Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 2
Facility Construction Permit No. CPPR-92
NRC Docket No. 50-391

Subject: **Watts Bar Nuclear Plant Unit 2 - Transmittal of Part V of the Unit 1/Unit 2 Fire Protection Report (TAC No. ME3091)**

Reference: Letter from TVA to NRC, "Watts Bar Nuclear Plant (WBN) Unit 2 - Transmittal of Unit 1/Unit 2 As-Constructed Fire Protection Report (TAC No. ME3091)," dated September 18, 2014

By letter dated September 18, 2014 (referenced above), TVA submitted the WBN Unit 1/Unit 2 As-Constructed Fire Protection Report (FPR) to the Nuclear Regulatory Commission (NRC). Since that time, additional changes have been made as a result of discussions with the NRC staff and ongoing TVA reviews. This letter responds to a request from NRC to provide in the enclosure, the updated Part V, "Manual Actions, Repairs, and Emergency Lighting," of the Unit 1/Unit 2 FPR to support completion of NRC Staff review for WBN Unit 2. The revision bars in Part V reflect the changes between the reference letter and the current version of the FPR.

No new commitments are made in this letter. Please direct any questions concerning this matter to Gordon Arent at (423) 365-2004.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 9th day of January 2015.

Respectfully,

J. W. Shea
Vice President, Nuclear Licensing

Enclosure

cc: See Page 2

Enclosure: Watts Bar Nuclear Plant, Unit 1/Unit 2 Fire Protection Report - "Part V - Manual Actions, Repairs, and Emergency Lighting"

cc (Enclosure):

U. S. Nuclear Regulatory Commission, Region II
NRC Senior Resident Inspector, Watts Bar Nuclear Plant, Unit 1
NRC Senior Resident Inspector, Watts Bar Nuclear Plant, Unit 2

Enclosure

Watts Bar Nuclear Plant, Unit 1/Unit 2 Fire Protection Report -
"Part V - Manual Actions, Repairs, and Emergency Lighting"

PART V – MANUAL ACTIONS, REPAIRS, AND EMERGENCY LIGHTING

1.0 INTRODUCTION

Part V documents the methodology used to satisfy Appendix R Section III.G, III.J, and III.L requirements for actions as a result of fire events that occur in any plant location. This includes the criteria and assumptions used to evaluate feasibility and reliability of operator manual actions (OMAs) credited in achieving and maintaining hot shutdown conditions. Part V describes the process for determining the need for, and adequacy of, emergency lighting in the access routes to operator manual action locations, and at the specific locations where the operator manual action is required to take place. Part V also identifies the repairs that are required in order to achieve and maintain cold shutdown conditions. The following sections describe these topics in more detail.

2.0 OPERATOR MANUAL ACTIONS

Operator Manual Actions (OMAs) are those actions performed by operators to manipulate components and equipment from outside the main control room to achieve and maintain post fire hot shutdown, but do not include “repairs”. OMAs comprise an integrated set of actions needed to help ensure that hot shutdown can be accomplished, given that a fire has occurred in a particular plant area. Operator Actions (OAs) are actions taken by an Operator while in the Main Control Room (MCR). Actions performed inside the main control room are not included in the definition of operator manual actions. Additionally, actions performed at auxiliary control system stations (e.g., Auxiliary Control Room) in response to a main control room abandonment event are considered OAs but are evaluated against the guidance for OMAs. OMAs are identified in calculation EDQ00099920090016, “Appendix R – Units 1 & 2 Manual Action Requirements,” (Part II, Reference 4.2.59) which also establishes the allowable time to complete each action. Operator actions performed inside the main control room are also identified in a separate appendix within this calculation.

OMAs have been identified that are required to ensure the proper operation of specific equipment that is relied on for safe shutdown as a result of an Appendix R fire at WBN Units 1 and 2. These actions are based on an analysis of:

1. The location of the fire,

2. The components and cables in the location that may be affected by the fire,

3. The location of the specific component manually operated,

4. The time requirements for completion of the operator manual action following reactor trip as a result of the Appendix R fire, including the time it takes to get to the operator manual action location and the time it takes to perform the operator manual action; and

5. The minimum operator staffing level available to perform the operator manual actions.

For each combination of rooms analyzed for Appendix R compliance, Part VI of the FPR summarizes which major component(s) may be damaged by the fire and assumed unavailable. Part VI of the FPR also identifies the OMAs necessary to mitigate the postulated impact of fire damage to the component(s).

In accordance with Regulatory Guide 1.189 (Part II, Reference, 4.1.26), OMAs provide an acceptable protection method for Structures, Systems, and Components (SSC) including

circuits that are important to safe shutdown. OMAs for SSC in the safe-shutdown success path require prior NRC approval. The OMAs relied upon for post fire safe shutdown as identified for each analysis volume in Part VI of this FPR fall into three categories as follows:

1. OMAs required for Unit 1 only operation which are approved by the NRC in SSER 18 (Part II, Reference, 4.3.9). Per SSER 18 this category is defined by calculation WBN-OSG4-165 revision 5. Unit 1 OMA demonstrated performance time acceptance criteria is established in SSER 18, Appendix FF, Section 3.5. Feasibility and reliability has been evaluated in the Re-verification and Revalidation of Appendix R Manual Operator Actions walkdowns (Part II, Reference 4.2.93).

2. OMAs added for Unit 1 after issuance of SSER 18. The added OMAs are for SSCs important to safe shutdown and do not require prior NRC approval. Feasibility and reliability has been evaluated and documented in the Re-verification and Revalidation of Appendix R Manual Operator Actions walkdowns (Part II, Reference 4.2.93); or

3. OMAs required for Unit 2 operation (including common equipment). Feasibility and reliability of these OMAs are evaluated as described below. Those requiring prior NRC approval are documented as engineering evaluations in Part VII, Section 8 of this FPR.

2.1 Unit 2 OMA Feasibility and Reliability

OMAs are evaluated to ensure they are feasible (can be performed) and that they are reliable (can be performed reliably under a wide range of plant conditions that an operator might encounter during a fire). Feasibility and reliability of WBN Unit 2 and common OMAs (including OMAs for Control Room abandonment) are evaluated to the criteria below which are based on the criteria and technical bases provided in NUREG 1852; “Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire” (Part II, Reference 4.1.27).

A robust defense-in-depth fire prevention/protection program provides additional assurance that OMAs are both feasible and reliable. This defense-in-depth at WBN consists of a transient control program, Hot Work Permit procedure, fire rated barriers (including fire doors, fire dampers, and penetration seals), detection and automatic suppression, standpipe and hose station system, and a well trained, dedicated fire brigade. The fire prevention/protection program serves to minimize the possibility and severity of a fire in an area where an OMA is relied upon. Any area crediting OMAs with a required time less than 2 hours and lacking robust defense-in-depth, is given additional consideration in the feasibility and reliability evaluation.

2.1.1 Unit 2 and Common OMA Feasibility and Reliability Analysis Criteria:

1. Adequate time exists for the operator to perform the action considering:

    a. Differences between analyzed and actual conditions that may be present during a fire; and
    b. Human performance uncertainties that may be encountered.

2. Appropriate allowances have been made for environmental factors that negatively impact the ability to perform the operator manual action. Environmental factors considered include;

    a. Smoke and hot gases;

b. Water from firefighting activities;
c. Radiation;
d. Temperature and humidity;
e. Noise; and
f. Lighting.

3. Equipment to be operated is available and accessible

   a. Equipment is functional and accessible;
   b. Support equipment (if needed) is available and functional;
   c. Diagnostic instrumentation (if needed) to identify the need for the action and to confirm action results. Diagnostic instrumentation is not required for preventive actions;
   d. Necessary communications;
   e. Necessary personnel protective equipment; and
   f. Necessary portable equipment.

4. Plant procedures directing performance of the OMA exist and procedure training has been conducted. (see Section 2.2)

5. Adequate personnel (staffing) are available to perform the OMAs exclusive of the fire brigade.

2.1.2 Unit 2 and Common OMA Feasibility and Reliability Acceptance Criteria

Unit 2 and common Operator Manual Actions that meet the following criteria of NUREG 1852 are considered feasible and reliable. As provided in NUREG 1852, specific evaluations can be performed for situations not meeting the acceptance criteria. Specific evaluations are documented in calculation EDQ00299920110381 (Part II, Reference 4.2.59A).

1. Adequate time ($\geq$ 10 minutes) is available to perform actions (t=0 is defined in Section 2.2.2) and either:

   a. Use of self-contained breathing apparatus (SCBA) is not required, the demonstrated performance time is less than 50% of the allowable time (100% margin) and the room of fire origin is equipped with cross zoned smoke detection to ensure early detection and rapid AUO recall.

   b. Alternatively the following uncertainty allowances, as applicable, should be added to the demonstrated performance time before comparing to the total allowable time:

      i. A penalty of 50% of the demonstrated performance time up to a maximum of three (3) minutes for human centered uncertainties such as size, physical strength, cognitive differences and experience level,
      ii. If SCBA is needed and not carried during the performance demonstration, a 15 percent penalty for each applicable OMA (which thus affects the time for all subsequent actions) will be added to the performance demonstration times. The 15 percent penalty is similar in magnitude to the requirement defined in Regulatory Guide 8.15 (Reference 4.1.28) for

ALARA purposes and has been shown to be conservative based on plant walkdowns using SCBA for Appendix R purposes,

iii. A three (3) minute delay for visual fire confirmation for rooms without cross zoned detection (i.e., 125 vdc vital battery rooms and 125 vdc vital battery board rooms), and/or

iv. A ten (10) minute delay for visual fire confirmation for the Intake Pumping Station Duct Banks A and B which do not contain detection.

c. Unit 2 action(s) taken in the MCR associated with abandoning the MCR in the case of a fire are excluded from NUREG 1852. Additionally, Unit 2 actions performed at auxiliary control system stations (e.g., Auxiliary Control Room) in response to a main control room abandonment event are evaluated against the timing criteria for OMAs.

2. Environmental factors

a. Availability of a path for the operator to travel to the control location along the 8-hour battery pack emergency light illuminated paths defined in calculation EDQ00099920090017 (Part II, Reference, 4.2.58) without traversing the fire affected room ensures adequate lighting and minimal impact from fire suppression effects;

b. The 100 percent time margin or performance time plus uncertainty allowances from paragraph 1.a and 1.b above ensures adequate time to reach the control location and perform the action including the effects of smoke and hot gases. Additional time margin must be included for OMAs required for a fire in an area lacking robust defense-in-depth fire prevention/protection;

c. Communications: Part II section 12.8 and calculation WBPEVAR9205004, Appendix R Analysis for Intraplant Communication System (Part II, Reference 4.2.76), describe the design adequacy of the communication systems for operator manual actions. This is validated by as-constructed walkdown of OMAs; and

d. OMAs to be performed in the fire affected room in about an hour are specifically evaluated and documented in FPR Part VII.

3. Equipment functionality and accessibility

a. Equipment and associated cables (if required) are unaffected by the fire;

b. Support equipment (if needed) is unaffected by the fire;

c. Diagnostic instrumentation (not needed for preventive actions) is not affected by the fire; and

d. Personal protective equipment and tools (portable equipment) are staged and readily available.

4. Plant procedures are available for the affected room (see Section 2.2 below)

5. Adequate personnel (staffing) are available to perform all of the credited OMAs for the affected fire (including sequential actions performed by the same operator).

The OMA feasibility and reliability analyses for Unit 2 and common OMAs are documented in calculation EDQ00299920110381 (Part II, Reference 4.2.59A). Additionally a summary of the

analysis for Unit 2 and common OMAs of the following types are included in Part VII, Section 8 of the FPR:

1. OMAs involving FSSD success path components with a required time (allowable) less than 120 minutes;

2. OMAs requiring reentry into the fire zone in about 1 hour.

The following assumptions may be applied (if appropriate) in the feasibility and reliability analysis:

1. A bounding analysis can be used for OMA's with similar characteristics; and

2. Operator Manual Actions with a required completion time (allowable time) of 120 minutes or greater have adequate time for feasible and reliable performance and can be excluded from performance validation demonstrations.

2.2 Unit 1 and Unit 2 Safe Shutdown Procedures

Abnormal Operating Instruction 0-AOI-30.1, "Plant Fires" (Part II, Reference 4.2.89) provides operator actions to respond to and mitigate the consequences of a confirmed plant fire. Plant fires are confirmed by cross zoned fire detection system actuation, High Pressure Fire Pump (HPFP) auto start, CO_2 initiation, sprinkler initiation or by visual observation. The operator response includes:

1. Initiate fire alarm;
2. Ensure Fire Operations (fire brigade) is notified;
3. For fire located in the Control Building, Auxiliary Building, Annulus, Intake Pumping Station or Reactor Building, notify the Appendix R Assistant Unit Operators (AUOs) to report to the control room, and to obtain SCBA, radio, and other equipment as required.
4. Announce fire location and the location of the incident command post, over the public address system;
5. Ensure the diesel fire pump or two electric fire pumps are running.

The decision to declare an Appendix R fire and to trip the unit(s) is left to the judgment of the Unit SRO/Shift Manager and must be based on the magnitude of the fire and its potential effect on the System Structures and Components necessary to achieve and maintain safe shutdown.

Abnormal Operating Instruction 0-AOI-30.2, "Fire Safe Shutdown" (Part II, Reference 4.2.90) has been developed to specify the actions which may be required for fires that damage equipment necessary to achieve and maintain safe shutdown. The fire safe shutdown procedures contained in 0-AOI-30.2 are developed based on calculations WBN-0SG4-031, "Equipment Required for Safe Shutdown per 10CFR50 Appendix R" (Part II, Reference 4.2.8) and EDQ00099920090016, "Manual Actions Required for Safe Shutdown Following a Fire" (Part II, Reference 4.2.59). The procedure documents the required operator actions and operator manual action(s) that must take place given an Appendix R fire in any room of the plant. The procedure also documents, on an operator-by-operator basis, the locations and sequence in which the operator manual actions must be performed.

For unit(s) in Modes 1, 2 or 3, the minimum staffing level required to perform the actions for the worst case Appendix R fire is as follows:

POSITION	NUMBER
Shift Manager-Licensed SRO (SM)	1 for one or two units
Unit Supervisor-Licensed SRO (US)	1 per unit
Licensed Unit Operator (UO)	2 per unit
Non-licensed Assistant Unit Operator (AUO)	8 for one or two units
Shift Technical Advisor (STA)	1 for one or two units
Incident Commander (IC)	1 for one or two units

The Shift Technical Advisor and Incident Commander positions require SRO level knowledge and shall be separate from the Shift Manager and Unit Supervisor(s).

2.2.1 Plant Walk Downs

Plant walk downs were conducted to: (i) sequence actions, (ii) verify the amount of time required to accomplish the operator actions and operator manual actions, and (iii) verify the minimum number of operators required to support operator manual actions given a fire in any plant location. The plant walk downs address those actions required within the first 2-hours following a reactor trip as a result of the Appendix R fire. The 2-hour time frame corresponds to predicted minimal operator staffing prior to availability of additional personnel for operator manual actions as a result of the plant callback procedure.

2.2.2 Operator Locations Prior to Initiating Operator Manual Actions and t=0 Definition

For the purposes of developing the post fire safe shutdown procedures, assistant unit operators (AUOs) performing operator manual actions assemble at and are dispatched from the Main Control Room (MCR) for fires in most plant locations, or the Auxiliary Control Room for control building fires. The basis for dispatch locations is that the AUOs must obtain the operator-specific safe shutdown procedures from these locations. Upon confirmation of a fire either automatically (e.g., cross zoned detection, HPFP auto start, CO_2 initiation or sprinkler initiation) or visual observation, the MCR recalls AUOs to the assembly location from their normal duties in various plant locations. Based on AUO recall exercises (Part II, Reference 4.2.92), AUOs working near the MCR are available within about three minutes and any AUOs at the most remote location (intake pumping station) are available within about eight minutes. The other AUO availability times would be expected to be between these two times. It is expected that in most cases the AUOs will be assembled with their proper gear before the plant declares an Appendix R event.

The time requirements for completion of operator manual actions are based on defining the initial time (t = 0) as the time when the reactor is tripped. This definition of t = 0 is appropriate because the operator manual actions are not required to maintain the operating status of plant equipment prior to tripping the reactor because the reactor is considered to be in a stable operating condition prior to reactor trip. After the reactor is tripped, either automatically or manually, the OMAs are preventive (not reactive) and are performed to prevent spurious equipment operation and to ensure safe shutdown can be accomplished.

The following reactor trip scenarios are postulated and evaluated:

1. Manual trip by the MCR operator after evaluating fire significance and potential effects on plant operability.
2. Automatic reactor trip resulting from fire damage to multiple channels of reactor protection system (RPS) concurrent logic inputs.
3. Spurious reactor trip initiated by fire damage to the manual reactor trip circuit.

MCR operators are alerted in the early stage of fire development by the NFPA Code compliant smoke detection provided in the plant as described in Part II, Section 12.5 and Part X, The fire (smoke) detection system is installed to provide for prompt detection of a fire in its incipient stage and provide early warning capability. The MCR will be alerted to the fire (even small fires that might slowly degrade devices) before the fire can affect the safe shutdown capability. With this early notification, the decision to trip the reactor manually is expected to be reached prior to or about the same time as needed for fire damage to develop sufficiently to cause an automatic reactor trip. Multiple concurrent RPS logic inputs are necessary to initiate an automatic reactor trip and these input circuits are physically separated in accordance with Watts Bar Design Criteria WBN-DC-30-4, Separation/Isolation (Part II, Reference 4.2.20) which follows the guidance of Regulatory Guide 1.75, “Physical Independence of Electrical Systems”. Since the circuits are in physically separated raceways and there is early warning provided by the smoke detection system, reactor trip is not expected to be the first observed indication of a fire or first observed circuit failure resulting from the fire. Defense in depth provided by early detection, automatic fire suppression, and physical separation will delay fire development and automatic reactor trip thereby allowing time for the MCR to recall the AUOs, evaluate the fire, and manually initiate reactor trip if necessary in accordance with Part II, References 4.2.89 and 4.2.90.

A spurious reactor trip due to fire damage to the manual trip circuits does not adversely affect OMA performance time because for the rooms where the reactor trip circuit is located the allowable time for the first OMA is 60 minutes (except as noted below). Even considering a fire induced reactor trip prior to recalling the AUOs to the MCR, there is more than adequate time for the AUOs to perform the needed local actions within the allowable time. The spurious manual reactor trip circuit is evaluated in calculation WBN-OSG4-031 (Part II, Reference 4.2.8). The worst Unit 2 case is a fire in 772.0-A16 (480VAC Reactor MOV Board Room 2A). There are two 15-minute OMAs (operate switches on C&A Vent boards just outside the MCR) for a fire in this room. However, the basis for the 15 minute allowable time is not reactor trip, but rather two separate unrelated, but concurrent, spurious motor operated valve operations. Defense in depth provided by early detection, automatic fire suppression, and physical separation will delay fire development and multiple spurious valve operations thereby allowing time for the MCR to recall the AUOs to perform these OMAs. Plant AUO recall exercises show that the first two AUOs will be available in about 5 minutes and can reliably complete the actions within the allowable time.

Once reactor trip is initiated, either automatically or manually, the preventive OMAs are performed to prevent spurious equipment operation and to ensure safe shutdown can be accomplished. Since the OMAs are preventive rather than reactive, they are performed per procedure without diagnostic delays.

There are very few situations where action must be taken based upon fire damage to equipment or cables before reactor trip. In these situations, the plant Emergency Operating Instructions (EOIs) (Part II, Reference 4.2.91) provides the immediate response (before reactor trip) while

the FSSD procedure is preventive (action taken after reactor trip but before fire damage causes a need for the action). For example:

1. Electrical power distribution board fire – The EOI response and the safe shutdown action are the same; de-energize the board prior to extinguishing the fire.

2. Spurious start of a containment air return fan. The fan must be stopped. Existing system operating procedures require securing the fan (opening the breaker) which is the same action required for fire safe shutdown.

For rooms without automatic fire detection it is theoretically possible for a fire to develop slowly and affect cables and equipment before the MCR operators are aware of the fire. Each room without automatic fire detection was evaluated for potential adverse effects on OMA timing due to delayed notification of the fire. The evaluation is documented in calculation WBN-OSG4-031 (Part II, Reference 4.2.8). The evaluation determined that there are no OMAs needed to achieve and maintain hot shutdown for rooms without automatic fire detection. Therefore, normal and emergency operating instructions are used to address equipment failures.

2.3 Actions Prior to Main Control Room Abandonment

A fire in the Control Building is the only postulated fire event that may require abandonment of the MCR to ensure fire safe shutdown capabilities. Upon reactor trip as a result of the Appendix R fire that requires abandonment of the MCR, four actions are taken in addition to tripping the reactor(s). Two actions are to close the pressurizer power operated relief valves (PORVs) and to close the block valves to prevent loss of RCS pressure/inventory due to possible spurious PORV opening prior to transferring plant control to the ACS. The third action is to isolate main feedwater (either main feedwater isolation valves or feedwater control valve as well as the main feedwater bypass valves) to prevent steam generator overfill. The fourth action is to trip the reactor coolant pumps (RCPs). In the event of a fire in the Control Building, an immediate trip of the RCPs is necessary to prevent reactor coolant system (RCS) depressurization caused by a spurious actuation of pressurizer spray valves, since the pressurizer spray valve circuits are not isolated from the Control Building.

The following discussion provides justification for taking credit for closing the pressurizer PORVs and associated block valves, tripping the RCPs and isolating main feedwater from the main control room prior to abandonment. While the fire safe shutdown analysis typically assumes instantaneous burnout of the entire location of fire influence, it is reasonable to predict that a fire requiring MCR abandonment is a slow growth fire, especially one that occurs in the MCR or a MCR panel. Such a fire is detected in its early stages by either an operator or an installed fire detector. Other Control Building locations that may result in MCR abandonment (e.g., the cable spreading room or auxiliary instrument room) are provided with automatic detection and suppression systems, which also results in detection of the fire in its early stages. The RCP Start Bus breaker controls in the MCR are separated by greater than 20 feet from the pressurizer spray valve controller cables; therefore, a fire involving one does not affect the other simultaneously. Controls are available outside the control room in case the action cannot be completed prior to abandonment to locally open the RCP breakers for each unit from outside the Control Building to prevent reclosure and ensure the RCPs remain tripped. Upon MCR abandonment, sufficient time is available to isolate the Pressurizer PORV block valve as well as the main feedwater circuits for each unit from the control room and controls are available outside the control room to ensure the valves are closed and remain closed.

2.4 Access Routes to Operator Manual Action Locations

For fire events that require operator manual actions be taken, TVA has evaluated the availability of access routes to reach the operator manual action location. In recognition that certain operator manual actions are required in one portion of a large fire area that is separated at least 20 feet from a different portion of the same fire area in which the fire occurs, an additional access route has been evaluated. The additional route was considered to provide flexibility regarding access through these large areas due to the potential for heat and smoke spread. Fire suppression activities, either automatic by installed suppression systems or manual by the fire brigade, were also considered. Plant walk downs verify the viability of the operator manual actions.

3.0 COLD SHUTDOWN REPAIRS

Appendix R Section III.G.1.b requires that systems necessary to achieve and maintain cold shutdown from either the MCR or emergency control station(s) can be repaired within 72 hours. There are two generic repairs that are required to ensure cold shutdown capabilities. Repair procedures have been developed and the required materials are available onsite to accomplish the repairs. The two repairs are described below.

3.1 RHR Room Cooler Repair

There are a number of plant locations where fire damage disables the control and/or power cable for the room cooler to an RHR pump that is relied on for cold shutdown capabilities. For Unit 1, the repair requires the installation of a jumper on 1-MCC-214-A1/9A-A in Room 757.0-A2 when the control cable for the RHR Pump A cooler 1-MTR-30-175-A is lost, or on 1-MCC-214-B1/9A-B in room 757.0-A5 when the control cable for the RHR Pump B cooler 1-MTR-30-176-B is lost. With the jumper in place, the appropriate room cooler automatically starts when the associated RHR pump starts. Should the fire damage the power cable for the cooler, the repair consists of replacement of the power cable from the MCC to the room cooler.

A fire in the following plant locations results in the need to implement this repair procedure:

1. Room 676.0-A1, -A16
2. Room 692.0-A1A, -A1B, -A1C, -A8
3. Room 713.0-A1A**,** -A27, -A28
4. Room 737.0-A1A, -A3
5. Room 757.0-A2, -A9

For Unit 2, the repair requires the installation of a jumper, on 2-MCC-214-A1/9A-A in Room 757.0-A21 when the control cable for the RHR Pump A cooler 2-MTR-30-175-A is lost, or on 2-MCC-214-B1/9A-B in room 757.0-A24 when the control cable for the RHR Pump B cooler 2-MTR-30-176-B is lost. With the jumper in place, the appropriate room cooler automatically starts when the associated RHR pump starts. Should the fire damage the power cable for the cooler, the repair consists of replacement of the power cable from the MCC to the room cooler.

A fire in the following plant locations results in the need to implement this repair procedure:

1. Room 676.0-A1, -A16
2. Room 692.0-A1A, -A1B, -A1C, -A8
3. Room 713.0-A1A, -A1B, -A1C, -A27, -A28
4. Room 737.0-A1B, -A1CN, -A1N

3.2 RHR/RCS High-Low Pressure Boundary Valve Repair

There are a number of locations where fire damage disables the Unit 1 control and/or power cable for RHR/RCS high-low pressure boundary valves 1-FCV-74-1-A, -2-B, -8-A and/or -9-B. The repair requires the installation of a jumper on 1-MCC-213-A1-A and/or on 1-MCC-213-A2-A (both of which are in Room 772.0-A1) when the control cable for 1-FCV-74-1-A and/or 1-FCV-74-8-A are lost. When the control cables for valves 1-FCV-74-2-B and/or 1-FCV-74-9-B are lost, the jumper is installed on 1-MCC-213-B1-B in Room 772.0-A2. The jumper allows the boundary valves to be opened for cold shutdown capability. Should the fire damage the power and limit switch cables for the valve(s), the repair consists of replacement of the power and limit switch cables from the respective MCC to junction boxes located in Room 757.0-A10.

A fire in the following plant locations results in the need to implement this repair procedure:

1. Room 737.0-A1A,
2. Room 757.0-A2, -A9, -A10
3. Room 772.0-A6 (power and limit switch cable replacement)
4. Unit 1 Reactor Building includes Annulus

There are a number of locations where fire damage disables the Unit 2 control and/or power cable for RHR/RCS high-low pressure boundary valves 2-FCV-74-1-A, -2-B, -8-A and/or -9-B. The repair requires the installation of a jumper on 2-MCC-213-A1-A and/or on 2-MCC-213-A2-A (both of which are in Room 772.0-A16) when the control cable for 2-FCV-74-1-A and/or 2-FCV-74-8-A are lost. When the control cables for valves 2-FCV-74-2-B and/or 2-FCV-74-9-B are lost, the jumper is installed on 2-MCC-213-B1-B in Room 772.0-A15. The jumper allows the boundary valves to be opened for cold shutdown capability. A fire in the following plant locations results in the need to implement this repair procedure:

1. Room 713.0-A1B
2. Room 737.0-A1A, -A1B
3. Room 757.0-A1, A2, -A9, -A21, -A23, -A27
4. Room 772.0-A12, -A15(EAST), -A15(WEST)

4.0 EMERGENCY LIGHTING

Emergency lighting units with at least an 8-hour battery power supply are provided in areas needed for operation of safe shutdown equipment and in access and egress routes. Offsite power is assumed lost for Control Building fires that require MCR abandonment. While offsite power is not assumed lost for non-alternative shutdown fire locations (i.e., fires outside of the Control Building), cables for normal plant lighting have not been included in the Appendix R separation analysis. Therefore, emergency lighting is provided for Appendix R fire scenarios that result in operator manual actions in order to ensure safe shutdown capability. The operators carry a portable lantern when required to perform an operator manual action in an area that has experienced a fire (time to perform the action is after the fire has been

extinguished). Refer to Sections 12.7, “Emergency Lighting,” and 14.9, “Emergency Battery Lighting Units,” of Part II, “Fire Protection Plan,” for additional requirements.

4.1 Adequacy of Emergency Lighting Locations and Illumination Levels

In order to ensure that adequate emergency lighting is installed in the plant and that the requirements of Appendix R Section III.J are met, the following must be performed:

1. For access routes not previously verified, an assessment of the emergency lighting in the access routes to the locations where the operator manual actions are performed.

2. An assessment of the emergency lighting at the location where each operator manual action is performed.

3. The above assessments are to be performed under local or general area blackout conditions.

4. The performance of the above assessments will be documented and include the signature of the Operator that performed the assessments.