgrades

NRC expects 18 power upgrade applications from 2006 through 2010 that would add about 1,277 megawatts of new electrical generating capacity. The following plants have submitted power upgrades that are currently under review by NRC: Vermont Yankee, Browns Ferry, Beaver Valley, Calvert Cliffs, Fort Calhoun, Ginna, Seabrook, and Hope Creek.

NRC's Advisory Committee on Reactor Safeguards (ACRS) recommended in a Jan. 4 letter that Entergy's 20% upgrade request for Vermont Yankee should be approved. The ACRS recommendation was expected based on its tentative vote at a meeting in December. In the letter, the ACRS said it believed Entergy's request to make a change in the licensing basis for containment overpressure credit should be granted along with the staff's upgrade decision. The ACRS noted that much attention has been focused on the unit's steam dryer, particularly since several cracks have been found. But the ACRS said it expects that Entergy's planned power ascension program and additional inspections of the steam dryers would catch any problem before "substantial damage" is inflicted.

#### 1.6 Report on," Evaluation of Loss of Offsite Power Events at Nuclear Power Plants: 1986-2003" (NUREG/CR 6890 dated December 2005)

In December 2005, NRC issued a report titled, NUREG/CR 6890, "Evaluation of Loss of Offsite Power Events at Nuclear Power Plants: 1986-2003." This report is an update of two previous analyses of loss of offsite power (LOOP) event at U. S. Commercial nuclear power plants. Frequency and duration estimates for critical plant operation and shutdown operations were generated for five categories of LOOPs (plant centered, switchyard centered, grid related, severe weather related, and extreme weather related). **Overall findings are LOOP frequencies have significantly decreased in recent years during plant operation, while**

**LOOP durations have increased.** This information is needed for probabilistic risk assessment models of U.S. plants to accurately model current risk from LOOP and associated station blackout scenarios. LOOP is a loss of offsite power to all safety buses, while a station blackout is the loss of all offsite and onsite ac power to the safety buses.

#### 1.7 Set Point Calculation: Method 3

The staff has questioned about the adequacy of a methodology used to calculate settings for instruments that monitor operational safety limits at nuclear power plants. At issue is "Method 3" as defined in ISA S67.04, Part II (1994). About 70% of power reactor licensees use Method 3. The Allowable values (AVs) calculated using Method 3 may not provide adequate margin to assure that the analytical limit is not violated. AV must ensure that the probability of trip at Analytical Limit (AL) is never less than 95% but with Method 3 failure to trip is always more than 5%. The details of the dispute with the nuclear industry over Method 3 are technically complex.

NEI is currently working on a TSTF to provide changes to the standard tech specs in accordance with the NRC staff's guidance provided during several meetings and in various letters from 2005. The current due date for these changes was Friday, January 20, 2006. The staff will review the proposed changes, and if acceptable to the staff, a safety evaluation will be written and a CLIIP generated. All 6 current STS NUREGs would be revised as a result. The NRC staff is also preparing a generic communication (currently a RIS) that would accompany the staff's endorsement of the tech spec changes

#### 1.8 10 CFR 50.46

The staff issued a proposed rule offering a risk-informed approach to emergency core cooling system in 10 CFR 50.46. The rule proposes the voluntary use of risk information in refining requirements for how nuclear power plants must safely handle loss-of-coolant accidents of various sizes. Comment period expired on February 6, 2006.

#### 1.9 Security Rulemaking

The Commission directed the staff to develop the technical basis for a rulemaking requiring licensees to evaluate the effects of plant changes on the interface between safety and security. The expected completion date is May 28, 2006.

#### 1.10 Final Rule - AP 1000 Design Certification

Westinghouse submitted an application for certification of its AP1000 standard plant design on March 28, 2002. NRC staff completed its review and issued NUREG-1793, "Final Safety Evaluation Report related to Certification of the AP1000 Standard Design," in September 2004. On April 18, 2005, the NRC published a proposed design certification rule (DCR) for the AP1000 standard plant design which is nearly identical to the AP600 DCR. The Commission approved a final rule amending 10 CFR Part 52 to certify the AP1000 on December 30, 2005. (SECY-05-0227 dated December 14, 2005)

#### 1.11 Issuance of NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power"

On January 9 and 10, 2006, NRC sponsored a workshop regarding the Generic Letter (GL) on "Grid Reliability, and the Impacts on Plant Risk, and the Operability of Offsite Power". The GL on the above subject was issued on February 1, 2006, to obtain the grid information concerning the status of compliance with NRC regulation on 10 CFR Part 50 Appendix A, GDC 17, "Electric power systems," 10 CFR 50.63, "Loss of all alternating current power (SBO)," and 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," and plant technical specifications (TS) for offsite power. The purpose of the workshop was to clearly identify the GL's objective and the way it relates to the above NRC regulations. The workshop was well attended by members from industry, NERC, Regional Transmission Organizations (RTOs), Independent System Operators (ISOs), the Federal Energy Regulatory Commission (FERC), as well as the State Public Utility Commissions (PUCs). (SECY-05-0219 dated December 2, 2005).

#### 1.12 Status of the Accident Sequence Precursor (ASP) Program and the Development of Standardized Plant Analysis Risk (SPAR) Models

The ASP Program systematically evaluates US nuclear power plant operating experience to identify, document and rank the operating events that were most likely to have led to inadequate core cooling and severe core damage, accounting for the likelihood of additional failures. The ASP Program provides a measure for trending core damage risk, provides a partial check on dominant core damage scenarios predicted by PRAs, and provides feedback to regulatory activities. This program has found the occurrence rate of lower risk precursors is increasing. The increasing trend is partly due to the grid-related LOOP events caused by the August 14, 2003 Northeast Blackout (3 precursors). The SPAR models were initially used to perform precursor analyses in the early 1980s. Today's Revision 3 SPAR models for internal events are far more comprehensive than their predecessors. For example, the revised SPAR models include a new, improved LOOP/SBO module, which the staff used in evaluating SBO risk as part of the agency's efforts to address issues related to the reliability of the Nations' electric power grid. The SPAR model program has completed a model for internal initiating events during LP/SD operation. The program has also incorporated external initiating events into the Revision 3 SPAR models for certain plants. (SECY-05-0192, dated October 24, 2005).

#### 1.13 NRC Participation in the Organization for Economic Cooperation and Development (OECD) Halden Reactor Project During 2006-2008

The OECD Halden Reactor Project (HRP) is a cooperatively funded international research and development project that operates under the auspices of the OECD's Nuclear Energy Agency (NEA) with the sponsorship of 19 countries, including the United States. The international organizations actively participating in the Halden project represent a cross-section of the nuclear community: licensing and regulatory interests, national research organizations, reactor and fuel vendors, and utilities. The research programs at the HRP address five areas of interest to the NRC including: (1) nuclear fuels; (2) nuclear reactor materials; performance; (3) the testing, development, and analysis of digital instrumentation and control (I&C) systems; (4) human factors research; and (5) human reliability analysis (HRA). The specific areas of I&C research are Requirements Engineering, Fault Tolerance, Pre-Developed Software, and Integrated Tool Environments. Also, HRP will establish a software engineering laboratory - the SELab - which will be an organizational unit that provides the systems and resources needed to support research, development, assessment, consultancy, and training related to safety-oriented software engineering. The staff has interacted with HRP on the development of the

next three-year program, which has resulted in HRP aligning its work with the recently revised NRC Digital System Research Plan, FY2005 - FY2009, particularly with regard to outputs. With renewed focus on measurable products (e.g., software tools, review guidance, and objective acceptance criteria), the staff believes that the research products generated from the HRP research over the next few years will aid the NRC in establishing the technical bases for realistic safety decisions regarding current and new digital system designs and technologies for safety-related applications. The agency's continued cooperation with HRP will allow access to technical information on these systems, as well as access to operational experience from European reactor operators and vendors, thereby leveraging the agency's digital I&C resources as it establishes a technical basis for reviewing these advanced systems. The Commission has approved the continued participation in the Halden Reactor Project through 2008 (SECY-05-0156 dated August 29, 2005).

#### 1.14 Risk-Informed and Performance-Based Alternatives to the Single-Failure Criterion (SFC)

The SFC requirements, found in 10 CFR Part 50.55a(h), specify that plants must meet the requirements of the Institute of Electrical and Electronics Engineers (IEEE) 279 or IEEE 603, depending on the date of the construction permit (but after January 1, 1971). Both of these IEEE standards invoke the SFC. Other NRC regulatory guides and documents have additional guidance, as do other industry consensus standards that the NRC uses.

Risk-assessment studies reveal that applying the SFC sometimes has led to redundant system elements which while providing an acceptable safety margin, have a minimal impact on risk. While maintaining adequate safety margins is a major safety objective, the benefits of assuming the worst single failure for all design-basis accidents may sometimes place unnecessary constraints on licensees. Such risk insights suggest that alternatives to the SFC may be constructed that relate more directly to quantitative functional- or system-reliability than does the current SFC, while, at the same time, maintaining appropriate defense-in-depth and adequate safety margins. These alternatives would require the safety systems to have a level of reliability commensurate with the frequency of challenges to them, and a design that addresses common cause failure, system dependencies, spatial dependencies, and multiple independent failures, which are not considered by the current SFC. In addition, alternatives may be considered which risk-inform the selection of accident sequences that are selected for design-basis analysis. This study explored potential risk-informed alternatives that would address these and other issues related to the SFC. The Commission approved the draft technical report on single-failure criterion available to the public. (SECY-05-0138 dated August 2, 2005).

#### 1.15 New Reactor Licensing Requirements

**Split commission gives staff okay to issue ANPR on new Part 53 A** divided commission has approved the staff's recommendation to issue an advanced notice of proposed rulemaking (ANPR) on approaches for making risk-informed, performance-based, and technology-neutral revisions to the reactor requirements in 10 CFR Part 50. Chairman Nils Diaz and Commissioners Jeffrey Merrifield and Peter Lyons approved the project. Commissioners Edward McGaffigan and Gregory Jaczko disapproved the staff's plan (INRC, 6 Feb., 4). Diaz said the ANPR would provide "a good mechanism for obtaining early stakeholder participation" in this task, which the staff and commission hope might culminate in a new rule, to be called 10 CFR Part 53, that would be applicable to all reactor technologies, including advanced non-LWRs. McGaffigan, however, told Platts that one has to beware of efforts that "have three hyphens." In his vote on

the staff's proposal, McGaffigan said, "We are not going to get where we need to be through fuzzy discussions of broad ambiguous concepts." McGaffigan said he favors developing detailed frameworks for each non-LWR technology. Jaczko proposed a similar approach, calling for "separate, focused" rulemakings to address the needs of specific reactor technologies.

#### 1.16 Pressurized Thermal Shock Rulemaking

**NRC staff prepares for rulemaking on pressurized thermal shock** As NRC staff finalizes its technical basis for revision of regulations to protect PWRs against pressurized thermal shock (PTS), the industry is expressing concern that the rulemaking will not be completed quickly enough to prevent some plants from running afoul of current PTS requirements and is proposing an alternative approach. The current rule — 10 CFR 50.61, last revised in 1996 — establishes fracture toughness requirements for protection against PTS based on plant-specific assessments. PTS could threaten the integrity of a PWR's pressure vessel in an abnormal situation, such as a loss-of-coolant accident, if a reactor core was severely and rapidly cooled while the vessel was pressurized. Such cooling could cause the vessel to crack, with regions embrittled by prolonged neutron bombardment at particular risk.

The preliminary results of the reevaluation suggest that no currently operating US PWR would exceed the proposed PTS criteria even after 60 years of operation under a renewed license (INRC, 16 Dec. '04, 7). However, a few plants, such as Nuclear Management Co.'s Palisades, might run up against limits in the current rule within the next few years, underscoring the urgency of revising the criteria in a timely manner, industry representatives said at the meeting.

#### 1.17 10 CFR Part 26 Rulemaking Public Workshop

On March 29 - 30, 2006, the staff held a public workshop at Headquarters to discuss the proposed rule to amend 10 CFR Part 26 on Fitness-for-Duty (FFD) and Fatigue. The proposed rule was published in the Federal Register on August 26, 2005. The purpose of the workshop was to discuss guidance for work hour controls and staff developed alternative proposals in two areas; how FFD program requirements would be applied to personnel at reactor construction sites and proposed work hour controls for normal operations and during outages. These alternate proposals were developed in response to comments submitted by stakeholders on the proposed rule.

The first day was devoted to proposed alternatives for how FFD program requirements would be applied to personnel at reactor construction sites and proposed work hour controls for normal operations and during outages. In the area of FFD program requirements at construction sites, the industry agreed that key personnel directly responsible for the quality of construction should be subject to FFD, but expressed different views about other details of the staff-proposed program for construction personnel. The meaning of "unescorted access," how it would be controlled, and its objectives were also discussed. In the area of proposed work hour controls for normal operations and during outages, the industry stated that the staff's alternative proposals (for average number of days off over a time period), would not provide them sufficient flexibility for work scheduling. The industry repeated its interest in focusing on the performance objectives in section 26.199(c), in lieu of further prescriptive limits on individual work hour scheduling.

## **2.0 Research Activities:**

### **2.1 Digital System Risk Program**

The NRC is conducting a set of research programs to develop needed information, and methods to support the use of risk information in the licensing of digital instrumentation and control systems used in nuclear power plants. This research is expected to produce a draft regulatory guide to support risk informed digital systems reviews within the next year and the supporting information in NUREG/CRs. The NUREG/CR "Current State of Reliability Modeling Methodologies for Digital Systems and Their Acceptance Criteria for Nuclear Power Plant Assessments" will be published in February 2006. The draft regulatory guide is expected to be published for public comment in September 2006.

### **2.2 On-Line Monitoring Project**

Current commercial nuclear power plant technical specifications require that all redundant safety-related instrument channels be calibrated once each refueling cycle. These types of non-optimal periodic maintenance practices are being replaced in other industries by condition-based techniques. The nuclear industry has been moving towards these condition-based practices to reduce manual calibration requirements. NRC has issued a safety evaluation report (SER) on EPRI Topical Report #104965: "On-Line Monitoring of Instrument Channel Performance". Several plants, which are participants in the EPRI On-Line Monitoring (OLM) Project, are moving towards implementation of these new technologies. Regulatory approval will be required in the form of a license amendment. The current research will provide NRC with a technical reference to support the review of On-Line Monitoring applications. A theoretical basis for the analysis of uncertainty including assumptions and their significance will be supplied, as well as a checklist to cross-reference review guidelines to standards, reports, or other documentation necessary for the proper review of safety concerns.

### **2.3 Update of the NRC Digital Systems Safety Research Plan**

The staff is in the process of updating its Digital Systems Safety Research Program Plan. The last revision (SECY-01-0155), covered research planned for FY 01-04, and the new plan will cover research planned for FY 05- 09. As part of the development of the research plan, the NRC is planning to interact with the interested stakeholders.

### **2.4 Research Project, "Effects of Switchgear Aging on Energetic Faults"**

An event at a Taiwan nuclear power plant resulted in a energetic fault and a fire that damaged medium voltage (4.16 kV) switchgears. The damage affected both safety division buses in the plant and the event resulted in a station blackout, because emergency diesels were not available on time. Since the design of switchgear was based on the US specification, such energetic faults could occur in US nuclear plants. The NRC initiated a research project to evaluate the effects of switchgear equipment aging on energetic faults and performed the sensitivity analysis. The research identified that aging of safety-related power system components could contribute and increase frequency and severity of such energetic faults if aging is not properly managed. A system level evaluation of medium voltage electrical distribution systems was conducted to examine the effects of various system transients. This task involved a review of plant electrical distribution system designs for transients. Two nuclear

plant distribution systems were modeled using a power system analysis software (ETAP) to evaluate medium voltage system operating and fault transients.

The research results are being incorporated in a NUREG/CR-XXXX report. The report is scheduled to be published in April/May, 2006. This research identified the importance of preventing maintenance and inspection of circuit breakers and relays to reduce the occurrence and severity of energetic faults and maintain overall plant safety.

## 2.5 Research Project, "Collaborative Research on Wire System Aging"

The Office of Nuclear Regulatory Research has completed the Phase 1 research on, "Evaluation of the Broadband Impedance Spectroscopy (BIS) Prognostic/Diagnostic Technique for Electric Cables Used in Nuclear Power Plants." The research results demonstrate the effectiveness of the BIS method for detecting and locating various types of cable degradation. It was feasible to detect and locate cable anomalies due to global and local aging, thermal hot spots, humidity and localized abrasions.

The research results along with the theory and principles of Broadband Impedance Spectroscopy are being incorporated in a NUREG/CR-XXXX report. The report is scheduled to be published in March/April, 2006. Also, the report will include recommendations for follow-on activities, preferably in a collaborative manner to demonstrate the effectiveness of the BIS method in nuclear plant environment.

## 3.0 NRC Rulemaking and Regulatory Guide Activities:

3.1 Regulatory Guide 1.152, Revision 2, "Criteria for Use of Computers in Safety Systems of Nuclear Power Plants," was issued in January 2006. This Regulatory Guides provides guidance for the use of computers in safety systems and includes guidance on cyber security.

3.2 Regulatory Guide 1.188, Revision 1, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses," was issued in August 2005.

3.3 Regulatory Guide 1.204, "Guidelines for Lightning Protection of Nuclear Power Plants," was issued in November 2005. Lightning protection systems should incorporate strike termination devices, discharge down conductors, and a grounding system to protect against the effects of lightning strikes. To protect against the secondary effects of lightning strikes, such as potentially disruptive surges, the LPS should also incorporate individual equipment grounding systems and surge protection devices. It endorses IEEE Std 665-1995, IEEE Std 666-191, IEEE Std 1050-1996 & IEEE Std C62.23-1995.

3.4 Draft Regulatory Guide DG-1128, which is a revision of Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants," was issued for public comment in August 2005. RG 1.97 Rev 4 is being reviewed for final issuance.

3.5 Draft Regulatory Guide DG-XXXX, "An approach for plant-specific, risk-informed decision making for digital systems," expected to be published for public comment in September 2006.



## **4.0 NUREGs**

4.1 NUREG/CR - 6888, "Emerging Technologies in Instrumentation and Controls: An Update". January 2006.

4.2 NUREG/CR-6895 Volume 1: Technical Review of On-line Monitoring Techniques for Performance Assessment, Part I State-of-the-Art," January 2006.

4.3 NUREG/CR - 6866, "Technical Basis for Regulatory Guidance on Lightning Protection in Nuclear Power Plants," expected to be published January 2006.

## **5.0 Recent NRC Generic Communications**

### **5.1 Generic Letters:**

**Generic Letter 2006-03 issued on April 10, 2006**, "Potentially Nonconforming Hemyc and MT Fire Barrier Configurations." In 1981, the NRC issued Section 50.48 of Title 10 of the Code of Federal Regulations (10 CFR), the fire protection rule. The rule requires protection of safe shutdown capabilities in the event of a fire. One means of complying with this requirement is to separate one safe shutdown train from its redundant trains using rated fire barriers. Consequently, a number of licensees installed Hemyc and MT fire barrier systems in U.S. nuclear power plants (NPPs) to protect circuits and other electrical and instrumentation components and/or systems in accordance with regulatory requirements and plant-specific commitments. In 1989, fire barrier performance became an issue with the failure of Thermo-Lag fire barriers to pass performance tests. The NRC issued several generic communications relating to nonconforming fire barrier configurations, and, based on these communications, licensees committed to take corrective actions. The staff also developed an action plan to resolve the Thermo-Lag issue. The action plan included implementation of a fire protection functional inspection program.

**Generic Letter 2006- 2 Issued on Feb 1, 2006**, "Grid Reliability, Impacts on Plant Risk, and Operability of Offsite Power." In connection with August 14, 2003, blackout event in Northeastern United States of America and a part of Canada, NRC had issued Regulatory Issue Summary (RIS) (ML040990550) on April 15, 2004 to advise nuclear power plants of the requirements of Section 50.65 of Title of the 10 CFR (10 CFR 50.65), "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," 10 CFR 50.63, "Loss of all alternating current power," 10 CFR Part 50 Appendix A, GDC 17, "Electric power systems," and plant technical specifications on operation of offsite power. Subsequent to the issuance of the RIS, the staff had issued TI (ML040360320) titled, "Offsite power system operational readiness" for these inspections on April 29, 2004. This TI was to confirm, the operational readiness of offsite power system in accordance with NRC requirements prescribed in 10 CFR Part 50, GDC-17, Plant TS for offsite power systems, 10 CFR 50.63, and 10 CFR 50.65(a)(4). After reviewing information collected via this TI, the staff determined that a generic letter is required to assess grid reliability, impacts on plant risk, and operability of offsite power.

**Generic Letter on Medium Voltage (4.16 kV) Inaccessible/Underground Cable Aging Issues.** NRC staff plans to issue a generic letter on potential degradation concerns identified in

the medium voltage underground cables during a review of the license renewal and operating experience on emergency component cooling water system cable problems at a nuclear power plant. The staff has reviewed the operational data (LERs) and finds that cables can fail due to water treeing or a decrease in a dielectric strength due to aging, if it exposed to condensation and wetting in inaccessible locations such as conduits, cable trenches, and duct banks

## 5.2 Information Notices:

IN 2005-25: "Inadvertent Reactor Trip and Partial Safety Injection Actuation to Tin Whisker"

IN 2005-28: "Inadequate Test Procedures Fails to Detect Inoperable Criticality Accident Alarm Horns"

IN 2005-30: "Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design"

IN 2005-33: "Managing the Safety/Security Interface" (For Official Use Only)

IN 2006-01: "Torus Cracking in BWR I Containment"

IN 2006-02: "Use of Galvanized Supports and Cable Trays with Meggitt Si 2400 Stainless Steel-Jacketed Electrical Cables"

IN 2006-03: January 25, 2006 "Motor Starter Failures Due to Mechanical-interlock Binding"

IN 2006-04: Feb 13, 2006 "Design Deficiency in Pressurizer Heaters for Pressurized-water"

IN 2006-05: March 16, 2006 "Possible Defect in Bussmann KWN-R and KTN-R Fuses"

IN 2006-06: "Loss of Offsite Power and Station Blackout are more probable during Summer Period"

IN 2006-09: April 11, 2006 "Performance of NRC-licensed Individuals While on Duty with Respect to Control Room Attentiveness"

## 5.3 Regulatory Issue Summaries

RIS-2005-029, "Anticipated Transients That Could Develop Into More Serious Events"

RIS-2005-30, "Clarification of Post-Fire Safe-Shutdown Circuit Regulatory Requirements"

RIS-2006-04, "Experience with Implementation of Alternative Source Terms"

## 6.0 Human Factors

The NRC initiated a new project to determine if excessive workload has been imposed on operators based on various new changes in required operator actions.

Major focus has been on developing enhancements to the reactor oversight program to include safety culture.

Comment period on fitness for duty rule making closed December 27, 2005. The staff will be considering comments and expect the final rule to be out by the end of the calendar year. See <http://www.ife.no/hrp-seghof-workshop> for workshop on Human Factors in new reactors and control rooms.

## 7.0 Need for New Standards

A standard is needed to address the security aspects of digital systems. IEEE Std 7-4.3.2-2003 did not address this topic. However, NRC has included cyber security requirements in RG

1.152, Revision 2, "Criteria for Use of Computers in Safety Related Systems of Nuclear Power Plants." A standard should be developed to address these security requirements.

A standard or good practice document should also be developed for root cause analysis.

A standard is needed to address reliability modeling of digital systems for nuclear power plant PRAs. IEEE and IEC has several standards for reliability modeling of digital systems but they were developed to support digital system design efforts, not regulatory reviews and not for inclusion in PRAs. NRC and EPRI have programs to develop methods to support this need. ANS and ASME have developed or are developing standards similar to this for general PRAs development, as well as, fire and seismic PRAs. IEEE and/or IEC should consider the need for such a standard in the digital system area.

## **8.0 Miscellaneous:**

Eight (8) years appears to be the minimum amount of time it will take to bring a new nuclear power plant on line (assumes a submission of a top-notch combined construction permit-operating license application.)

NRC issued a draft confirmatory order to Entergy Nuclear that will require the company to install backup power for the plant's emergency notification system (sirens, receivers, transmitters, and sensors) at Indian Point.

General Electric's ESBWR design certification is complete for technical review. Completion of the certification rulemaking is scheduled for fall 2008.

NRC staff would update standard review plan (SRP) for reviewing new power reactor license applications.

Wireless computer networks are being installed at a number of nuclear power reactors, but security concerns currently limit the application to non-safety related systems.

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