



June 13, 1996

LTR: Byron 96-0176  
FILE: 1.10.0101

U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

ATTENTION: Document Control Desk

SUBJECT: Byron Station Units 1 & 2  
Actions taken in Response to Safe Shutdown Analysis  
Deficiencies  
NRC Docket Nos. 50-454 and 50-455

REFERENCE: 1) 6/4/96 Emergency Notification System call regarding  
identified deficiencies in the Safe Shutdown Analysis  
  
2) Letter from K. Kofron to NRC concerning Action Taken in  
Response to Safe Shutdown Analysis Deficiencies dated  
6/12/96

On 6/13/96, it was discovered that the letter of Reference 2 was missing details of long term actions to be taken in regards to Fire Zone 3.2.B-1. This revised transmittal includes the missing information.

On 6/4/96, Byron Site Engineering concluded the existing Byron Fire Protection Report (FPR) Safe Shutdown Analysis (SSA) conclusions regarding the availability of Control Room Ventilation (VC) System after a fire in the fire zones 2.1-0, 3.2B-1, 11.4-0, 11.4C-0, 11.5-0 and 11.6-0 are incorrect. Detailed reviews performed at Byron Station identified that redundant safe shutdown cables from both trains of VC are currently located within the fire zones identified above and are not protected in accordance with the separation requirements of Section III.G of 10CFR50 Appendix R.

It was determined that the existing configuration was not in compliance with the requirements of Section III.G of 10CFR50 Appendix R and that this condition was reportable per 10CFR 50.72(b)(1)(ii). The Reference ENS phone notification was made to the NRC on 6/04/96 for a condition outside the design basis for the plant. Additional details related to these deficiencies were discussed with NRC staff members in conference calls held on June 6 and 7, 1996. The purpose of this letter is to document the results of those discussions and the results of reviews completed since June 7.

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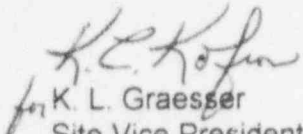
A detailed explanation of these newly identified discrepancies for each of the six (6) fire zones is presented in Attachment A. Also included is an evaluation of the specific fire zones, short term compensatory actions, and the planned resolutions for these discrepancies.

Compensatory actions in the form of hourly firewatches, procedure verification, additional controls over transient combustibles and hot work, alternate cooling capability, and shift briefings have been initiated. These actions are presented in zone-specific manner in the Attachment. Additionally, the long term resolutions are detailed in the Attachment.

Additional vulnerabilities have been identified in one zone. Compensatory measures for this zone have been adjusted accordingly. The affected zone is Fire Zone 11.4-0.

Please address any questions to D. Brindle, Regulatory Assurance Supervisor, at (815) 234-5441 extension 2280.

Respectfully,

  
for K. L. Graesser  
Site Vice President  
Byron Nuclear Power Station

KLG/DB/rp

cc: H. Miller, Administrator Region 111  
G. Dick, Project Manager - NRR  
H. Peterson, Senior Resident Inspector - Byron

## FIRE ZONE 2.1-0, MAIN CONTROL ROOM

### Description of fire zone:

Fire Zone 2.1-0 is located on Auxiliary Building Elevation 451 and includes the Main Control Room (MCR) between row/columns L and P and 13 and 23 as shown on Figure 2.3-8 of the Fire Protection Report (FPR). The fire zone includes both the Unit 1 and Unit 2 main control panels. This zone is continuously manned by the control room operators. Also, ionization detectors in the supply and exhaust ductwork for the control panels alarm in the MCR. The zone contains ionization detectors which annunciate and alarm in the Main Control Room (MCR). No automatic suppression systems are present in the zone.

### Existing safe shutdown analysis discussion:

FPR Sections 2.4.2.4 (Unit 1) and 2.4.2.2 (Unit 2) discuss the safe shutdown analysis for this zone. Power and/or control cables for redundant safe shutdown equipment are routed through this zone. Instrument cables required to verify safe shutdown are also present in the zone. The current analysis describes an evaluation to evacuate the MCR due to the fire and to achieve safe shutdown outside of the MCR.

### FPR revisions required to address current Control Room Ventilation (VC) system evaluations:

FPR Sections 2.4.2.4 and 2.4.2.2 do not list VC cables. Neither unit discusses the potential loss of both trains of the VC system due to a fire in this zone. In this zone, new evaluations indicate that both VC Return Fans 0A and 0B would be disabled, along with redundant dampers such as both VC Supply Fan discharge dampers (0VC033Y, 0VC172Y). When these recently identified additional VC safe shutdown components and cables are added to the analysis, both trains of VC become vulnerable to a fire in this zone. The redundant safe shutdown VC cables are routed to a MCR panel where control switches for both VC trains are located. The existing safe shutdown analysis for a fire in this zone assumes all control and instrumentation functions are lost and the evacuation of the MCR is required. This evaluation bounds a loss of ventilation in the MCR, except that the loss of VC results in the loss of cooling in the Aux Electric Equipment Rooms. This could affect instrumentation equipment in these rooms which could disable instrumentation indication at the Remote Shutdown Panel. If this should occur, instrumentation will still be available at the Fire Hazards Panels. Existing procedure BOA PRI-5 "Control Room Inaccessibility" incorporates utilization of the Fire Hazards Panel. FPR Sections 2.4.2.4 (Unit 1) and 2.4.2.2 (Unit 2) require a minor revision to discuss this alternate shutdown capability.

### Compensatory actions and long term resolutions:

The capability to safely shutdown following a fire in zone 2.1-0 is established by the existing evaluations for this zone. The loss of ventilation in the Aux Electric Equipment Rooms does not impact the current procedure (BOA PRI-5) for shutting down outside the MCR. Therefore, no compensatory actions or long term fixes are required.

### FIRE ZONE 3.2B-1, LOWER CABLE SPREADING AREA:

#### Description of fire zone:

Fire Zone 3.2B-1 is located on Auxiliary Building Elevation 439 and includes a portion of the lower cable spreading area between row/columns L and Q and 10 and 13 as shown on Figure 2.3-9 of the Fire Protection Report (FPR). The fire zone is located in the Unit 1 area of the Aux Building. The zone contains thermal ionization detectors which annunciate and alarm in the Main Control Room (MCR). Automatic suppression (total flooding CO2 system) is present in this zone.

#### Existing safe shutdown analysis discussion:

FPR Section 2.4.2.8 (Unit 1) discusses the safe shutdown analysis for this zone. The existing analysis states power and/or control cables for only Division 12 are routed through this zone. Instrument cables for both channels of source range neutron monitoring are also present in the zone. The existing analysis takes credit for alternate source range monitoring at the Fire Hazards Panel.

#### FPR revisions required to address current Control Room Ventilation (VC) system evaluations:

FPR Section 2.4.2.8 does not list VC cables. It also does not discuss the potential loss of both trains of the VC system due to a fire in this zone. In this zone, new evaluations indicate that both VC Return Fans 0A and 0B would be disabled, along with redundant dampers such as both VC Supply Fan discharge dampers (0VC033Y, 0VC172Y). When these recently identified additional VC safe shutdown components and cables are added to the analysis, both trains of VC become vulnerable to a fire in this zone. The redundant safe shutdown VC cables are routed in trays/conduits which are separated by a distance of 4 horizontal feet. This occurs at a single point of closest approach near column rows 10 and M where conduits containing Division 11 VC cables cross over cable trays containing redundant VC cables. The conclusion that both trains of VC are vulnerable to a fire in this zone will be added to the safe shutdown analyses for this zone. Although fire zone 3.2B-1 contains Division 12 cables, Division 12 power will be available to power the Fire Hazard Panel. Also, the alternate safe shutdown capability discussed below will be added to the FPR sections.

#### Alternate safe shutdown capability with the loss of the entire VC system:

Existing safe shutdown analyses for fires in the MCR and the Aux Electric Equipment Rooms bound the consequences of the loss of ventilation in these rooms. FPR Unit 1 Sections 2.4.2.4 & 2.4.2.21 and Unit 2 Sections 2.4.2.2 & 2.4.2.20 currently evaluate the capability to achieve and maintain safe shutdown following a fire occurring in the Main Control Room Fire Zone 2.1-0 and the Aux Electric Equipment Rooms (fire zones 5.5-1&2). The fire in the MCR is assumed to disable control and instrumentation functions and force the evacuation of the MCR. The fire in the Aux Electric Equipment Rooms are assumed to disable redundant control and instrumentation functions. These existing evaluations for fire bound the consequences of the loss of ventilation to the MCR and the Aux Electric Equipment Rooms. These evaluations assume that instrumentation provided at the Fire Hazards Panel, 1PL10J, is available.

The existing criteria for achieving safe shutdown following a fire in these zones are:

1. Reactor is tripped and control rods inserted is verified prior to evacuation.
2. Pressurizer safety valves provide over-pressure protection for hot standby and the PORV controls can be repaired and restored for later controlled depressurization. PORV block valves can be operated from their respective MCCs.
3. Main Steam Relief valves will be operated locally using the hand hydraulic pumps.

4. Control of essential hot shutdown equipment can be achieved at the Remote Shutdown Panel and locally using BOA PRI-5 "Control Room Inaccessibility" and BOA ELECT-5 "Local Emergency Control of Safe Shutdown Equipment".
5. Essential instrumentation indication is available at the Remote Shutdown and/or Fire Hazards Panels.
6. Controls for RH can be repaired to achieve cold shutdown within 72 hours.

Safe shutdown in fire zone 3.2B-1, if the loss of all VC should occur, will be demonstrated by applying the above criteria with the following verifications:

1. Reactor is tripped and control rods inserted; the consequences of the loss of VC does not occur so fast that this verification cannot be made for a fire in this zone.
2. Pressurizer safety valve function and capability to repair/operate the pressurizer PORVs or isolation valves are not impaired as a result of a fire in this zone.
3. Local manual operation of the main steam relief valves using the hand hydraulic pumps is not impaired as a result of a fire in this zone.
4. Operation of the essential hot shutdown equipment utilizing BOA PRI-5 and BOA ELECT-5 is not impaired as a result of a fire in this zone.
5. Essential instrumentation on the Unit 1 Fire Hazard Panels is available for a fire in this zone since the installation of Thermo-Lag resolution cable re-route modification in May 1996.
6. Capability to repair/operate equipment necessary for residual heat removal is not impaired as a result of a fire in this zone.

Criteria 5 is met since the installation of recent Thermo-lag resolution modifications and due to operating policies which establish that control of Division 12 switchgear and miscellaneous equipment room ventilation systems will be maintained in a "local" control mode. Operation in this mode will prevent fire induced faults from affecting the Division 12 ventilation train.

#### Compensatory actions and long term resolutions:

The capability to safely shutdown following a fire in zone 3.2B-1 that results in the loss of ventilation in the MCR and Aux Electric Equipment Room is established by the bounding evaluations for fire in these rooms. Therefore, no long term fixes are required in this zone.

This Unit 1 Lower Cable Spreading Area has been made a transient combustible and hot work exclusion area. In the event that either transient combustibles must be present or hot work must be performed, a continuous fire watch will be established.

In this zone, control cables associated with the Unit 1 Division 12 switchgear and miscellaneous equipment room ventilation systems can be damaged by the fire. Byron station operates these systems in the "local" control mode which will isolate the cables of concern. Operation will be available at the local panel. Caution cards are placed at the appropriate locations to assure this operating configuration is maintained. The completion of the long term action for this zone discussed below will allow the removal of the caution cards and the reliance on this mode of operation.

The following long term action is being implemented as a long term solution:

A permanent design change to provide an alternate power source for the Unit 1 Fire Hazards Panel from a Division 11 power source will be completed and installed no later than Refuel Outage B1R08.



## FIRE ZONE 11.4-0, AUXILIARY BUILDING ELEVATION 383 FEET

### Description of fire zone:

Fire Zone 11.4-0 is located on Auxiliary Building Elevation 383 and includes all of the general open-access areas between row/columns L and W and 10 and 25 as shown on Figure 2.3-13 of the Fire Protection Report (FPR). The fire zone includes both Unit 1 and Unit 2 areas of the Aux Building. This zone sees normal foot traffic by site personnel performing activities in the Auxiliary Building. The zone contains ionization detectors which annunciate and alarm in the Main Control Room (MCR). No automatic suppression systems are present except for automatic sprinklers provided around a stairway at coordinates P-18.

### Existing safe shutdown analysis discussion:

FPR Sections 2.4.2.43 (Unit 1) and 2.4.2.42 (Unit 2) discuss the safe shutdown analysis for this zone. Power and/or control cables for redundant safe shutdown equipment are routed through this zone. Instrument cables required to verify safe shutdown are also present in the zone. The existing analysis states Division 11 (Unit 1) and Division 21 (Unit 2) cables will be protected as necessary with fire rated barriers. The existing analysis is currently being revised to reflect re-routing of cables out of the zone to accomplish equivalent protection previously provided by the Thermo-Lag fire barriers.

### FPR revisions required to address current Control Room Ventilation (VC) system evaluations:

FPR Section 2.4.2.42 (Unit 2) currently lists the routing of some redundant VC safe shutdown cables in zone 11.4-0. Unit 1 does not list VC cables. Neither unit discusses the potential loss of both trains of the VC system due to a fire in this zone. In this zone, new evaluations indicate that both VC Return Fans 0A and 0B would be disabled, along with redundant dampers such as both VC Supply Fan discharge dampers (0VC033Y, 0VC172Y). When these recently identified additional VC safe shutdown components and cables are added to the analysis, both trains of VC become vulnerable to a fire in this zone. The redundant safe shutdown VC cables are routed in trays which are separated by a distance of approximately 10 feet. This occurs at a single point of closest approach near column rows 17 and P. The conclusion that both trains of VC are vulnerable to a fire in this zone will be added to the safe shutdown analyses for this zone. Also the alternate safe shutdown capability discussed below will be added to the FPR sections.

### Alternate safe shutdown capability with the loss of the entire VC system:

Existing safe shutdown analyses for fires in the MCR and the Aux Electric Equipment Rooms bound the consequences of the loss of ventilation in these systems. FPR Unit 1 Sections 2.4.2.4 & 2.4.2.21 and Unit 2 Sections 2.4.2.2 & 2.4.2.20 currently evaluate the capability to achieve and maintain safe shutdown following a fire occurring in the Main Control Room Fire Zone 2.1-0 and the Aux Electric Equipment Rooms (fire zones 5.5-1&2). The fire in the MCR is assumed to disable control and instrumentation functions and force the evacuation of the MCR. The fire in the Aux Electric Equipment Rooms are assumed to disable redundant control and instrumentation functions. These existing evaluations for fire bound the consequences of the loss of ventilation to the MCR and the Aux Electric Equipment Rooms. However, these evaluations assume that instrumentation provided at the Fire Hazards Panels, 1/2PL10J, is available. For a fire in this zone, Unit 1 Fire Hazard Panel will be powered from Division 12 as a result of a Thermo-Lag resolution cable re-route modification installed in May 1996. For a fire in this zone, Unit 2 Fire Hazard Panel will not be available because of damage to the Division 22 power systems.

The existing criteria for achieving safe shutdown following a fire in these zones are:

1. Reactor is tripped and control rods inserted is verified prior to evacuation.

2. Pressurizer safety valves provide over-pressure protection for hot standby and the PORV controls can be repaired and restored for later controlled depressurization. PORV block valves can be operated from their respective MCCs.
3. Main Steam Relief valves will be operated locally using the hand hydraulic pumps.
4. Control of essential hot shutdown equipment can be achieved at the Remote Shutdown Panel and locally using BOA PRI-5 "Control Room Inaccessibility" and BOA ELECT-5 "Local Emergency Control of Safe Shutdown Equipment".
5. Essential instrumentation indication is available at the Remote Shutdown and/or Fire Hazards Panels.
6. Controls for RH can be repaired to achieve cold shutdown within 72 hours.

Safe shutdown in fire zone 11.4-0, if the loss of all VC should occur, will be demonstrated by applying the above criteria with the following verifications:

1. Reactor is tripped and control rods inserted; the consequences of the loss of VC does not occur so fast that this verification cannot be made for a fire in this zone.
2. Pressurizer safety valve function and capability to repair/operate the pressurizer PORVs or its block valves are not impaired as a result of a fire in this zone.
3. Local manual operation of the main steam relief valves using the hand hydraulic pumps is not impaired as a result of a fire in this zone.
4. Operation of the essential hot shutdown equipment utilizing BOA PRI-5 and BOA ELECT-5 is not impaired as a result of a fire in this zone.
5. Essential instrumentation on the Unit 1 Fire Hazard Panel is now available for a fire in this zone. For Unit 2, the Division 22 power supply for the Fire Hazard Panel will not be available, and therefore the panel will not be available.
6. Capability to repair/operate equipment necessary for residual heat removal is not impaired as a result of a fire in this zone.

The ability to safely shut down Unit 1 is demonstrated. However, Criteria 5 would not be met for Unit 2, and the capability to safely shut down that Unit cannot be demonstrated.

#### Compensatory actions and long term resolutions:

The capability to safely shut down Unit 1 following a fire in this zone that results in loss of ventilation in the MCR and AEER is established by the bounding evaluations for fire in these rooms. Therefore, no compensatory actions nor long term fixes are required.

The capability to safely shutdown Unit 2 following a fire in zone 11.4-0 that results in the loss of ventilation in the MCR and Aux Electric Equipment Room, and loss of power to the Fire Hazards Panel will be assured by the following interim compensatory actions, and long term resolutions.

The following interim compensatory actions have been instituted to ensure that a fire severe enough to threaten safe shutdown equipment from both divisions will not occur, and to ensure that the capability to restore safe shutdown functions is available even if such a fire did occur:

1. In the event that the detection system is disabled, a continuous fire watch will be established.
2. Temporary procedures and a temporary alteration are being prepared and materials ordered to allow restoration of one train of the control room ventilation system in a once through purge mode using 100% outside air. These procedures involve opening two dampers in the supply air flowpath, and manually operating a supply fan at the switchgear bus breaker, and opening control room envelope doors to establish a relief flowpath to the turbine building operating deck. It is estimated that these actions can be implemented within 30 minutes of receiving a control

room ventilation airflow alarm. These actions will restore adequate air flow through the control room envelope using outside air. The temporary alteration will be installed no later than 6/21/96.

3. Training will be provided for all scheduled shifts prior to assuming their shift responsibilities. All training of scheduled shifts will occur within one week of the installation of the measures discussed in #2 above.

4. The common area surrounding the cables of concern (redundant VC cables, cables powering Unit 2 Fire Hazards Panel) has been designated a transient combustible exclusion area with no hot work allowed. If transient combustibles are brought in the area or hot work is performed, a continuous fire watch in the zone will be established.

The following long term actions will be implemented as a long term solution to this problem:

1. A Thermo-lag resolution cable re-route modification being installed in the upcoming Unit 2 refuel outage (B2R06) in September, 1996, will restore this zone to compliance with Appendix R. Upon completion of this modification, the interim compensatory measures will be discontinued.

2. Also, to insure consistency with Braidwood Unit 2, a modification will be installed to provide an alternate power source for the Unit 2 Fire Hazards Panel by the Unit 2 refueling outage B2R07.



## **FIRE ZONE 11.4C-0, RADWASTE AND REMOTE SHUTDOWN CONTROL ROOM:**

### Description of fire zone:

Fire Zone 11.4C-0 is located on Auxiliary Building Elevation 383 and includes the radwaste and the Unit 1 and 2 remote shutdown control rooms located between row/columns L and P and 23 and 28 as shown on Figure 2.3-13 of the Fire Protection Report (FPR). The fire zone is located in the Unit 2 area of the Aux Building. This zone is normally occupied by an operator who is present at the radwaste control panel. The zone contains ionization detectors which annunciate and alarm in the Main Control Room (MCR). No automatic suppression systems are present.

### Existing safe shutdown analysis discussion:

FPR Sections 2.4.2.46 (Unit 1) and 2.4.2.45 (Unit 2) discuss the safe shutdown analysis for this zone. Control cables for redundant safe shutdown equipment are routed through this zone. Instrument cables required to verify safe shutdown are also present in the zone. The existing analysis states a fire in this zone will render inoperable controls on the remote shutdown panel and the corresponding controls in the MCR, however, alternate shutdown capability is provided for all controls located on the panel. The existing analysis states that instrumentation located on the remote shutdown panel is isolated from instrumentation at the MCR. It is stated that all instrumentation lost at the remote shutdown panel has either redundant channels of the same instrument or diverse instruments of equivalent information in the MCR or elsewhere.

### FPR revisions required to address current Control Room Ventilation (VC) system evaluations:

FPR Section 2.4.2.46 (Unit 1) currently does not list the routing of redundant VC safe shutdown cables brought to the Unit 1 remote shutdown panel in zone 11.4C-0. The Unit 2 remote shutdown panel does not contain any VC controls or instrumentation. Unit 1 does not discuss the potential loss of both trains of the VC system due to a fire in this zone. In this zone, new evaluations indicate that both VC Return Fans 0A and 0B would be disabled, along with redundant dampers such as both VC Supply Fan discharge dampers (0VC033Y, 0VC172Y). When these recently identified additional VC safe shutdown components and cables are added to the analysis, both trains of VC become vulnerable to a fire in this zone. The redundant safe shutdown VC cables are routed in trays/conduits which enter the Unit 1 remote shutdown panel from the ceiling and floor separated by a metal barrier between train panels. If the modification discussed below under compensatory actions and long term resolution is installed, loss of redundant VC trains is not possible and no FPR revisions will be required. If the modification is not installed, the conclusion that both trains of VC are vulnerable to a fire in this zone will be added to the safe shutdown analyses for Unit 1. Also the alternate safe shutdown capability discussed in Section 2.4.2.46 will be revised to take credit for the fire hazards panel instead of the MCR instrumentation. The revised alternate safe shutdown capability is discussed below.

### Alternate safe shutdown capability with the loss of the entire VC system:

Existing safe shutdown analyses for fires in the MCR and the Aux Electric Equipment Rooms bound the consequences of the loss of ventilation in these rooms. FPR Unit 1 Sections 2.4.2.4 & 2.4.2.21 and Unit 2 Sections 2.4.2.2 & 2.4.2.20 currently evaluate the capability to achieve and maintain safe shutdown following a fire occurring in the Main Control Room Fire Zone 2.1-0 and the Aux Electric Equipment Rooms (fire zones 5.5-1&2). The fire in the MCR is assumed to disable control and instrumentation functions and force the evacuation of the MCR. The fire in the Aux Electric Equipment Rooms are assumed to disable redundant control and instrumentation functions. These existing evaluations for fire bound the consequences of the loss of ventilation to the MCR and the Aux Electric Equipment Rooms.

The existing criteria for achieving safe shutdown following a fire in these zones are:

1. Reactor is tripped and control rods inserted is verified prior to evacuation.
2. Pressurizer safety valves provide over-pressure protection for hot standby and the PORV controls can be repaired and restored for later controlled depressurization. PORV block valves can be operated from their respective MCCs.
3. Main Steam Relief valves will be operated locally using the hand hydraulic pumps.
4. Control of essential hot shutdown equipment can be achieved at the Remote Shutdown Panel and locally using BOA PRI-5 "Control Room Inaccessibility" and BOA ELECT-5 "Local Emergency Control of Safe Shutdown Equipment".
5. Essential instrumentation indication is available at the Remote Shutdown and/or Fire Hazards Panels.
6. Controls for RH can be repaired to achieve cold shutdown within 72 hours.

Safe shutdown in fire zone 11.4C-0, if the loss of all VC should occur, will be demonstrated by applying the above criteria with the following verifications:

1. Reactor is tripped and control rods inserted; the consequences of the loss of VC does not occur so fast that this verification cannot be made for a fire in this zone.
2. Pressurizer safety valve function and capability to repair/operate the pressurizer PORVs or its block valves are not impaired as a result of a fire in this zone.
3. Local manual operation of the main steam relief valves using the hand hydraulic pumps is not impaired as a result of a fire in this zone.
4. Operation of the essential hot shutdown equipment utilizing BOA PRI-5 and BOA ELECT-5 is not impaired as a result of a fire in this zone.
5. Essential instrumentation on the Unit 1&2 Fire Hazard Panels are available for a fire in this zone.
6. Capability to repair/operate equipment necessary for residual heat removal is not impaired as a result of a fire in this zone.

#### Compensatory actions and long term resolutions:

The following interim compensatory actions are being instituted to ensure that the capability to restore safe shutdown functions are available even if a fire should occur.

1. There is currently a set of equipment for local safe shutdown actions in the remote shutdown control room. One additional set of equipment for local safe shutdown actions will be provided in the Shift Engineers Office by 6/21/96.
2. Operating procedure BOA PRI-5 "Control Room Inaccessibility," has been reviewed for use at the Fire Hazards Panel under the conditions postulated as a result of a fire at the Unit 1 remote shutdown panel. No fundamental changes to the procedure were identified. As an enhancement to BOA PRI-5, compensatory measure #3 below will be implemented to provide a means to make the MCR habitable and to have MCR instrumentation available.
3. Temporary procedures and a temporary alteration are being prepared and materials ordered to allow restoration of one train of the control room ventilation system in a once through purge mode using 100% outside air, opening two dampers in the supply air flowpath, and manually operating a supply fan at the switchgear bus breaker, and opening control room envelope doors to establish a relief flowpath to the turbine building operating deck. It is estimated that these actions can be implemented within 30 minutes of receiving a control room ventilation airflow alarm. These actions will restore adequate air flow using outside air through the control room envelope. The temporary alteration will be installed at Byron by no later than 6/21/96.

4. Training will be provided for all scheduled shifts prior to assuming their shift responsibilities. All training of scheduled shifts will occur within one week of the installation of the measures discussed in #3 above.

For fire zone 11.4C-0, the long term corrective actions have not been determined at this time, and are still being evaluated. Actions being considered include a plant modification to remove one train (as a minimum) of VC from the remote shutdown panels. Details of this long term action will be provided in the LER associated with this issue.

## FIRE ZONE 11.5-0, AUXILIARY BUILDING ELEVATION 401 FEET:

### Description of fire zone:

Fire Zone 11.5-0 is located on Auxiliary Building Elevation 401 and includes all of the general open-access areas between row/columns L and W and 10 and 26 as shown on Figure 2.3-12 of the Fire Protection Report (FPR). The fire zone includes both Unit 1 and Unit 2 areas of the Aux Building. This zone sees normal foot traffic by site personnel performing activities in the Auxiliary Building. The zone contains ionization detectors which annunciate and alarm in the Main Control Room (MCR). No automatic suppression systems are present except for automatic sprinklers provided around a stairway at coordinates P-18 and over the waste oil tank at coordinates M-11.

### Existing safe shutdown analysis discussion:

FPR Sections 2.4.2.47 (Unit 1) and Section 2.4.2.48 (Unit 2) discuss the safe shutdown analysis for this zone. Power and/or control cables for redundant safe shutdown equipment are routed through this zone. Instrument cables required to verify safe shutdown are also present in the zone. The existing analysis states Division 11 (Unit 1) and Division 22 (Unit 2) cables will be protected as necessary with fire rated barriers. The existing analysis takes credit for the Fire Hazards Panel for selected instrumentation. The existing analysis is currently being revised to reflect re-routing of cables out of the zone to accomplish equivalent protection previously provided by the Thermo-Lag fire barriers.

### FPR revisions required to address current Control Room Ventilation (VC) system evaluations:

FPR Section 2.4.2.48 (Unit 2) currently lists the routing of some redundant VC safe shutdown cables in zone 11.5-0 and concludes the Division 11 VC train will be available, operated locally. Unit 1 does not list VC cables. In this zone, new evaluations indicate that both VC Return Fans 0A and 0B would be disabled, along with redundant dampers such as both VC Supply Fan discharge dampers (0VC033Y, 0VC172Y). When these recently identified additional VC safe shutdown components and cables are added to the analysis, both trains of VC become vulnerable to a fire in this zone. The redundant safe shutdown VC cables are routed in trays/conduits which are separated by a distance of approximately 10 feet. This occurs at a single point of closest approach near column rows 15 and Q. The conclusion that both trains of VC are vulnerable to a fire in this zone will be added to the safe shutdown analyses for this zone. The existing conclusion that Division 11 VC train can be operated locally will be removed. Also the alternate safe shutdown capability discussed below will be added to the FPR sections.

### Alternate safe shutdown capability with the loss of the entire VC system:

Existing safe shutdown analyses for fires in the MCR and the Aux Electric Equipment Rooms bound the consequences of the loss of ventilation in these rooms. FPR Unit 1 Sections 2.4.2.4 & 2.4.2.21 and Unit 2 Sections 2.4.2.2 & 2.4.2.20 currently evaluate the capability to achieve and maintain safe shutdown following a fire occurring in the Main Control Room Fire Zone 2.1-0 and the Aux Electric Equipment Rooms (fire zones 5.5-1&2). The fire in the MCR is assumed to disable control and instrumentation functions and force the evacuation of the MCR. The fire in the Aux Electric Equipment Rooms are assumed to disable redundant control and instrumentation functions. These existing evaluations for fire bound the consequences of the loss of ventilation to the MCR and the Aux Electric Equipment Rooms. However, these evaluations assume that instrumentation provided at the Fire Hazards Panels, 1/2PL10J, is available. For a fire in this zone, Unit 1 Fire Hazard Panel will be powered from Division 12 as a result of a Thermo-Lag resolution cable re-route modification installed in May 1996. For Unit 2, Division 22 is the protected division, and it remains available. Division 22 cables are protected with Thermo-Lag fire barrier. An hourly fire watch is in place. Modifications to eliminate Thermo-Lag are designed and will be installed by 12/96.

The existing criteria for achieving safe shutdown following a fire in these zones are:

1. Reactor is tripped and control rods inserted is verified prior to evacuation.
2. Pressurizer safety valves provide over-pressure protection for hot standby and the PORV controls can be repaired and restored for later controlled depressurization. PORV block valves can be operated from their respective MCCs.
3. Main Steam Relief valves will be operated locally using the hand hydraulic pumps.
4. Control of essential hot shutdown equipment can be achieved at the Remote Shutdown Panel and locally using BOA PRI-5 "Control Room Inaccessibility" and BOA ELECT-5 "Local Emergency Control of Safe Shutdown Equipment".
5. Essential instrumentation indication is available at the Remote Shutdown and/or Fire Hazards Panels.
6. Controls for RH can be repaired to achieve cold shutdown within 72 hours.

Safe shutdown in fire zone 11.5-0, if the loss of all VC should occur, will be demonstrated by applying the above criteria with the following verifications:

1. Reactor is tripped and control rods inserted; the consequences of the loss of VC does not occur so fast that this verification cannot be made for a fire in this zone.
2. Pressurizer safety valve function and capability to repair/operate the pressurizer PORVs or its block valves are not impaired as a result of a fire in this zone.
3. Local manual operation of the main steam relief valves using the hand hydraulic pumps is not impaired as a result of a fire in this zone.
4. Operation of the essential hot shutdown equipment utilizing BOA PRI-5 and BOA ELECT-5 is not impaired as a result of a fire in this zone.
5. Essential instrumentation on the Unit 2 Fire Hazard Panel is available for a fire in this zone. For Unit 1, the Division 12 power supply for the Fire Hazard Panel is available since the installation of Thermo-Lag resolution cable re-route modifications in May 1996.
6. Capability to repair/operate equipment necessary for residual heat removal is not impaired as a result of a fire in this zone.

#### Compensatory actions and long term resolutions:

The capability to safely shutdown following a fire in zone 11.5-0 that results in the loss of ventilation in the MCR and Aux Electric Equipment Room is established by the bounding evaluations for fire in these rooms. Therefore, no compensatory actions or long term fixes are required other than currently ongoing modifications to resolve the Thermo-Lag fire barrier (GL 92-08) issue.



## FIRE ZONE 11.6-0, AUXILIARY BUILDING ELEVATION 426 FEET

### Description of fire zone:

Fire Zone 11.6-0 is located on Auxiliary Building Elevation 426 and includes all of the general open-access areas between row/columns L and V and 11 and 26 as shown on Figure 2.3-10 of the Fire Protection Report (FPR). The fire zone includes both Unit 1 and Unit 2 areas of the Aux Building. This zone sees normal foot traffic by site personnel performing activities in the Auxiliary Building. The zone contains ionization detectors which annunciate and alarm in the Main Control Room (MCR). No automatic suppression systems are present except for automatic sprinklers provided around a stairway at coordinates P-18.

### Existing safe shutdown analysis discussion:

FPR Sections 2.4.2.51 (Unit 1) and 2.4.2.52 (Unit 2) discuss the safe shutdown analysis for this zone. Power and/or control cables for redundant safe shutdown equipment are routed through this zone. Instrument cables required to verify safe shutdown are also present in the zone. The existing analysis states Division 12 (Unit 1) and Division 22 (Unit 2) cables will be protected as necessary with fire rated barriers. The existing analysis takes credit for the Fire Hazards Panel for selected instrumentation. The existing analysis is currently being revised to reflect re-routing of cables out of the zone to accomplish equivalent protection previously provided by the Thermo-Lag fire barriers.

### FPR revisions required to address current Control Room Ventilation (VC) system evaluations:

FPR Section 2.4.2.52 (Unit 2) currently lists the routing of some redundant VC safe shutdown cables in zone 11.6-0 and concludes the Division 12 VC train will be available, operated locally. Unit 1 does not list VC cables. In this zone, new evaluations indicate that both VC Return Fans 0A and 0B would be disabled, along with redundant dampers such as both VC Supply Fan discharge dampers (0VC033Y, 0VC172Y). When these recently identified additional VC safe shutdown components and cables are added to the analysis, both trains of VC become vulnerable to a fire in this zone. The redundant safe shutdown VC cables are routed in trays/conduits which are separated by a maximum distance of approximately 10 feet. This occurs at a single point of closest approach near column rows 16 and P. The conclusion that both trains of VC are vulnerable to a fire in this zone will be added to the safe shutdown analyses for this zone. The existing conclusion that Division 12 VC train can be operated locally will be removed. Also the alternate safe shutdown capability discussed below will be added to the FPR sections.

### Alternate safe shutdown capability with the loss of the entire VC system:

Existing safe shutdown analyses for fires in the MCR and the Aux Electric Equipment Rooms bound the consequences of the loss of ventilation in these rooms. FPR Unit 1 Sections 2.4.2.4 & 2.4.2.21 and Unit 2 Sections 2.4.2.2 & 2.4.2.20 currently evaluate the capability to achieve and maintain safe shutdown following a fire occurring in the Main Control Room Fire Zone 2.1-0 and the Aux Electric Equipment Rooms (fire zones 5.5-1&2). The fire in the MCR is assumed to disable control and instrumentation functions and force the evacuation of the MCR. The fire in the Aux Electric Equipment Rooms are assumed to disable redundant control and instrumentation functions. These existing evaluations for fire bound the consequences of the loss of ventilation to the MCR and the Aux Electric Equipment Rooms. The Fire Hazard Panels remain available for a fire in this zone because Divisions 12 and 22 are protected divisions. Division 22 is protected with Thermo-lag. An hourly fire watch is in place. Modifications to eliminate Thermo-Lag are designed and will be installed by 12/96.

The existing criteria for achieving safe shutdown following a fire in these zones are:

1. Reactor is tripped and control rods inserted is verified prior to evacuation.

2. Pressurizer safety valves provide over-pressure protection for hot standby and the PORV controls can be repaired and restored for later controlled depressurization. PORV block valves can be operated from their respective MCCs.
3. Main Steam Relief valves will be operated locally using the hand hydraulic pumps.
4. Control of essential hot shutdown equipment can be achieved at the Remote Shutdown Panel and locally using BOA PRI-5 "Control Room Inaccessibility" and BOA ELECT-5 "Local Emergency Control of Safe Shutdown Equipment".
5. Essential instrumentation indication is available at the Remote Shutdown and/or Fire Hazards Panels.
6. Controls for RH can be repaired to achieve cold shutdown within 72 hours.

Safe shutdown in fire zone 11.6-0, if the loss of all VC should occur, will be demonstrated by applying the above criteria with the following verifications:

1. Reactor is tripped and control rods inserted; the consequences of the loss of VC does not occur so fast that this verification cannot be made for a fire in this zone.
2. Pressurizer safety valve function and capability to repair/operate the pressurizer PORVs or its block valves are not impaired as a result of a fire in this zone.
3. Local manual operation of the main steam relief valves using the hand hydraulic pumps is not impaired as a result of a fire in this zone.
4. Operation of the essential hot shutdown equipment utilizing BOA PRI-5 and BOA ELECT-5 is not impaired as a result of a fire in this zone.
5. Essential instrumentation on the Unit 1&2 Fire Hazard Panels are available for a fire in this zone.
6. Capability to repair/operate equipment necessary for residual heat removal is not impaired as a result of a fire in this zone.

Compensatory actions and long term resolutions:

The capability to safely shutdown following a fire in zone 11.6-0 that results in the loss of ventilation in the MCR and Aux Electric Equipment Room is established by the bounding evaluations for fire in these rooms. Therefore, no compensatory actions or long term fixes are required other than currently ongoing modifications to resolve the Thermo-Lag fire barrier (GL 92-08) issue.