

## **Enclosure 2**

### **MFN 15-064, Revision 1, Supplement 2**

### **GEH's Supplemental Response to RAI 09.05.01-1**

### **- ABWR DCD Revision 6 Markups**

#### **IMPORTANT NOTICE REGARDING CONTENTS OF THIS DOCUMENT Please Read Carefully**

The information contained in this document is furnished solely for the purpose(s) stated in the transmittal letter. The only undertakings of GEH with respect to information in this document are contained in the contracts between GEH and its customers or participating utilities, and nothing contained in this document shall be construed as changing that contract. The use of this information by anyone for any purpose other than that for which it is intended is not authorized; and with respect to any unauthorized use, GEH makes no representation or warranty, and assumes no liability as to the completeness, accuracy, or usefulness of the information contained in this document.

**NOTE: MFN 15-064 Revision 1, Supplement 2, proposed changes are in "BLUE" text boxes. The "RED" text boxes are from MFN 15-064 Revision 1, Supplement 1.**

motor-operated volume damper is also provided in each exhaust branch. Upon detection of a fire, a normally non operating exhaust fan is started to increase the negative pressure of the exhaust system. The motor-operated dampers in the exhaust ducts for the divisional HVAC/fire areas without the fire reposition to their predetermined fire settings to maintain normal negative pressure in their zones. The pressure in the HVAC/fire area experiencing the fire moves negative with the change in exhaust pressure. This establishes a pressure differential to the adjacent fire areas to provide smoke control by the differential pressure across the fire barriers surrounding the fire.

See Subsection 9.4.4 for a description of the smoke control system for the Turbine Building.

### 9.5.1.1.7 Spurious Control Actions

As stated above, the systems are separated by fire areas on a divisional basis. The multiplexing system is a dual channel system. Two simultaneous, identical digitized control signals are required at the de-multiplexer for control action to be taken at the field device. The probability of two spurious signals matching is essentially zero.

identical

that must match

minuscule

likelihood

The significance of the two-channel operation of the multiplex system is that, if the ability to operate from the control room is lost, equipment will not be started. This feature may also be used in a fire situation without fear that failures in the control room will start spurious signals from the control room. The feature of being able to start equipment locally to utilize non- safety-related systems such as the feedwater and condensate pumps in the Turbine Building as backups to the safety-related safe shutdown system, if desired.

Spurious operation of equipment controlled by Remote Multiplexing Units (RMU) in the field due to physical damage because of fire or smoke will be considered in cases where the connection between the RMU and the field devices is transmitting a command signal.

[Revised.] ADD: , induced by physical damage (including fire damage) to the fiber-optic transmission cable sent simultaneously and

Add Insert #1 here. [See next page.]

The interlocks which prevent damage of equipment may be accomplished directly and by hard wiring in the field. For example, the protective relaying for the switchgear is located in the switchgear and the interlocks accomplished in switchgear. Signals for operational logic are multiplexed to the control room, but protective actions are not dependent on conditions in the control room.

[Revised] MOVED FROM 9.5.1.6.5: The COL applicant shall provide an evaluation of the ABWR's susceptibility to Multiple Spurious Operations (MSOs) in accordance with the methodology contained in NEI 00-01, Guidance for Post Fire Safe Shutdown Circuit Analysis, Revision 2 and as modified by Regulatory Guide 1.189, Revision 2. Spurious operation of equipment due to fire or smoke damage to the equipment listed above will be considered. The COL applicant will submit the results of this evaluation to the NRC for review. See Subsection 9.5.13.22 for COL license information.

Because of the nature of the damage induced failures within a division are confirmed by the analysis performed. The sabotage analysis was done on a division.

### 9.5.1.1.8 Support Systems

Support systems such as HVAC and Reactor Building Closed Cooling Water Systems are designated as safety-related if they support safety-related systems. They are given divisional assignments and separated by fire barriers in the same fashion as the safety-related primary systems.

### Insert #1 for Section 9.5.1.1.7

The likelihood of fire or smoke-induced spurious signals initiating in and propagating through the integrated digital instrumentation and control systems and the supporting Essential Multiplexing System (EMS) is miniscule due to the use of message authentication, which requires the message format and sequence to be correct to be recognized, and the use of optical fiber cabling, which cannot “hot short” to other cables. Nevertheless, spurious operation of plant equipment due to fire or smoke damage to the following digital instrumentation and control and EMS equipment is considered, regardless of its location:

- Main Control Room (MCR) components or equipment that are connected via electrical wires to other equipment, both digital controller and EMS equipment, located in two (2) separate rooms in the C/B arranged adjacent to and on opposite sides of the MCR, and to other equipment in other plant locations.
- Digital controller and EMS equipment connected via fiber-optic cable, arranged as Divisions 1 and 3 and Divisions 2 and 4, located in their own separate rooms in the C/B wherein each room is adjacent to and on opposite sides of the MCR.
- EMS equipment located in the two (2) separate rooms in the C/B that is connected via fiber-optic cable to other EMS equipment in other plant locations.
- Remote Multiplexing Units (RMUs) located in the field that are connected via electrical wires to plant process components (e.g., instruments and actuators).

plant-specific licensing. Items of interest under the administrative controls review will include but not be limited to:

- (1) Control of combustible materials such as combustible/flammable liquids and gases, fire retardant treated wood, plastic materials, and dry ion exchange resins
- (2) Transient combustible materials and general housekeeping, including health physics materials
- (3) Open-flame and hot-work permits and cutting and welding operations
- (4) Quality assurance with respect to fire protection systems components, installation, maintenance, and operation
- (5) Qualification of fire protection engineering personnel, fire brigade members, and fire protection systems maintenance and testing personnel
- (6) Instruction, training, and drills provided to fire brigade members

The COL applicant shall provide the description of the review. See Subsection 9.5.13.18 for COL license information.

**DELETE: Subsection 9.5.1.6.5 in its entirety.  
[Discussion moved to Subsection 9.5.1.1.7]**

#### **9.5.1.6.5 Multiple Spurious Operations Evaluation**

The COL applicant shall provide an evaluation of the ABWR's susceptibility to Multiple Spurious Operations (MSO) in accordance with the methodology contained in NEI 00-01, Guidance for Post Fire Safe Shutdown Circuit Analysis, Revision 2 and as modified by Regulatory Guide 1.189, Revision 2. The COL applicant will submit the results of this evaluation to the NRC for review. See Subsection 9.5.13.22 for COL license information.

### **9.5.2 Communication Systems**

The ABWR Standard Plant design provides a telephonic communication system consisting of a power-actuated paging facility and a separate network of cables and jacks to facilitate use of sound-powered telephones for maintenance, repair, and emergency conditions.

See Subsection 9.5.13.11 for COL applicant information pertaining to criteria for the design of the plant security system.

#### **9.5.2.1 Design Bases**

##### **9.5.2.1.1 Power-Actuated Paging System**

The paging system is designed to provide facilities for mutual communication and simultaneous broadcasting in the related buildings of the plant.

**Editors Note: Section 9.5.13.22 Multiple Spurious Operations Evaluation - Continued**

Guidance for Post Fire Safe Shutdown Circuit Analysis, Revision 2 and as modified by Regulatory Guide 1.189, Revision 2. The COL applicant will submit the results of this evaluation to the NRC for review.

**9.5.14 Reference**

[Revised.] ADD: The equipment listed in Subsection 9.5.1.1.7 will be considered in this evaluation.

- 9.5-1 Stello, Victor, Jr., "Design Requirements Related To The Evolutionary Advanced Light Water Reactors (ALWRS)", Policy Issue, SECY-89-013, The Commissioners, United States Nuclear Regulatory Commission, January 19, 1989.
- 9.5-2 Cote, Arthur E., "NFPA Fire Protection Handbook", National Fire Protection Association, Sixteenth Edition.
- 9.5-3 "Design of Smoke Control Systems for Buildings", American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc., September 1983.
- 9.5-4 "Recommended Practice for Smoke Control Systems", NFPA 92A, National Fire Protection Association, 1988.
- 9.5-5 Life Safety Code, NFPA 101, National Fire Protection Association.
- 9.5-6 "Reliability of Emergency Diesel Generators at U.S. Nuclear Power Plants", Electric Power Research Institute, NSAC-108, September 1986.
- 9.5-7 Loss of All Alternating Current Power, 10CFR50.63.
- 9.5-8 Regulatory Guide 1.155—Station Blackout.
- 9.5-9 "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors", NUMARC-87-00.
- 9.5-10 "NEI 00-01, Guidance For Post Fire Safe Shutdown Circuit Analysis, Revision 2, May 2009".

[Revised.] ADD: 9.5-11 Regulatory Guide 1.189 - Fire Protection for Nuclear Power Plants, Revision 2.