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February 10, 1984

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

Docket Copies

Attention: Ms. E. G. Adensam, Chief
Docket Nos. 50-413 and 50-414

Dear Mr. Denton:

Ms. E. G. Adensam's letter of January 20, 1984 transmitted the Fire Protection Site Audit Summary for Catawba. Attached is a response to this Summary.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

ROS/php

Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
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Catawba Nuclear Station

Response to
NRC Fire Protection Site Audit Summary

Response to the subject document is as follows:

The following is a list of fire protection concerns raised during the audit.

1. The following features of the fire protection program were observed to be incomplete:

   - Replacement of cork seals with fire rated sealant at the seismic expansion joints in the control complex.

   - The installation of the fire rated "envelope" around the SSF-related cables in fire areas 2 and 3 (Auxiliary Building, Elevation 543 feet).

   - The replacement of the listed fire door and frame at the train "B" disconnect enclosure in the train "A" penetration room.

   - The replacement of the double fire doors in the train "A" penetration room.

   - The emergency lighting in the train "A" penetration room.

   - The installation of fire rated sealant at wall and floor/ceiling assemblies throughout the station.

   - The installation of smoke detectors throughout the station.

   - The installation of the sprinkler systems in the following areas:

     Annulus
     Pipe Corridor
     Reactor Coolant Pumps
     Fire Areas 2 and 3 (Auxiliary Building, Elevation 543 feet)
     Fire Area 18 (Component Cooling Pump Area)
     Fire Area 11 (Auxiliary Building General Area)

   - The installation of fire door hardware throughout the plant (i.e., self-closers, latches).

   - Access panels for fire dampers in HVAC ducts.

   - The installation of the fire door between the Unit 1 and Unit 2 battery room.

- The protection of unprotected steel beams in stairway enclosures in the control complex.

- The installation of hose, nozzles and enclosure cabinets for the SP outlets in the following areas:

  Fire Area 8 (Auxiliary Building, Elevation 560 feet)
  Fire Area 1 (Auxiliary Building, Elevation 522 feet)

- The supervision of OS & Y and PIV-type control valves for fire protection water supply piping.

- The provision of required fire fighting equipment at hose houses.

- The radio communication repeater.

The applicant should verify that the fire protection program will be completed by fuel load.

Response: The features listed above will be complete and in place prior to fuel load.

2. We observed that unprotected steel exists in fire rated walls in the plant. We are concerned that this steel will allow heat from a fire to be transmitted through the fire wall and damage safety related systems on the other side. To conform with Section C.5.a of BTP CMEB 9.5-1, unprotected steel which is framed into fire rated walls and floor/ceiling assemblies should be protected with material having a fire resistance rating equal to that of barrier.

Response: A Study (The Bletzaker Report) has been submitted under separate cover which determined that unprotected steel embedded in masonry block walls which meet specific criteria (as stated in the report) does not degrade the fire resistive rating of wall assemblies. Where embedded steel does not meet the acceptance criteria defined by the study, a fire insulating material will be applied in a configuration proven to be acceptable by fire tests which were conducted as a part of the study.

We also observed that unprotected cable trays and seismic supports pass through fire rated walls and floor/ceiling assemblies. The openings in these fire barriers are sealed. We are concerned that in a fire, the cable trays and supports would collapse and pull our the sealant material. The integrity of the fire barrier would then be compromised. The applicant should protect and/or support the cable trays so that potential collapse during a fire will not cause the failure of the penetration seal. To conform to Section C.5.a of BTP CMEB 9.5-1, the applicant should also protect the seismic supports so that they will not collapse during a fire.

Response: Cable trays will be supported at floor slabs and within two feet of either side of fire barrier walls. Seismic cable tray supports penetrate fire barrier walls only at cable shafts between Column (DD-EE) - (54-60) (includes Unit 2). Automatic sprinkler systems will be installed in the cable shafts and in corridors on Elevation 574 feet and 554 feet adjacent to the shafts.

3. In the July 1983 revision to the response to Section D.1 of Appendix A to Branch Technical Position APCSB 9.5-1, the applicant committed to seal fire penetrations with material having a fire resistance rating comparable to the ratings of fire walls and floor/ceiling assemblies. This necessitates that sealant material be installed to an appropriate depth consistent with its UL listing. We observed that sealant material was installed in the plant in thicknesses greater than the depth of the concrete floor slab. This configuration does not appear to be consistent with the listing of the material. We are concerned that with the sealant material in this configuration the fire rating of the penetration seals, as installed in the plant, are not equivalent to the rating of the structural assembly.

Response: Mechanical penetrations in masonry block fire resistive walls are the only examples of fire barrier penetration seals which extend beyond the surface of the structural assembly. Masonry block walls are nominal eight inches thick. Mechanical penetration seals utilize ten inches of foam sealant material. In order to adequately protect these penetrations, sealant material is overlapped a minimum of two inches around the opening.

Fire barrier penetration seal tests, submitted for review under separate cover, were tested to IEEE 383 acceptance criteria by the standard ASTM E119 test method. The test results met ASTM E119 acceptance criteria except for a zone around the penetrating member (calbe or tray). The zone has a radius of one inch extending up to six inches along the penetrating member. There are no ordinary combustible materials or sensitive electronic equipment in this zone which would be affected by heat transfer.

4. In the July 1983 revision to the response to Appendix A to BTP APCSB 9.5-1, the applicant committed to provide portable fire extinguishers in accordance with NFPA Standard No. 10. We observed that only gaseous-type portable fire extinguishers are contemplated in the main portion of the plant. These extinguishers would not be effective on certain types of Class "A" combustible fires, necessitating the use of the standpipe (SP) system. We are concerned that reliance on the SP system in areas such as the control room and switchgear rooms would have adverse safety consequences. To meet this guideline, the applicant should provide a number of water and/or dry chemical type portable fire extinguishers in these areas in accordance with NFPA 10.

Response: Two and one half gallon water filled portable fire extinguishers will be provided in the control room as well as train "A" and "B". Essential switchgear rooms (Elevations 577 feet and 560 feet).

5. We observed that redundant divisions were separated by less than 20 feet without compensating fire protection. To conform with Section C.7.a of BTP CMEB 9.5-1, redundant shutdown-related systems within the annulus should be protected by one of the following methods:

   - Separated by more than 20 feet without intervening combustibles; or
   - Separated by a noncombustible radiant energy shielf; or
   - By a one hour fire rated barrier; or
   - By the installation of complete, area-wide automatic fire suppression and detection systems.

Response: Cables will be rerouted as appropriate in the annulus to maintain at least 20 feet separation. Electric power and control cables do not have exposed plastic insulation and there are no other in-situ combustibles in the annulus.

6. To comply with Section C.6.c of BPT CMEB 9.5-1, interior manual hose stations should be installed so as to be able to reach any location that contains, or could present a fire exposure hazard to safety related equipment with at least one effective hose stream. We observed that because of the present location of manual hose stations, it is not possible to reach all areas of the annulus and the pipe tunnel in Fire Area 1. To meet this guideline, the licensee should either redesign the standpipe system or provide a complete fixed fire suppression system in accordance with our guidelines.

Response: A fixed fire suppression system will be installed in the annulus utilizing three elevations of sprinkler branch lines, on a manually actuated light hazard system, designed for the most hydraulically remote five heads operating, using 212°F rated heads with 5 inch water shields. A minimum of 500 GPM will be reserved for hose streams. Line type heat detection will be installed parallel to sprinkler branch lines in lieu of spot type detectors for the annulus.

In order to provide protection to the pipe tunnel adjacent to Fire Area 1 (Elevation 522 feet), additional 1 1/2 inch hose will be stored in the fire brigade locker. Hydraulic calculations verify that water supply is adequate to utilize 1 1/2 inch hose supplied from standpipe connections in Fire Area 1. The Station Prefire Plan will include appropriate instructions.

We are also concerned that if a significant fire occurred within the diesel generator rooms, the fire brigade will not be able to use the hose stations which are located in the room itself. To meet our guidelines, prefire strategies should be developed for fire attack from an outside hose house.

Response: The Station Pre-Fire Plan will include instructions for providing fire hose for manual fire fighting from the interior fire protection system as follows:

The fire hose cabinet at Column BB, 45-46 in the Electrical Switchgear will be used for water supply. Utilizing 175 feet of 1 1/2 hose, the hose can be laid through Diesel Sequencer Corridors to within thirty feet of any area in either Diesel Generator Room. This is the optimum plan of attack since the fire brigade would be approaching the scene through the Auxiliary Building. If necessary, an outside fire hydrant could be used by laying 100 feet of 2 1/2 inch hose to supply 2-1 1/2 inch hoses.

Hydraulic calculations confirm that the water supply is adequate for either usage.

The existing hose station in Diesel Generator Rooms will not be included in station pre-fire plans, fire protection inspections or Quality Assurance Program.

7. To conform with Section C.6.b of BTP CMEB 9.5-1, the fire pumps and related cables should be protected so that one fire pump will remain undamaged and functional after a fire. We observed that all three fire pumps could be rendered inoperable if a fire occurred at the intake structure. To meet this guideline, the applicant should protect the pumps and cables so that at least one will remain undamaged after a fire.

Response: A one hour fire rated "wrap" will be installed on the conduit containing cables for Pump B from the location where the cables penetrate the intake structure beneath Pump B to the east side of the intake structure. The fire rated block wall between Pumps A and B will be extended westward to the edge of the trench drain and south approximately 5 feet to effect an "L" shaped configuration.

8. We observed that conduit seals do not conform to Section C.5.a (2) of BTP CMEB 9.5-1 because conduits which penetrate fire barriers are not internally sealed at the barrier. To meet this guideline, the applicant should verify that these unprotected conduit penetrations do not exist in walls which separate redundant shutdown divisions or provide compensating fire protection.

Response: The specification for installing cable penetration firestops requires that conduits which penetrate fire barriers be sealed. Conduit ends which are not terminated to boxes, devices or by cable sealing connectors will have a firestop seal. These seals will consist of cerafiber bulk or RTV foam installed at the end of the conduit.

9. We observed that HVAC ducts have a cross sectional area of less than 20 square inches, which penetrate fire barriers, are not provided with fire dampers. This does not conform with Section C.5.a of BTP CMEB 9.5-1. We are concerned that the absence of fire dampers in these ducts will permit fire propagation through the barrier and cause damage to redundant shutdown divisions.

Response: There are no unprotected openings in fire boundaries separating redundant equipment necessary for safe shutdown. The only examples of this arrangement are 12 gauge stainless steel, welded pipes which are located as follows:

1. 4" Ø Pipe Penetrating Brick Wall @ El. 607+1 CN-1522-03.40-00
2. 4" Ø Duct Penetrating Block Wall @ El. 607+2, 51, NN,PP CN-1522-06.40-00
3. 4" Ø Duke Penetrating Floor @ El. 631+6, PP-NN, 50-51 CN-1522.06.42-00
4. 4 Ø Duct Penetrating Blcok Wall @ El. 607+4, 63, PP-NN CN-2522-06.40-00
5. 4" Ø Duct Penetrating Floor @ El. 631+6 63,64, PP-NN CN-1522-06.42-00
6. 8" Ø Duct Penetrating Wall @ El. 573+4 54-55, MM-NN CN-1522-01.45-01
7. 8" Ø Duct Penetrating Wall @ El. 564+9 54-55, MM CN-1522-01.45-01
8. 6" Ø Duct Penetrating Wall @ El. 572+3 54, LL-MM CN-1522-01.45-01
9. 2 1/2" Ø Duct Penetrating Wall @ El. 564+9 54,LL-MM CN-1522-01.45-01
10. 2 1/2" Ø Duct Penetrating Wall @ El. 564+9 54, LL-MM CN-1522-01.45-0;
11. 2 1/2" Ø Duct Penetrating Wall @ El. 564+9 54, KK-LL CN-1522-01.45-01
12. 2 1/2" Ø Duct Penetrating Wall @ El. 560+6 54-55, LL-MM CN-1522-01.45-01
13. 2 1/2" Ø Duct Penetrating Wall @ El. 560+6 54-55, LL-MM CN-1522-01.45-01
14. 2 1/2" Ø Duct Penetrating Wall @ El. 560+0 54-55, LL-MM CN-1522-01.45-01
15. 6" Ø Duct Penetrating Wall @ El. 569+11 54-55, JJ-KK CN-1522-01.45-01
16. 6" Ø Duct Penetrating Wall @ El. 569+6 55-56, JJ-KK CN-1522-01.45-01
17. 8" Ø Duct Penetrating Wall @ El. 564+9 59-60, MM CN-1522-01.46-01
18. 6" Ø Duct Penetrating Wall @ El. 572+3 60-61, LL-MM CN-1522-01.46-01

19. 2 1/2" Ø Duct Penetrating Wall @ El. 564+9 59-60, LL-MM CN-1522-01.46-01

20. 2 1/2" Ø Duct Penetrating Wall @ El. 564+9 59-60, LL-MM CN-1522-01.46-01

21. 2 1/2" Ø Duct Penetrating Wall @ El. 596+6 59-60, KK-LL CN-1522-01.46-01

22. 2 1/2" Ø Duct Penetrating Wall @ El. 569+6 59-60, KK-LL CN-1522-01.46-01

23. 6" Ø Duct Penetrating Wall @ El. 569+6 59-60, JJ-KK CN-1522-01.46-01

24. 6" Ø Duct Penetrating Wall @ El. 569+6 58-59, JJ-KK CN-1522-01.46-01

25. 2 1/2" Ø Duct Penetrating Wall @ El. 564+9 60, LL-MM CN-1522-01.46-01

26. 2 1/2" Ø Duct Penetrating Wall @ El. 564+9 60, LL-MM CN-1522-01.46-01

27. 2 1/2" Ø Duct Penetrating Wall @ El. 564+9 60, KK-LL CN-1522-01.46-01

28. 6" Ø Duct Pentrating Wall @ El. 572+3 61-62, LL-MM CN-1522-01.46-01

29. 2 1/2" Ø Duct Penetrating Wall @ El. 571+0 62, MM-NN CN-1522-01.46-01

30. 2 1/2" Ø Duct Penetrating Wall @ El. 571+0 62, JJ-KK CN-1522-01.46-01

31. 2 1/2" Ø Duct Penetrating Wall @ El. 571+0 62-63, JJ-KK CN-1522-01.46-01

10. We observed that the dike wall around the diesel fuel oil day tank did not conform with Section C.5.d (4) of BTP CMEB 9.5-1 because it would not confine oil leaking under pressure from pipe flanges. To meet this guideline, the licensee should implement an effective method to confine the oil.

Response: Supply to the fuel oil day tank from the storage tank is accomplished by opening and closing a solenoid valve on day tank level. Without postulating failures in the supply system, the connections above the dike wall are either under low pressure (less than 1 psi for the manway) or are above the operating level of the tank and do not constitute a spray hazard. If, however, a failure occurred in the supply system, level would rise into the day tank vent until hydrostatic equilibrium is reached with the fuel oil storage tanks. Under this condition, pressure on the connections above the dike wall would be great enough to cause some spray if a flange leaked. Failure of the supply system is considered remote since the solenoid valve is fail-closed on loss of electrical power, and redundant level switches are used to operate the solenoid valve. In addition, high level in the day tank is alarmed in the control room which would allow an operator to respond to a faulted condition.

11. We observed that because of conditions in Elevation 543 feet of the Auxiliary Building (Fire Areas 2 and 3) it may not be possible to utilize existing manual hose stations because of the inability to fully deploy the woven-jacketed fire hose. In such areas, to comply with Section C.6.c of BTP CMEB 9.5-1, it will be necessary to replace the woven-jacketd hose with a hard rubber type.

Response: The fire hose cabinet will be replaced with a continuous flow hose reel and hard rubber hose. Although not UL listed or FM approved, the hose and reel are considered appropriate for this application.

12. The applicant committed to comply with the "intent" of NFPA Standard No. 72D in the design of fire protection systems. Sufficent information was not available during our audit to verify that the design of these systems complies with the guidelines in BTP CMEB 9.5-1. Our principal concern is with the supervision of alarm annunciation circuits to the control room, and the normal and alternate power supplies to the systems.

Response: All fire detection instruments annunciating through the CPU are equipped with Class A supervised circuits. This includes all circuits connecting individual detectors to data gathering panels as well as those circuits which connect the data gathering panels to the CPU.

Fire detection instrument circuits associated with automatic fire suppression (carbon dioxide) are also Class A supervised.

Individual data gathering panels of the fire detection system are equipped with standby batteries. The primary and secondary power cables to the CPU are not routed in the same conduit.

Sprinkler system waterflow signalling and valve position signalling circuits are not electrically supervised. These circuits will be tested from the initiating devices on a monthly (waterflow) or 6 month (valve position) basis. The position of each valve is also verified by individual valve inspection on a monthly basis.

Fire detection instruments have been provided in all sprinklered areas. Therefore, an assured means of control room annunciation exists in the sprinklered areas in the event of fire even if the waterflow signals fail to transmit properly.

13. We observed that the installation of fire detectors does not conform to Section C.6.a of BTP CMEB 9.5-1 because fire detectors have not been installed in the following areas which contain safety related equipment.

    a. Room 203, Waste Gas Decay Tank Area
    b. Room 2-6A, Waste Gas Hydrogen Recombiner B

c. Room 206B, Waste Gas Compressor Package B
d. Room 207, Waste Gas Compressor Package A
e. Room 210A, Recycle Evaporator Feed Pump A and B
f. Room 211, Recycle Evaporator Package
g. Room 215A, Waste Drain Tank Pumps
h. Room 215B, Waste Evaporator Feed Tank Pumps
i. Room 216, Waste Evaporator Package
j. Room 301, Boric Acid Transfer Pumps, Unit 2
k. Room 302, Boroc Acid Transfer Pumps, Unit 1
l. Room 331, Seal Water Heat Exchanger, Unit 1
m. Room 300, Hatchway Area
n. Room 300, Hatchway Area Near Room 331
o. Room 510, Counting Room
p. Room 561, Corridor/Hatch Area
q. Room 571, Corridor
r. Room 580, N_2 Accum. Tank Blowoff, Unit 2
s. Room 590, N_2 Accum. Tank Blowoff, Unit 1
t. Room 750, Purge Supply Room, Unit 1
u. Room 751, Purge Supply Room, Unit 2
v. Room 801, Fuel Pool Purge Unit, Unit 1
w. Room 802, Fuel Pool Purge Unit, Unit 2

Response: Additional detectors will be provided as follows:

Room 300 (Hatchway Area)
Hatchway Area Near 331
Room 510
Room 561
Room 571
Room 580
Room 590
Room 801
Room 802

The following rooms are not safety related and will not be provided with fire detection.

Room 210A
Room 221
Room 215A
Room 215B
Room 216
Room 750
Room 751

The following rooms are not accessible during power operation; Rooms 204, 206A, 206B, 207, 301, 302 and 331. Detectors will be installed in return air ducts. These detectors will be located such that each detector will be in a duct which returns air from more than one of the subject rooms. Detectors will be located as follows: Elevation 555+10, Column (60-61) - (MM-NN); Elevation 556+8, Column (53-54) - (FF-GG) and Elevation 573+10, Column (59-60) - (MM-NN). Station operations instructions will provide directions for investigating alarms from these detectors. A total of three detectors are required.