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May 27, 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC. 20555

Subject: Braidwood Station Unit 1
Supplemental Summary of Changes to Amendment 7
to the Fire Protection Report
NRC Docket No. 50-456

Reference: May 2, 1986 A.D. Miosi letter to H.R. Denton

Dear Mr. Denton:

In response to a request from the Staff, a more detailed explanation of the changes to the Fire Protection Report provided in Amendment 7 has been prepared. The Referenced letter submitted Amendment 7 to the FPR. Attachment A to that letter contained a summary of changes included in that amendment. The attachments to this letter supplement the summary of changes provided in Attachment A to the referenced letter.

Changes to the Fire Hazard Analysis (Sections 2.1, 2.2, and 2.3 of the FPR) have been adequately explained in Attachment A to the referenced letter. Thus, no further explanation of these changes is provided. Attachment A to this letter includes a section by section comparison of the Braidwood-1 Safe Shutdown Analysis (FPR Section 2.4) to the Byron-1 analysis. A zone by zone comparison of each zone analyzed is included. Attachment B to this letter provides a comparison of the Braidwood-1 Branch Technical Position CMEB 9.5-1 conformance description against the same Byron-1 material. Finally, Attachment C to this letter provides a comparison of the Braidwood-1 Appendix R deviations against those identified for Byron-1.

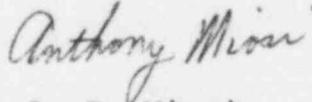
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Please direct any questions you may have regarding this matter to this office.

One signed original and fifteen copies of this letter and enclosure are provided for your review.

Very truly yours,



A. D. Miosi
Nuclear Licensing Administrator

/klj

cc: J. A. Stevens

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ATTACHMENT A

Comparison of Braidwood 1 vs. Byron-1 Safe Shutdown Analysis

The following comparison is performed on a subsection by subsection basis for Section 2.4, "Safe Shutdown Analysis" of the B/B Fire Protection Report. The new Braidwood-1 section submitted with Amendment 7 to the FPR is compared with the existing Byron-1 section.

<u>Section No.</u>	<u>Comparison</u>
2.4.1.1	The Braidwood-1 section is identical to the Byron-1 section.
2.4.1.2	The Braidwood-1 section is identical to the Byron-1 section.
2.4.1.3	The Braidwood-1 section is identical to the Byron-1 section except as noted below. In the second paragraph under "b", the statement is made that the cable data base is updated monthly. For Braidwood-1, this statement has been changed to indicate that the cable data base is updated periodically, since the level of design activity has dropped to the point that monthly updates are not required. Also, the table references in the last paragraph under item "b" are different. Refer to the discussion for Table 2.4-4 for a more detailed explanation.
2.4.1.4	The introductory paragraph and the second paragraph through item "a" are identical to Byron-1 Item "b" for Braidwood-1 is equivalent to items "b" through "e" for Byron-1. In other words, the safe shutdown equipment list is presented in one table for Braidwood-1, while, four separate tables were involved for Byron-1. Refer to the discussion for Table 2.4-2 for a more detailed explanation of the rationale and the specific differences between the equipment lists for those units.
2.4.1.5	The Braidwood-1 section is identical to the Byron-1 section except as noted below. Under items "2" and "3", the procedure numbers and titles have been changed to reflect the equivalent Braidwood-1 procedures. Item "5b" has been modified to indicate that the analysis for Braidwood-1 will be provided in a future FSAR amendment. A new item "5d" is provided for Braidwood-1. This does not represent a change in commitments or method of analysis. Rather, it represents a more detailed description of work that was performed for Byron-1, but was not explicitly described. It is included here for additional clarity.

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<u>Section No.</u>	<u>Comparison</u>
2.4.1.6	<p>The Braidwood-1 section is identical to the Byron-1 section except for the table reference. Refer to the discussion for Table 2.4-3 for a more detailed explanation of specific repair differences.</p>
2.4.2	<p>The introductory paragraphs have been changed to delete reference to Byron-1 Tables 2.4-7, 2.4-8 and 2.4-9. These tables list, respectively, Unit 2 zones not analyzed, Unit 1 and shared zones which do not contain safe shutdown equipment or cables, and Unit 1 zones which contain equipment or cables from only one division. These tables do not contain any information essential to the analysis, and thus equivalent tables for Braidwood-1 are not provided. This change is editorial.</p>
2.4.2.1	<p>Containment - For Braidwood, the entire containment was analyzed as one zone, since subdivisions are not relevant for fire protection (safe shutdown) purposes. This section is thus equivalent to Byron-1 Sections 2.4.2.1 through 2.4.2.3.</p> <p>Effects on the RHR system are the same as for Byron-1 (Byron-1 Sections 2.4.2.1 and 2.4.2.2). The credit taken for repair to allow RHR system operation is the same as for Byron-1.</p> <p>As for Byron-1 (Sections 2.4.2.1 through 2.4.2.3) the incore thermocouples and hot and cold leg RTD's are affected. The modification to the hot and cold leg RTD's proposed by Byron-1 has already been installed for Braidwood-1. Two Appendix R deviations have been identified for Braidwood-1 which are basically the same as those for Byron-1 (refer to the Appendix A5.8 comparison for details).</p> <p>All source range neutron monitors are affected as for Byron-1 (Sections 2.4.2.1 and 2.4.2.2). An Appendix R deviation has been identified for Braidwood-1 that is basically the same as that for Byron-1 (refer to the Appendix A5.8 comparison for details).</p> <p>As for Byron-1, all channels of steam generator level, pressurizer level and pressurizer pressure are affected. In each case, an Appendix R deviation has been identified for Braidwood-1 that is basically the same as a Byron-1 deviation. (Refer to the Appendix A5.8 comparison for details.)</p>

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<u>Section No.</u>	<u>Comparison</u>
	<p>Both PORV's and block valves are affected as for Byron-1. An Appendix R deviation has been identified for Braidwood-1 that is basically the same as for Byron-1 (refer to the Appendix A5.8 comparison for details).</p>
	<p>All four RCFC's are analyzed for Braidwood-1. This equipment was not analyzed for Byron-1. As a result, a new Appendix R deviation has been identified. Further explanation is provided in the comparison for Braidwood-1 Table 2.4-2 and in the comparison of Appendix A5.8.</p>
	<p>For Byron-1, both channels of wide range RCS pressure were affected inside containment. A subsequent design change, which was unrelated to fire protection, resulted in the relocation of the pressure transmitters to outside containment. Thus these instruments are not affected inside containment at Braidwood-1.</p>
2.4.2.2	<p>Zone 2.1-0 (Byron-1 Section 2.4.2.4) - For a fire in this zone, credit is taken for reactor trip and verification of control rod insertion prior to evacuation. This is the same as for Byron-1.</p> <p>Control of the pressurizer PORV's could be lost following a fire in this zone. Credit is taken for implementing a repair to the control circuit prior to depressurizing the primary system (required to achieve cold shutdown). This is the same as for Byron-1.</p> <p>For all other systems affected, alternate shutdown is available from the remote shutdown panels and/or locally. This is the same as for Byron-1. Equivalent Braidwood procedures are referenced. An Appendix R deviation has been identified that is basically the same as for Byron-1 (refer to the Appendix A5.8 comparison for details).</p> <p>For Byron-1, credit was taken for interim procedures to sample the primary system for boron concentration (in place of neutron monitoring) until the modification to install the fire hazards panel was completed. For Braidwood-1, this panel, which includes indication of source range neutron flux, has already been installed. Thus, no interim procedures are required.</p>

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Section No.	Comparison
	Credit is taken for implementing repairs to the RHR system prior to achieving cold shutdown. This is the same as for Byron-1.
2.4.2.3	Zone 3.1-1 (Byron-1 Section 2.4.2.5) - This summary is the same as for Byron-1.
2.4.2.4	Zone 3.2-0 (Byron-1 Section 2.4.2.6) - This summary is the same as for Byron-1.
2.4.2.5	Zone 3.2A-1 (Byron-1 Section 2.4.2.7) - Both trains of PCRV's and block valves are affected in this zone. The discussion of the effects and the repair for which credit is taken prior to depressurizing the primary system is the same as for Byron-1.
	For Braidwood-1, diesel generator 1A is unaffected by a fire in this zone. For Byron-1, it was necessary to take credit for local operation of diesel generator 1A, since a fire resulted in loss of control from the control room. There is no difference in the safe shutdown consequences in these two cases.
	Both divisions of the DC power system are affected in this zone. An Appendix R deviation was identified for the battery charger power cables (refer to the Appendix A5.8 comparison for deviation details). A one-hour rated fire barrier will be provided for some specific cables. The discussion, deviation and modification are the same as for Byron-1.
	Control power cables for both trains of switchgear are affected. This is compensated for by local operation of equipment at the switchgear. This is the same as Byron-1. Control cables for some specific Division 11 components are in this zone (ESW pump 1A). The specific components affected differ from Byron-1. However, in each case, the Division 11 components can be locally operated at the switchgear. The safe shutdown effects are thus the same at both units.
	Both trains of the RHR system are affected in this zone. Credit is taken for making repairs prior to achieving cold shutdown. This is the same as Byron-1.

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<u>Section No.</u>	<u>Comparison</u>
2.4.2.6	<p>Zone 3.2B-1 (Byron-1 Section 2.4.2.8) - For Byron-1, credit was taken for interim procedures to compensate for loss of neutron monitoring and the RCS cold leg thermocouples until the modification to install the fire hazards panel was completed. For Braidwood-1, this panel has already been installed, thus no interim procedures are required.</p> <p>All four steam generator atmospheric relief valves could be affected in this zone. At Byron-1, only one train (two valves) was affected.</p> <p>Both trains of the RHR heat exchanger outlet temperature instrumentation are affected in this zone. Credit is taken for effecting repairs prior to achieving cold shutdown. This is the same as Byron-1.</p>
2.4.2.7	<p>Zone 3.2C-1 (Byron-1 Section 2.4.2.9) - As previously stated, the fire hazards panel has already been installed for Braidwood-1, thus complete loss of neutron monitoring and RC cold leg temperature indication does not occur as it did for Byron-1.</p> <p>Credit is taken for repairing RHR heat exchanger outlet temperature instrumentation prior to achieving cold shutdown. This is the same as Byron-1.</p>
2.4.2.8	<p>Zone 3.2D-1 (Byron-1 Section 2.4.2.10) - The summary is the same as for Byron-1.</p>
2.4.2.9	<p>Zone 3.2E-1 (Byron-1 Section 2.4.2.11) - At Byron-1, two Division 12 cables were routed in this zone. At Braidwood-1, only Division 11 cables are present. The safe shutdown effects are the same for both units, despite minor differences in equipment affected.</p>
2.4.2.10	<p>Zone 3.3A-1 (Byron-1 Section 2.4.2.12) - The summary is the same as for Byron-1.</p>
2.4.2.11	<p>Zone 3.3B-1 (Byron-1 Section 2.4.2.13) - A repair was required at Byron-1 for RHR heat exchanger outlet temperature instrumentation. This is not required for Braidwood-1. Only Division 11 cables are present, as was the case for Byron-1.</p>
2.4.2.12	<p>Zone 3.3C-1 (Byron-1 Section 2.4.2.14) - A repair to RHR system instrumentation is required for Byron-1, but not for Braidwood-1. At Braidwood-1, both trains</p>

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<u>Section No.</u>	<u>Comparison</u>
	of neutron monitoring instruments could be affected, which did not occur at Byron-1. Since redundant indication of source range neutron flux is provided at the fire hazards panel, this is acceptable. Only Division 11 cables are present, as at Byron-1.
2.4.2.13	Zone 3.3D-1 (Byron-1 Section 2.4.2.15) - Both trains of neutron monitoring instrumentation are affected in this zone, which did not occur at Byron-1. Since redundant indication of source range neutron flux is provided on the fire hazards panel, this is acceptable. Only Division 11 cables are present, as at Byron-1.
2.4.2.14	Zone 3.4A-1 (Byron-1 Section 2.4.2.16) - As at Byron-1, only Division 11 cables are present. However, both trains of source range neutron monitoring indication are affected at Braidwood-1 (not at Byron-1). This is acceptable, however, as redundant indication of source range neutron flux is provided on the fire hazards panel.
2.4.2.15	Zone 5.1-1 (Byron-1 Section 2.4.2.17) - The summary is the same as for Byron-1.
2.4.2.16	Zone 5.2-1 (Byron-1 Section 2.4.2.18) - At Byron-1, only Division 11 cables were present. At Braidwood-1, several Division 12 cables are present, in addition to the many Division 11 cables. Five of these cables are associated with steam generator pressure indication. Since redundant indication is provided at the fire hazards panel, this is acceptable. Two Division 12 essential service water system (SX) cables are listed in Table 2.4-4. This is an error in the listing and will be corrected in a future amendment.
2.4.2.17	Zone 5.3-1 (Byron-1 Section 2.4.2.19) - Equipment and cables from only one division are present, as at Byron-1.
2.4.2.18	Zone 5.4-1 (Byron-1 Section 2.4.2.20) - A number of Division 11 control cables are routed through this zone, as was the case for Byron-1. Control cables for diesel generator 1A are present. Credit is taken for locally operating the generator, as at Byron-1. Control cables for the 1A AFW and ESW pumps are present. Credit is taken for local operation of these pumps at the switchgear, as at Byron-1. Control cables for RHR pump 1A are present. Credit

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	is taken for effecting repairs prior to achieving cold shutdown. This is the same as at Byron-1.
2.4.2.19	Zone 5.5-1 (Byron-1 Section 2.4.2.21) - The same components and instruments are affected at Braidwood-1 as at Byron-1. An Appendix R deviation has been identified for Braidwood-1. This is basically the same as the Byron-1 deviation (refer to the Appendix A5.8 comparison for details). For Braidwood-1, credit is taken for local operation of affected components at the switchgear. This is the same as at Byron-1. For instrumentation, a fire hazards panel has been installed at Braidwood-1 independent of this zone. The instrumentation on the panel is the same as at Byron-1. This panel has already been installed at Braidwood-1, thus no interim procedures or fire watches are required as was the case for Byron-1. Credit is taken for effecting repairs to the RHR system and to reactor coolant system wide range pressure instrumentation prior to achieving cold shutdown. This is the same as Byron-1.
2.4.2.20	Zone 5.6-1 (Byron-1 Section 2.4.2.22) - The summary is the same as for Byron-1.
NA	Zone 8.3-1 (Byron-1 Section 2.4.2.23) - No safe shutdown cables are in this zone at Braidwood-1.
NA	Zone 8.5-1 (Byron-1 Section 2.4.2.24) - No safe shutdown cables are in this zone at Braidwood-1.
2.4.2.21	Zone 9.1-1 (Byron-1 Section 2.4.2.25) - At Byron-1, only Division 12 cables and equipment were present. At Braidwood-1, one Division 11 cable is present. This has been evaluated and found to have no safe shutdown consequences.
2.4.2.22	Zone 9.2-1 (Byron-1 Section 2.4.2.26) - The summary is the same as for Byron-1.
2.4.2.23	Zone 9.3-1 (Byron-1 Section 2.4.2.27) - The summary is the same as for Byron-1.
2.4.2.24	Zone 9.4-1 (Byron-1 Section 2.4.2.28) - The summary is the same as for Byron-1.
2.4.2.25	Zone 10.1-1 (Byron-1 Section 2.4.2.29) - The summary is the same as for Byron-1.

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<u>Section No.</u>	<u>Comparison</u>
2.4.2.26	Zone 10.2-1 (Byron-1 Section 2.4.2.30) - The discussion provided for Byron-1 regarding filling the AFW pump 1B day tank has been deleted, since a review of station procedures indicates that the tank is normally refilled by gravity feed from the outdoor fuel oil storage tank, and not from the 50,000 gallons of fuel oil in the diesel generator storage tanks. Only Division 11 equipment and cables are present at both plants.
2.4.2.27	Zone 11.1A-0 (Byron-1 Section 2.4.2.31) - The summary is the same as for Byron-1.
2.4.2.28	Zone 11.1B-0 (Byron-1 Section 2.4.2.32) - The summary is the same as for Byron-1.
2.4.2.29	Zone 11.2-0 (Byron-1 Section 2.4.2.33) - Cabling for both trains of the essential service water system are present. At Byron-1, an Appendix R deviation was identified. At Braidwood-1, a decision was made to protect the Division 12 cables with a 3-hour rated barrier. At Byron-1 cables for both trains of charging pumps were present. At Braidwood-1, only one train is affected. Both trains of the RHR system are affected in this zone. Credit is taken for effecting repairs to one train prior to achieving cold shutdown. This is the same as Byron-1.
2.4.2.30	Zone 11.2A-1 (Byron-1 Section 2.4.2.34) - The summary is the same as for Byron-1.
2.4.2.31	Zone 11.2B-1 (No equivalent Byron-1 section) - No safe shutdown cables were present in this zone for Byron-1.
2.4.2.32	Zone 11.2C-1 (Byron-1 Section 2.4.2.35) - The summary is the same as for Byron-1.
2.4.2.33	Zone 11.2D-1 (Byron-1 Section 2.4.2.36) - The summary is the same as for Byron-1.
2.4.2.34	Zone 11.3-0 (Byron-1 Section 2.4.2.37) - Basically the same systems and components are affected at Braidwood-1 as for Byron-1. At Braidwood-1, a 3-hour rated barrier will be provided around Division 11 cables associated with the essential service water pump 1A and centrifugal charging pump 1A, to allow local operation of these pumps at the switchgear. This is the same as Byron-1. A deviation from Appendix R has been identified at Braidwood-1 for the

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	component cooling system. This is basically the same as the Byron-1 deviation (refer to the Appendix A5.8 comparison for details). Both trains of the RHR system can be affected. Credit is taken for effecting cable repairs to one division prior to achieving cold shutdown. This is basically the same as for Byron-1.
2.4.2.35	<p>Zone 11.3-1 (Byron-1 Section 2.4.2.38) - As at Byron 1, power and control cables for both trains of the essential service water pumps and the centrifugal charging pumps are affected in this zone. A one hour rated fire barrier will be provided around the Division 12 cables to allow local operation of the 1B charging and ESW pumps at the switchgear. This is still a deviation from Appendix R. Refer to the Appendix A5.8 comparison for details. This is basically the same as for Byron-1.</p> <p>Cables for all four main steam atmospheric relief valves are present. This is acceptable, since the local operation of these valves is unaffected. All of these cables were not present at Byron-1, however.</p> <p>Credit is taken for effecting repairs to one train of the RHR system, the RHR heat exchanger outlet temperature instrumentation, and reactor coolant wide range pressure instrumentation prior to achieving cold shutdown. This is similar to Byron-1.</p>
2.4.2.36	Zone 11.3B-1 (Byron-1 Section 2.4.2.39) - The summary is the same as for Byron-1.
2.4.2.37	Zone 11.3C-1 (No equivalent Byron-1 section) - No safe shutdown cables were present in this zone at Byron-1.
2.4.2.38	Zone 11.3D-1 (Byron-1 Section 2.4.2.40) - The summary is the same as for Byron-1.
2.4.2.39	Zone 11.3E-1 (Byron-1 Section 2.4.2.41) - The summary is the same as for Byron-1.
2.4.2.40	Zone 11.3G-1 (Byron-1 Section 2.4.2.42) - The summary is the same as for Byron-1.
2.4.2.41	Zone 11.4-0 (Byron-1 Section 2.4.2.43) - Cables for both divisions of component cooling and essential service water pumps are located in this zone. This discussion of the effects of a fire in this zone and

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the addition of a fire barrier to separate Division 11 and 12 cables is the same as for Byron-1. The fire barrier was developed as a resolution of a Byron-1 deviation and incorporated into the Braidwood-1 design; therefore, Braidwood-1 does not have a deviation similar to the Byron-1 deviation.

Power and control cables for auxiliary feedwater pumps 1A and 1B are located in this zone, as well as auxiliary feedwater pump 1A. An Appendix R deviation has been identified for the AFW pump 1B cables (see the Appendix A5.8 comparison for details). A remote start switch for AFW pump 1B has been added. The discussion, deviation, and modification are the same as for Byron-1.

Due to differences in cable routings, power and control cables for DG 1A fuel oil transfer pump 1A and DG 1B fuel oil transfer pump 1B are routed through this zone for Braidwood-1. This does not occur at Byron-1. This does not affect safe shutdown at Braidwood-1, as transfer pump 1D is available to serve DG 1B.

Control cables for all four RCFC fans are located in this zone at Braidwood-1, where as control cables for essential service water cooling tower fans OA, OB, OE, and OF are located in this zone at Byron-1. However, the safe shutdown effects are the same for both units. In addition, cables for all four main steam valves are present in this zone at Braidwood-1. At Byron-1, cables for main steam valves 1A, 1B, and 1D are routed through this zone. The use of locally manually operated hand pumps for the main steam valves is the same for both units.

Instrument cables for redundant channels of neutron monitoring are routed through this zone. Additional monitoring channels independent of this zone has been provided. This is the same as for Byron-1.

Power and control cables for RHR pump 1A and 1B cubicle coolers, power cables for RHR pumps 1A and 1B, and instrument cables for RHR heat exchanger 1A and 1B outlet temperature indication are present in this zone. This is the same as for Byron-1. The credit taken for repair is the same as for Byron-1.

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2.4.2.42	Zone 11.4A-1 (Byron-1 Section 2.4.2.44). This zone contains Division 12 cables except for two Division 11 cables associated with the auxiliary feedwater pump 1A lube oil cooler. For Braidwood-1, credit is taken for the operation of AFW pump 1A at the switchgear. For Byron-1, loss of the essential service water supply to the AFW pumps 1A and 1B will not affect the ability to safely shut down the plant since the condensate storage tank is the normal source of water.
2.4.2.43	Zone 11.4B-0 (Byron-1 Section 2.4.2.45). This summary is the same as for Byron-1.
2.4.2.44	<p>Zone 11.4C-0 (Byron-1 Section 2.4.2.46). The remote shutdown panels are located in this zone. A fire will cause the panels to become inoperable, as well as the corresponding controls in the control room. Credit is taken for the availability of alternate shutdown for all controls located in this zone. This is the same as for Byron-1.</p> <p>The discussion of remote shutdown panels 1PL04J, 1PL05J, and 1PL06J is the same as for Byron-1. All instrumentation which might be lost as a result of a fire in this zone has either redundant channels or diverse instruments which provide equivalent information to the operators and is available in the control room or elsewhere. All essential equipment controlled from these panels can be controlled from other locations. This is the same as for Byron-1.</p>
2.4.2.45	Zone 11.5-0 (Byron-1 Section 2.4.2.47). Cables for both divisions of centrifugal charging pumps, essential service water pumps, and component cooling pumps are routed through this zone. In addition, power and control cables for DG cooling water valves 1SX169A and 1SX169B are routed through this zone for Braidwood-1 only. The discussion of a fire in this zone and the addition of a fire barrier to separate Division 11 and Division 12 cables is the same as for Byron-1. The fire barrier was developed as a resolution of a Byron-1 deviation and incorporated into the Braidwood-1 design; therefore, Braidwood-1 does not have a deviation similar to the Byron-1 deviation.

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At Braidwood-1, this zone also contains auxiliary feedwater pump 1A, 1B, and pump 1A and 1B auxiliaries power and control cables. Credit is taken for the local operation of AFW pump 1A at the switchgear.

At Braidwood-1, power and control cables for Division 11 RCFC and control cables for Division 12 RCFC are routed through this zone. The Division 11 power cables will be protected to allow operation of Train A fans at the switchgear.

At Braidwood-1, Division 12 control room control and power cables and Division 11 control room ventilation system control cables are located in this zone. The Division 11 supply fan can be operated locally at the switchgear. This is similar to the discussion of the cables for the essential service water cooling tower fans located in this zone at Byron-1. Although the Division 11 return fan at Braidwood-1 cannot be operated locally, shutdown of the plant from the control room is still possible if the supply fan is operable.

Cables serving all for main steam atmospheric relief valves are located in this zone. Credit is taken for operating the valves using hand pumps in the main steam pipe tunnel. This is the same as for Byron-1.

At Braidwood-1, instrument cables for redundant channels of neutron monitoring are located in this zone. An additional channel has been added which is independent of this zone. At Byron-1, instrumentation cables for all reactor coolant wide range hot leg RTD's and all incore thermocouples are routed through this zone. Dual element RTD's have been provided, and the cables for these RTD's have been routed such that a fire in this zone will not result in the loss of all indication.

Power cables for RHR pumps 1A and 1B, power and control cables for RHR pump 1A and 1B cubicle coolers, and instrument cables for RHR heat exchanger 1A and 1B outlet temperature indication and both channels of reactor coolant pressure indication are routed through this zone. This is the same as for Byron-1. The credit taken for repairs is the same as for Byron-1.

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Section No.	Comparison
2.4.2.46	Zone 11.5-1 (No equivalent Byron-1 section). No safe shutdown equipment is located in this zone at Byron-1.
2.4.2.47	Zone 11.5A-0 (Byron-1 Section 2.4.2.48) - The summary is the same as for Byron-1.
2.4.2.48	Zone 11.5A-1 (Byron-1 Section 2.4.2.49). A fire in this zone will result in the loss of main steam relief valves 1A, 1B, and 1D. These valves can be operated manually using hand pumps in the main steam tunnel. At Byron-1, this zone contains only Division 11 equipment and cables.
2.4.2.49	Zone 11.5B-1 (Byron-1 Section 2.4.2.50). At Braidwood-1, cables from only one division of safe shutdown equipment are located in this zone.
2.4.2.50	Zone 11.6-0 (Byron-1 Section 2.4.2.51). Control and control power cables for diesel generators 1A and 1B are routed through this zone. The Division 12 control power cable will be protected, as well as the Division 12 cables for the DG cooling water valves. Deviations from Appendix R are required for Byron-1; however, no corresponding deviations are necessary because of the aforementioned modifications. Power and control cables for CV pump 1A and control cables for CV pump 1B are located in this zone. Credit is taken for operating pump 1B at the switchgear. This is the same as for Byron-1. Control cables for ESW pumps 1A and 1B, and for component cooling pumps "O", 1A, and 1B are routed through this zone. Credit is taken for operating ESW pump 1B and component cooling pump 1B at the switchgear. This is the same as for Byron-1. At Braidwood-1, control cables for AFW pump 1A, pump 1B, and the auxiliaries for pump 1A, as well as power cables for pump 1B auxiliaries are located in this zone. Credit is taken for starting pump 1B locally at the pump. Cables for all four main steam relief valves are routed through this zone. Credit is taken for the local operation of the valves using hand pumps. This is the same as for Byron-1.

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	<p>At Braidwood-1, power and control cables for the Division 11 RCFC fans, control cables for the Division 12 RCFC fans, and power and control cables for redundant control room supply and return fans are located in this zone. Credit is taken for the local operation of the Division 12 RCFC and control room supply fans at the switchgear. Safe shutdown from the control room can be achieved without using the return fans.</p>
	<p>At Braidwood-1, instrument cables for the redundant channels of neutron monitoring are located in this zone. Additional monitoring channels independent of this zone have been added. At Byron-1, cables required for all reactor coolant wide range hot leg RTD's and all incore thermocouples are routed through this zone. Dual element RTD's have been provided, and the cables for these RTD's have been routed such that a fire in this zone will not result in the loss of all indication.</p>
	<p>A Division 12 instrument cable for RHR heat exchanger 1B outlet temperature indication and power and control cables for RHR pump 1A are located in this zone. Credit is taken for repairing the Division 12 cable. This is the same as for Byron-1.</p>
2.4.2.51	<p>Zone 11.6-1 (Byron-1 Section 2.4.2.52). Division 11 and 12 cables associated with neutron monitoring are routed through this zone. For Braidwood-1, an additional channel of source range flux indication has been installed independent of this zone. This is the same as Byron-1.</p>
	<p>Instrument cables for reactor coolant loop 1A, 1B, 1C, and 1D cold leg RTD's are routed through this zone. At Byron-1, a commitment was made to route cables for the new dual element RTD's so that all indication would not be lost after a fire in this zone. This modification has proved to be not feasible. However, loss of all cold leg RTD's is acceptable for the following reasons. These would normally be used in conjunction with the hot leg RTD's to verify adequate core cooling, i.e., that natural circulation is present. This condition can also be verified by trending the temperatures indicated by the core exit thermocouples. Furthermore, subcooled conditions in the primary system can be verified by the plant computer, if it is available, or by manual calculation using</p>

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	instrumentation independent of this zone, if the computer is not available. Furthermore, cold leg temperature can be inferred from steam generator pressure. Plant emergency procedures are written to refer to these alternate methods of verifying primary system conditions. In fact, the core exit thermocouples are the preferred method. The Byron and Braidwood plant procedures are written using guidance from the Westinghouse Owners Group. Thus, loss of all cold leg RTD's in this zone is acceptable.
2.4.2.52	Zone 11.6A-0 (Byron-1 Section 2.4.2.53). For Braidwood-1, no safe shutdown equipment is located in this zone.
2.4.2.53	Zone 11.6A-1 (Byron-1 Section 2.4.2.54). This summary is the same as for Byron-1.
2.4.2.54	Zone 11.6C-0 (Byron-1 Section 2.4.2.55). At Braidwood-1, both Division 11 and 12 cables are located in this zone. These cables do not serve redundant equipment. At Byron-1, only Division 11 cables are located in this zone.
2.4.2.55	Zone 11.7-0 (Byron-1 Section 2.4.2.56). This summary is the same as for Byron-1. An Appendix R deviation has been identified for this zone, relating to redundant power and control cables for the auxiliary building ventilation fans (see the Appendix A5.8 comparison for details).
2.4.2.56	Zone 11.7-1 (No equivalent Byron-1 section). At Byron-1, no safe shutdown equipment is located in this zone.
2.4.2.57	Zone 12.1-0 (No equivalent Byron-1 section). No safe shutdown equipment is located in this zone at Byron-1.
2.4.2.58	Zone 16.1-1 (Byron-1 Section 2.4.2.57) - The summary is the same as for Byron-1.
2.4.2.59	Zone 18.1-1 (Byron-1 Section 2.4.2.60) - The summary is the same as for Byron-1.
2.4.2.60	Zone 18.2-1 (Byron-1 Section 2.4.2.61) - The summary is the same as for Byron-1.

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2.4.2.61	Zone 18.3-1 (Byron-1 Section 2.4.2.62) - This summary is the same as for Byron-1. An Appendix R deviation has been identified for this zone, relating to routing cables from the valve enclosures through the pipe tunnel (see the Appendix A5.8 comparison for details).
2.4.2.62	Zone 18.4-1 (Byron-1 Section 2.4.2.63) - This summary is the same as for Byron-1.
2.4.2.63	Zone 18.4-2 (No equivalent Byron-1 section). Only Division 12 equipment and cables are present in this zone, therefore a fire in this zone would not affect the ability to safely shut down the plant.
2.4.2.64	Zone 18.5-1 (No equivalent Byron-1 section). No safe shutdown equipment is located in this zone at Byron-1.
2.4.2.65	Zone 18.23-0 (Byron-1 Section 2.4.2.66). This summary is the same as for Byron-1.
2.4.2.66	Zone 18.39 (No equivalent Byron-1 section). The only safe shutdown equipment present in this zone are the two normally open ESW return valves OSX165A and OSX165B. Power to these valves is locked out during normal plant operation. Therefore, a fire in this zone would not affect the ability to safely shut down the plant.
2.4.2.67	Many Unit 2 zones (No equivalent Byron-1 section). This section is included to discuss Unit 2 zones containing cables associated with the auxiliary building ventilation system and the control room ventilation system.
2.4.3	<p><u>General:</u> The high-low pressure interfaces identified for Braidwood-1 are the same as those identified for Byron-1. Some of the cables and cable routings are different. The major difference between the Braidwood-1 and Byron-1 discussions is that the Braidwood-1 writeup includes assessment of three-phase a-c hot shorts and d-c hot shorts in valve power/control cabling. This was included per recent NRC guidance (SECY-85-306, Enclosure 5, Section 5.3.1, dated 9-17-85). Other postulated failure modes are the same.</p> <p>Note that Section 2.4.3 for Byron-1 (Amendment 3, June 1984) is not current. Subsequent to</p>

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<u>Section No.</u>	<u>Comparison</u>
	Amendment 3, the Auxiliary System Branch of the staff requested that three phase a-c and 2 wire d-c hot shorts be considered outside of containment. As a result, this failure mode was addressed for Byron-1 by a combination of design changes and procedures to mitigate the effects of spurious operation. Although this item was closed on Byron-1, the FPR has not been updated to reflect this fact.
2.4.3.1	Same, except the two sentences in Subsections 2.4.3.1.1 and 2.4.3.1.2 are deleted.
2.4.3.2	Same.
2.4.3.2.1	Same
2.4.3.2.1.1	For Braidwood-1 power valves are listed in Table 2.4-7. References to Tables 2.4-7 and 2.4-78 cable routing information for RH valves are included for Braidwood-1.
2.4.3.2.1.2	For Braidwood-1 this subsection is entitled "Assumption and Information." Content of this subsection differs from Byron-1 in that, for Braidwood-1 a hot short in valve power cabling is considered. Also, discussion is expanded to list postulated control circuit failures for each valve. Additionally, reference to "360 psig" for Byron-1 is given as "approximately 400 psig" for Braidwood-1.
2.4.3.2.1.3	For Braidwood-1 this subsection is entitled "Failure Modes." Same types of failure modes are postulated as for Byron-1 with the addition of a three-phase hot short in valve power cabling (failure mode 7). The acceptance criteria have been split into two parts: A) power cable, and B) control/interlock circuit. This was done because, as discussed previously, a hot short in power cabling is postulated for Braidwood-1. The acceptance criteria for the control/interlock circuit are the same as for Byron-1.
2.4.3.2.1.4	This Braidwood-1 subsection, entitled "Method of Analysis," does not appear in the Byron-1 writeup. This new subsection was included to give additional details on how the analysis was performed, and references a new table (2.4-12) which gives cable combinations considered to cause a spurious valve

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	operation. Note also that panels were not analyzed explicitly, as in Byron-1, since the panel locations are included implicitly in cable routing data. Also, cables routed only in Fire Zone 5.5-1 are not included in the cable combinations since a fire in this zone would not cause any of the 4 valves to open.
2.4.3.2.1.5	This Braidwood-1 subsection, entitled "Results," does not appear in the Byron-1 writeup (for Byron-1 the results are given in 2.4.3.2.1.3). For Braidwood-1 the results for each pair of valves are presented in two parts: A) power cable, and B) control/interlock circuit. There are some differences in the results relative to the zones in which a given valve could open due to a fire. This is due to cable routing differences and the assumption of a hot short in the valve power cabling for Braidwood-1. However, the additional protection required for Braidwood-1 is the same as that required for Byron-1: cables associated with valve 1RH8701A were protected in Fire Zone 11.5-0.
2.4.3.2.2	Same
2.4.3.2.2.1	The interface description has minor differences: For Braidwood-1 the PORV's are described as N ₂ -operated rather than air-operated, and the references to contacts PY455EX, PY456EX, PY457EX, and PY458EX have been deleted. Also the power and control cables for the valves are listed in Table 2.4-13 (listed in Table 2.4-79 for Byron-1).
2.4.3.2.2.2	For Braidwood-1, this subsection is entitled, "Assumptions and Information," and was not included in Byron-1 analysis. This subsection states that a hot short in PORV d-c control/power cabling is considered. It also states that control/interlock circuit failures and block valve failures to close are also considered; these were also considered for Byron-1.
2.4.3.2.2.3	This subsection is entitled "Failure Modes" for Braidwood-1 and is the same as Byron-1 subSection 2.4.3.2.2.2 on failure modes, except for some minor differences. For Braidwood-1, discussion has been clarified to indicate that the block valve fails open (normal position). Also, Byron-1 cables 1RY398 and 1RY251 are numbered 1RY486 and 1RY487 for Braidwood-1.

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2.4.3.2.2.4	This Braidwood-1 subsection, entitled "Method of Analysis," does not appear in the Byron-1 writeup. This new subsection was included to give additional details on how the analysis was performed and references a new table (2.4-14) which gives cable combinations considered to cause a spurious valve operation. It also explains that panels were not analyzed explicitly since the panel locations are included implicitly in the cable routing data.
2.4.3.2.2.5	This subsection, entitled "Evaluation and Results," appears in the Byron-1 writeup under SubSection 2.4.3.2.2.3. For failure modes 1 and 2 there are some differences in the results relative to the zones in which a given failure mode could occur. This is due to different cables and cable routings in the Braidwood-1 analysis. Also, for failure mode 2, the first paragraph in the Byron-1 discussion is not included in the Braidwood-1 writeup. This omission does not affect the results. For failure mode 3, the Braidwood-1 writeup references existing procedures used for closing the block valves following a fire in the control room, whereas the Byron-1 writeup states: "a procedure will be written..." Note that for failure modes 1, 2, and 3 the methods for mitigating the effects of these failures are the same for both Byron-1 and Braidwood-1. For failure mode 4, the Braidwood-1 writeup is completely different from the Byron-1 writeup. As mentioned earlier under Section 2.4.3 "General," the Byron-1 section is not current, and does not reflect a staff request (from the Auxiliary Systems Branch) to address this failure mode outside of containment. The resolution for Braidwood-1 is the same as for Byron-1 outside of containment. This failure mode was also addressed inside containment for Braidwood-1.
Table 2.4-1	For Braidwood-1, this table is identical to Table 2.4-1 for Byron-1. In other words, the systems used for safe shutdown are the same for both units.
Table 2.4-2	For Braidwood-1, all safe shutdown equipment and instruments are listed in this table. This format is different from Byron-1 in that four separate tables were presented for Byron-1. Except for specific equipment differences listed below, the same equipment listed in Tables 2.4-2 through 2.4-5 for Byron-1 are listed in Table 2.4-2 for Braidwood-1. Some unused and redundant information included in

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	<p>Tables 2.4-2 through 2.4-5 for Byron-1 was deleted from Braidwood-1 Table 2.4-2. The Byron-1 tables had columns headed "Elevation" and "Column/Row." Since the analysis is performed on a fire zone basis (and the fire zone in which the equipment is located was included for Byron-1 and is presented for Braidwood-1) the specific location within the fire zone represents information not utilized in the analysis. Therefore, it is not provided for Braidwood-1. Byron-1 Tables 2.4-2 through 2.4-5 had a column titled "Function." The information in this column is the same information provided in Table 2.4-1. Therefore, this column was not provided in Braidwood-1 Table 2.4-2. Thus, all information essential for the analysis is provided in Braidwood-1 Table 2.4-2.</p> <p>A detailed comparison of the Braidwood-1 vs Byron-1 equipment list was performed. Table A-1 is a listing of equipment on the Braidwood-1 list not on the Byron-1 list, and Table A-2 listing of equipment on the Byron-1 list not on the Braidwood-1 list. A column is provided which refers to notes that explain the additions and deletions for each piece of equipment. The changes generally represent a refinement in the analysis, not a change in philosophy or method of analysis.</p>
Table 2.4-3	<p>The equivalent Byron-1 table is 2.4-6. A comparison of these two tables will reveal that the affected equipment, repair description and required material are the same for both units. What differs is the specific fire zones for which a given repair may be required. This illustrates that the criteria for taking credit for repair is the same for both units. However, due to differences in cable routings, the specific fire zones where it is necessary to take credit for repairs are different.</p>
Table 2.4-4	<p>Tables 2.4-10 through 2.4-75 provide the equivalent information for Byron-1. The major difference involves the format.</p> <p>For Byron-1, a separate table number was utilized for each fire zone. For Braidwood-1, a new column 1 titled "Zone Number" was added to each page, which identifies the fire zone for which the equipment and cables are listed. Since the zones are listed in numerical order, finding a particular zone is readily accomplished. For Byron-1, the tables included a</p>

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column labeled "Safe Shutdown Function" which indicated for each component, either "H" (hot shutdown), "C" (cold shutdown) or "S" (support). This column was deleted in the Braidwood-1 table since it is redundant to the information in Table 2.4-1.

In addition to the format differences, the equipment and cables within a given zone may be different for Braidwood-1 than for the corresponding Byron-1 zone. The primary reason for these differences is that the cable routings may not correspond exactly. Equipment locations are generally identical. For Braidwood-1, the containment is listed and analyzed as one zone. For Byron-1, a separate discussion was provided for each of the three hazard zones identified and discussed in the Fire Hazards Analysis. This does not affect the results of the analysis.

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TABLE A-1

EQUIPMENT ON BRAIDWOOD-1 LIST NOT ON BYRON-1 LIST

<u>EQUIPMENT NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>	<u>REASON WHY NOT ON OTHER LIST*</u>
1AF01AA	Motor Driven AF Oil Cooler	3
1AF01AB	Diesel AF Pump Oil Cooler	3
1AF01E	AFW Pump 1B Diesel Engine Batteries	3
1AF01PB-K	AFW Pump 1B Diesel Engine	3
1AF02A	AFW Pump 1B Gear Oil Cooler	3
2AP05E	4160V Switchgear Bus 241 - ESF Division 21	2
2AP23E	480V ESF MCC 232 X1	2
0CC01A	Component Cooling Ht. Exch.	4
1CC01A	Component Cooling Ht. Exch.	4
1CC01T	Component Cooling Surge Tank	4
1CV02SA	Chg. Pump 1A Gear Cooler	3
1CV02SB	Chg. Pump 1B Gear Cooler	3
1CV03SA	Chg. Pump 1A Lube Oil Cooler	3
1CV03SB	Chg. Pump 1B Lube Oil Cooler	3
2DC01E	125V Battery 211 Division 21	2
2DC03E	Battery Charger 211 Division 21	2
2DC05E	125V DC Bus 211 ESF Division 21	2
1D01OT	AF Diesel Day Tank	3
1NR11E	Post Accident Neutron Detector	6
1NR11EB	Post Accident Neutron Detector Amplifier	6
1NR11EC	Post Accident Neutron Detector Processor	6
1NR13E	Post Accident Neutron Detector	6
1NR13EB	Post Accident Neutron Detector Amplifier	6
1NR13EC	Post Accident Neutron Detector Processor	6
1PL10J	Fire Hazards Panel	6
1RC01BA	Steam Generator 1A	4
1RC01BB	Steam Generator 1B	4
1RC01BC	Steam Generator 1C	4
1RC01BD	Steam Generator 1D	4
1RC01R	Reactor Vessel	4
1RY01S	Pressurizer	4
1RY32MA	PORV Accumulator Tank 1A	6
1RY32MB	PORV Accumulator Tank 1B	6
OSX165A	Cooling Lake Effluent MO Valve	1
OSX165B	Cooling Lake Effluent MO Valve	1

*See notes at the end of Tables A-1 and A-2.

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TABLE A-1 (Cont'd)

EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	REASON WHY NOT ON OTHER LIST*
1SX01AA	Ess'l Service Water Pump 1A Oil Cooler	3
1SX01AB	Ess'l Service Water Pump 1B Oil Cooler	3
1SX01K	Diesel AF Closed Cycle Hx	3
1SX02K	AF Gear Drive Lube Oil Cooler	3
OVC01CA	Control Room HVAC Supply Fan	2
OVC01CB	Control Room HVAC Supply Fan	2
OVC01JA	Local Control Panel	2
OVC01JB	Local Control Panel	2
OVC02CA	Control Room HVAC Return Fan	2
OVC02CB	Control Room HVAC Return Fan	2
1VP01AA	Cnmt. Ess'l Service Water Coil 1A	2
1VP01AB	Cnmt. Ess'l Service Water Coil 1B	2
1VP01AC	Cnmt. Ess'l Service Water Coil 1C	2
1VP01AD	Cnmt. Ess'l Service Water Coil 1D	2
1VP01CA	Prim. Cnmt. Vent System RCFC Fan, Motor	2
1VP01CB	Prim. Cnmt. Vent System RCFC Fan, Motor	2
1VP01CC	Prim. Cnmt. Vent System RCFC Fan, Motor	2
1VP01CD	Prim. Cnmt. Vent System RCFC Fan, Motor	2

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TABLE A-2

EQUIPMENT ON BYRON-1 LIST NOT ON BRAIDWOOD-1 LIST

<u>EQUIPMENT NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>	<u>REASON WHY NOT ON OTHER LIST*</u>
MOV-1CV-8105-2	Reg. Hx Line Containment Isolation Valve	7
MOV-1CV-1806-1	Reg. Hx Line Containment Isolation Valve	7
MOV-1CV-8110-1	Cent. Chg. Pump Mini-Flow Valve	7
MOV-1CV-8111-2	Cent. Chg. Pump Mini-Flow Valve	7
MOV-1CV-8804A	RHR Hx to Chg. Pump Suction Valve	7
1HS-AF157	Emergency Start Switch for AFW Pump 1B	5
1AF01PB-B	Junction Box Associated with AFW Pump 1B	5
1JB388A	Junction Box with AFW Pump Lube Oil Pump	5
1JB389A	Junction Box with AFW Pump Lube Oil Pump	5
LS-1SX173	Limit Switch with AFW Pump 1B	5
LS-1SX178	Limit Switch with AFW Pump 1B	5
1HS-AF119	Handswitch with AFW Lube Oil Pump	5
1HS-AF120	Handswitch with AFW Lube Oil Pump	5
1JB-2093A	Junction Box with AFW Pump 1B Gear Box Pump	5
1HS-AF152	Handswitch with AFW Pump 1B Gear Box Pump	5
1AP99E	480 V ESF Switchgear Bus 131Z - Division 11	1
1AP93E	480 V MCC 131Z1 - Division 11	1
1AP25E-B	480 V ESF MCC 131X2B	5
1AP98E	480 V ESF Switchgear Bus 132Z - Division 12	1
1AP73E	480 V Switchgear Bus 134V - Division 12	7
1AP92E	480 V MCC 132Z2	1
1AP43E	480 V MCC 134V3 - Division 12	7
1LSL-CC072	Interlock Switches for Component Cooling	5
1LSL-CC073	Pumps 1A and 1B	5
1JB1921A	Junction Box for DC Feed to Switchgear 1AP73E	5
1DG04EA	Circuit Breaker Control Panels Associated	7
1DG04EB	with DG Feeds to Switchgear	7
1DO055A	Transfer Pump Discharge to Diesel Driven	7
1DO055B	Aux. Feed Pump Day Tank Valves	7
1DO057		
1IT01J	Incore Thermocouple Ref. Junction Box 1 Division 11	5

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TABLE A-2 (Cont'd)

<u>EQUIPMENT NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>	<u>REASON WHY NOT ON OTHER LIST*</u>
1IT02J	Incore Thermocouple Ref. Junction Box 2 Division 12	5
1PT-MS041		7
1PT-MS042	S/G Atmospheric Relief Valve Pressure	7
1PT-MC043	Switches	7
1PT-MS044		
1NR073	Neutron Monitoring Junction Boxes	5
1NR09E		5
2PA09J	Protection System Cabinets	7
2PA10J		7
1JB381R	Junction Boxes for Pressurizer PORV's	5
1JB600R		5
1JB200R		5
1JB204R		5
1JB206R		5
1JB232R	Junction Boxes for RC Hot and Cold Leg	5
1JB237R	RTD's	5
1JB241R		5
1JB287R		5
1JB377R		5
1RY079A	Solenoid Valves for N ₂ Supply for	6
1RY079B	PZR PORV's	
OSX03CA	ESW Cooling Tower Fan OA	1
OSX03CB	ESW Cooling Tower Fan OB	1
OSX03CE	ESW Cooling Tower Fan OE	1
OSX03CF	ESW Cooling Tower Fan OF	1
1PSL-SX023		1
1PSL-SX024	Interlock Switches Associated with SX	1
1PSL-SX140	System	
1PSL-SX143		
LS-1SX001A		5
LS-1SX001B		5
LS-1SX016A		5
LS-1SX016B		5
LS-1SX027A	Limit Switches Associated with SX System	5
LS-1SX027B		5

*See notes at end of Tables A-1 and A-2

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TABLE A-2 (Cont'd)

<u>EQUIPMENT NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>	<u>REASON WHY NOT ON OTHER LIST*</u>
LS-1SX163A		1
LS-1SX163B		1
LS-1SX163E		1
LS-1SX163F		1
LJB-058A	Junction Boxes Associated with SX System	5
LJB-059A		5
LHS-SX136	Hand Switches Associated with SX System	5
LHS-SX137		
OZS-VA035A		5
OZS-VA035B		5
OZS-VA036A		5
OZS-VA036B		5
OZS-VA037A	Interlock Switches Associated with VA System	5
OZS-VA037B		5
OZS-VA038A		5
OZS-VA038B		5
OZS-VA035		5
OZS-VA036		5
OFZ-VA037		5
OFZ-VA038		5
ITS-VA001		5
ITS-VA002	Interlock Switches Associated with VA System	5
ITS-VA003		5
ITS-VA004		5
ITS-VA010		5
ITS-VA011		5
LS-OVA12EA		5
LS-OVA12EB		5
LS-OVA15EA		5
LS-OVA15EB	Limit Switches Associated with VA System	5
LS-OVA16EA		5
LS-OVA16EB		5
LS-OVA19EA		5
LS-OVA19EB		5
LJB-491A		5
LJB-581A		5
LJB-583A	Junction Boxes Associated with VA System	5
LJB-565A		
LJB-567A		
1XY-VE001	Interlock Switch for VE System	5
OVI01C	Remote Shutdown Control Room Fans	7

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TABLE A-2 (Cont'd)

<u>EQUIPMENT NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>	<u>REASON WHY NOT ON OTHER LIST*</u>
OVI02C		7
OVI01J	Local Control Panel	7
1VX05C	ESW Cooling Tower Vent Fans	1
1VX06C		1
1VX05J	Local Control Panels	1
1VX06J		1
1XY-VX001	Interlock Switches for VX System	1
1XY-VX002		1
1VX98J	Panels for VX System	1
1VX99J		1
1LV09E (E27)		5
1LV10E (E3)		5
1NR01E (E22)		5
1NR02E (E42)		5
1S101E (E45)		5
1S102E (E11)	Containment Electrical Penetrations	5
1S103E (E44)		5
1S104E (E12)		5
1S105E (E24)		5
1S106E (E35)		5
1S107E (E51)		5
1S108E (E7)		5

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Notes to Tables A-1 and A-2

1. Site specific difference. The major difference is in the essential service water system, where mechanical draft cooling towers are used at Byron, and a cooling pond is used at Braidwood.
2. New equipment added to analysis. Both the control room ventilation system (VC system) and the containment fan coolers (VP system) are included in the Braidwood-1 list, but were not analyzed for Byron-1.
3. Addition of support components to the Braidwood list which were implicitly included in the Byron list by virtue of the fact that they are located in the same zone with the primary piece of equipment which they support. In many cases, they are mounted on the same skid. This is a refinement of the analysis and not a significant change in the philosophy or method of performing the analysis.
4. Addition of major passive components such as heat exchangers, tanks and pressure vessels. These components were in some cases not listed for Byron-1. Components such as these are generally not susceptible to fire damage.
5. In many cases, specific components which are part of or are related to electrical control and power circuits are deleted. Components such as junction boxes, electrical containment penetrations, limit switches, etc. are included in this category. Since the cables which these specific components are associated with are explicitly included, deletion of these components is acceptable, and does not affect the results of the analysis. This is a refinement of the analysis, and does not represent a change in the philosophy or method of performing the analysis.
6. Equipment added or deleted as a result of design changes since the Byron-1 analysis was completed.
7. Equipment deleted as a result of a re-evaluation of its safe shutdown role, and shown to be not required for safe shutdown.

ATTACHMENT B

COMPARISON OF BYRON-1 VS. BRAIDWOOD-1 RESPONSE TO BTP 9.5-1

<u>SECTION</u>	<u>DESCRIPTION</u>
3.1 through 3.8	General differences: Throughout these sections the texts for both Byron-1 and Braidwood-1 reference various plant procedures, however, the procedure numbers differ for the two facilities.
3.1.a.3.f	The Braidwood response states that the Project Start-up Group will perform the preoperational testing. This is not specified in the Byron response.
3.1.a.3.f	The Byron response states that the station will conduct tests of new fire equipment. The Braidwood response states that this testing will be done by the Project Start-up Group.
3.1.a.4.d.i	The Byron response references a specific procedure for inspecting fire doors; the Braidwood procedure has not been written yet.
3.1.a.5.b	The Byron response states that the fire brigade members have an annual physical which shows them capable of unrestricted activity. The Braidwood response does not specify what the annual physical is to demonstrate.
3.1.a.5.d	The initial training of the Byron fire brigade was administered by the State of Illinois and the Byron Fire Department. The training of the Braidwood fire brigade is conducted by the CECO Training Department and the CECO Fire Marshall's staff.
3.1.a.6	The Byron response specifies that the station administration is responsible for the organization of fire protection services and review of their performance. This is not specified in the Braidwood response.
3.1.a.6	The Braidwood response states that conformance with all BWAP 1100-1 procedures is discussed in Table 3-1. The Byron response does not include procedures.
3.1.e.1	The Byron response states that all hose reels were functional prior to fuel load and does not address fire detection in the Fuel Handling Building. The Braidwood response states that specific hose reels were functional prior to fuel receipt and also that fire detection was operable in the Fuel Handling Building prior to receipt of fuel on site.

ATTACHMENT B (Cont'd)

<u>SECTION</u>	<u>DESCRIPTION</u>
3.2.k	The Byron response references a procedure; the Braidwood response does not reference a procedure.
3.3 (Item 9)	The responses reference station-specific files.
3.5.a.3	The Braidwood response discusses the sealing of all openings inside conduits which penetrate fire barriers that separate fire areas. This is not addressed in the Byron response.
3.5.a.5.a	The Byron response states that security inspects unlocked doors daily, while the Braidwood response references a specific inspection procedure.
3.5.a.5.d	The Braidwood response addresses the surveillance of fire doors; this is not addressed in the Byron response.
3.5.c.5	The Byron response specifies a procedure for compliance. The Braidwood response states that a procedure will be developed to meet the requirement.
3.5.d.2	The Braidwood reference to Table 3-1 is denoted "to be provided."
3.5.d.4	The Braidwood reference to Table 3-1 is denoted "to be provided."
3.5.e.1	The Braidwood response elaborates on the stated position of compliance.
3.5.g.3	For Byron, power for the plant pager system is supplied from MCC 131 x 2. The Braidwood response states that power is supplied from MCC 033W3 and the security diesel. Also, Byron references specific drawings.
3.6.a.1	Byron complies, while Braidwood complies with exceptions.
3.6.a.2	The Braidwood reference to Table 3-1 is denoted as "to be provided."
3.6.a.5	Byron complies; Braidwood does not address this item.
3.6.b.2	Byron complies, while Braidwood complies except for underground nonindicating valve 0FP590 at the gatehouse.

ATTACHMENT B (Cont'd)

<u>SECTION</u>	<u>DESCRIPTION</u>
3.6.b.11	The Braidwood response references Table 3-1, while the Byron response does not.
3.6.b.12	The Byron station has cooling towers. The Braidwood station has a cooling pond.
3.6.b.13	This item does not apply to the Byron station. It does apply to the Braidwood cooling pond, and Braidwood is in compliance with the item.
3.6.b.14	The Byron response states that the Service Water and Essential Service Water System tie-ins are manual. The Braidwood response states that the Essential Service Water System tie-in is manual.
3.6.c.6	The stations reference different procedures in their responses.
3.6.c.7	NFPA 11A and 11B are not applicable to the Byron station. These codes are applicable to the Braidwood station and are addressed in the response.
3.6.d	NFPA 12B is not applicable to the Byron station. This code is applicable to the Braidwood station and is addressed in the response.
3.6.d	The Byron response states that interlock and alarms are tested initially by the technical staff. The Braidwood response states that this testing is done by the start-up group.
3.6.d	The Byron response references the prefire plans in regards to venting, while the Braidwood response references the smoke removal procedure.
3.6.d	The Byron response discusses halon test results from site testing. This is not discussed in the Braidwood response since site test data is not available.
3.6.e	The Braidwood response discusses the addition of an odorizer to the CO ₂ systems. This is not discussed in the Byron response.
3.7.a.1	The Braidwood response discusses manual deluge systems and thermistor wires for the charcoal filter units within containment. These are not addressed in the Byron response.

ATTACHMENT B (Cont'd)

<u>SECTION</u>	<u>DESCRIPTION</u>
3.7.a.1.d	The Byron response states that the normal fire protection system water supply is used. The Braidwood response states that the normal fire protection system is used.
3.7.b	The Byron response specifies the rating of the portable fire extinguishers in the control room. This rating is not specified in the Braidwood response.
3.7.b.2	The Braidwood response specifies that smoke detectors are installed in "exhaust" vents and ducts. The Byron response addresses vents and ducts, but does not specify "exhaust."
3.7.c	The Byron response states that the Halon and CO ₂ systems meet the requirements of NFPA 12. The Braidwood response states that the Halon and CO ₂ system's conformance to NFPA 12 and 12A will be evaluated.
3.7.c	The Byron response states that hose stations are available for use in the cable spreading rooms. The Braidwood response states that water is available for use in the cable spreading rooms.
3.7.c	The Braidwood response states that hose stations are located adjacent to the doorways of the cable spreading areas so that water availability will be guaranteed even if severe smoke conditions exist. The phrase "even if severe smoke conditions exist" is not included in the Byron response.
3.7.c	The Braidwood response states that manual hose stations and portable fire extinguishers are available in the cable spreading area. The Byron response does not include portable fire extinguishers.
3.7.f	The Braidwood response states that the Remote Shutdown Panels are located alongside each other in the same room. The Byron response does not discuss the relative locations of the Remote Shutdown Panels, however the panel locations are the same at both plants.
3.8.a	The Braidwood response states that a procedure exists to meet this requirement, while the Byron response specifies the applicable procedure.

ATTACHMENT C

COMPARISON OF BYRON-1 VS. BRAIDWOOD-1 APPENDIX R DEVIATIONS

SECTION

DIFFERENCES

A.5.8

General: An introduction is provided in the Braidwood-1 writeup which was not included in the Byron-1 writeup. The introduction was provided to explain that Appendix A.5.8 addresses deviations that will exist during plant operation. This differs from Byron-1 in that certain Byron-1 deviations (e.g., A.16 and A.19) were written which discuss the addition of a 3-hour fire barrier around one division of cables. Once the barrier is added, no deviation exists. Therefore, for Braidwood-1, instead of writing a deviation to discuss the addition of a fire barrier around cables in a given zone, the addition of the barrier was discussed in Section 2.4.

Also, for the Braidwood-1 auxiliary building deviations (A5.8.1 through A5.8.24), penetration tabulations for the barriers referred to in the deviations were not included. Tables of redundant cables/equipment present in the zones discussed were not included since this information is provided in Table 2.4-4. (The deviations reference this table.) In addition, figures showing exact routings of cables for Braidwood-1 were not included since review of the text of the deviations in conjunction with the figures in Section 2.3 is sufficient to determine the approximate separation of the cables/equipment involved. For the containment deviations (A5.8.25 through A5.8.32) figures were provided since the cable routings are more difficult to visualize without the aid of figures showing these routings.

A5.8.1

Deviation is the same for both Byron-1 and Braidwood-1.

A5.8.2

Deviation is the same for both Byron-1 and Braidwood-1.

A5.8.3

Deviation is the same for both Byron-1 and Braidwood-1, however, the justification for the Braidwood-1 deviation references Section 2.4 instead of deviation A.16 since there is no Braidwood-1 deviation corresponding to Byron-1 deviation A.16. Section 2.4 provides the applicable information.

ATTACHMENT C (Cont'd)

<u>SECTION</u>	<u>DIFFERENCES</u>
A5.8.4	Braidwood-1 deviation differs from Byron-1 deviation in that Division 12 risers were protected on Braidwood-1 Elevation 383 feet 0 inch. Although redundant cables are not directly above each other on Elevations 383 feet and 364 feet, redundant cables are separated by about 18 feet horizontally. Therefore, unsealed penetrations in this area on Elevation 383 feet will be sealed. For Byron-1, sealing in this area was not required since Division 11 cables were protected on both Elevations 383 feet and 364 feet. (Note: The sealing of penetrations on Braidwood-1 was not discussed for this deviation in Amendment 7, however, this deviation will be revised in FPR Amendment 8 to include this.) Also, Section 2.4 is referenced rather than Deviation A.17.
A5.8.5	Basic deviation is the same for both Byron-1 and Braidwood-1. The major difference is that in the justification for the deviation, the Braidwood-1 writeup does not include the Byron-1 discussion regarding the protection of Division 11 cables and risers on both elevations 383 feet and 401 feet (Zones 11.4-0 and 11.5-0). The reason is that cables of opposite divisions were protected on Braidwood-1 elevations 383 feet and 401 feet. Therefore, for Braidwood-1, unsealed penetrations on Elevation 401 feet will be sealed in the area where Division 12 cables on 401 feet pass directly over redundant Division 11 cables on 383 feet. (Note: The sealing of penetrations on Braidwood-1 was not discussed in Amendment 7, however, this deviation will be revised in FPR Amendment 8 to include this.)
A5.8.6	Deviation is the same for both Byron-1 and Braidwood-1.
A5.8.7	Deviation is the same for both Byron-1 and Braidwood-1, except that the Braidwood-1 writeup does not include Tables A5.8.7-1 and A5.8.7-2 listing safe shutdown cables within 20 feet of the equipment hatch for elevations 414 feet and 426 feet.
A5.8.8	Deviation is the same for both Byron-1 and Braidwood-1, except the referenced operating procedure on Byron-1, BHP 4200-33, is numbered BWHP 4200-33 for Braidwood-1.
A5.8.9 (Byron)	No writeup for Braidwood-1 Zone 11.2-0 since one division of redundant cables was protected, as discussed in Braidwood-1 Section 2.4.

ATTACHMENT C (Cont'd)

<u>SECTION</u>	<u>DIFFERENCES</u>
A5.8.9 (Braid)/ A5.8.10 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1.
A5.8.10 (Braid)/ A5.8.11 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1 except the separation between redundant cables/equipment for Braidwood-1 is greater than 35 feet rather than 45 feet.
A5.8.11 (Braid)	This is a new deviation for Braidwood-1 and does not appear in Byron-1 Appendix A5.8. The deviation involves Zones 11.3D-1 and 11.3-0. The justification for the deviation is similar to other auxiliary building deviations in that the redundant cables/equipment are separated by a wall of 3-hour construction and also separated by a large distance. No plant modifications are required.
A5.8.12	Deviation is the same for both Byron-1 and Braidwood-1, except that the separation between redundant cables/equipment for Braidwood-1 is greater than 75 feet rather than 85 feet.
A5.8.13	Deviation is the same for both Byron-1 and Braidwood-1, except that the separation between redundant cables/equipment for Braidwood-1 is greater than 30 feet rather than 45 feet. Also, the combustible loading for Braidwood-1 Zone 11.3-1 is given as 9,900 Btu/ft ² . (The combustible loading given in the Byron-1 writeup is 17,400 Btu/ft ² , however, this value is to be revised to 9,900 Btu/ft ² , also.)
A5.8.14	Deviation is the same for both Byron-1 and Braidwood-1.
A5.8.15	Deviation is the same for both Byron-1 and Braidwood-1.
A5.8.16 (Byron)	No corresponding Braidwood-1 deviation for Zone 11.3-0 since one division of cables will be protected with a 3-hour barrier, and therefore, no deviation will exist.
A5.8.17 (Byron)	No corresponding Braidwood-1 deviation for Zone 11.4-0 since one division of cables will be protected with a 3-hour barrier, and therefore, no deviation will exist.
A5.8.16 (Braid)/ A5.8.18 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1.

ATTACHMENT C (Cont'd)

<u>SECTION</u>	<u>DIFFERENCES</u>
A5.8.19 (Byron)	No corresponding Braidwood-1 deviation for Zone 11.5-0 since one division of cables was protected with a 3-hour barrier, and therefore, no deviation will exist.
A5.8.17 (Braid)/ A5.8.20 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1.
A5.8.18 (Braid)/ A5.8.21 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1.
A5.8.22 (Byron)	No corresponding Braidwood-1 deviation for Zone 11.6-0 since one division of cables was protected with a 3-hour barrier, and therefore, no deviation will exist.
A5.8.19 (Braid)/ A5.8.23 (Byron)	The basic difference between the Byron-1 and Braidwood-1 deviations is that for Braidwood-1, cables 1DC001, 1DC002, and 1DC003 were not included as part of the deviation. These cables are to be wrapped with a 1-hour barrier (CO ₂ suppression is also present), and therefore, no deviation will exist. The remaining part of the deviation regarding cables 1DC021 and 1DC023 is the same, except that the separation for Braidwood-1 is given as about 30 feet rather than 30 to 35 feet.
A5.8.20 (Braid)/ A5.8.24 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1.
A5.8.21 (Braid)/ A5.8.25 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1.
A5.8.22 (Braid)/ A5.8.26 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1, except that the Braidwood-1 write-up mentions there is no ionization detection on El. 475 feet. (This is also true for Byron-1, but was not mentioned in writeup.)
A5.8.23 (Braid)/ A5.8.27 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1.
A5.8.24 (Braid)/ A5.8.35 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1.
A5.8.25 (Braid)/ A5.8.28 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1 except that cable routings and separations are slightly different and the PORV control cables are to be routed in conduit for Braidwood-1.

ATTACHMENT C (Cont'd)

<u>SECTION</u>	<u>DIFFERENCES</u>
A5.8.26 (Braid)/ A5.8.29 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1 except the minimum vertical cable separation is about 15 feet and the horizontal separation is about 60 feet for Braidwood-1 (17 and 65 for Byron-1, respectively).
A5.8.27 (Braid)/ A5.8.30 (Byron)	Deviation is basically the same for both Byron-1 and Braidwood-1. Although the Braidwood-1 deviation lists 3 cables for each source range detector instead of one, the routings are nearly the same as for Byron-1.
A5.8.28 (Braid)/ A5.8.31 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1, except cable separations are slightly different.
A5.8.29 (Braid)/ A5.8.32 (Byron)	Deviation is the same for both Byron-1 and Braidwood-1, except vertical cable separation is slightly different.
A5.8.30 (Braid)/ A5.8.33 (Byron)	Deviation is basically the same for both Byron-1 and Braidwood-1. The main difference is that the Braidwood-1 deviation addresses the as-built configuration of the dual element RTD cables. Cable separations and routing elevations are also slightly different. In addition, a figure is provided with the Braidwood-1 deviation which was not provided for Byron-1.
A5.8.31 (Braid)/ A5.8.34 (Byron)	This Braidwood-1 deviation is different from the Byron-1 deviation in that the Braidwood-1 deviation addresses the as-built configuration of the dual element RTD cables. Cable separation is different and a figure is provided for the Braidwood-1 deviation. The justification for deviation also differs for the following reason: At Byron-1 a commitment was made to route cables for the new dual element cold leg RTD's so that all indication would not be lost after a fire in this zone. This modification proved to be not feasible for both Byron and Braidwood. Therefore, the Braidwood-1 justification for the deviation describes an acceptable means of verifying primary system conditions in the event that all cold leg RTD indication is lost.
A5.8.32 (Braid)	This is a new deviation for Braidwood-1 and does not appear in Byron-1 Appendix A5.8. The deviation addresses RCFC high-speed cables routed in containment. No plant modifications are required.