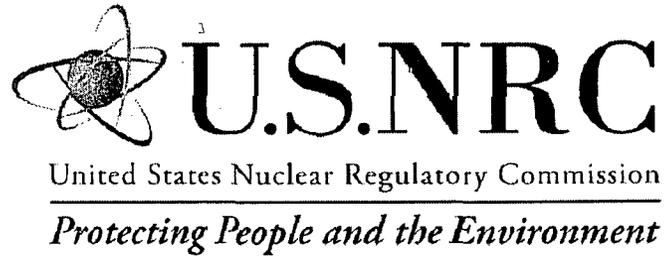


COMMISSION BRIEFING SLIDES/EXHIBITS

**BRIEFING ON DIGITAL
INSTRUMENTATION AND CONTROL**

JUNE 4, 2009



Digital Instrumentation and Control

June 4, 2009

Agenda

- **Background and Steering Committee accomplishments**
- **Operating reactor licensing activities**
- **New reactor licensing activities**
- **Fuel cycle activities**
- **Research activities**

Background

- **NRC Steering Committee established**
-
- **Project Plan used**
 - **Industry counterpart groups**

Steering Committee Activities

- **Technical ISGs have been issued**
- **ISGs being used**
- **Extensive outreach with stakeholders**
- **ISGs are being incorporated into regulatory infrastructure**

Ongoing Activities

- **Operating reactor licensing process**
- **New reactor guidance on DAC and ITAAC**
- **Operational issues**
- **Research in key areas**

Use of ISGs

- **ISG-1, Cyber security**
- **ISG-2, Diversity and defense-in-depth**
- **ISG-4, Digital communications**

NRR Licensing of Digital I&C

- **Wolf Creek**
 - **Main Steam and Feedwater Isolation System**
- **Oconee**
 - **Reactor Protection & Engineered Safeguards Protective Systems**
- **Lessons learned workshop**

Operating Reactor Licensing

- **ISG will define a predictable and consistent licensing process**
- **Lessons learned from Oconee and Wolf Creek reviews**
- **Focuses on**
 - **Process definition**
 - **Scope of review**
 - **Information to be provided**

Operational Issues

- **Evolution of previously-approved platforms**
- **Design Changes (10 CFR 50.59)**
- **Significance Determination Process**
- **Maintenance Rule (10 CFR 50.65)**

Technical Consistency

- **Joint development of guidance/ criteria**
- **Management and staff coordination**
- **Joint and peer reviews**

New Reactor Licensing

- **Design certification and COL application reviews**
- **ISG documents being used**
- **Design centered review approach to licensing**

International Interactions

- **Operating experience and lessons learned**
- **Multinational Design Evaluation Program**
- **Benefits of collaboration**

New Reactor Activities

- **Additional guidance on DAC/ITAAC**
- **International**
 - **Consensus standards**
 - **Common regulatory practices**

Fuel Cycle Facilities

- **ISG-7 addresses fuel cycle facilities**
- **Scope**
 - **Cyber Security**
 - **Independence**
 - **Communications**
 - **Software Quality**

Research Activities

- **Supporting licensing offices**
- **Collaboration and Coordination**
 - **Other Federal Agencies**
 - **International Partners**
 - **Industry**

Research Plan

- **Determination of Adequate Diversity**
- **Fault and Failure Mode Analysis/
Risk Tools**
- **Advanced Reactor Controls**
- **Security of Digital Systems**

Conclusions

- **Licensing actions completed**
- **Technical guidance issued**
- **Predictability and effectiveness improved**
- **Commitment to continued improvement**

Acronyms

COL	Combined License
DAC	Design Acceptance Criteria
I&C	Instrumentation and Controls
ISG	Interim Staff Guidance
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria
NRC	Nuclear Regulatory Commission

Wolf Creek Digital I&C Application Experience

June 4, 2009

Terry Garrett

Vice President Engineering
Wolf Creek Nuclear Operating Corp.

Introduction

- Wolf Creek Generation Station to install first implementation of the Advanced Logic System (ALS) during fall 2009 refueling outage
- Culmination of five year development and 24 month licensing effort

Wolf Creek Goals

- Improve the safety of the plant
- Address equipment reliability issues with safety-related instrumentation and control (I&C)
- Resolve current obsolescence concerns
- Generic licensing approval

Wolf Creek Approach

- Common platform for safety-related I&C
- Design simplicity
- Incorporate advanced testing and diagnostics
- No additional diverse actuation systems

Wolf Creek Benefits

- Generic approval of ALS
 - Future use of the ALS platform will require minimal staff review
- Equipment reliability issues and obsolescence resolved
 - Single point vulnerabilities eliminated
 - Improved testing and diagnostics
- Improve the safety of the plant
 - Increased integrity and reliability

Licensing Experience

- Approval process was challenging
 - Application review process was not clear
 - First time for ALS - an FPGA based platform
 - Key interim staff guidance (ISG) issued while review was in process
 - Documentation and depth of review
- ISGs served as point of reference for staff position(s)
 - ISG 1: Cyber Security
 - ISG 2: Diversity and Defense-in-Depth
 - ISG 4: Communications

Oconee Nuclear Station
RPS/ESPS Digital Upgrade
June 4, 2009

Ron Jones
Sr. Vice President, Nuclear Operations
Duke Energy Corporation

Terminology

RPS/ESPS Reactor Protective System
and Engineered Safeguards
Protective System

Oconee RPS/ESPS Submittal

- Replacing legacy analog system with digital technology
- Addresses obsolescence issues
- Improves nuclear safety, reliability, and safety system availability
- Anticipate regulatory approval in Fall of 2009
- First implementation in Spring of 2011

Licensing Process Experience

- Oconee submittal review in parallel with development of the proposed process
- Interim Staff Guidance beneficial to Oconee submittal
- Recognize the significant efforts of the NRC to support this submittal review
- Industry interest in the licensing process

Going Forward

- Appreciate NRC working with industry to develop digital licensing guidance
- Agree with the proposed multi-tier review structure that can streamline reviews
- Two process concerns remain:
 - Burden of amount of docketed material
 - Approval after factory acceptance test

Continuing Efforts

- Oconee licensing submittal is an important first step
- Mutual interest in enabling digital upgrades
- We believe it is possible to:
 - Satisfy all safety and regulatory requirements
 - Further reduce licensee risk and burden
- Would welcome opportunity to continue to refine this process

Digital I&C Industry Perspective

June 4, 2009

Alex Marion

Vice President Nuclear Operations, NEI

Topics

- Objectives
- Progress To-Date
- Remaining Effort
- Continuing Concerns
- Requested Activities

Objectives

- Develop a digital licensing process that is stable, predictable, and timely
- Provide guidance for the licensing process that is understandable and useable
- Facilitate application of digital technology that enhances plant safety, availability, and reliability

Progress To-Date

- Successful project plan implemented
 - Problem statements
 - Milestones
 - Deliverables
- Interim Staff Guidance (ISG) status
 - Four ISGs are finalized
 - Cyber security
 - PRA
 - Communications
 - Human Factors

Progress To-Date

- One ISG being revised
 - Diversity and Defense in Depth (May09)
- Two ISGs are in development
 - Licensing process
 - Fuel cycle facilities
- Issues identified beyond Project scope
 - Project scope limited to creating ISGs
 - NRC & Industry resolving issues together

Remaining Effort

- Complete DI&C-ISG-06 Licensing Process

- Important work beyond Project scope:
 - Address operational issues
 - Define adequate diversity
 - Research PRA modeling
 - Incorporate operational experience

Continuing Concerns

- Licensing process is burdensome and is a disincentive for licensee submittals
 - Scope/detail of NRC review
 - Detailed design review versus
 - Reasonable assurance of regulatory compliance
 - Extent of document submittals
 - Those necessary for Staff development of a Safety Evaluation Report (SER) versus
 - Those available for audit/inspection
 - Credit for existing Appendix B Programs

- Crucial that basis be on a finding of reasonable assurance

Requested Activities

- Refine current digital licensing process through
 - Resolution of remaining issues
 - Applying lead projects lessons learned
 - Processing additional LARs
- Change existing deterministic Commission Policy on diversity and defense-in-depth
 - Policy established in SRM to SECY 93-087
 - Requires use of best estimate methods in analyzing defense against common-mode failure
 - Silent on use of risk informed decision making
 - Policy change necessary fully enable the licensing of DI&C designs by allowing risk informed methods

Requested Activities

- Complete permanent regulatory guidance this year
- Maintain Steering Committee through FY 2010
- Identify additional pilot plants
- Complete research (EPRI MOU)
- Commission briefing by the end of 2009