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September 29, 1986

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

Subject: Braidwood Station Unit 1
Fire Protection August 1986
Audit - Resolution of Issues
NRC Docket No. 50-456

Reference: September 22, 1986 A.D. Miosi letter to H.R. Denton

Dear Mr. Denton:

The purpose of this letter is to provide design data as agreed with members of your staff during the September 12, 1986 meeting and to provide further clarification of commitments made in the referenced letter.

Clarifications to our previous commitments have been modified and now read:

K-3 Sprinkler system around the hatchway at elevation 426' in the Auxiliary Building outside the Laundry room was not considered adequate. Also hatchway does not have a draft curtain.

CECo Response - CECo will use one of several options for this hatchway. The options are: (1) New sprinklers will be added at the hatchway opening prior to exceeding 5% power and draft stops will be added to the hatchway no later than 6 months after Fuel Load. (2) The hatchway will be covered by steel plates that are caulked into place prior to exceeding 5% power. Compensatory measures will be taken if it becomes necessary to remove the steel plates.

K-22 The NRC questioned the adequacy of our sprinkler systems in various areas of the Aux. and Turbine Buildings due to physical obstructions.

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CECo Response - M&M will review one half of the obstructed sprinkler heads in the Auxiliary Building and provide additional justification for these sprinklers by 9-22-86. (This is now complete). Added justification for the second half of the obstructed sprinklers will be sent to the NRC by 9-30-86. A schedule for any necessary changes to sprinklers will be established subsequent to NRC disposition of our technical justifications. Further evaluation of Turbine building sprinkler obstructions and any modifications deemed necessary be Commonwealth Edison will be made prior to the first refueling outage for Braidwood Unit 1.

During our meeting with the NRC on September 12, 1986, CECo committed to provide data to the NRC concerning the duct smoke detectors installed to detect fires in the Main Control Panels on Braidwood Unit #1. In keeping with that commitment we are providing the following information (attached):

1. Interior volume of Unit #1 Control Panels. (Attachment #1)

2. Control Panel Duct Smoke Detector Design Data. (Attachment #2)

3. Drawings showing the construction details with dimensions of panels 1PM01J through 1PM06J.

4. Smoke detector location drawings M-832 sheets 27 through 30.

5. HVAC physical installation drawings M-1326 sheets 1, 2, 4 and 6.

6. Auxiliary building control room ventilation plan drawings, M-1323 sheets 2, 3, 4 and 5.

7. Elect Installation Equipment Location, Auxiliary building Main Control Room plan. Drawing #20E-0-3372B. Unit #1 main control panels are highlighted.

8. HVAC/C & I Diagram for the Control Room Vent system. M-2096 sheet 11.

9. Smoke Detector Mounting details. S&L drawing M-1261 sheet 30 and Johnson Controls drawing CMD-16.

10. Annunciator Window Engraving Schematics. Drawing #20E-0-4030AN002 and 6/20E-0-4030AN0022.

11. Pyrotronics operation, installation and maintenance manual for the model CA-4 duct detector. Also Pyrotronics specifications are included.

12. Diagram of Control Room HVAC System. M-96 sheet 3.

We have provided all of the above technical data to Jan Stevens as backup to our position concerning the adequacy of our duct detector installation. Following is a technical discussion of our installation:

A. Duct Smoke Detectors

Pyrotronics model CA-4 duct detectors are used in the exhaust ducts of the main control room panels. Each main control room panel has at least one duct detector to detect smoke from the panel (1PM05J has 3 detectors - see Reference #8 above). The CA-4 duct detector is rated to operate in a range of airflow from 500 fpm to 3100 fpm. Based on data shown in reference #2 above the air flows seen by the duct detectors in our installation fall within the rated range of the detectors.

The vendor's recommendation for mounting states that: "The detector should, when possible, be located a minimum of two duct widths downstream from the source of turbulence." Each duct detector for our panels is mounted in the ductwork above the ceiling of the control room. The duct detectors are mounted in a horizontal section of duct work downstream of a T-shaped section in the ductwork which is a source of turbulence. The duct detectors are located in a range of 12 inches to 54 inches from the T in the ductwork. Four of the eight detectors do not meet the 2 duct width recommendation. Those 4 duct detector locations are as follows:

Duct Selector #	Panel #	Duct Selector Distance from Duct "T"
OXY-VC065P	1PM04J	12"
OXY-VC065W	1PM02J	14"
OXY-VC065V	1PM06J	19"
OXY-VC065N	1PM03J	28"

The duct widths at the locations where these 4 duct detectors are installed are 18" except for the duct where OXY-VC065V is located which is 20". The vendor's recommendation would have these detectors located either 36" or 40" from the point of turbulence at the duct "T" where possible. The ductwork configuration downstream of the smoke detectors is such that it would not be feasible to move the detectors without encountering conflicts with additional duct bends. The vendor makes no determination in his manuals that the duct detectors will not function properly if shorter separation

distances are utilized and therefore we believe that our installation at Braidwood fully meets the vendor's recommendations. Each of the duct detectors alarm at a common alarm on panel OPM02J and at specific panel alarms on local control panel OVC01JC. (See Reference 10 above).

B. Ventilation System

The main control room panels are cooled by the control room ventilation system (VC). (Reference #12 above) Conditioned air flow is supplied directly to the control room. Each main control room panel is louvered in the front as can be seen from the drawings (Reference #3 above). The louvered openings provide the intake for the air into the panels. The air is exhausted from the top of the panels via a 12 inch round duct thus providing ventilation as well as cooling for the panels. Each panel has at least one 12" exhaust duct except for panel 1PM05J which has 3 ducts and 1PM06J which has 2 exhaust ducts. The backs of the panels are to be kept closed thereby avoiding the possibility of any air in-leakage to mix with the air flow through the panels.

Under balanced conditions the amount of air that will be exhausted through each panel is given in Attachment #2. Since the panels have no physical barriers separating the interiors of each panel the total pressure (velocity plus static pressure) inside each panel will be the same (this means that there is no pressure gradient between the panels). Hence, if a fire/smoke occurs in one panel, there would be detection by the respective detector by the Ventilation Principle. However, since the panel interiors are open to each other there is a slight chance that an additional alarm may be triggered for an adjacent panel. The physical separation of the exhaust ducts coming off the top of each panel also provides assurance that there will be only slight mixing of air flows. Therefore we can expect the proper alarm for a panel in the incipient stages of a fire.

The control room ventilation system is powered by an ESF bus which means that we should always have one train of the system operable to provide ventilation to the control room panels.

C. Conclusions

The design employed to monitor for main control room panel fires is conservative and will provide the function desired (i.e., smoke detection and alarm). By utilizing ionization type duct smoke detectors we are assuring that fires will be detected in its incipient stage before a major fire can develop. Given the nature of the combustibles in the panels, mainly IEEE-383 rated cable, an incipient fire will be quickly detected prior to the spread of fire to the surrounding cables. We believe that our design clearly meets the intent of the NRC guidelines to promptly detect fires within main control room panels.

Should you have any questions concerning this matter please contact this office.

One signed original of this letter and attachments are provided for your review.

Very truly yours,

Anthony Miosi

A. D. Miosi
Nuclear Licensing Administrator

/klj
cc: J. Stevens
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ATTACHMENT #1

BRAIDWOOD UNIT #1 CONTROL PANEL VOLUMES

Panel #	Volume (cu/ft)
1PM01J	590
1PM02J	304.5
1PM03J	183.4
1PM04J	317
1PM05JB-1	317
1PM05JB-2	528
1PM06JA-1	352
1PM06JA-2	352

(1078M/0123M)

ATTACHMENT #2

BRAIDWOOD UNIT #1 CONTROL PANEL

DUCT SMOKE DETECTORS DESIGN DATA

Duct Smoke Detector	Panel #	Design Flow (cfm)	Duct Size	Velocity (fpm)
0XY-VC065N	1PM03J	580	18X6	773
0XY-VC065P	1PM04J	580	18X6	773
0XY-VC065R	1PM05J	580	18X6	773
0XY-VC065S	1PM05J	580	18X6	773
0XY-VC065T	1PM05J	580	18X6	773
0XY-VC065V	1PM06J	1160	20X8	1044
0XY-VC065W	1PM02J	580	18X6	773
0XY-VC065X	1PM01J	580	18X6	773