

Enclosure 3  
HFE Slide Package (Redacted)

# ***Human Factors Program and Main Control Room Development***

*June 21, 2012*

**(Redacted Version)**

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This is a pre-application document and includes preliminary B&W mPower Reactor design or design supporting information and is subject to further internal review, revision, or verification.

- HFE Technical Reports
  - Program Management Plan
  - Operating Experience Program
  - Human Reliability Assessment Interface
  - Functional Requirements Analysis and Function Allocation
  - Task Analysis and Design assessment
- Critical Safety Functions
- Accident Mitigation Strategy
- Initial Manual Safety Panel inventory and concept
- MCR Lighting Concept
- MCR Heat-up Curves for SBO
- MCR Concept and User Interface Development
- Path Forward and Conclusion

- First Impression:
  - Scope
  - Approach
  - Level of Detail
  - Consistency
- Plan for Submittal (Topical/Technical reports)
- Concept of Operation, Alarms, Navigation, and Control

# HFE Program Management Plan (PMP)

Program Management Plan

NUREG-0711

	1.1	1.2	1.3	2	3.1	3.2	3.2.1	3.2.3	3.2.4	3.2.5	3.2.6	3.2.7	3.2.8	3.2.9	3.2.10	3.3	3.3.1	3.3.2	3.3.3	3.3.4	3.4	3.4.3	3.5	3.8	4	4.1	4.1.1	5.1	5.2	5.3	5.4	6	8		
2.1			x	x																															
2.2		x					x																												
2.3					x	x																													
2.4						x																													
2.4.1 (1)		x						x	x																										
2.4.1 (2)								x				x																							
2.4.1 (3)			x																																
2.4.1 (4)			x							x	x																								
2.4.1 (5)																									x										
2.4.1 (6)															x										x										
2.4.2 (1)		x	x													x	x																		
2.4.2 (2)		x	x													x																			
2.4.2 (3)																		x	x	x															
2.4.2 (4)																			x	x															
2.4.3 (1)																	x				x														
2.4.3 (2)																							x												
2.4.3 (3)					x																	x	x												
2.4.3 (4)																																	x		
2.4.3 (5)																																		x	
2.4.3 (6)	x																																		
2.4.4 (1)																							x			x		x							
2.4.4 (2)																												x	x						
2.4.4 (3)																												x	x					x	
2.4.4 (4)																												x	x						
2.4.5 (1)						x	x	x	x	x	x	x	x	x																					
2.4.5 (2)																																			x
2.4.5 (3)																							x						x	x	x				
2.4.5 (4)																								x											
2.4.5 (5)																								x	x										

## Review Criteria Cross-Reference

# Operating Experience Review

## Operating Experience Program

NUREG-0711

	1.3	1.4	1.5	1.6	2	3.1.1	3.2.1.1	3.2.1.2	3.2.1.3	3.2.1.4	3.2.2.3	3.2.3	3.2.3.1	3.2.3.3	3.3.1	4	6
3.1	X	X	X														
3.2		X			X												
3.3				X												X	
3.4.1 (1)							X										
3.4.1 (2)								X									
3.4.1 (3)									X								
3.4.1 (4)											X		X				
3.4.1 (5)										X							
3.4.2 (1)												X		X			
3.4.2 (2)						X										X	
3.4.2 (3)						X									X		
3.5																	X

## Review Criteria Cross-Reference

## Human Reliability Analysis

NUREG-0711

	1.2	2	3.1	3.2	3.3	3.4	3.5	3.6	3.8	3.9	4	6
7.1	x	x	x	x								
7.2	x											
7.3											x	
7.4 (1)				x	x	x				x		
7.4 (2)				x	x		x	x	x			
7.4 (3)					x			x	x	x		
7.4 (4)				x					x			
7.5												x

## Review Criteria Cross-Reference

# Functional Requirements Analysis

Functional Requirements Analysis and Function Allocation

NUREG-0711

	1.2	2	3	3.1	3.1.2.4	3.1.2.5	3.1.3	3.2	3.4	4	6
4.1		x									
4.2	x										
4.3			x							x	
4.4 (1)			x	x							
4.4 (2)								x			
4.4 (3)			x	x							
4.4 (4)				x	x	x					
4.4 (5)									x		
4.4 (6)								x			
4.4 (7)								x			
4.4 (8)								x			
4.4 (9)								x			
4.4 (10)							x	x		x	
4.4 (11)									x		
4.5											x

## Review Criteria Cross-Reference



# Staffing and Qualification

Task Analysis										PMP		
NUREG-0711		1.2	2	3.1	3.3	3.3.4	3.4	3.5	4	6	3.2.4	
	6.1	x	x									
	6.2	x										
	6.3								x			
	6.4 (1)					x	x					
	6.4 (2)					x		x			x	
	6.4 (3)			x	x		x	x				
	6.4 (4)				x	x		x	x			
	6.5									x		

**Review criteria addressed in Task Analysis and other plans**

# Task Analysis / Design Assessment

## Task Analysis

NUREG-0711

	1.2	2	3.1	3.2	3.2.19	3.3	3.3.4	3.3.8	3.4	3.5	3.6	3.7	4	6
5.1		x												
5.2	x													
5.3													x	
5.4 (1)	x													
5.4 (2)				x		x								
5.4 (3)			x			x				x				
5.4 (4)						x	x		x	x				
5.4 (5)								x		x				
5.4 (6)					x						x		x	
5.4 (7)												x		
5.5														x

Review Criteria Cross-Reference

# Critical Safety Functions (CSF)

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[CCI per Affidavit 4(a)-(d)]

# Accident Mitigation Strategy Supports Critical Safety Functions

## Diversity, Simplicity, and Reliability

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# Preliminary Main Safety Panel (MSP) Layout

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[CCI per Affidavit 4(a)-(d)]

# MSP Indications Arranged based on Critical Safety Functions

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# Preliminary MCR Electrical and Heat Loads

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# MCR Heat-up Estimate During SBO

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[CCI per Affidavit 4(a)-(d)]

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[CCI per Affidavit 4(a)-(d)]

# User Interface Development

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[CCI per Affidavit 4(a)-(d)]

# User Interface Selection

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[CCI per Affidavit 4(a)-(d)]

# Simulator and User Interface Integration

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- Pilot OER, FRA/FA, and Task Analysis
- Develop Manual Safety Panel and Remote Shutdown Panel initial inventory of indications, alarms, and controls
- Develop Concept of Operations
  - Develop accident mitigation strategies
  - Plant maneuvering
  - Surveillance performance
- Develop user interface concepts
  - Alarm presentation
  - Navigation
  - Style guide
- Construct full-scope MCR mock-up and integrate with Engineering Simulator

## CONCLUSION