

ENCLOSURE 4

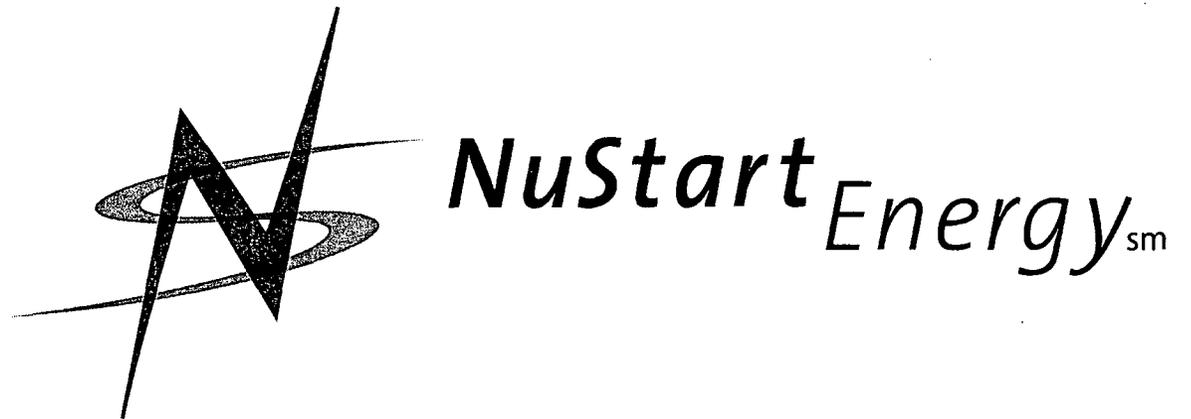
Westinghouse Non-Proprietary

NRC Human Factors Engineering Program Presentation (Non-Proprietary)
APP-OCS-GLY-001-NP

November 13, 2006



HFE Program Presentation
November 7th through 9th, 2006



Licensing Status and Process



Agenda

Tuesday, November 7, 2006

1:00 Introduction and Agenda

1:10 Licensing Status and Process

Proprietary Closed Session

1:45 HFE Program Overview

2:45 Adjourn to 286 Facility for Ringhals Simulator Tour

Agenda (Cont'd)

Wednesday, November 8, 2006

- 8:30 Detailed HFE Element Discussion
 - Element 1: HFE Program
 - Element 2: Operating Experience Review
 - Element 3: Functional Requirements Analysis and Allocation
 - Element 4: Task Analysis
 - Element 5: Staffing
 - Element 6: Integration of HFE with Human Reliability Analysis
- 12:00 Working Lunch
- 12:30 Element 7: HSI Design
 - AP1000 Simulator Demonstration
- 5:00 Adjourn for the day

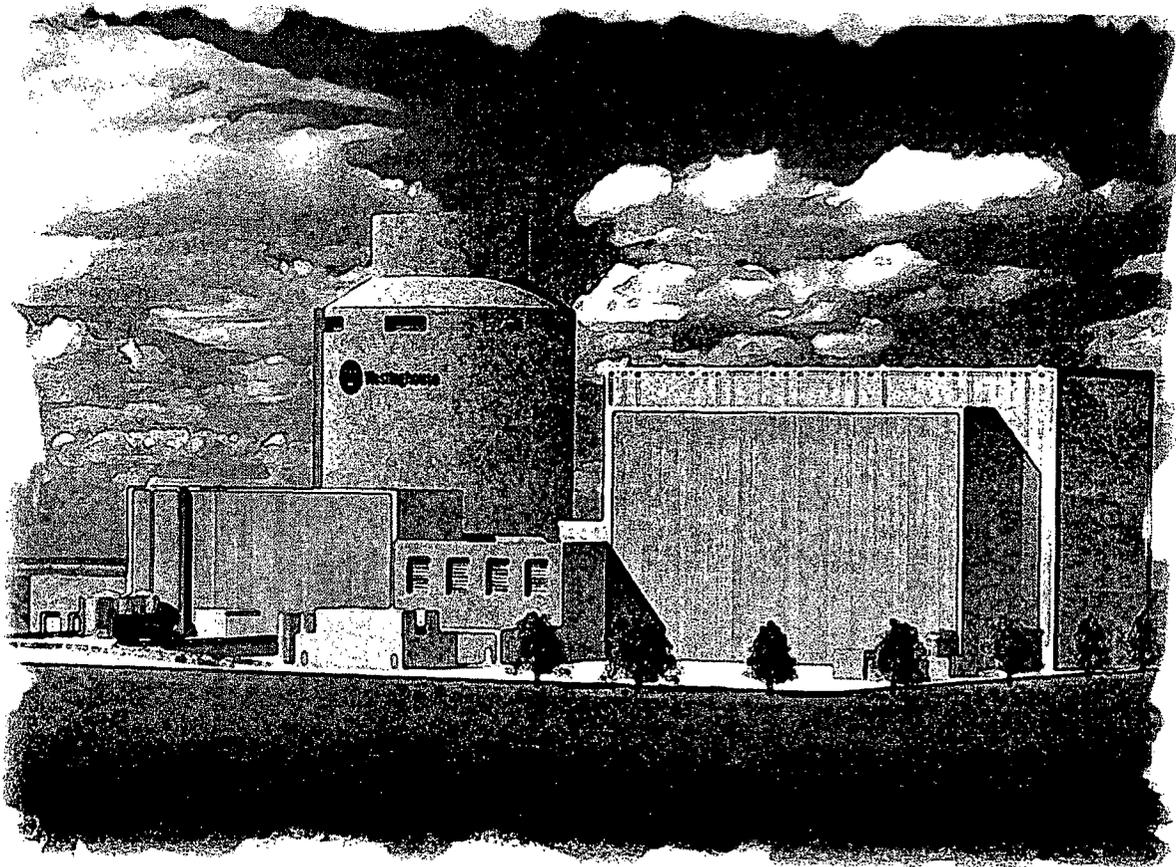
Agenda (Cont'd)

Thursday, November 9, 2006

- 8:30 Detailed HFE Element Discussion (continued)
 - Element 8: Procedure Development
 - Element 9: Training
 - Element 10: HFE V&V
 - Element 11: Design Implementation
 - Element 12: Human Performance Monitoring
 - Minimum Inventory
- 11:30 Plan Going Forward
 - Westinghouse
 - NRC
- 12:15 Reopen Public Meeting for Conclusions
- 12:30 Adjourn

AP1000 Pre-Application Licensing Approach

Andrea Sterdis
AP1000 Licensing



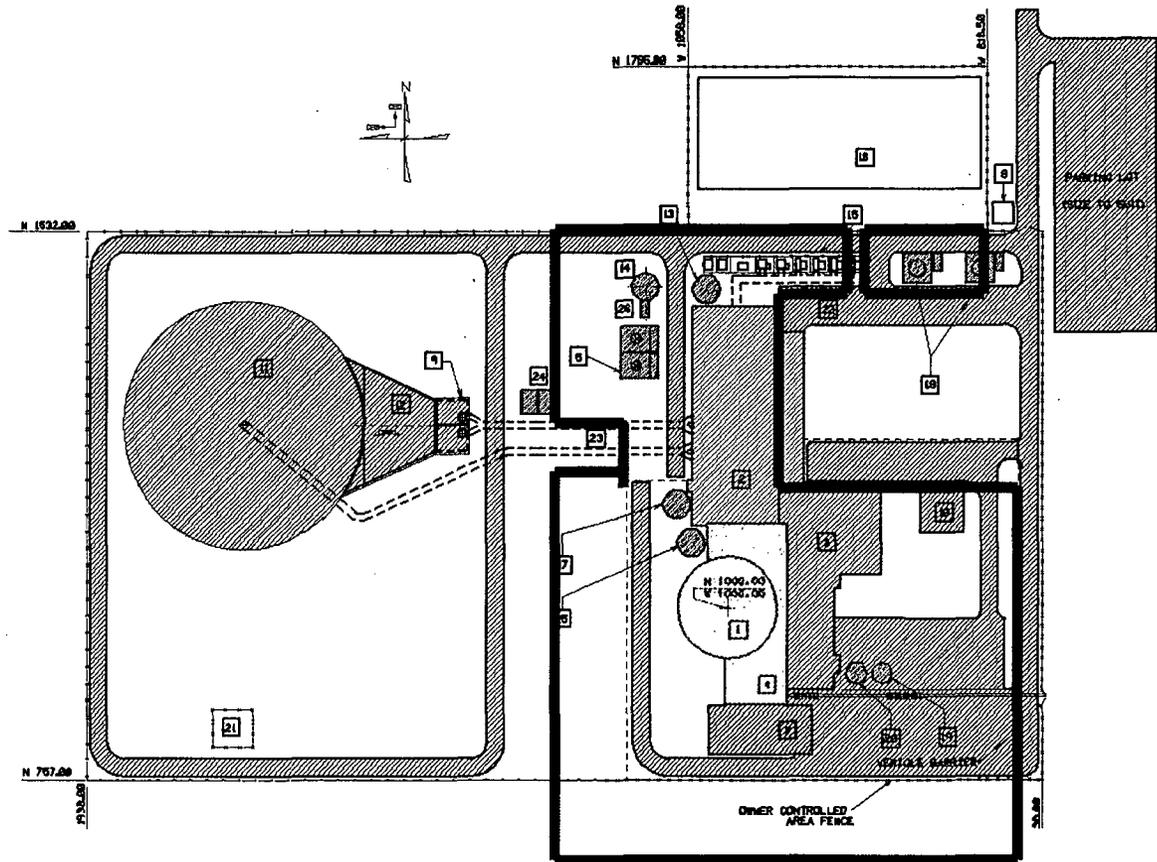


AP1000 Pre-Application Licensing Approach

- Pre-Application activities build on AP1000 Design Certification
- Design Certification was approved December 30, 2005
- Pre-Application activities are active now
- COL Applications are expected in Fall of 2007

What's In the Certified Scope? (DCD Fig. 1.2-2)

- The AP1000 Design Certification includes more scope than the traditional NSSS.
- Only areas not included in the standard design scope and certification scope are the site specific aspects (e.g. circulating water and switchyard design).



Licensing Approach and Activities

- Pre-Application Review
- COL Information Item Closures
- DAC Completion
- As-Built Verification and Inspections

Pre-Application Review

- Westinghouse is preparing reports to address COL information items and other design completion activities in support of expected COL applications.
- Pre-application activities are in support of standardization of AP1000 COL applications.
- Pre-application activities support the NRC Design Centered Review Approach.

Pre-Application Review

- The technical reports document COL information item closure activities
- A limited number of design changes are documented in technical reports
- NuStart review and oversight of technical report preparation and other pre-application activities promote standardization of AP1000 COL applications.

Pre-Application Review

- Submittal of technical reports by Westinghouse to provide standard AP1000 Design information
- NRC Staff Review (Interaction as necessary)
- NRC SER Preparation
- Application to all COL Applications via reference to technical reports and corresponding SERs

Potential Part 52 Revision

- Revision of AP1000 Design Certification Rule
 - Part 52 does not currently provide for revision
 - Substantial industry comments on NOPR for revising Part 52 to permit revision
 - Indications are that revised rule will include mechanism for revision
 - ✦ Draft rule language issued
 - ✦ Anticipated publishing date end of 2006
- If revised Part 52 allows, Westinghouse plans to submit a revised DCD in May 2007

COL Information Items Closures

- NRC Review and approval of technical reports documenting COL information items closure activities will:
 - Provide one standard approach by COL applicants
 - Require one review by NRC
 - Remove the review of these items from the critical path in application review.
- Reports for approximately half of scheduled COL information items have been submitted for NRC review.

Human Factors Engineering (HFE) Program Overview



Paul Hunton

Westinghouse

Project Manager

AP1000 Operations & Control Centers

Human Factors Engineering Status Report

- Meeting Purpose

- Provide a detailed overview of work efforts since Design Certification
- Provide a preview of work expected to be completed to support a Combined License Application (COLA) submittal

- Final Objective

- Identify plan of action with respect to the HFE program for COLA, Post COLA to support COL review, & Post COL and obtain NRC feedback

AP1000 Design Control Document

Chapter 18



- Design Certification Scope
 - Establish the HFE Program In Accordance With NUREG 0711
 - Identify key process steps and products to ensure
 - ✦ That accepted HFE practices and guidelines are followed
 - ✦ That HFE products are properly incorporated into the final HSI design

Human Factors Engineering (HFE) Program Plan (captures 12 Elements of 0711 HFE Program Review Model)

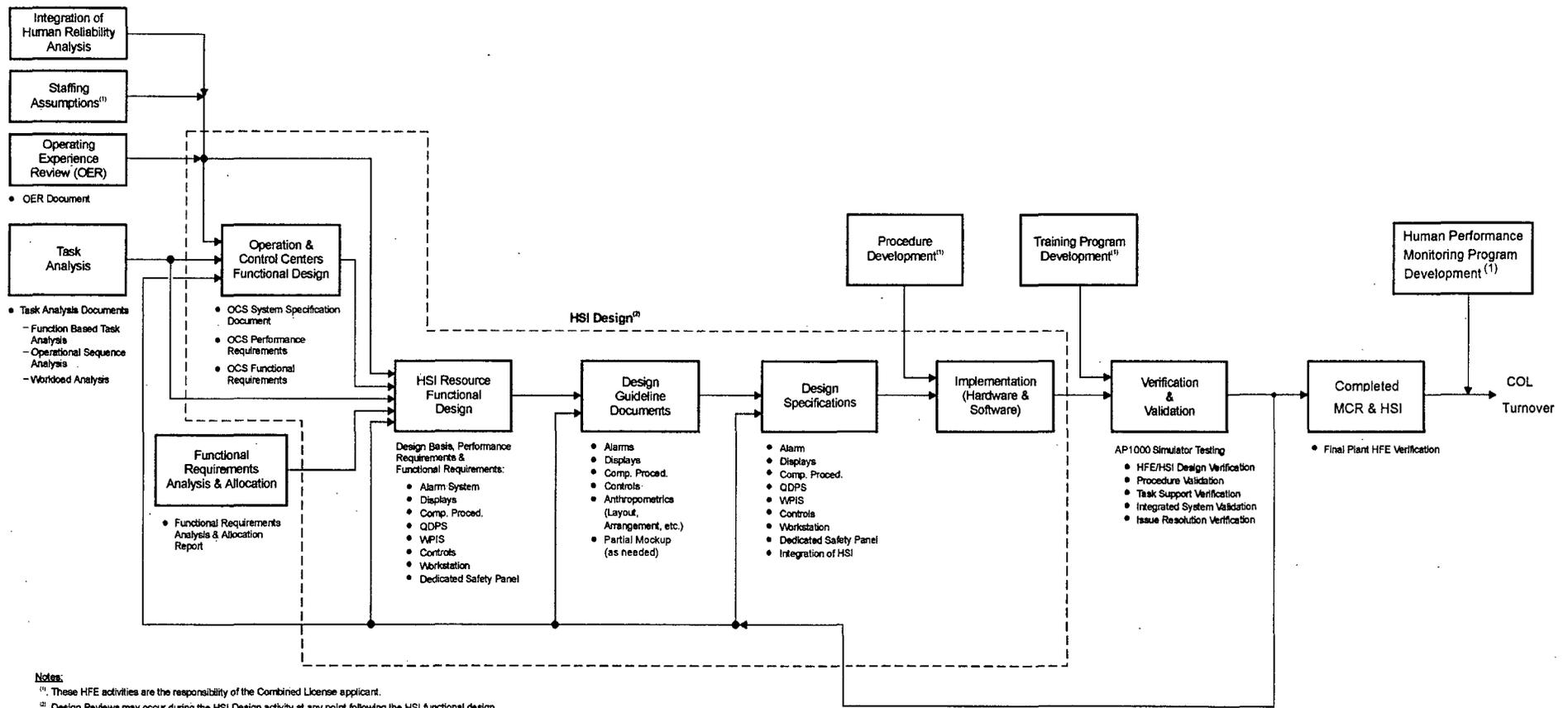


Figure 18.2-3 from DCD



Status of HSI Design

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Detailed Presentation Format

- Westinghouse and Enercon will address status & plans for each of the 12 Elements of the AP1000 HFE Program
- Each presentation will include:
 - Status at Design Certification (either):
 - ✦ Element completed
 - ✦ Implementation plan
 - ✦ Programmatic level description
 - COLA related work efforts (documents, related technical reports, DCD markups, etc.)
 - ✦ Work completed since Design Certification
 - ✦ Work to be completed by COLA submittal
 - Post COLA to support COL review
 - Post COL

Requested NRC Action Will be Clearly Delineated as Shown in this Box

HFE Program Plan

NUREG 0711 Element 1 - AP1000 DCD 18.2



Paul Hunton

Westinghouse



HFE Program Plan

NUREG 0711 Element 1 - AP1000 DCD 18.2

- Status at Design Certification:
 - HFE Program Management reviewed and found acceptable at a complete element level
- COL Information Item 18.2-1:
 - “The Combined License applicant referencing the AP1000 certified design is responsible for the execution of the NRC approved human factors engineering program as presented by Section 18.2”.
 - The purpose of this entire presentation is to demonstrate that execution of the HFE Program is in accordance with 18.2

HFE Program Plan

NUREG 0711 Element 1 - AP1000 DCD 18.2

- COLA Related Work Efforts:

- An engineering document has been issued presenting the NRC approved human factors engineering program:

- ✦ APP-GW-GLR-012 (TR 72): AP1000 HFE Program Plan (APP-OCS-GBH-001)

- The AP1000 HFE Program Plan ensures that the commitments in Chapter 18 of the DCD are met, via:

- ✦ Providing additional detail to the DCD Chapter 18 and

- ✦ Defining the implementation of HFE into the design process



HFE Program Plan

NUREG 0711 Element 1 - AP1000 DCD 18.2

- By COLA submittal

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NRC SER Closing COL Information Item 18.2-1 is Requested

Emergency Operations Facility

NUREG 0711 Element 1 - AP1000 DCD 18.2



Jay Maisler

Enercon

Emergency Operations Facility

NUREG 0711 Element 1 - AP1000 DCD 18.2

- Status at Design Certification:
 - COL Information Item 18.2-2, “The Combined License applicant referencing the AP1000 certified design is responsible for designing the emergency operations facility, including specification of the location, in accordance with the AP1000 human factors engineering program.”
- COLA related work efforts
 - Work completed to date
 - ✦ Reviewed DCD section 18.2 and no exceptions in FSAR section 18.2 are expected
 - ✦ Presented draft EOF implementation strategy for FSAR Section 18.2 to NuStart to confirm approach
 - ✦ Reviewed NUREG 0696 (Feb 1981) and NUREG 0737 Supplement 1 (January 1983) requirements for EOF facilities

Emergency Operations Facility

NUREG 0711 Element 1 - AP1000 DCD 18.2



- COLA related work efforts (cont.)
 - Work to be completed by COLA submittal/review
 - ✦ COL Information item 18.2-2: Design of the EOF
 - EOF design and location is site-specific. The applicant's strategy is to utilize the existing EOF for it's fleet. Part of the COL application will also include a separate exemption request since the EOF is more than 20 miles from the site.
 - Review / evaluate applicable AP1000 EOF Specification Documents and AP1000 Human Factors Engineering Program Plan for EOF impact.
 - Data requirements, communications, staffing, and training will be addressed in the COLA Emergency Plan.

Emergency Operations Facility

NUREG 0711 Element 1 - AP1000 DCD 18.2



- Work to be completed by COLA submittal/review (cont.)
 - ✦ Evaluation of differences between NUREG 0711 Rev 1 and 2 for impact and incorporation.
 - ✦ FSAR Section 18.2 (EOF portion) completion with NuStart review and concurrence.
- Post COLA
 - Confirm functionality and operability of the EOF (included in EP ITAAC)

COL Information Item 18.2-2 will be completed with COLA

Operating Experience Review (OER) NUREG 0711 Element 2 - AP1000 DCD 18.3



Tom Chaney
Westinghouse

Operational Experience Review (OER)

NUREG-0711 Element 2 – AP1000 DCD 18.3



- Status at Design Certification

- OER completed in AP1000 Design Certification
(No COL Information Item listed in Table 1.8-2)

- 18.3.1 Combined License Information:

- ◆ “Combined License applicant responsibilities identified in Reference 1 are presented in Sections 10.4.12, 16.2, 18.2.6, 18.6.1, 18.9.1 and 18.10.1.”

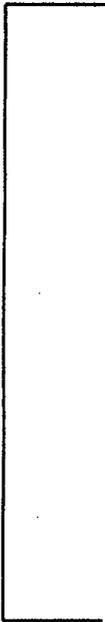
- ◆ DCD reference 1: WCAP-14645, “Human Factors Engineering Experience Review Report for the AP600 Nuclear Power Plant,” Revision 2, December 1996

Operational Experience Review (OER)

NUREG-0711 Element 2 – AP1000 DCD 18.3



- COLA Related Work Efforts



Operational Experience Review (OER) NUREG-0711 Element 2 – AP1000 DCD 18.3



- Scope of AP1000 OER Update

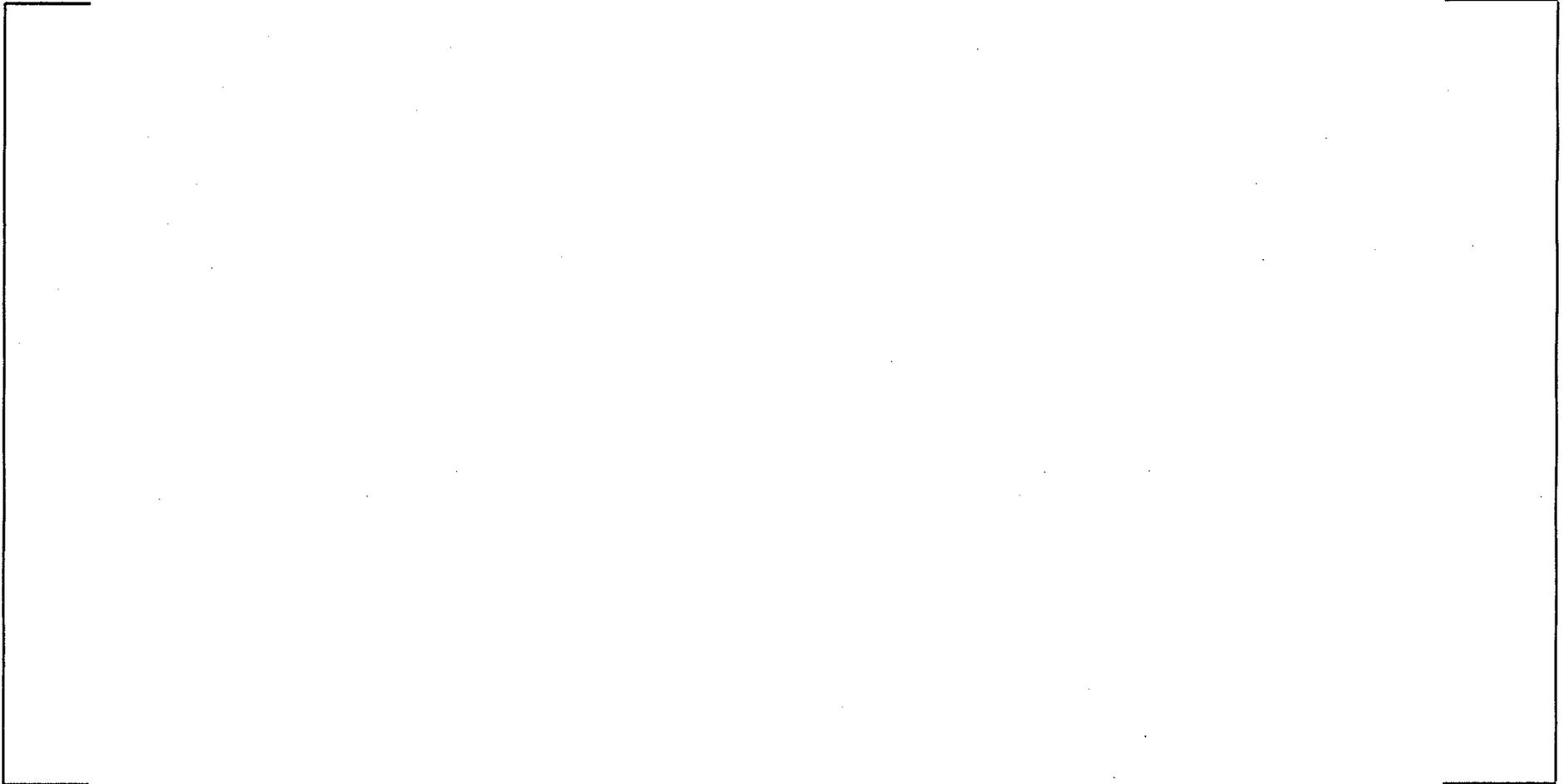


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Operational Experience Review (OER) NUREG-0711 Element 2 – AP1000 DCD 18.3



- Scope of AP1000 OER Update (cont'd)



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Functional Requirements Analysis & Allocation

NUREG 0711 Element 3 - AP1000 DCD 18.4



Steve Kerch

Westinghouse

Functional Requirements Analysis & Allocation

NUREG 0711 Element 3 - AP1000 DCD 18.4



- Status at Design Certification
 - AP1000 Functional Requirements Analysis and Functional Allocation element certified complete based upon WCAP-14644, Rev. 0, September 1996
 - Combined License Information, section 18.4.1
“This section has no requirement for additional information to be provided in support of the Combined License application.”
- COLA Related Work Efforts: None
- Post COLA: None

Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5



Mike Shaffer

Westinghouse

Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5

- Status at Design Certification

- Implementation plan of DCD Section 18.5 included:

- ✦ Functional Based Task Analysis (FBTA)
- ✦ Operational Sequence Analysis (OSA) - 1
- ✦ Operational Sequence Analysis - 2

- COLA Related Work Efforts



Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5



- Post COL



Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5



- COLA Related Work Efforts

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Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5

- COLA Related Work Efforts (cont'd)

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Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5

- COLA Related Work Efforts (cont'd)

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- ◆ Includes analysis of Risk Important Human Actions taken from Table 3.2-2 of *"AP1000 Identification of Critical Human Actions and Risk Important Task"*, APP-GW-GL-011, referenced in APP-GW-GLR-011 (TR 59)

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Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5

- COLA Related Work Efforts (cont'd)
 - Operational Sequence Analysis - 1 (cont'd)
 - ✦ Analysis addresses the scenarios identified in AP1000 Table 3.2-1 ITAAC Design Commitment #2:
 - Plant Heatup and Startup from Post-Refueling to 100%
 - Reactor Trip, Turbine Trip and Safety Injection
 - Natural Circulation Cooldown (Startup FW with SG)
 - Loss of Reactor or Secondary Coolant
 - Post Loss-Of-Coolant Cooldown and Depressurization
 - Loss of RCS Inventory During Shutdown
 - Loss of Normal RNS During Shutdown
 - Manual ADS Actuation
 - Manual Reactor Trip via PMS and DAS
 - ADS Valve Testing During Mode 1

Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5



- COLA Related Work Efforts (cont'd)



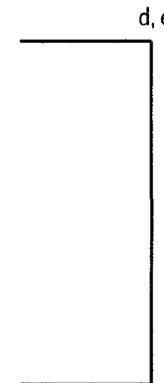
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Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5

- COLA Related Work Efforts (cont'd)



Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5

- COLA Related Work Efforts (cont'd)
 - MCR Staffing Roles & Responsibilities Document
 - ✦ Completed to address COL Information Item 18.5-2
 - ✦ Defines minimum, alternate, and maximum staffing complements
 - ✦ Describes duties and responsibilities for each MRC staff position for all operations, normal operations, and plant transients / emergencies
 - ✦ Provides staffing basis for AP1000 HSI

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Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5

- COLA Related Work Efforts (cont.)

- MCR Staffing Roles & Responsibilities Document

- ✦ Submitted to NRC for review (APP-GW-GLR-010)

- ✦ COL Information Item 18.5-2

- “Combined License applicants referencing the AP1000 certified design will document the scope and responsibilities of each main control room position, considering the assumptions and results of the task analysis.”

- ✦ DCD Markup of COL Information Item 18.5-2

~~“Completed. Combined License applicants referencing the AP1000 certified design will document t~~The scope and responsibilities of each main control room position are documented in Reference 14. , considering the assumptions and results of the task analysis.”

Reference 14: APP-GW-GLR-010, “AP1000 Main Control Room Staffing Roles and Responsibilities,” March 2006.

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Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5



- Post COL

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Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5

- Post COL (cont.)





Task Analysis

NUREG 0711 Element 4 - AP1000 DCD 18.5

- COL Item 18.5-1

- “Combined License applicants referencing the AP1000 certified design will address the execution and documentation of the task analysis implementation plan presented in section 18.5.”

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Staffing and Qualifications

NUREG 0711 Element 5 - AP1000 DCD 18.6



Tom Jablonski

Enercon



Staffing and Qualifications

NUREG 0711 Element 5 - AP1000 DCD 18.6

- Status at Design Certification

— COL Information Item 18.6-1, “Combined License applicants referencing the AP1000 design will address the staffing levels and qualifications of plant personnel including operations, maintenance, engineering, instrumentation and control technicians, radiological protection technicians, security, and chemists. The number of operators needed to directly monitor and control the plant from the main control room, including the staffing requirements of 10CFR50.54(m), will be addressed.”

Staffing and Qualifications

NUREG 0711 Element 5 - AP1000 DCD 18.6

- COLA related work efforts
 - Work completed to date
 - ✦ Reviewed DCD section 18.6 and no exceptions in FSAR section 18.6 are expected
 - ✦ Reviewed staffing studies assessing AP1000 organizational requirements
 - “Improvements in Nuclear Plant Staffing Resulting from the AP600 Design Program,” Westinghouse
 - “O&M Staffing and Cost Development for Advanced Reactor Designs,” Dominion Energy, 2004
 - ✦ Presented draft Staffing & Qualifications implementation strategy for FSAR Section 18.6 to NuStart to confirm approach.
 - ✦ Reviewed/evaluated WCAP 14694, “Designer’s Input to Determination of the AP600 MCR Staffing Level” for impact.
 - ✦ Evaluated differences between NUREG 0711 Rev 1 and 2.



Staffing and Qualifications

NUREG 0711 Element 5 - AP1000 DCD 18.6

- COLA related work efforts (cont'd)

- Work completed to date

- ◆ Developed draft FSAR section 13.1, “Organizational Structure of Applicant.”

- Prepared FSAR 13.1 to generically apply to AP1000 and ESBWR designs.
- Developed staffing description and organization charts (based on regulatory requirements (SRP), above studies, and existing plant FSARs)
- Qualifications – in accordance with SRP 13.1.1, “Management and Technical Support Organization”, and SRP 13.1.2 - 13.1.3, “Operating Organization”, applicant commits to RG 1.8, “Qualification and Training of Personnel for Nuclear Power Plants”, and ANSI/ANS-3.1-1993, “Selection, Qualification, and Training of Personnel for Nuclear Power Plants”

Staffing and Qualifications

NUREG 0711 Element 5 - AP1000 DCD 18.6

- COLA related work efforts (cont.)
 - Work to be completed by COLA submittal/review
 - ✦ Complete FSAR Section 18.6 including:
 - Review and use description of organization in section 13.1.
 - Review Regulatory Guidance for additional HFE requirements (NUREG 0711, SRP 18.0).
 - Review Regulatory Guidance for potential additional HFE requirements (SRP 18.0, DG-1145).
 - Review 18.5-2 Information Item closure document: APP-GW-GLR-010 (AP1000 Main Control Room Staffing Roles and Responsibilities)
 - Perform NuStart review and obtain concurrence.
 - On-going incorporation of changes from other elements.

Basis for closure of COL Information Item 18.6-1 is the completion of FSAR Section 18.6 as part of COLA.

Staffing and Qualifications

NUREG 0711 Element 5 - AP1000 DCD 18.6



- Post COLA
 - Update as needed based on feedback from other elements of the HFE Plan

Human Reliability Analysis/HFE Integration

NUREG 0711 Element 6 - AP1000 DCD 18.7



Bob Fuld

Westinghouse

Human Reliability Analysis/HFE Integration

NUREG 0711 Element 6 - AP1000 DCD 18.7



- Status at Design Certification
 - HRA/HFE Implementation plan certified based upon WCAP-14651 r.2
- COLA Related Work Efforts
 - Screening analysis submitted, WCAP-16555
 - ✦ No Critical Human Actions identified for AP1000 passive plant
 - ✦ 22 post-accident Risk-Important Tasks
 - ✦ 38 Risk-Important maintenance-test-inspection Tasks (representative)
 - ✦ RAIs being addressed before COLA (Note receipt of RAI on this element)

Human Reliability Analysis/HFE Integration

NUREG 0711 Element 6 - AP1000 DCD 18.7

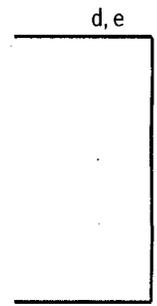


- COLA Related Work Efforts (cont'd)

 - DCD 18.7 markup:

 - ✦ Add WCAP-16555 r.0 (or r.1 if required to resolve RAI's)

- Post COL



Human Reliability Analysis/HFE Integration

NUREG 0711 Element 6 - AP1000 DCD 18.7



- COL Information Item 18.7-1

- Technical Report APP-GW-GLR-011 submitted with DCD COL Information Item markup as follows:

"Completed. Combined License applicants referencing the AP1000 certified design will address the The execution and documentation of the human reliability analysis/human factors engineering integration implementation plan that is documented by reference presented in section 18.7."

- Request completion of the above COL Information item based upon APP-GW-GLR-011 (TR 59)

Request completion of COL Information Item 18.7-1

Human Reliability Analysis/HFE Integration

NUREG 0711 Element 6 - AP1000 DCD 18.7



- ITAAC Table 3.2-1 Design Commitment #1

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Human-System Interface Design

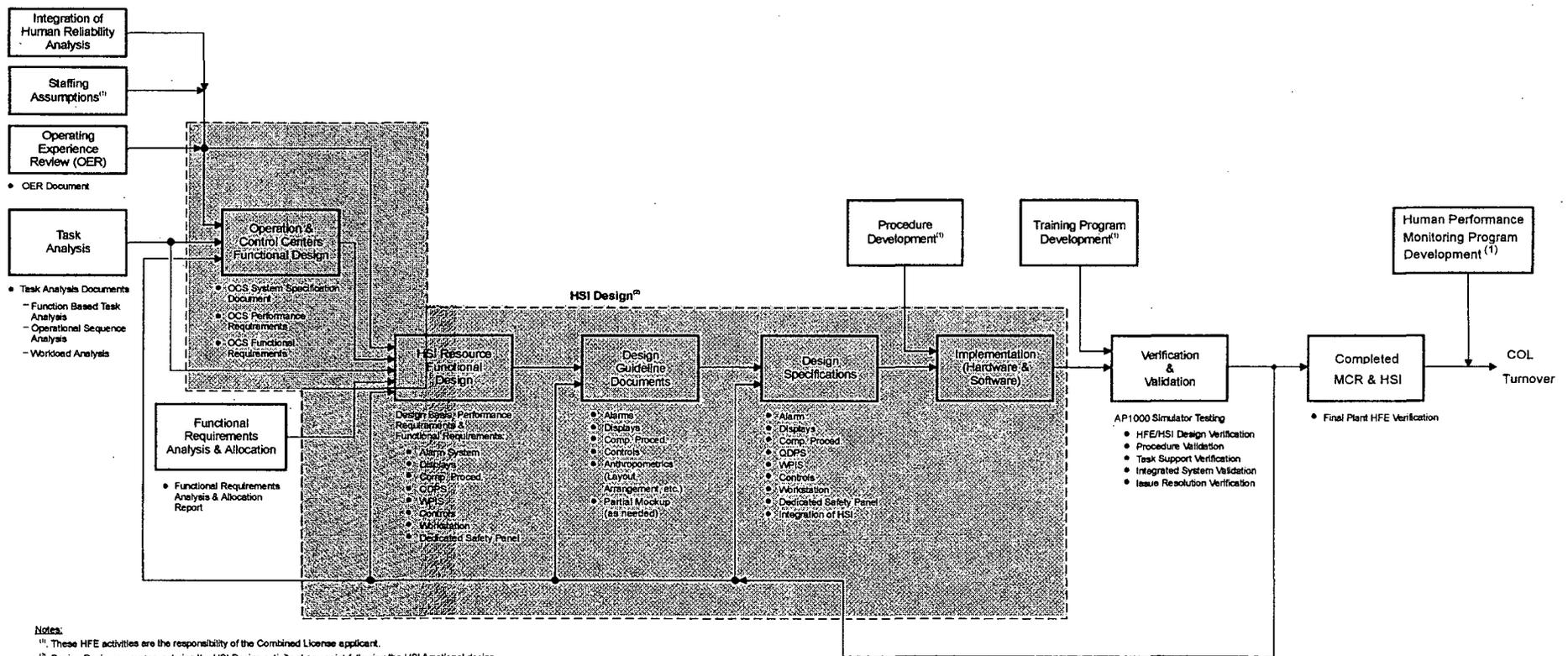
NUREG 0711 Element 7 - AP1000 DCD 18.8



Paul Hunton
Westinghouse

Scope of HSI Design

● Status at Design Certification: Implementation Plan





COLA Related HSI Design Efforts

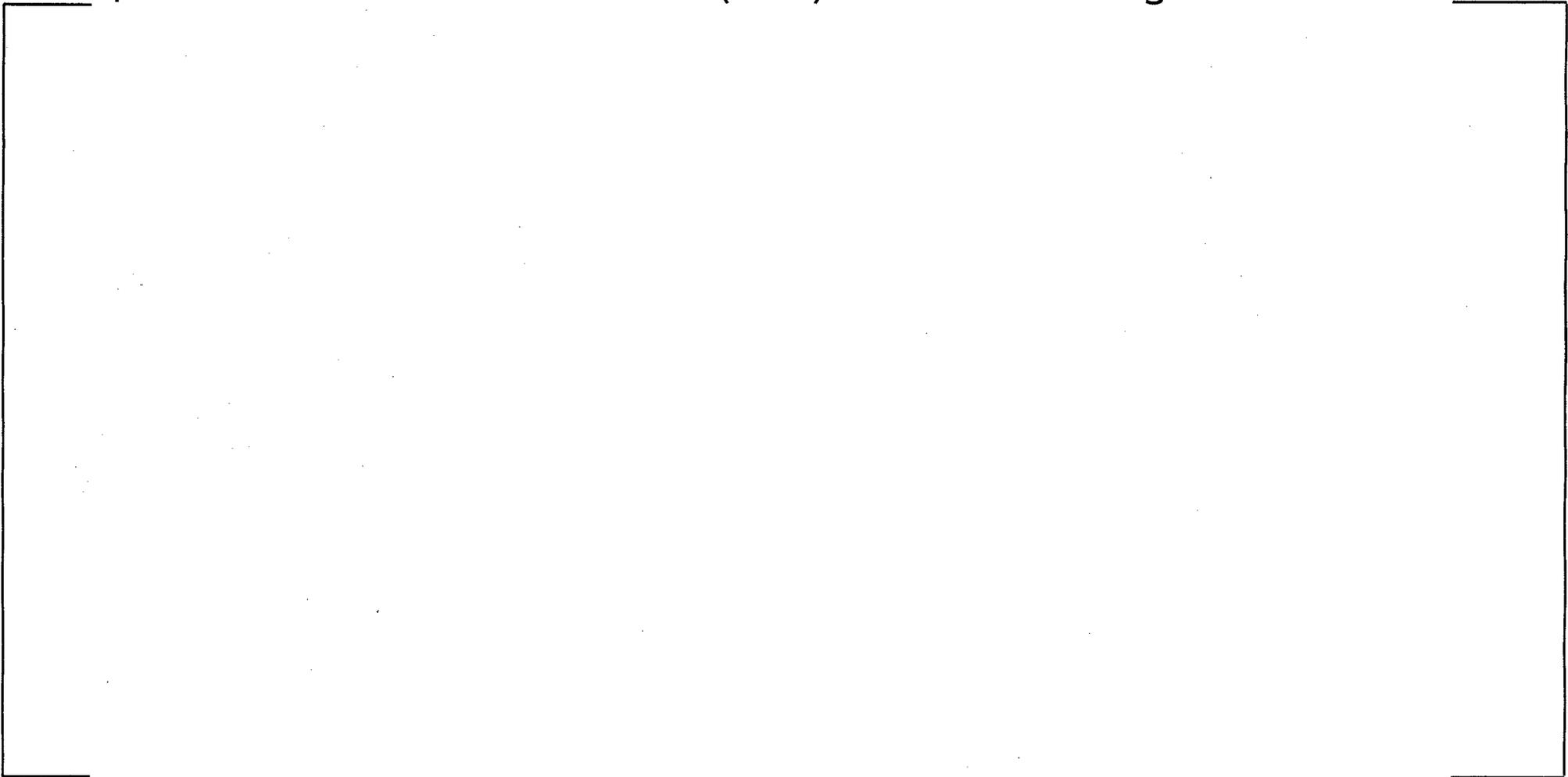
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Status of HSI Design Efforts Since Design Certification



- Operations and Control Centers (OCS) Functional Design



Status of HSI Design Efforts Since Design Certification



- HSI Design Guidelines
 - Status



Status of HSI Design Efforts Since Design Certification

- HSI Resource Functional Requirements
 - Alarm System
 - Computerized Procedure System (CPS)
 - Display System
 - Wall Panel Information System (WPIS)
 - Qualified Data Processing System/Post Accident Monitoring System (QDPS/PAMS)

Status of HSI Design Efforts Since Design Certification

- Design Specifications
 - Alarm System
 - Computerized Procedure System (CPS)
 - Display System
 - ✦ Display Design Specification
 - ✦ Display Specification for Static/Dynamic Components
 - Wall Panel Information System (WPIS)

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Status of HSI Design Efforts Since Design Certification



Julie Reed

Human System Interface Design Guidelines

Human System Interface Design Guidelines

- Status



Human System Interface Design Guidelines

- Objectives
 - Provide an integrated design
 - Provide the users with easy to use control and monitoring facilities under all plant conditions
 - Incorporation of human factors into the design process in a timely manner
 - Provide engineer-friendly guidance
 - Address all stages of the design process
 - Provide a basis for design verification
 - Support license application and approval

Human System Interface Design Guidelines

- Development

- Main external references:

- ✦ NUREG 0700
 - ✦ IEEE 1023 and 1289
 - ✦ EPRI URD, Volume III, Chapter 10

- Main internal references:

- ✦ Operating experience review
 - ✦ Engineering test results
 - ✦ HSI resources design documentation

- Extensively reviewed by key design personnel

Human System Interface Design Guidelines

Contents/Scope



Human System Interface Design Guidelines

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Human System Interface Design Guidelines

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Status of HSI Design Efforts Since Design Certification



Bob Fuld

Man-in-the-Loop Testing/Mockup Activities

Man-in-the-Loop Tests & MCR Mockups

DCD 18.8.1.4 & 18.8.1.5

- Engineering Tests on prototype design products to obtain feedback early in HSI design process
- Plan description approved at Design Certification (WCAP-14396 r.3)
 - Practical goals and methods
 - Part-scope dynamic mockup & simulation
 - Small samples (crews, scenarios, repetitions)
 - Minimal operator training
 - Design (*not* V&V) activity for “unproved” concepts
- Issues on “concepts” addressed by Engineering Tests
 - Universal Soft Controls (Phase 1)
 - MCR Resource Integration (Phase 2)

Man-in-the-Loop Tests and MCR Mockups

Phase 1 Tests – Soft Controls

- Phase 1 Test Plan

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Man-in-the-Loop Tests and MCR Mockups Phase 2 Tests – Integration Tests



- Phase 2 Test Plan

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Man-in-the-Loop Tests and MCR Mockups ITAAC Closure (DCD Table 3.2-1 Item 3[e])





Post COLA HSI Design Efforts

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Human-System Interface Design

NUREG 0711 Element 7 – AP1000 DCD 18.8



- COL Information Item 18.8 – 1
 - “Combined License applicants referencing AP1000 certified design will address the execution and documentation of the human system interface design implementation plan that is presented by Section 18.8.”

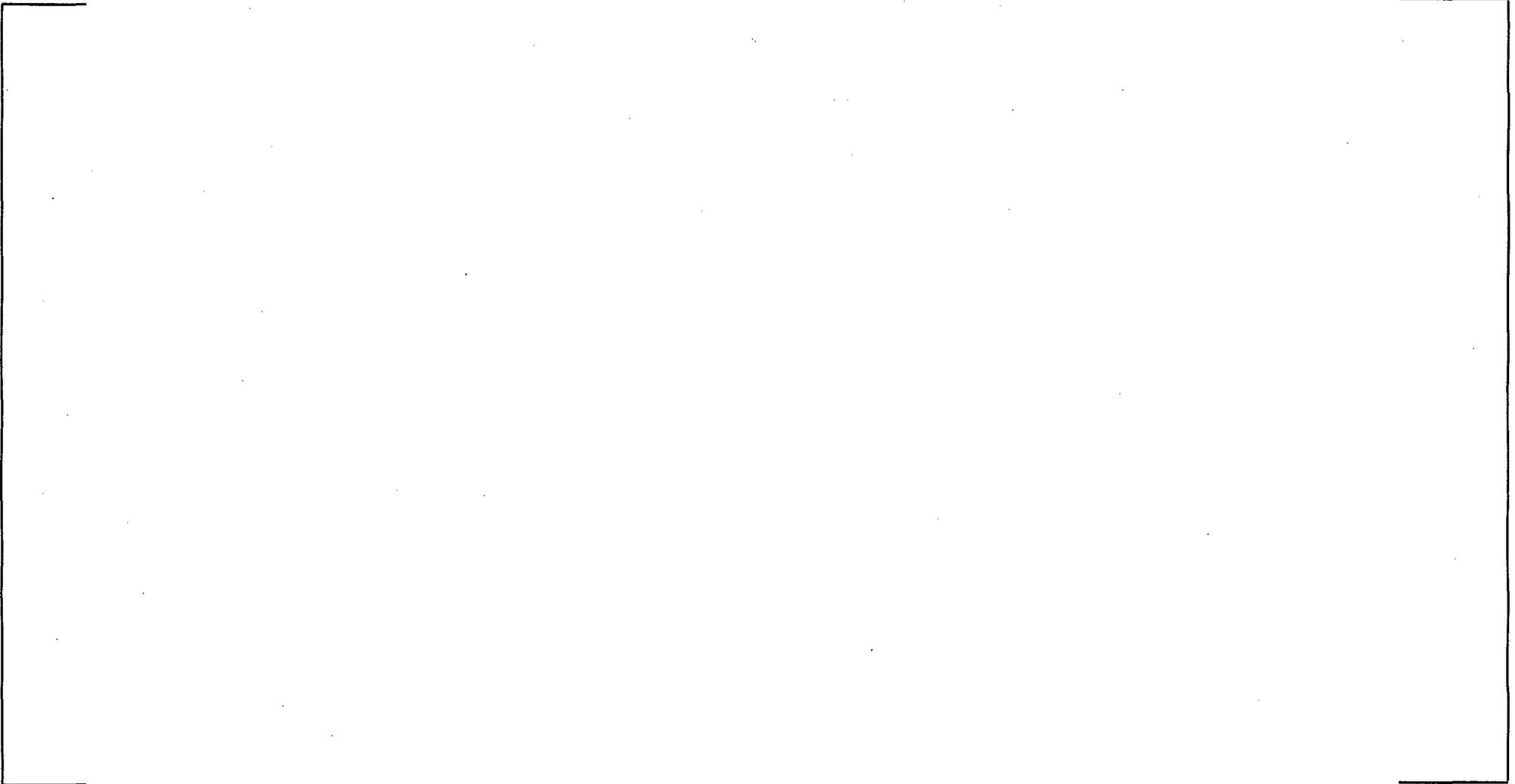
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Human-System Interface Design

NUREG 0711 Element 7 – AP1000 DCD 18.8



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Procedure Development

NUREG 0711 Element 8 – AP1000 DCD 18.9



Mark Williams

Westinghouse

Procedure Development

NUREG 0711 Element 8 – AP1000 DCD 18.9

- Status at Design Certification
 - COL Applicant responsibility (COL Information Item 13.5-1)
- COLA related work efforts (documents, related technical reports, DCD markups, etc.)
 - Work completed to date: APP-GW-GLR-040 (TR 70), which addresses COL Information Item 18.9-1 has been completed.
- Post COLA
 - Phase 3 procedure development

Procedure Development

NUREG 0711 Element 8 – AP1000 DCD 18.9

- Methodology and criteria for procedure development is contained in the Westinghouse Writer's Guidelines for the Normal Operating and Two-Column Format Procedures
 - Writer's Guidelines incorporate industry and regulatory standards for the procedure development process
 - Writer's Guidelines also address human factors requirements for nuclear power plant procedures
 - Writer's Guidelines provide the basis for generating the procedures necessary for the conduct of human factors evaluation work and plant operations



Procedure Development

NUREG 0711 Element 8 – AP1000 DCD 18.9

- Procedures are being completed in accordance with the AP1000 Procedures Project Integrated Master Plan.
- AP1000 Procedures will be available for NRC review at Westinghouse in accordance with the Current Integrated Master Plan, Phases 1 through 3, as delineated on the schedule in the subsequent two slides.

Procedure Development

NUREG 0711 Element 8 – AP1000 DCD 18.9



- Phases 1 and 2 of the current AP1000 Procedures Project Plan have been completed and are delineated below:

Current Integrated Master Plan

Phase 1 Procedures --- WEC Engineering Office Human Factors/ Simulator Development Support		
◇	Emergency Operating Procedures (3 total)	Completed
◇	Draft Normal Operating Procedures (15 total)	Completed
◇	Draft Abnormal Operating Procedures (2 total)	Completed
Phase 2 Procedures --- WEC Engineering Office Operational Task Analysis (OSA-1) Support		
◇	Emergency Operating Procedures (20 total)	Completed
◇	Draft Normal Operating Procedures, (9 total)	Completed
◇	Draft Surveillance Test Procedures, (1 total)	Completed

Procedure Development

NUREG 0711 Element 8 – AP1000 DCD 18.9

- Phase 3 Procedure Activities as delineated below, are expected to occur after the COLA is submitted:

Phase 3 Procedures and Guidelines --- WEC Engineering Office

Remaining Procedures and Guidelines

- ◇ Remaining Emergency Operating Procedures (11 total)
- ◇ Draft Normal Operating Procedures which support specific EOP actions (20 total)
- ◇ Draft Abnormal Operating Procedures (43 total)
- ◇ Draft Post-72 Hour Procedures (estimate 15 total)
- ◇ Remaining Draft Normal Operating Procedures (47 total)
- ◇ Maintenance Guidelines (estimated 150 total)
- ◇ Surveillance Guidelines (estimated 200 total)
- ◇ Draft Refueling & Outage Procedures (estimated 50 total)
- ◇ Alarm Response Guidelines (estimated 3000 total)
- ◇ Administrative Guideline (1 total)



Procedure Development

NUREG 0711 Element 8 – AP1000 DCD 18.9

- Procedure Development Process
- The procedure development process follows the requirements delineated in the applicable AP1000 Writer's Guidelines. The Writer's Guidelines establish programmatic guidelines for AP1000 Operating Procedure development as well as the process for the:
 - Preparation of AP1000 Operating Procedures
 - Review of AP1000 Operating Procedures
 - Approval of AP1000 Operating Procedures

Procedure Development

NUREG 0711 Element 8 – AP1000 DCD 18.9

- Procedure Development Qualifications and Training
- Personnel developing AP1000 Operating Procedures are qualified in accordance with classroom training and Computer-Based Training, which address:
 - Procedure Writing
 - The AP1000 Procedure Writer's Guidelines
 - AP1000 Administrative Processes, and
 - AP1000 Systems and Design



Procedure Development

NUREG 0711 Element 8 – AP1000 DCD 18.9

- Proposed Markup of the DCD Subsequent to NRC acceptance of TR 70:
- Revise Section 18.9.1 to read as follows:
 - 18.9.1 Combined License Information
- Completed. The process to manage the writing, review and approval of the AP1000 plant procedures is described in reference 2 below
- Add Reference 2 to Section 18.9.2 as follows
 - 18.9.2 References
 - ★ 2. APP-GW-GLR-040, “Plant Operations, Surveillance, and Maintenance Procedures,” September 2006

APP-GW-GLR-040 (TR 70) completes COL Information Item 18.9-1

Training Program Development

NUREG 0711 Element 9 – AP1000 DCD 18.10



Tom Jablonski

Enercon



Training Program Development

NUREG 0711 Element 9 – AP1000 DCD 18.10

- Status at Design Certification

- COL Information Item 18.10-1, “See Section 13.2 for a discussion of the responsibility for training program development.”
- COL Information Item 13.2-1, “Combined License applicants referencing the AP1000 certified design will develop and implement training programs for plant personnel. This includes the training program for the operations personnel who participate as subjects in the human factors engineering verification and validation. These Combined License applicant training programs will address the scope of licensing examinations as well as new training requirements.”

Training Program Development

NUREG 0711 Element 9 – AP1000 DCD 18.10

- COLA related work efforts
 - Work completed to date
 - ✦ Reviewed DCD section 18.10 and no exceptions to FSAR section 18.10 are expected.
 - ✦ Presented draft training program implementation strategy for FSAR Section 18.10 to NuStart to confirm approach.
 - ✦ Developed FSAR section 13.2, “Training” by industry task force facilitated by NEI (submitted to NRC as NEI 06-13, Rev. 0, 10/30/06).
 - ✦ Evaluated differences between NUREG 0711 Rev 1 and 2.

Training Program Development

NUREG 0711 Element 9 – AP1000 DCD 18.10



- COLA related work efforts (cont'd)
 - Work to be completed by COLA submittal/review
 - ✦ Regulator endorsement of NEI 06-13.
 - ✦ Incorporate applicable sections of WCAP 14655, “Designer’s Input for the Training of the HFE V&V Personnel.”
 - ✦ Review Regulatory Guidance for additional HFE requirements (NUREG 0711, SRP 18.0).
 - ✦ Review Regulatory Guidance for potential additional HFE requirements (SRP 18.0, DG-1145).
 - ✦ FSAR Section 18.10 completion with NuStart review and concurrence.

Basis for closure of COL Information Item 18.10-1 is regulator endorsement of NEI 06-13



Training Program Development

NUREG 0711 Element 9 – AP1000 DCD 18.10

- Post COLA
 - Update as needed based on feedback from other elements of the HFE Plan.

HFE Verification and Validation

NUREG 0711 Element 10 – AP1000 DCD 18.11



Robert Fuld
Westinghouse



HFE Verification and Validation

NUREG 0711 Element 10 – AP1000 DCD 18.11

- Status at Design Certification
 - V&V Program Description (WCAP-15860 r.2) certified at programmatic level
- COLA Related Work Efforts



HFE Verification and Validation

NUREG 0711 Element 10 – AP1000 DCD 18.11



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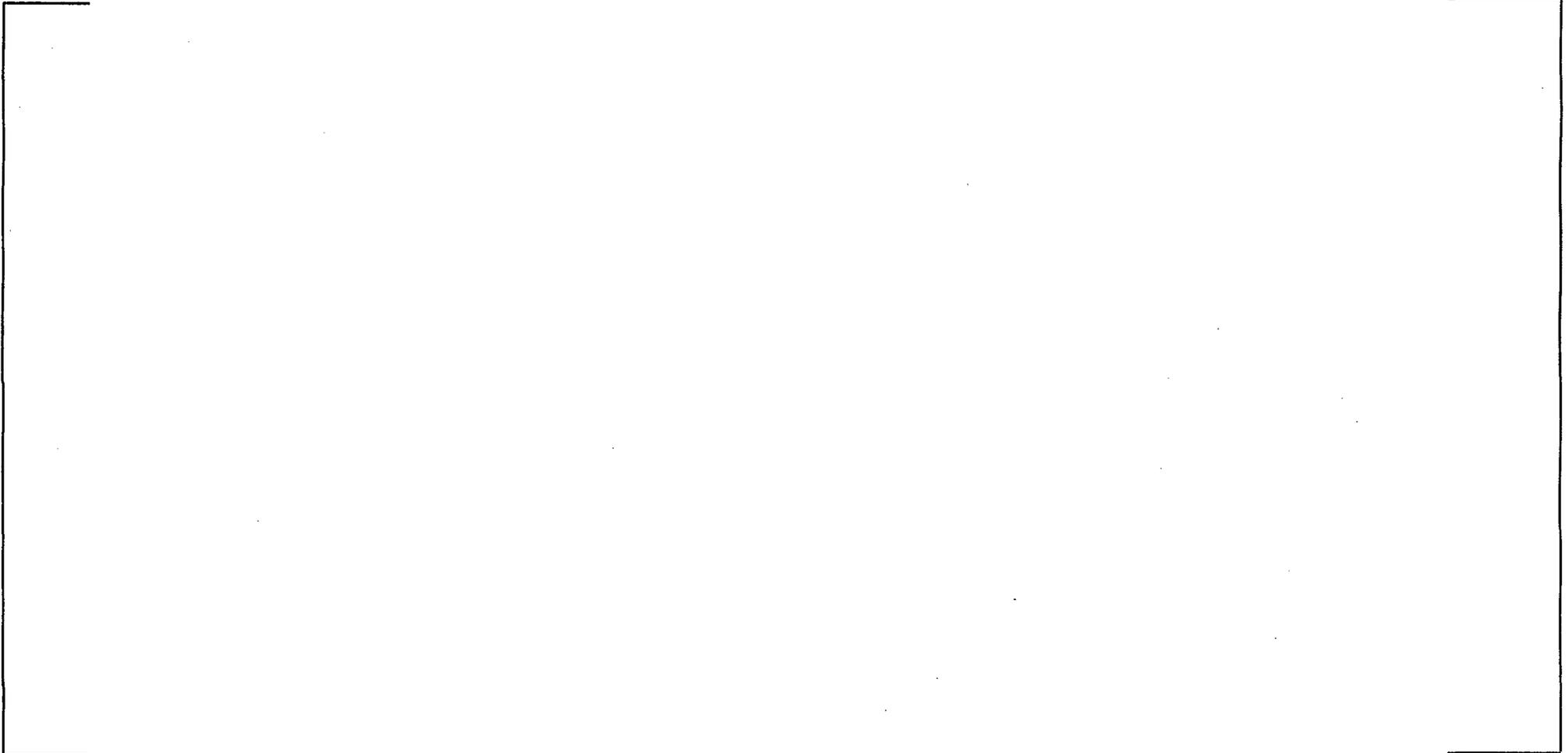
HFE Verification and Validation

NUREG 0711 Element 10 – AP1000 DCD 18.11



- Post COL

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Design Implementation

NUREG 0711 Element 11 – AP1000 DCD 18.13

- “This process element is added by Reference 2 (NUREG-0711, Rev 1, May 2002) to the Program Review Model specified in Reference 1 (NUREG-0711, July, 1994). However, it mostly applies to plant modernization. The portions of the added element that apply to new plants were formerly addressed under the Verification and Validation element in Reference 1. Since these aspects of the Program Review Model are unchanged, AP1000 will continue to address them under Section 18.11 as “Issue Resolution Verification” and “Final Plant HFE Verification.” ”

Human Performance Monitoring

NUREG 0711 Element 12 – AP1000 DCD 18.14



John Loyd

Enercon



Human Performance Monitoring

NUREG 0711 Element 12 – AP1000 DCD 18.14

- Status at Design Certification
 - COL Information Item 18.14-1, “Human performance monitoring applies after the plant is placed in operation, and is a Combined License applicant responsibility.”

Human Performance Monitoring

NUREG 0711 Element 12 – AP1000 DCD 18.14

- COLA Related Work Efforts

- Work completed to date

- ✦ Reviewed DCD section 18.14 and no exceptions in FSAR section 18.14 are expected
 - ✦ Presented draft Human Performance Monitoring implementation strategy for FSAR Section 18.14 to NuStart to confirm approach
 - ✦ Evaluated differences between NUREG 0711 Rev 1 and 2

Human Performance Monitoring

NUREG 0711 Element 12 – AP1000 DCD 18.14

- COLA Related Work Efforts (Cont'd)
 - Work to be completed by COLA submittal/review
 - ✦ COL Item 18.14-1
 - Review current COL Applicant human performance monitoring and corrective action program for its existing nuclear plants.
 - Describe and commit to implement a similar program which meets the requirements of NUREG-0711, “Human Factors Engineering Program Review Model.” Revision 2.
 - ✦ Review Regulatory Guidance for potential additional HFE requirements, SRP 18.0, DG-1145
 - ✦ FSAR Section 18.14 completion with NuStart review and concurrence.

Human Performance Monitoring

NUREG 0711 Element 12 – AP1000 DCD 18.14

- COLA Related Work Efforts (Cont'd)

- Work to be completed by COLA submittal/review (cont'd)

- ✦ Submit a DCD markup by COLA submittal to correct DCD section 18.14 reference to “Element 13” as described below:

18.14 Human Performance Monitoring

Human performance monitoring applies after the plant is placed in operation, and is a Combined License applicant responsibility. Guidance and additional information on the objectives, scope, and methods of such programs are presented in ~~Element 13~~ of Reference 1.

18.14.1 References

1. NUREG-0711, Rev. 1, “Human Factors Engineering Program Review Model,” U.S. NRC, May 2002.



Human Performance Monitoring

NUREG 0711 Element 12 – AP1000 DCD 18.14

- Post COLA
 - No additional items added to this section after application.

COL Information Item 18.14-1 will be completed with COLA

Minimum Inventory AP1000 DCD 18.12



Steve Kerch
Westinghouse

Minimum Inventory

AP1000 DCD 18.12

- Status at Design Certification

- Minimum Inventory of control room Fixed Position Controls, Displays, and Alerts listed in Table 18.12.2-1 and certified complete.

- COLA Related Work Efforts

- Minimum Inventory is being incorporated into the design of the main control room



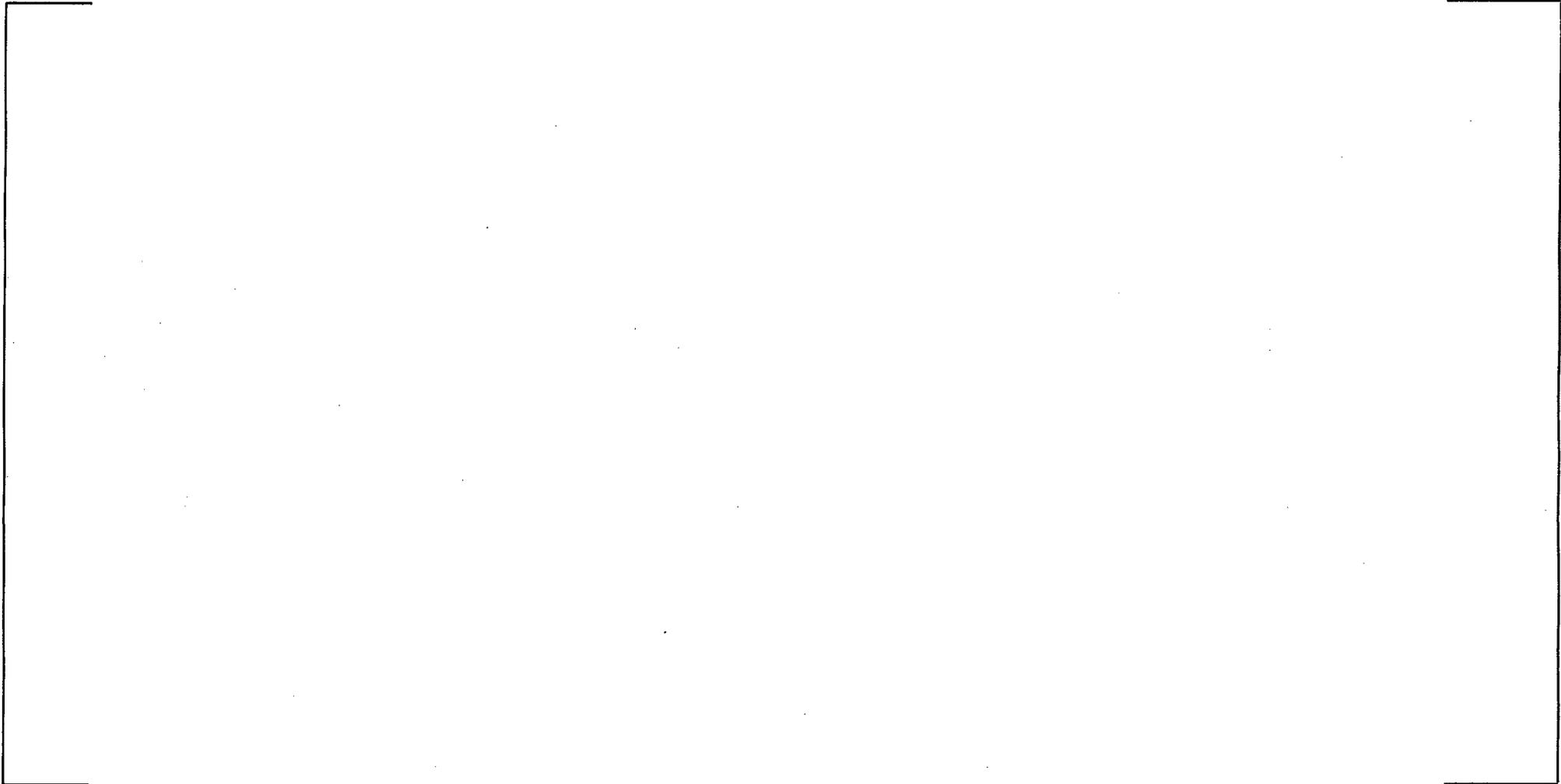
Conclusion

Paul Hunton
Westinghouse



Status of HSI Design at COL Application

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HFE Program Plan

NUREG 0711 Element 1 – AP1000 DCD 18.2

- Status at Design Certification
 - HFE Program Management reviewed and found acceptable at a complete element level
- COL Information Item 18.2-1:
 - “The Combined License applicant referencing the AP1000 certified design is responsible for the execution of the NRC approved human factors engineering program as presented by Section 18.2”.
- The purpose of this entire presentation is to demonstrate that execution of the HFE Program is in accordance with 18.2

Near Term Action Items (COLA)

- Westinghouse/NuStart
 - Technical Reports planned for submittal
 - ✦ TR (TBD) Strategy for closure of Chapter 18 Information Items and ITAAC Modifications (general)
 - ✦ TR 81: COL Information Item 18.5-1, 5-2; Task Analysis
 - ✦ TR 82: COL Information Item 18.8-1; HSI Design Implementation
 - ✦ TR 70: COL Information Item 18.9-1 Procedure Development
 - ✦ TR 84: COL Information Item 18.11-1; Verification & Validation Plans
 - ✦ TR (TBD) for HSI Design Guidelines (Rev B) for review
- Other Work Efforts
 - Address RAIs
 - Make relevant chapter 18 documentation available at the Rockville & Windsor offices for review including:
 - ✦ Writer's guides for procedure development
 - ✦ Reference (3) of TR45 (APP-GW-GLR-027, Rev.1)
 - Schedule additional meeting with NRC Staff as appropriate to discuss content of the Chapter 18 strategy TR presented above

NRC Actions

- Review of Technical Reports upon submittal
- Regular schedule updates of NRC review status including SER completion
- Continued interaction
- Feedback/interaction on industry section 13.2 , NEI 06-13