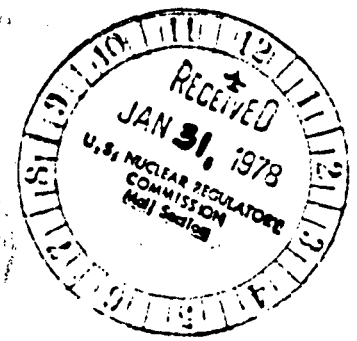
DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

January 25, 1978

TELEPHONE: AREA 704
373-4083



Mr. Edson G. Case, Acting Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. A. Schwencer, Chief
Operating Reactors Branch #1

Reference: Oconee Nuclear Station
Docket No. 50-269

Dear Sir:

During the week of October 3, 1977, representatives from the Nuclear Regulatory Commission visited Oconee Nuclear Station for the purpose of observing station features pertinent to fire protection. Staff requests for additional information on the Oconee fire protection program were provided during that visit and subsequently transmitted by Mr. A. Schwencer's letter of November 10, 1977. An initial response to these requests was provided by my letter of November 22, 1977. On December 15, 1977, further requests for additional information were received with regard to fire protection and initially responded to on January 16, 1978. Questions were also received from the staff on January 16, 1978. The purpose of this letter is to supplement the information provided on November 22, 1977 and January 16, 1978 and to respond to the request received on January 16, 1978.

The attached refers to and is based in part on a proposed Safe Shutdown System for Oconee. This system was discussed with the staff on January 18, 1978 and information concerning the system will be formally transmitted on February 1, 1978.

Very truly yours,

William O Parker Jr

William O. Parker, Jr.

DCH:ge
Attachment

Requests 2, 3, and Position 4 for additional information concerning systems, equipment, and cable routing for safe shutdown were provided in part on January 18, 1978, when Duke Power Company made a presentation to the NRC outlining a concept for a safe shutdown facility.

This safe shutdown facility provides a means to safely shutdown the plant independent and diverse from existing plant equipment which could be affected by a postulated fire.

To complete this response, a system description for the facility will be provided by February 1, 1978, and the additional information on Reactor Building cable routing as requested in Item 3 is enclosed in this submittal.

The application of a fire retardant coating on redundant cable will be deleted from the December 31, 1976, Response to Branch Technical Position 9.5-1 due to the separate safe shutdown facility.

3. Instrumentation and control cables located in the Reactor Building that are associated with hot shutdown are listed on attached Figure 012478. The physical routing of these cables is shown on attached Drawings 0-875,0-884,0-885,0-886, 0-886A,0-886B and 0-887. The drawings employ a color coding scheme identified in Figure 012478 for the identification of the cables.

A review of the cable routing on the drawings shows that all hot shutdown system instrumentation and control cables associated with Reactor Loop A and pressurizer level terminate on penetrations on the East side of the building, and those cables associated with Loop B terminate on penetrations on the West side of the building (see 0-875 and 0-886).

The minimum instrumentation and control cables required for hot shutdown that are located in the Reactor Building are as follows:

1. One cable from Reactor Coolant Temperature Loop A or B.
2. One cable from Reactor Coolant Pressure A or B.
3. One cable from Pressurizer Level.
4. One cable from Steam Generator A Level.
5. One cable from Steam Generator B Level.

In addition to the instrumentation and control cables described above, power cables to one group (126 KW) of pressurizer heaters are required for hot shutdown. Drawings 0-875 and 0-885 are marked to show the routing of all the pressurizer heater cables with the Reactor Building and these cables all terminate on penetrations on the East side of the Reactor Building.

5. The attached drawings are marked to show the HVAC penetrations.

The penetrations are coded to denote those which are provided with dampers and those proposed for upgrading.

Fire doors have labels or are being replaced with doors provided with labels except for the East Penetration Room Doors and an Instrument Room Door in the Turbine Building.

The Penetration Room doors are blast doors and considered adequate. The Instrument Room contains negligible combustibles and no contact with unit shutdown; therefore, no fire door should be required.

6. Attached is the analysis of the Radiological Consequences of Fires in Radwaste Areas.

Fire protection is provided by local hose stations.

Room Number	Component	Source	Approximate Dose Rate To Firefighters
51	RC Bleed Evaporation Feed Pump	Liquid from RC Bleed Evaporation Feed Tank (400 ft^3 Tank Vol). Dose rate in room would be predominately from evaporator bottoms stored in the evaporator.	50-200 mr/hr
	Spent Resin Sluice Pumps Spent Resin Transfer Pumps	Resin/Sluice water. Dose rate due mostly to source in the pumps	10-150 mr/hr
	Miscellaneous Waste Pumps	Miscellaneous Liquid Radwaste. Dose rate due mostly to source in the pumps.	10-50 mr/hr
106, 124, 166	Concentrated Boric Acid Transfer Pumps	Low activity liquid - concentrated boric acid. Dose rate due entirely from concentrated boric acid storage tanks (3000 ft^3 Tank Vol).	5-40 mr/hr
122	Miscellaneous Waste Evaporation Feed Pump	Liquid from Miscellaneous Waste Evaporation Feed Tank (400 ft^3 Tank Vol). Dose rate in room would be predominately from evaporator bottoms stored in the evaporator.	50-200 mr/hr
304	Low Level Drumming Storage Area	Low activity solids - rags, clothing, etc.	2-20 mr/hr

10. The analysis of the information concerning regular and emergency lighting to areas providing access to a fire in safety-related areas provided November 22, 1976, demonstrates that a fire in a safety-related area of the plant will not cause the loss of lighting to areas providing access to the fire.

11. As illustrated in attached Figure 021578, the Reactor Coolant Pump Motor Drain and Overflow System will be modified to include housings and leak collection provisions around the upper and lower bearing oil level devices and the upper bearing oil cooler.

With this modification, all potential oil leaks of motor bearing oil will be collected and drained to the collector tank in the Reactor Coolant Pump Motor Drain and Overflow System.

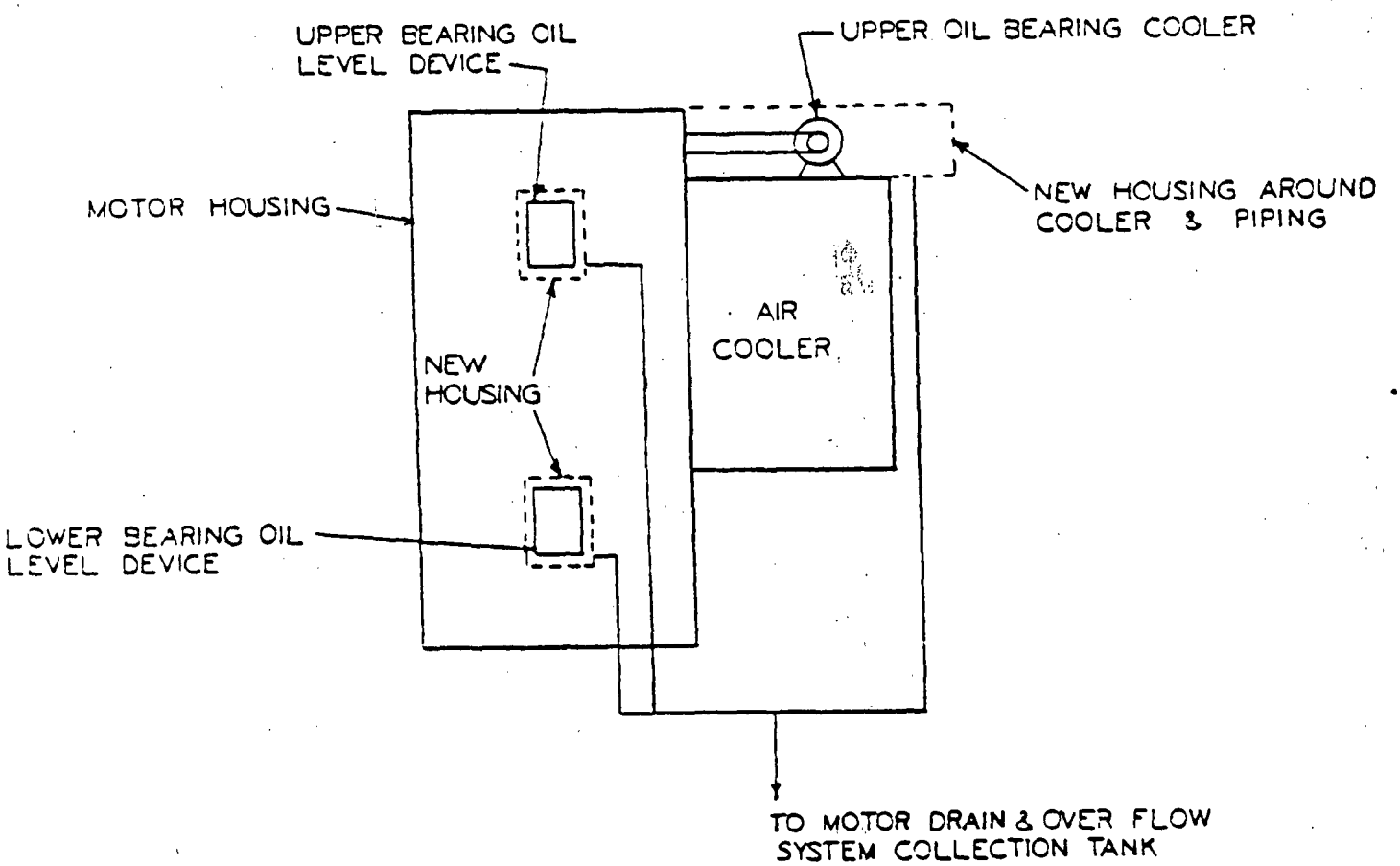


FIGURE 012578

13. The Data/Sheet for Standard Armstrong Armaflex Sheet Insulation is attached.

Standard Armaflex® Sheet Insulation

DESCRIPTION

Standard Armaflex Sheet Insulation is a flexible, elastomeric thermal insulation, black in color, supplied as flat sheets 36" x 48", in thicknesses ⅛" through 1" in ⅛" increments (except ⅞"). It is furnished with a smooth skin one side which forms the outer, exposed insulation surface. The expanded, closed-cell structure of Armaflex Sheet makes it an efficient insulation, and because of its low water vapor permeance, it is considered to be a vapor barrier in itself.

Standard Armaflex Insulations have been evaluated for typical flame-spread classification by ASTM E84 (NFPA 255) Method of Test for "Surface Burning Characteristics of Building Materials." Average maximum specific optical smoke density has been measured by National Bureau of Standards (NBS) Smoke Chamber Method.

These numerical flame-spread ratings alone do not define the hazards presented by this material under actual fire conditions. These numerical flame-spread ratings are intended only to provide guidelines for regulatory authorities.

Thickness	Typical Flame-Spread Classification	Test Method
½" or less	50 or less	ASTM E84
1" or less	75 or less	ASTM E84

Thickness	Avg.* Max. Specific Optical Smoke Density D_s (corr.)	Test Method
½" or less	330	NBS Smoke Chamber
1" or less	400	NBS Smoke Chamber

*Average of smoldering and flaming modes

USES

Standard Armaflex Sheet is used for all applications that cannot be accomplished by the preformed tubular insulation also available. It is particularly adaptable for insulating ductwork, large piping, tanks, and vessels. Its flexibility allows application to curved and irregular surfaces. Armaflex Sheet is very adaptable to making all types of fitting cover insulations.

The recommended temperature usage range for Armaflex Sheet is −40 F to +220 F according to method of application. With full adhesive coverage attachment, the surface to which it is applied may operate to a limit of 180 F. When used for pipe insulation with adhesive adhering seams and joints only, Armaflex Sheet can be applied to lines that will operate to a limit of 220 F.

For use on cold surfaces, Armaflex Sheet thicknesses have been calculated to prevent condensation on the insulation surface, as shown in the table of thickness recommendations.

APPLICATION

Standard Armaflex Sheet is installed using Armstrong 520 Adhesive, a heat-resistant and water-vapor-resistant contact adhesive. For application to large flat or curved metal surfaces such as ducts, very large pipes, tanks, and vessels, full adhesive coverage attachment is used. For application as pipe insulation and fitting covers, only the seams and joints are adhered with adhesive. 520 Adhesive is a contact adhesive; therefore, in all cases, both surfaces to be joined are coated with adhesive.

Indoors, no protective finish is required but may be desirable. Outdoors, a weather-resistant protective finish is to be applied. The recommended protective finish is Armstrong Armaflex Finish; however, other compatible finish systems are not ruled out.

SPECIFICATION COMPLIANCE

Standard Armaflex Sheet can be supplied upon request to meet:

ASTM C534, Type II
ASTM D1056 SBE 41-42
MIL-C-3133B (MIL STD 670B), Grade SBE 3
HH-I-573B, Class S

The Plant Facilities and Equipment Staff of USDA APHIS has no objection to the use of Standard Armaflex Insulations in processing, transporting, or storage areas for meat and poultry prepared under Federal inspection, provided the insulation is covered or coated with an acceptable material. The jacket or coating material used should provide a surface that is smooth, impervious, and cleanable and be approved by USDA APHIS.

Armstrong

Industry Products Division, Lancaster, Pa. 17604

Standard Armaflex Sheet Insulation

Average physical properties*

		Test Method (See note 3)
Density, lb/cu ft	5.7	ASTM D1622
Thermal conductivity Btu/hr sq ft (F deg/in.)		
75 F mean temp	0.27	ASTM C177
90 F mean temp	0.276	or C518
Upper use limit, deg F (See note 1)	220	—
Lower use limit, deg F (See note 2)	−40	—
Thermal stability, % shrinkage		
7 days, 200 F	3	ASTM C548
7 days, 220 F	5	
Water vapor permeability, wet cup, perm-in.	0.1	ASTM C355
Water absorption, % by weight	8	ASTM D1056
Ozone resistance	GOOD	—
Odor	NEGLIGIBLE	—
Sizes		
Width and length, inches	36 x 48	—
Thickness, inches (See note 4)	⅛ to 1 (⅛ increments)	—

Notes

[1] When Armaflex Sheet is installed by adhering butt joints and seams only, the upper temperature limit is 220 F using 520 Adhesive. Armaflex Sheet adhered with complete adhesive coverage on flat or curved metal surfaces may be applied to surfaces that will operate as high as 180 F using 520 Adhesive.

[2] At −20 F, flexible Armaflex insulations become hard and, as temperatures drop below −20 F, will be increasingly brittle; however, this hardening characteristic does not affect thermal efficiency and resistance to water vapor permeability. Application below −40 F is at user's discretion.

[3] ASTM method, in some cases, may be modified slightly to make results more meaningful for end-use application. If details are required, contact Armstrong Cork Company.

[4] Armaflex Sheet in ⅜" thickness not available.

*Average values are not to be used for writing material specifications. Contact Armstrong for specification ranges.

Thickness recommendations

	Ducts—Tanks—Vessels—Equipment Metal-Surface Temperature		
	50 F	35 F	0 F
BASED ON NORMAL DESIGN CONDITIONS Armaflex in the thicknesses noted and within the specified temperature ranges will control insulation surface sweating indoors under normal design conditions, a maximum severity of 85 F and 70% RH. Armstrong research and field experience indicate that indoor conditions anywhere in the United States seldom exceed this degree of severity.	⅜"	½"	1"
BASED ON MILD DESIGN CONDITIONS Armaflex in the thicknesses noted and within the specified temperature ranges will control insulation surface sweating indoors under mild design conditions, a maximum severity of 80 F and 50% RH. Typical of these conditions are most air-conditioned spaces and arid climates.	⅛"	⅛"	½"
BASED ON SEVERE DESIGN CONDITIONS Armaflex in the thicknesses noted and within the specified temperature ranges will control insulation surface sweating indoors under severe design conditions, a maximum severity of 90 F and 80% RH. Typical of these conditions are indoor areas in which excessive moisture is introduced or in poorly ventilated confined areas where the temperature may be depressed below ambient.	½"	1¼"†	1⅞"†

† multiple layer

OFFICES

CHARLOTTE, NC 28217
P.O. Box 7089
Texland & Arrowood Boulevards
704/588-3770

CHICAGO, IL
422 Northwest Highway
Park Ridge, IL 60068
312/696-3130

CINCINNATI, OH 45241
4100 Executive Park Drive
513/563-4160

NEW YORK, NY
Park 80 Plaza West—One
Garden State Parkway at Interstate 80
Saddle Brook, NJ 07662
201/843-0300

ST. LOUIS, MO 63105
222 South Meramec Avenue
314/863-7979

SAN FRANCISCO, CA
3190 Clearview Way
San Mateo, CA 94402
415/574-4133

IA-796-277Y

Printed in United States of America

14. The oil-fired boiler conforms to NFPA 85, "Oil-and-Gas Fired Water Tube Furnaces - One Boiler, '73," except that:

a. Upon loss of control air, the Oconee boiler will drop to minimal flow and not create an unsafe condition.

b. The boiler will start the purge fan prior to proof of valve closure. The boiler is not auto-recycle; therefore, no unsafe condition should be created.

The Auxiliary Boiler meets the intent of NFPA 85.

15. There are no backflow devices provided in the Turbine Building drain system.

20. The Turbine Building roof deck was constructed in accordance with Koppers Company's Specification No 17:

.1 Strip mop steel deck with steep roof asphalt and apply 1-5/16" of Owens-Corning Fiberglas roof insulation, mop solid with coal-tar pitch and apply one 43 lb coated base sheet and mop solid with coal-tar pitch.

.2 Install 3 plies of 15 lb tarred felt, each ply lapped 24-2/3" with coal-tar pitch.

.3 Embed 400 lb gravel or 300 lb slag per square into not less than 75 lb per square of hot coal-tar pitch.

Therefore, construction is considered to be in accordance with FM Class 1, but installation documentation is not available.

24. The HPSW System provides water for fire protection. Flow diagrams and piping layout drawings are attached.

If water flow is lost to sections of the Turbine Building Basement, the Mezzanine and Operating Floor hose stations are also lost due to the vertical risers feeding them.

Automatic suppression systems are fed from the "B" line header as shown on the attached drawings.

Refer to Tables I and II for a synopsis.

TABLE I

Break Location	Isolation Required	Area of Loss of Fire Protection
1	HPSW-111 HPSW-33 HPSW-75	Turbine Building Auto Systems - Units 1 & 2 FWP Turbine and Turbine Oil Tank Mulsifier System; Unit 1 & 2 Seal Oil Tank Mulsifier System; Unit 1 Main Turb Oil Tank, turb bearing and oil piping Mulsifier System; Unit 1 Emergency F. W. Turb & Turb System and Sprinkler System to Trans CT 1, 1T, Main #1 and CT 4. Turbine Building Manual Systems - 33% of Unit 1 area hose racks. Loss of all fire protection in service building, shop and administration building.
2	2 HPSW-31 2 HPSW-33 2 HPSW-75	Turbine Building Auto Systems - Unit 2 Main Turb Oil Tank, Turb Bearing and Oil Piping Mulsifier System. Turbine Building Manual System - 20% of Unit 2 area hose racks.
3	HPSW-33 2 HPSW-31	Turbine Building Auto Systems - Unit 2 emergency FW turb and Turb Oil Tank Mulsifier System; Sprinkler System to Trans 2T, Unit 2 Main and CT 2; Basement and mezzanine area 3 sprinkler system. Turb Building Manual Systems - 17% of Unit 1 area hose racks.
4	HPSW-20 HPSW-11	Loss of Fire Protection Jockey Pumps Turbine Building Manual Systems - 50% of Unit 1 area hose racks; 80% of Unit 2 area hose racks; 78% of Unit 3 area hose racks.
5	HPSW-20 HPSW-21	Auxiliary Building Manual Systems - Loss of all auxiliary building area hose racks.
6	HPSW-103 2 HPSW-33	Turbine Building Auto Systems - Unit 3 Emergency FW Turb and Turb Oil Tank Mulsifier System; Unit 3 Main Turb Oil Tank, Turb Bearing and Oil Piping Mulsifier System, Unit 3 FWP Turb and Turb Oil Tank Mulsifier System; Sprinkler System to Trans. CT 3 3T and Mains 3A, 3B, 3C and 3D; Basement and mezzanine area 4 sprinkler system. Turbine Building Manual Systems - 12% of Unit 3 area hose racks.
7	HPSW-104	230 Hv and 500 Kv Switch Yard - Loss of all auto systems. Loss of Fire Hydrants - FH-12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 32 and 33.

Question 24

TABLE II

ISOLATION FOR MAINTENANCE OF FIRE HYDRANTS

Isolation Valves Closed	Hydrants Affected	Other Areas Affected
HPSW 79	FH-5, 4, 3, 2, 1	None
HPSW-77, HPSW-76, HPSW-81, & 2HPSW-80	FH 34 & 35	None
HPSW-78 & 223	FH-8, 9, 10, 11	None
HPSW-187	FH-24	None
HPSW-188	FH-23	Mulsifier System to Trans. CT-5
HPSW-27	FH-25	FH-24, FH-23 and Mulsifier System to Trans. CT-5
HPSW-21, 22 & 109	FH-29 & 22	None
HPSW-23 & 106	FH-28 & 27	CCW Pump Fire Protection and FH-26
HPSW-107	FH-26	CCW Pump Fire Protection
HPSW-104 & 106 HPSW-81 & 103 HPSW-223	FH-12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 30, 31, 32 & 33	230 and 500 Kv Switch Yard Auto Fire Protection

QUESTION 24

DEK/h
1/12/78

30. Reference the January 16, 1978, submittal. These radios will be made available to the fire brigade as necessary.

32. Refer to Response 5. Fire doors have labels except for the East Penetration Rooms which are equipped with blast doors.

Positions

1. Hose stations will be provided as shown on drawings submitted November 22, 1976, and will reach safety-related areas in the Auxiliary and Turbine Buildings with 100 ft hoses.

9. Detectors will be provided in areas described in previous submittals.

   Installation of smoke detectors in all locations containing safety-related equipment is considered unnecessary based on construction of the safe shutdown facility.

11. The Equipment Rooms contain redundant cables and doors are alarmed to the Control Room.

    The details for the safe shutdown facility doors will be provided at a later date.

12. Portable smoke purge fans with at least 3700 CFM capacity will be provided.

14. Twenty-five dual-circuit sound powered phone stations are located in the Reactor Building along with a separate sound powered phone circuit in the refueling area of the Reactor Building. In addition, telephone and public address system communication facilities are available inside the Reactor Building.

All the systems described above provide communication between the Reactor Building and areas of the Auxiliary Building including the Control Room.

Because of the high level of duplication of diverse communication systems within the Reactor Building, we do not feel the installation of fixed repeaters in the Reactor Building is warranted.

17. The schedule for the testing of cable penetration fire stops for Oconee is as follows:

1. Performance of tests - Week of February 13, 1978
2. Preliminary Report to be given orally to NRC Staff - Week of February 27, 1978
3. Submittal of Final Test Reports - April 1, 1978

WJF/kss

1/25/78

Additional Information Required For The Oconee 1, 2, and 3
Fire Protection Revision

Telecopied January 16, 1978

1.)
)
2.) Included in this submittal.
)
3.)

4. Provided at January 18, 1978, meeting.

5.)
)
6.)
) Included in this submittal.
7.)
)
8.)

9. Provided at January 18, 1978, meeting.

10. There will be 8 - 7.5 volt sealed beam lights and 9 - flashlights provided for the fire brigade.

11. Included in this response.

12. The fire hazard analysis did consider the affect of water spray on safety-related systems.

13. Hose racks, connected to the LPSW System, will be provided in the Reactor Buildings. Details for the systems will be provided as design is completed.