LICENSEE: Baltimore Gas and Electric Company

2.

FACILITY: Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2

SUBJECT: SUMMARY OF AUGUST 13, 1998, MEETING WITH BALTIMORE GAS AND ELECTRIC COMPANY (BGE) REGARDING LICENSE RENEWAL ACTIVITIES FOR CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 (TAC NOS. MA1445, MA1446 AND M99214)

On August 13, 1998, the Nuclear Regulatory Commission (NRC) staff held a public meeting with representatives of Baltimore Gas and Electric Company (BGE) at Rockville, Maryland, to discuss BGE's Fire Protection evaluation, Section 5.10, contained within its License Renewal Application. A list of meeting attendees is provided in Enclosure 1 and slides used by BGE for the discussion are provided in Enclosure 2.

During the meeting, BGE provided an overview of its integrated plant assessment process which was used to determine the scope of systems, structures and components with fire protection functions. BGE then provided a summary of how the various components and or systems with fire protection functions were evaluated to determine what aging management review activities were relied on for managing aging of the respective components and or systems.

original signed by:

David L. Solorio, Project Manager License Renewal Project Directorate Division of Reactor Program Management Office of Nuclear Reactor Regulation

NGC FILE CENTER

Docket Nos. 50-317 and 50-318

Enclosures: 1. List of Attendees 2. BGE's Presentation Slides

cc w/encls: See next page

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Baltimore Gas & Electric Company cc:

President Calvert County Board of Commissioners 175 Main Street Prince Frederick, MD 20678

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(w/enclosure 1)

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CBajwa (CSB:,

NRC & BGE PUBLIC MEETING AUGUST 13, 1998

NAME

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ORGANIZATION

DAVID SOLORIO STEVEN WEST BRIAN BATES PETER PENN DON SHAW JOHN RYCYNA BARTH DOROSHUK RUSSELL SYDNER ED MCCANN ALICE CARSON CLIFF SINOPOLI DALE BUFFINGTON KARL ESER LEE BANIC ERNIE TAORMINA STEVE HOFFMAN SAM LEE CHRISTOPHER REGAN GOUTAM BAGCHI THOMAS CHENG GEOFF HORNSETH **BOB WEISMAN**

NRC/NRR/PDLR NRC/NRR/SPLB SET-BGE BGE BGE/LR BGE/LR BGE BGE BGE BECHTEL BGE BGE BGE NRC/NRR/DE BGE NRC/NRR/PDLR NRC/NRR/PDLR NRC/NRR/PDLR NRC/NRR/ECGB NRC/NRR/ECGB NRC/NRR/EMCB NRC/OGC



Overview of BGE License Renewal Application Chapter 5.10 -Fire Protection

Presentation to NRC

August 13, 1998

98-047

Enclosure 2



Objectives

- Provide detailed review of BGE IPA process used for systems, structures and components with Fire Protection functions
- <u>Demonstrate</u> that all system and structure passive COMPONENTS with FP functions have been evaluated in an AMR and that aging effects are managed
- <u>Demonstrate</u> that passive COMPONENTS with FP functions evaluated in the FP Commodity AMR and included in Chapter 5.10, Fire Protection, of the BGE LRA have aging effects adequately managed for the period of extended operations.





Categories of Fire Protection Functions Identified in the FP Screening Tool

- FP functions (protect SR equipment and structures):
 - Fire detection
 - Fire fighting and extinguishing
- Safe shutdown functions:
 - RCS pressure and inventory control
 - Reactivity control
 - Heat removal from the RCS
 - Process monitoring

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Slide 5

			Fire Protection (FP) Screening Tool		Revision 5
SYSTEM/ STRUCTURE	S/U Sys ID No.		FIRE PROTECTION (FP) FUNCTION SAFE SHUTDOWN (SS) FUNCTION	SOURCE	SECTION/ PAGE
Intake Structure	9	FP	Provides rated fire barriers to confine or retard a fire from spreading to adjacent areas of the plant. Components include but are not limited to walls, floors, curbs, ceilings, and fire barrier penetration seals.	Ref 1 Ref 4	Item D.1 Item 3.2.5
Service Water Cooling	11	SS	Provides required cooling water to EDG, Containment Cooler loads, and IA and PA Compressors to support RCS Heat Removal (Cold Shutdown). [Notes 2, 3] * Includes isolation of non-essential Turbine Bldg loads * Includes head tank make-up operations	Ref 2	Pgs 325, 329, 330 & 339 Pgs 358 - 362, 368, 377, 378
Salt Water Cooling	12	SS	Provides ultimate heat sink to support RCS Heat Removal (Hot Standby & Cold Shutdown). [Note 2] * Includes ultimate heat sink for Service Water System * Includes ultimate heat sink for Component Cooling Water System	Ref 2	Pgs 324, 330 8 335 Pgs 368 & 377
Fire Protection	13	FP	Protects personnel and Safe Shutdown Systems and Structures from fire effects utilizing the following fixed fire suppression equipment: * Includes water supply, fire pumps and piping systems * Includes automatic water suppression systems * Includes manual water and foam suppression equipment and systems * includes automatic Halon suppression systems	Ref 18 Ref 1 Ref 7	Pg 1 Items A.5, D.3, D.4 & E.3 Items 3.1.6 & 3.3.5
		FP	Provides water curtains as rated fire barrier for unrated hatches and doors	Ref 8 Ref 19 Ref 20	Pgs 16, 28 & 37
		FP	Provides pressurized fire fighting water to hose stations inside containment by opening normally shut Containment Isolation MOV's. [Note 3]	Ref 1	Items E.3 & F.1
			BGE LCM PROGRAM		Page 5 of 13

BGE



		Fire Protection (FP) Screening Tool		Revision 5
SYSTEM/ STRUCTURE	S/U Sys ID No.	FIRE PROTECTION (FP) FUNCTION SAFE SHUTDOWN (SS) FUNCTION	SOURCE	SECTION
Fire Protection (Continued)	13	FP Provides isolation for ventilation duct penetrations to mitigate fire spread.	Ref 6 Ref 10	Items 12 & 1 item D.1
		SS Provides make-up water via fire hose connection to Condensate storage tanks 11 (21) to support RCS Heat Removal (Hot Standby & Cold Shutdown).	Ref 2	Pg 333 of 40 Pg 363 of 40
		SS Provides alternate water source to Component Cooling and Service Water systems at 1CD-457 (2CD-152) to support RCS Heat Removal (Cold Shutdown)	Ref 2	Pgs 329 & 33 of 406 Pgs 358 &36 of 406
		SS Provides alternate water source to AFW system via spool piece & fire hose station for SG heat removal at reduced SG pressure to support RCS Heat Removal (Hot Shutdown).	Ref 2	Pg 333 of 40 Pgs 357 & 38 of 406
		SS Provides an alternate source of cooling water to the IA and PA compressors via fire main hose connections.	Ref 2	Pg 339 of 40 Pgs 377 & 3 of 406
Component Cooling	15	 SS Provides heat sink for essential shutdown cooling loads to support RCS Heat Removal (Cold Shutdown). [Notes 2, 3] Includes isolation of non-essential containment neat loads Includes head tank make-up operations Includes removal of power or air from CV's 	Ref 2	Pg 335 of 40 Pgs 348, 349 365 & 368 of 406
		 SS Provides alternate heat sink via unaffected unit for essential shutdown cooling loads in event of a severe fire at the CC pump room. [Note 4] * Unit 2(1) CC system cools Unit 1(2) shutdown cooling loads 	Ref 2	Pgs 324 & 33 Pgs 348, 349 365 - 368
				Page 6 of 13
		BGE LCM PROGRAM		

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				TAB SYSTEM LEVEL SI	COPING	RESULTS								Revision
				CRITERIA 1 AND	13			L		CRITH	RUON	0		
System/Structure	Unit	9	Req'd for DBE	DBE Plant Function(s)	a	Class I, SR-1M, or HELB	Class !, SR- 1%, or HELB Reference	PAM	£	ATWS	SBO	PTS	EC	In Scope YealNo
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e Protection	182	013	No. 13 No. 17	Containment isolation (#13,17)	No	NIA	AWA	No	Yes	No	No	No	No	Yes
ansformer Deluge	18.2	014	No	None	No	NA	NVA	No	No	No	No	No	No	No
mponent Cooling bie 7] bie 9]	182	015	No. 13 No. 17 VA	Containment isolation (#13,17) VA for Containment Spray VA for Safety Injection (LPSUHPSI Pumps)	Yes	NIA	NVA	Yes	Yes	No	No	No	Yes	Yes
ctrical 250 VDC ite 7]	18.2	016	No	None	QN No	NIA	NIA	No	No	No	No	No	No	No
trument AC	182	617	VA	VA for CVCS/VA for RCS VA for Safety Injection VA for Safety Injection VA for Sarvice Water VA for Primary Containment H&V VA for Containment Spray VA for Component Cooling	2	NA	MA	\$8.	Yes	N	Yes	Ŷ	Ŷ	Yes
i instrument AC	182	018	×	VA for RCS VA for RPS VA for Nuclear Instrumentation VA for Nuclear Instrumentation VA for Painary Containment H&V VA for Safety injection VA for Cartey ESFAS VA for Area & Process Rad Monitoring VA for Compressed Air	°N	NA	MA	Yes	Yes	N	°2	Ŷ	No	Yes

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42 Systems and Structures in LR Scope have FP Functions

- Components in 26 systems/structures fully evaluated in other system, structure and commodity AMRs
- Components in 16 systems with NSR FP functions not fully evaluated above are evaluated in FP Commodity AMR



Components in 26 Systems/Structures Fully Evaluated in Other System, Structure and Commodity AMRs

- Five Structures Intake, Containment, Auxiliary Building, Turbine Building, Barriers and Barrier Penetrations included with structure
- Eight Fluid Systems SW, EDG, CR HVAC, AB HVAC, FW, SI, Containment H&V, CS
- 13 Electrical 125VDC, 4kV, 480V, 480V MCC, Instr AC, Vital Instr AC, Annuc, CRDM, NI, Main Turb, F&S Detection, L&P Recept, Plt Communications
- Example: SW LRA Chapter 5.16, page 5.16-5 lists FP function. All passive components which perform this FP function are SR PB and evaluated in SW AMR and included in LRA Chapter 5.16.



NSR Components in 16 Systems With FP Passive Functions Are Included in FP Commodity AMR

- Nine systems with other AMRs SRW, CCW, CAS, DFO, AFW, CVCS, RCS, N2H2, MS
 - Example NSR SRW components which supply cooling water to NSR air compressors
- Seven systems without other AMRs WPTW, FP*, PH*, DWCS*, Cond, PD*, LW*
 - Containment Isolation for these in CIG AMR and LRA Chapter 5.5



Passive Fire Protection Functions in the FP Commodity AMR and Included in Chapter 5.10 of the LRA

- NSR system pressure boundary (all 16 systems)
- Provide drainage of fire fighting water in rooms containing SR equipment (Plant Drains and Liquid Waste Systems)





AMR Method 1 - Process FP Program Activities Manage Aging Effects

- Identify the scope of all performance and/or condition monitoring activities (e.g., maintenance, testing, and inspection criteria) required by FPP that apply to the system
- Identify the scope of the system components subject to AMR that are addressed by the above activities
- Demonstrate adequate management of aging effects through the FPP activities
 - Programs verify pressure boundaries/drainage is intact
 - Verified all components are covered



AMR Method 2 - Process Performance and Condition Monitoring Activities Manage Aging Effects

- Identify all applicable overlaps of FP intended functions with normal operating functions associated with power production
- System in operation undergoes a continuous Fire Protection functional test
- Performance /condition monitoring associated with normal operations are credited for identifying effects of system aging
- Demonstrate that normal operation of the system ensures that FP intended function is capable of being performed by all components



AMR Method 3 - Process Aging Management Programs Credited for SR PB Components Manage NSR PB Components

- Review the results of a system's SR PB AMR with focus on the plausible ARDMs identified and the aging effects management programs
- Determine if plausible ARDMs are equally applicable to NSR PB components
- Determine if credited programs for SR PB components are also applicable to the NSR components
- Document the findings



AMR Method 4 - Process Normal IPA AMR Process Conducted for the Remaining Components

- Systems which did not have aging effects managed by any of the previous three methods required an AMR in accordance with the IPA process utilized for safety related piping systems
- The AMR identified intended functions, plausible ARDMs, and the required aging effects management



Corrective Actions

 All corrective actions will be performed in accordance with the CCNPP Corrective Actions Program BGE

Life Cycle Management Project

AMR Results Summary

System	System No.	FPP Activities Manage Aging	Ferformance/ Condition Monitoring Activ. Manage Aging	SR-PB AMR Manages Aging	AMR Conducted
Well and Pretreated Water	008	No	Yes	N/A	N/A.
Service Water	011	No	Yes	N/A	N/A
Fire Protection	013	Yes	N/A	N/A	N/A
Component Cooling	015	No	Yes	N/A	N/A
Compressed Air	019	No	Yes	N/A	N/A
Diesel Fuel Oil	023	Yes	N/A	N/A	N/A
Plant Heating	029	No	Yes	N/A	N/A
Auxiliary Feedwater	036	Yes (Partial)	Yes (Partial)	N/A	N/A
Demineralized Water and Condensate Storage	037	No	Yes	.N/A	N/A
Chemical and Volume Control	041	No	No	Yes	N/A
Condensate	044	No	Yes (Partial)	No	Yes (Partial)
Plant Drains	053	Yes (Partial)	Yes (Partial)	N/A	N/A.
Reactor Coolant	064	No	No	Yes	NIA
Liquid Waste	071	No	Yes	N/A	N/A.
Nitrogen & Hydrogen Gas	074	Yes	N/A	N/A	N/A
Main Steam	083	No	Yes	N/A	N/A

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Well and Pretreated Water (008) (AMR Method 2)

- Scope includes all components comprising the pressure boundary of the flow path from the well water pumps to the PWSTs and associated pretreated water booster pumps
- System is source of all makeup water for power production, fire fighting and potable water system
- The FP and SS functions do not challenge the system's pressure-retaining capability any more than normal operating conditions
- Aging effects are fully managed by performance and condition monitoring activities during normal operation



Service Water (011) (AMR Method 2)

- Scope includes NSR components comprising the pressure boundary of the flow path to the plant air and instrument air compressors (most of the NSR portion of the system)
- SRW provides cooling to IA and PA compressors that supply compressed air loads critical to power production
- The SS functions do not challenge the system's pressure-retaining capability any more than normal operating conditions
- Aging effects are fully managed by performance and condition monitoring activities during normal operation



Fire Protection (013) (AMR Method 1)

- Scope includes all pressure retaining boundary components that protect safety related structures, systems and components
- FP system is made of several subsystems: deluge water spray, preaction sprinklers, automatic sprinklers, Halon, foam, indoor and outdoor hose stations, and portable extinguishers
- Extensive set of FPP activities (with specified frequencies) ensures the system can perform the passive pressure boundary function
- Aging effects are fully managed by the FPP

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Component Cooling (015) (AMR Method 2)

- Scope includes NSR components comprising the pressure boundary of the head tank make-up flow paths and crossconnects using the reactor coolant waste evaporator flowpath
- CC serves as a heat sink for many plant loads critical to power production
- The SS functions do not challenge the system's pressure-retaining capability any more than normal operating conditions
- Aging effects are managed by performance and condition monitoring activities during normal operation



Compressed Air (019) (AMR Method 2)

- The entire NSR pressure boundary portion of the system is in scope
- IA system provides air for pneumatic instruments and controls and pneumatically-operated valves. The PA provides air for plant maintenance and operation.
- The SS functions do not chailenge the system's pressure-retaining capability any more than normal operating conditions
- Aging effects are managed by performance and condition monitoring activities during normal operation



Diesel Fuel Oil (023) (AMR Method 1)

- Scope includes NSR components comprising the pressure boundary of the fuel oil supply flow path to the diesel-driven fire pump
- DFO system provides fuel to the emergency diesel generators, auxiliary boilers, and diesel-driven fire pump
- FPP activities (with specified frequencies) ensures the system can perform the passive pressure boundary function
- Aging effects are fully managed by the FPP



Plant Heating (029) (AMR Method 2)

- Scope includes all components comprising the pressure boundary of the main flow paths to ensure adequate heating of the PWST
- The plant heating system is in continuous use during periods of cold weather and is crucial to heating plant areas and plant equipment
- The FP functions do not challenge the system's pressure-retaining capability any more than normal operating conditions
- Aging effects are managed by performance and condition monitoring activities during normal operation



Auxiliary Feedwater (036) (AMR Methods 1 and 2)

- Scope includes NSR components comprising the pressure boundaries of the pump suction flow paths from NSR CSTs 11 and 21; and the AFW fire hose connection spool piece
- AFW system is used to provide FW to the steam generators
- For SS, flowpath from NSR CSTs 11 and 21 demonstrated by normal operations
- · For SS, staged spool piece is inspected each quarter
- Aging effects are managed by FPP and by performance and condition monitoring activities during normal operation



Demineralized Water and Condensate Storage System (037) (AMR Method 2)

- Scope includes all components comprising the NSR pressure boundaries of the No. 11 and No. 21 CSTs out to the first isolation valves
- System stores demineralized water for normal plant operations and emergency conditions
- The SS functions do not challenge the system's pressure-retaining capability any more than normal operating conditions
- Aging effects are managed by performance and condition monitoring activities during normal operation



CVCS and RCS (041 & 064) (AMR Method 3)

- Scope includes all components comprising the NSR pressure boundary of the reactor coolant pumps controlled bleedoff lines to the volume control tank
- Controlled bleedoff maintains optimum seal stability and performance; if isolated, pressure and temperature may be different than during normal operation
- Comparison of SR PB AMR encompassed NSR components
- Corrosion of fasteners is plausible and aging effects managed along with the SR components (Boric Acid Corrosion Inspection Program)



Condensate (044) (AMR Methods 2 and 4)

- Scope includes all components comprising the pressure boundary of the make-up water flow paths to the SRW and CC head tanks from the fire hose connection
- Piping off discharge header to manual isolation valves is pressurized
- Piping downstream of valves is isolated
- Aging effects are managed by performance and condition monitoring activities during normal operation and the Age Related Degradation Program



Plant Drains (053) (AMR Methods 1 and 2)

- Scope includes all components comprising the pressure boundary of the drains from rooms containing SR equipment; and backflow protection for Charging Pump Rooms, ECCS Pump Rooms, EDG Rooms, and AFW Pump Rooms
- Drains are collected in floor sump and pumped by sump pump, same as during fire
- Check valves are under FPP evaluation
- Aging effects are managed by the FPP (ckvs), and by performance and condition monitoring activities during normal operation



Liquid Waste (071) (AMR Method 2)

- Scope includes all components comprising the flow path from the sump pump check valves to the waste processing subsystems
- System receives and processes floor sump drains through plant drain interface. Lines subjected to pump discharge pressure, same as during fire
- Aging effects are managed by performance and condition monitoring activities during normal operation



Nitrogen and Hydrogen System (074) (AMR Method 1)

- Scope includes NSR hydrogen excess flow check valves installed upstream of the Auxiliary Building
- Fire Protection function is to isolate flow to the Auxiliary Building in the event of a downstream rupture.
- Excess flow check valves are under FPP evaluation
- Aging effects are managed by the FPP



Main Steam (083) (AMR Method 2)

- Scope includes all NSR components comprising the pressure boundary of the piping from the MSIVs to downstream isolation valves
- System is designed to transfer steam from SG to main turbines, reheaters, and turbine-driven pumps
- Scoped portion is subjected to normal system conditions, same as for safe shutdown
- Aging effects are managed by performance and condition monitoring activities normal operation



Summary of FP Aging Management Review

- Three systems managed by FP Program
- Eight systems managed by performance and condition monitoring activities associated with normal operation
- Two systems managed by FPP & normal ops
- Two systems managed along with SR components (BACIP)
- One system managed by normal ops & ARDI Program



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Life Cycle Management Project

Acronyms / Abbreviations

SW	- Saltwater
EDG	- Emergency Diesel Generators
CR HVAC	Control Room HVAC
AB HVAC	- Auxiliary Building H&V
FW	- Feedwater
SI	- Safety Injection
Containment HVAV	- Primary Containment H&V
CS	- Containment Spray
125VDC	- Electrical 125 Volt DC Distribution
4kv	- Electrical 4 kV Transformers and Buses
480V	- Electrical 480 Volt Transformers and Buses
480V MCC	- Electrical 480 Volt Motor Control Centers
Instr AC	- Instrument AC
Vital Instr AC	- Vital Instrument AC
Annuc	- Annunciation
CRDM	- Control Rod Drive Mechanism and Electrical
NI	- Nuclear Instrumentation
Main Turb	- Main Turbine
F&S	- Fire and Smoke Detection
L&P Recept	- Lighting and Power Receptacles
Plt Communications	- Plant Communications

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Acronyms / Abbreviations

BACIP	- Boric Acid Corrosion Inspection Program
ARDI	- Age Related Degradation Inspection Program
CIG	- Containment Isolation Group
SR	- Safety Related
NSR	- Non Safety Related
FP	- Fire Protection
SS	- Safe Shutdown
IPA	- Integrated Plant Assessment
AMR	- Aging Management Review
PB	- Pressure Boundary
IA	- Instrument Air
PA	- Plant Air
FPP	- Fire Protection Program
ARDM	- Age Related Degradation Mechanism
CSTs	- Condensate Storage Tanks
ECCS	- Emergency Core Cooling System
CKVs	- Check Valves
AFW	- Auxiliary Fedwater System