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August 4, 1986

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

Subject: Braidwood Unit 1
Supplemental Information
to Amendment 7 of the Fire Protection
Report and NFPA Code Deviations
NRC Docket No. 50-456

Reference: (a) May 2, 1986 A.D. Miosi letter to H.R. Denton
(b) May 27, 1986 A.D. Miosi letter to H.R. Denton
(c) June 2, 1986 A.D. Miosi letter to H.R. Denton
(d) August 20, 1984 T.R. Tramm letter to H.R. Denton

Dear Mr. Denton:

Enclosed is supplemental information to facilitate your review on the fire hazards analysis, new safety shutdown analysis, and the NFPA Code deviations. This information has been discussed with members of your staff.

Enclosure one covers the issues raised by members of your staff. Enclosure two and three is our response to those issues raised.

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

Very truly yours,

Anthony Miosi

A. D. Miosi
Nuclear Licensing Administrator

/klj
cc: J. Stevens
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Issues Raised by NRC

I. GENERAL ISSUES

1. NFPA Code Deviations (see Reference (C) - The scheduled September submittal date for NFPA code deviations should be moved up. The code review must be performed for the same codes as was done for Byron-1. Agreed with our stated intention of only identifying permanent code deviations in the FPR.

2. A structural steel evaluation must be available for Braidwood like the one that was done for Byron.

II. SPECIFIC ISSUES

A. NFPA Code Deviations - Reference (c).

A.1) Page 3, item 18 - Verify that both fire pumps cannot be disabled by a single fire in the zone where the electric fire pumps cables are in exposed conduit.

A.2) Page 5, item 26.

A.3) Page 5, item 28.

A.4) Page 6, item 31-Concerned about lack of documentation of thrust block locations.

B. Fire Protection Report Sections 2.2 and 2.3 (Refer to Reference (a), Attachment A).

B.1 Page 2.2-29 (Att. A, p. 3) - Ionization detectors in supply air ducts in lieu of detectors for general area should be justified.

B.2 Examples - Page 2.2-23 (Att. A, p.3) - Any place where less detection is provided at Braidwood than at Byron must be justified. For the example, Byron had two types of detectors, Braidwood 1 only.

B.3 Several areas are identified where no form of detection is provided at Braidwood. For any area so identified, the logic for not providing detection must be provided.

B.4) P.2.3-158 (Att. A, p. 7) - Use of toggle switch vs. push button is an NFPA code deviation and must be justified.

C. Chapter 3 - Branch Technical Position comparison (Reference (b), Attachment B).

C.1) General - Why is Braidwood different than Byron?

C.2) Subsection 3.1.a.5.6 (Att. B, p.1) - The fire brigades annual physical must demonstrate that they can perform fire fighting activities.

C.3) Subsection 3.7.c (Att. B, p.4) - The Braidwood response states merely that "water" is available in the cable spreading rooms. The Byron response states that hose stations are provided. The Braidwood response should clarify how water is provided.

D. Section 2.4 - Safe Shutdown Analysis

D.1) Page 2.4-31 (FZ11.6A-1) - Credit is taken for manually operating valves in this zone following a fire. The Staff position is that credit for this manual action cannot be taken for 1 hour following the start of the fire. Action - verify that adequate time is available to make the manual actions.

D.2) Page 2.4-31 (FZ11.7-0) - Aux. Bldg. exhaust fans. The Auxiliary Systems Branch (ASB) must verify that these fans are not required for safe shutdown. Additional explanation of why loss of these fans is acceptable should be provided.

E. Appendix A.58 - Specific Appendix R Deviations

E.1) General - Where different division's cables were protected (wrapped) on different elevations, demonstrate that the vertical spread of fire (i.e. prevention of) has been adequately addressed. I.e., large openings such as stairwells within 20 ft. of redundant cables must have sprinkler protection and other openings must be sealed. Nature of seals must be identified and seals must be covered by Tech Specs.

E.2) Deviations A.4, A.5, A.6 and A.7 have typos in reference Table no's.

E.3) Deviation A.7 - For Byron-1, two tables listing safe shutdown cables within 20 ft. of the hatch were provided. The same tables should be provided for Braidwood-1.

E.4) Deviation A.11-Although this is similar to same Byron-1 deviations, the 65 feet of separation is not adequate, and additional protection will be required.

E.5) Deviation A.24 - Review the justifications for this deviation. Provide reference to previous submittals or inspection reports if available.

E.6) Deviation A.15 - Are there partial height walls around the component cooling pumps? They are an important part of the fire protection features. Deviation is acceptable with these walls.

E.7) Deviation C.6 - The existing horizontal separation of 15 feet is not acceptable. The Staff will not accept less than 20 feet. Additional protection must be provided. Either a non-combustible radiant energy shield or a rated fire wrap at the cables will be considered acceptable.

Enclosure Two
Response to Issues Raised by NRC

Item #I.1 Additional permanent NFPA Code Deviations will be sent to the NRC. This will include deviations for the following codes:

NFPA 11 - Low Expansion Foam
NFPA 12 - Carbon Dioxide
NFPA 12A - Halon
NFPA 16 - Foam Water Spray Systems
NFPA 30 - Flammable Liquids
NFPA 37 - Stationary Combustion Engines
NFPA 50 - Gaseous Hydrogen Systems
NFPA 72D - Protective Signalling Systems
NFPA 80 - Fire Doors and Windows
NFPA 90A - HVAC

There may be more permanent NFPA deviations identified for safety elated areas when construction is done and M&M completes is final NFPA review. Any such "new" permanent NFPA deviations in safety-related areas will be sent to the NRC in an expedited manner.

Item #I.2 An evaluation of unprotected structural steel within the auxiliary building was provided to the staff for Byron Unit-1 via referenced letter (d). This evaluation is equally applicable to Braidwood. Where additional protection was applied at Byron, the same protection was added at Braidwood.

Item #II.A.1 Both fire pumps cannot be disabled by a single fire. The diesel driven fire pump is located in a room with 3 hour rated barriers separating it from the motor driven pump. All circuitry and components needed to start the diesel driven pump are located within the same room.

The motor driven pump is located approximately 100 feet from the diesel driven fire pump room. The only place where the conduit with the cables for the motor driven pump is not embedded in concrete or protected by a fire barrier is right at the pump and right at the switchgear. Thus, a single fire could not disable both fire pumps.

Item #11.A.2 The nameplate on the electric motor driven fire pump is incorrect. However, correct data is available on file on various vendor drawings and in vendor manuals on the site. M&M has verified this data.

Item #II.A.3 Instead of check valves at the interface points to other systems CECo installed butterfly valves instead. This issue was brought up during the Byron #1 audit as item #454/83-62-44 and the NRC accepted the administrative controls put in-place at Byron in their letter dated November 6, 1984 closing out this item. The same procedures will be used at Braidwood.

Item #II.A.4 Some thrust blocks were installed with the underground fire mains however insufficient documentation exists to determine exact locations. The underground fire main system at Braidwood is a welded steel pip configuration which by NFPA 24 par. 8-6.1 and Formal Interpretation - F.I. 81-4 does not require thrust blocks except at the flanged hydrant connections. The CECO Construction Department is currently working on relocating/and/or repositioning some of the fire hydrants for other reasons. In the course of that construction work, thrust blocks are being installed where there are none and these installations are being documented for future references by the CECo Operating Department.

Procedure BwVS 100-4 has been developed by the CECO Operating Department to monitor for any unusual system leakage. If leakage occurs the affected sections of the system will be revised as necessary.

Our exposure in this matter is for the most part limited to the failure of individual hydrants only. Should a hydrant fail, CECO believes that adequate compensating measures can be implemented by use of adjacent hydrants. The fire main system and hydrants have been in operation for several years without any problems. Therefore CECo feels that the design and construction of the system is adequate to ensure operability and that administrative measures will adequately ensure future operability.

Item #II.B.1 The fire zones affected are the DG and SWgear Room air shafts and therefore detectors in the ducts are the only appropriate application. No area detection is possible in the shaft.

Item #II.B.2 There are 3 different cases where differences exist between Byron and Braidwood detection. They are:

A. Wherever we had 2 different types of detectors installed in the same area at Byron we then determined if the detectors provided the same alarm function. If the same alarm function was provided we did not install the redundant detector train at Braidwood because there is no necessity to do so per NFPA codes or any other regulation. M&M recognized this redundancy at Byron at the time of their inspections in 1984. However since the installations were already complete CECO decided not to remove one system. Zones for which redundant alarm functions were eliminated are:

10.1-1	Diesel Fuel Oil Storage
10.1-2	Diesel Fuel Oil Storage
10.2-1	Diesel Fuel Oil Storage
10.2-2	Diesel Fuel Oil Storage
11.4A-1	Aux Feedwater Pump Diesel Room
11.4A-2	Aux Feedwater Pump Diesel Room

M&M has determined that the Fenwal thermal detection system for the above zones at Braidwood is adequate in their letter dated January 8, 1985.

B. Several zones at Braidwood do not have detection whereas at Byron detection exists. These zones are:

8.1-0 - Clean and Dirty Oil Tank Room
18.13-0 Diesel Driven Fire Pump Cubicles
8.5-1 - Turbine Bldg. Mezzanine Floor
8.5-2 - Turbine Bldg. Mezzanine Floor

Detection for these zones was not provided at Braidwood because each zone is covered by automatic sprinkler systems which M&M has considered to be adequate for the hazards in the zones. M&M letters dated January 8, 1985, February 19, 1985, and April 1, 1985 spellout the M&M analysis concerning these areas. These zones contain non-safety related equipment only.

C. One zone at Braidwood does not have detection, whereas, at Byron detection exists. This zone is:

8.6-O - Turbine Bldg. Operating Floor (Elev. 451')

M&M analyzed this zone in their January 8, 1986 letter and determined that detection was not warranted. This zone contains non-safety related equipment only.

Item #II.B.3 M&M has evaluated all areas of the plant including those for which we do not have detection at both Braidwood and Byron. Their analysis on these areas is contained in their letter dated April 7, 1986, which is attached for your review. (Enclosure 3)

Item #II.B.4 Only UL approved toggle switches are used on the Halon system. M&M has a letter from Chemetron documenting the UL listing. This toggle switch is a spring return switch which in effect is a "deadman" switch. However, since this toggle switch is used for the manual initiation of the Halon system it is not specifically covered by NFPA 12A. NFPA 12A par. 1-8.4.3 does reference "deadman" abort switches but that is not the question here. M&M does not believe that this is an NFPA deviation.

Item #II.C.1 The BTP responses for Braidwood are different than the Byron response because of general site specific differences in physical layout and departmental organization. The differences as summarized in our May 27, 1986 submittal are quite minor in nature. We will be glad to discuss any specific differences that are of concern to the NRC.

Item #II.C.2 The Braidwood response will be changed to the exact words used in the Byron response.

Item #II.C.3 The Braidwood response for subsection 3.7.c will be revised to read "hose Stations are available..." instead of "Water is available..." The Braidwood design is the same as Byron.

Item #II.D.1 All zones where credit is taken for manual actions following a fire have been reviewed. In each case, the manual action is either performed in a different zone than the one with the fire, or the manual action is not needed for at least one hour. Revisions to the Fire Protection Report will be prepared for any zones where this is not clear.

Item #II.D.2 Loss of the auxiliary building exhaust fans following a fire will not prevent safe shutdown of the plant. The primary functions of the auxiliary building ventilation system are to maintain environmental conditions in the areas served and to control radioactivity by directing airflow from clean areas to areas of potential contamination. Most of the major components within the auxiliary building either have cubicle coolers for room cooling (for example, the centrifugal charging pumps) or have a separate ventilation system, (for example, the diesel generators). This, loss of the auxiliary building exhaust fans would not prevent these components from operating. Since concurrent accidents are not considered, loss of the radioactivity control function is not critical. Thus, loss of the auxiliary building exhaust fans may present operational difficulties, but would not prevent safe shutdown of either unit.

Item #II.E.1 Where sealing of floors is utilized to prevent the vertical spread of fire from affecting redundant safe shutdown divisions, the following criteria were applied. All floor openings are protected. Where seals are installed, the seal details are the same ones used in 3 hour rated fire barriers (i.e. the seals have been qualified to a 3 hour fire rating). The floor is sealed to a minimum distance of 20 feet in each direction from the point(s) where redundant cable routings overlap.

All large floor openings have been protected by sprinklers, as at Byron. The sealed area will be covered by the plant Technical Specifications. These criteria are the same ones used at Byron in similar situations.

Item #II.E.2 No further action required - the typos noted were corrected in Amendment 8.

Item #II.E.3 The tables requested are being prepared. The FPR will be amended to include them.

Item #II.E.4 A review of the plant configuration has revealed that intervening combustibles are not present throughout the area separating the redundant divisions. The physical separation distance between the two divisions is about 65 horizontal feet. Within this area, there is a section with a minimum horizontal distance of 20 feet with no intervening combustibles. The FPR will be amended to reflect this fact.

Item #II.E.5 This deviation is identical to an approved Byron-1 deviation. The Byron-1 procedures for accomplishing safety shutdown were walked through during the Byron site audit. No further action or response should be required at Braidwood, since Braidwood procedures are based on the equivalent Byron procedures.

Item #II.E.6 The description of the deviation will be amended to take credit for the partial height walls. The modification to the walls at Byron was also applied at Braidwood.

Item #II.E.7 One division of the RTD cables will be protected with a one hour rated fire wrap to achieve a minimum separation between unprotected portions of the cables of 20 horizontal feet. Specific details are not yet available since the design change is still being prepared. The FPR will be amended to reflect the additional protection provided.

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M&M PC
M&M Protection Consultants
A Resource of Marsh & McLennan

April 7, 1986

Mr. D. Elias
Project Engineer
Commonwealth Edison Company
P. O. Box 767
Chicago, IL 60690

Re: BYRON/BRAIDWOOD STATIONS
FIRE DETECTION REVIEW

Dear Mr. Elias:

A walkdown was performed at Byron and Braidwood Stations to evaluate the placement of fire detectors in safety related areas. The purpose of this evaluation was to determine if the existing detection system covers prevalent fire hazards which may expose safety related equipment. The attached list describes those areas and rooms where detection is not provided and associated comments.

For the inaccessible areas at Byron Unit 1, the contents were confirmed in the identical Unit 2 rooms or at Braidwood. The walkdown also utilized Byron/Braidwood fire detection drawings and the Byron/Braidwood Fire Protection Report.

As a result, an additional detector is recommended in the Unit 2 remote shutdown panel room at Byron.

The remaining rooms on the attached list were evaluated and it was determined that the fire loading and exposure are negligible. Therefore, additional detectors are not warranted due to the areas being non-fire hazards. In addition, it should be noted that detection is provided in all fire areas within the plant.

Mr. D. Elias
April 7, 1986
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Should there be any questions or comments concerning this review, please advise.

Very truly yours,

S. J. Chingo

Stanley J. Chingo
Fire Protection Consultant

Attachment

SJC/lw

cc: J. Deress
M. Pietraszewski
R. Linboom
C. Diaz
E. Fitzpatrick
T. Meyer
R. Salsbury
E. Crass
R. Querio
M. Balster
M. Smith
R. Smith, Jr.
G. Jones
B. Treece
R. Rakowski
(SJC1/1)

Bldg./Elev.	FPR zone	Area/Room	Contents	Comments
Aux. 346' (gen. area)	11.2-0	Recycle evaporator feed pump room, recycle evaporator rooms OA & OB, gas decay tanks & valve aisle rooms Unit 1 & 2 moderating heat exchanger rooms, letdown reheat heat exchanger rooms, letdown chiller heat exchanger rooms and valve aisle	Steel tanks, pipe, valves, and HVAC with electrical in conduit.	Unit 1 heat exchanger rooms were not accessible, however, pictures depicted noncombustible contents as confirmed in Unit 2 rooms, and also verified at Braidwood.
Aux. 364' (gen. area)	11.3-0	Recycle hold-up tank rooms, blowdown condenser room, aux. building, floor drain tanks and pump rooms	Steel tanks, pipe, valves and HVAC with electrical in conduit.	No access @ Byron. Noncombustible contents and negligible fire load confirmed at Braidwood.
Aux. 364'	11.3B-1, 11.3E-1 11.3B-2, 11.3E-2	Unit 1 & 2 RHR heat exchanger rooms	Steel tanks, pipe, valves & HVAC with electrical in conduit.	Unit 1 inaccessible except for pictures. Contents noncombustible as confirmed in Unit 2 and @ Braidwood. Fire load negligible.
Aux. 383' (gen. area)	11.4-0	All demineralizer and filter rooms	Steel pipe, valves, with electrical in conduit.	Dectection provided in valve aisles. Noncombustible contents confirmed at Braidwood.
Aux. 383'	11.4B-1, 11.4C-1 11.4D-1, 11.4B-2 11.4C-2, 11.4D-2	Unit 1 & 2 heat exchanger and valve aisle rooms	Steel tanks, valves, pipe and HVAC with electrical in conduit.	Unit 1 inaccessible except for pictures. Noncombustible contents confirmed in Unit 2 and at Braidwood. Fire load negligible.

Bldg./Elev.	FPR zone	Area/Room	Contents	Comments
Aux. 383'	11.4C-0	Unit 2 remote shutdown panel room	Shutdown panel.	Install detector in Unit 2 remote shutdown panel room at Byron.
Aux. 401' (gen. area)	11.5-0	All demineralizers and valve aisle rooms.	Steel pipe, valves, HVAC with electrical in conduit.	Unit 1 inaccessible. Noncombustible contents confirmed in Unit 2 and at Braidwood.
Aux. 401' (gen. area)	11.5-0	Boric acid tank room	Steel tank, pipe, valves, HVAC and safety cable trays.	Contents noncombustible with negligible fire exposure to cable trays.
Aux. 426'	11.6A-1 11.6A-2	Unit 1 & 2 volume control tank and valve aisle rooms	Steel tank, pipe valves and HVAC with safety cabling.	Unit 1 inaccessible except for pictures. Noncombustible contents confirmed on Unit 2 and at Braidwood. Fire load negligible.
Aux. 426'	11.6B-0	Auxiliary Building offices	Office furnishings and safety cable trays.	The office is considered to be part of the general area fire zone on elev. 426'. Although detectors are not installed within the office, the general area detection system (zone 275) will provide an early warning fire alarm to the control room.
Aux. 426'	14.4-0	Waste gas compressor room and valve aisle	Steel pipe, valves & HVAC with electrical in conduit and safety cable tray.	Byron inaccessible. Braidwood construction not complete to verify contents. Fire load to be negligible.

Bldg./Elev.	FPR zone	Area/Room	Contents	Comments
Aux. 417'	14.4-0	Spent resin storage tank room	Steel tank, pipe, valves, HVAC and electrical in conduit.	Byron inaccessible. Noncombustible contents verified at Braidwood. Fire load negligible.
Aux. 475'	11.7-0	HVAC complex	Auxiliary Bldg. exhaust fans, with electrical in conduit.	Fire load negligible.
Aux. 426'	3.1-1 3.1-2	Electric cable tunnel rear hatchway rooms	Safety cable trays, HVAC, with electrical in conduit.	The rooms are 3-hr. fire rated enclosures with negligible fire loading.
Aux. 401' thru 490'	18.1-1, 18.2-1 18.1-2, 18.2-2	Diesel generator and switchgear room air shafts	Intake/ exhaust shafts, fans, filter enclosures.	Duct smoke detectors are provided downstream of supply air fans. This is adequate in lieu of area wide detection.
Aux. 451', 459', & 467'	11.7-1 & 11.7-2	Unit 1 and 2 purge rooms	Containment isol. valves, HEPA filters.	Detectors installed on elevation 467' only. Remaining elevations are open to top level.
Containment 377' 401' 414' 426'	1.2-1 & 1.2-2 1.3-1 & 1.3-2	Unit 1 and 2 annular areas	Fan coolers, instrument panels safety cable trays, tanks, pumps, valves.	Byron inaccessible. Spot detection provided on elev. 414' and 426' (electrical penetration areas). Remaining cable areas are discussed in Appendix 5.8, Deviations from Appendix R.
Main steam and pipe tunnel and safety valve rooms. 357', 367', 377', 401', 413'	18.3-1 & 18.3-2	Unit 1 and 2 pipe tunnels	Pipe, valves, fans, instrument panels with electrical in conduit.	Byron inaccessible. Detectors installed in valve enclosure elev. 413' at Byron. Remaining areas are discussed in Appendix 5.8.

Bldg./Elev.	FPR zone	Area/Room	Contents	Comments
Refueling water storage tanks.	16.1-1 & 16.1-2	Outdoors adjacent to Fuel Handling Building	Borated water storage tanks.	Tanks are outdoors and are not exposed by fire hazards.

*NOTE: Negligible fire load signifies less than 1,000 BTU/ft^2

(SJC1/2)