

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

TO: Mr. Edson G. Case	FROM: Duke Power Company Charlotte, North Carolina William O. Parker, Jr.	DATE OF DOCUMENT 1/16/78
		DATE RECEIVED 1/19/78
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DESCRIPTION

PLANT NAME: Oconee Units 1-2-3

DISTRIBUTION OF FIRE PROTECTION INFO PER  
S. SHEPPARD 9-22-76 FOR OPERATING REACTORS

RJL 1/19/78 (1-P)

*Dist per S. Sheppard 1/18/78*

ENCLOSURE

Response to NRC request for additional info. concerning the fire protection program.....w/att set of drawings...

*See top of files for dwgs*

(10-P)+(12-P)

**1 ENCL/REPRO 40 CYS W/LTRS**  
**1 SET DRWGS TO FILES - TO BE CHECKED OUT TO JAMES KNIGHT**

SAFETY		FOR ACTION/INFORMATION	
BRANCH CHIEF: (3)	<b>SCHWENGER</b>		
PROJECT MANAGER:			
<del>LIC. ASST:</del>			

INTERNAL DISTRIBUTION			
<b>REG FILE</b>	<b>W/DRWGS TO BE CHECKED OUT TO JAMES KNIGHT</b>		
<del>REG PER</del>			
I & E (2)			
CELD			
BENAROYA (2)			
EISENHUT			
BUTLER (5)			
WAMBACH			
R. MURAKA			
HANAUFER			
<b>JAMES KNIGHT</b>			

EXTERNAL DISTRIBUTION			CONTROL NUMBER
LEDR: <b>WALHALLA SQ.</b>			790190184
TIC:			
NSIC:			
ACRS 16 CYS <del>HOLDING/SENT</del> <b>COT B</b>			

DUKE POWER COMPANY

POWER BUILDING

422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.  
VICE PRESIDENT  
STEAM PRODUCTION

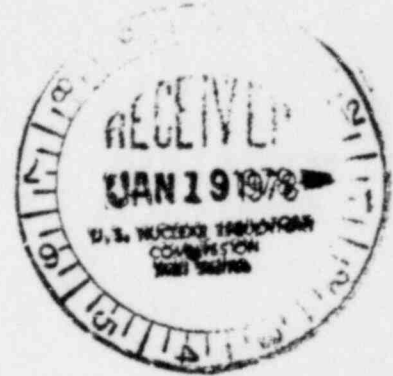
January 16, 1978

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 Nos. 50-269, -270, -287



Dear Sir:

In response to requests for additional information concerning the fire protection program transmitted at Oconee Nuclear Station by your letter of December 15, 1977, the attached information is provided.

Very truly yours,

*William O Parker Jr*  
William O. Parker, Jr.

LJB:ge  
Attachment

780190184

RESPONSE TO  
REQUESTS FOR ADDITIONAL INFORMATION  
OCONEE UNITS 1, 2, AND 3  
FIRE PROTECTION

Question 15

Identify any provisions in turbine building drains, such as backflow prevention devices or drains entering below sump level, that prevent a fire from being transmitted from one area to the next. Provide drawings showing piping and valving on the drain systems serving safety-related areas.

Response

This information will be provided by January 25, 1978.

Question 16

Describe whether any of the ventilation systems located at elevation 838 feet of the Auxiliary Building are required for safe shutdown functions, such as required room cooling for continued equipment operation.

Response

Ventilation systems located on elevation 838 are not required for unit shutdown.

Question 17

Provide information on the combustibility of the electrical cable used in Oconee and whether it meets the requirements of IEEE 383.

Response

The IEEE 383 Standard was developed after the Oconee cable had been installed. However, this same cable construction has been used at a later plant where IEEE 383-1971 was imposed and construction was acceptable under IEEE 383-1971.

Question 18

Provide drawings of the turbine building which show the routing and separation of the power feeds to the 4160 volt engineered safe guards switchgear including feeds in the blockhouse and those external to the building.

Response

This information was provided in Duke Power's November 22, 1977 submittal.

Question 19

Provide drawings showing the piping and valving arrangement for the condenser Cooling Water System including the cross-connection header and HPSW pump connection.

Response

The following drawings of the CCW System are provided:

- PO - 133 A Diagrammatic Layout
- PO - 133 B Diagrammatic Layout
- O - 331 CCW General Layout
- O - 201 Turbine Building Substructure Concrete
- O - 202 Turbine Building Substructure Concrete
- O - 214 Turbine Building Substructure Concrete
- O - 215 Turbine Building Substructure Concrete
- O - 225 Turbine Building Substructure Concrete
- O - 226 Turbine Building Substructure Concrete

These drawings are marked to show the CCW Piping, the cross-connection header and HPSW pump connections.

Question 20

Verify that the Turbine Building deck is Factory Mutual Class 1 construction.

Response

Information regarding the Turbine Building roof deck will be furnished by January 25, 1978.

Question 21

Document plans to install water flow alarms to the Control Room on all wet pipe sprinkler systems.

Response

Water flow alarms will be provided as indicated in Duke Power's November 22, 1977 submittal.

Question 22

Describe the water demands that could be placed on the HPSW system in addition to fire flow requirements. Identify any other normal demands supplied by the HPSW system.

Response

The HPSW System is also used to supply the following loads:

<u>LOAD</u>	<u>MAX. FLOW (gpm)</u>	<u>FREQ. OF USE</u>
CCW Pump Cooling & Sealing	90	Continuous
HP Inj. Pump Motor Cooling	27	Continuous
HPSW Motor Cooler	106	Continuous 53 gpm for each HPSW pump in use

223 gpm

HPSW System Capacity:

- 2 - HPSW Pumps @ 6,000 gpm
- 1 - HPSW Jockey Pump @ 500 gpm

Question 23

Identify locations where the HPSW pumps can be started manually.

Response

With DC power available to B1T and B2T (HPSW) Switchgear, pumps can be started from the Control Room or at the switchgear.

If DC power is not available, the pumps can be started at the switchgear.

Question 24

Describe the potential for a single piping break to cause loss of automatic and normal fire suppression capabilities in each area, including the Turbine Building. This review should also address the effects of isolating a hydrant if damaged.

Response

The single piping break is being reviewed and conclusions will be provided by February 1, 1978.

Question 25

Describe the effects of the loss of electrical buses running along the wall of the Turbine Building and resultant effects on safe shutdown capability.

Response

The Ocone 4KV power system is a double bus system with each bus normally energized and in service. The system has the ability to lose one bus completely and still operate satisfactorily with the remaining bus.

With regard to question 25, the following tabulation applies:

LOCATION OF LOSS

EFFECT

- |  |  |
|--|--|
| 1. Loss of busses in Area of Transf. 1T and CT1 (See Dwg. 0-976) | (a) 7KV power would be lost to 7KV Swgr. 1TA and 1TB; this would have no effect on safe shutdown of the station.<br>(b) 4KV power from Transf. 1T and CT1 would no longer be available to 4KV Bus 1, Unit 1 and 4KV Bus 2, Unit 1. Breakers BIT-1, BIT-3, B2T-13 and B2T-11 would be opened to clear the transformers from the switchgear busses. As 4KV Bus 1, Unit 1 feeding the Unit 1 switchgear would also be involved in the fire, Breakers BIT-6, ITC-14, ITD-14 and ITE-14 must also be opened to clear this bus. Power to 4KV Bus 2, Unit 1 would be available utilizing available power from standby bus No. 2 fed thru B2T-8. All safe shutdown systems would be fully operational. |
|--|--|



LOCATION OF LOSSEFFECT

2. Loss of busses in Area of Transf's. 2T and CT2 (See Dwg. 0-1976)

- (a) 7KV power would be lost to 7KV Swgr. 2TA and 2TB. This would have no effect on safe shutdown of the system.
- (b) 4KV power from Transf. 2T and CT2 would no longer be available to 4KV Bus 1, Unit 2 and 4KV Bus 2, Unit 2. In addition, the 4KV bus installed between Swgr. B1T, Compt. 7 and Swgr. 3B1T, Compt. 3 would be affected by the fire and would no longer be available. Breakers B1T-13, B1T-11, B2T-1, B2T-3, B1T-7, 3B1T-1, 3B1T-5, 3TC-1, 3TD-1 and 3TE-1 would be opened to clear the transformers and associated affected busses from the switchgear busses. Power from Standby Bus No. 1 would not be available for 4KV Bus No. 1, Unit No. 2 or for 4KV Bus No. 1, Unit No. 3. Breakers B1T-8, 2TC-1, 2TD-1 and 2TE-1 would be opened to clear 4KV Bus No. 1, Unit No. 2. Breakers B1T-7, 3B1T-1, 3B1T-5, 3TC-1, 3TD-1 and 3TE-1 would be opened to clear 4KV Bus No. 1, Unit No. 3. Power to 4KV Bus No. 2, Unit No. 2 would be available to Unit No. 2 auxiliaries utilizing available power from Standby Bus No. 2 fed thru B2T-6. As the 4KV Bus No. 2, Unit 3 running from Swgr. B2T to Swgr. 3B2T is run inside the Turbine Building this bus is not effected by the fire and is available to serve the Unit No. 3 auxiliaries. Power to Unit No. 3 auxiliaries would be available utilizing 4KV Bus 2, Unit No. 3 fed from Startup Bus No. 2, Transformer 3T or Transformer CT3. All safe shutdown systems for all units would be available.

3. Loss of busses in Area of Transf. CT3 located near Col. ES-27 (See Dwg. 0-2976)

- (a) 7KV power to 7KV Swgr. 3TA and 3TB would be unavailable from Transf. CT3, however, power would still be available from Transf. 3T if Unit No. 3 was in operation. In any case, loss of power to Swgr. 3TA and 3TB has no effect on safe shutdown of the station.
- (b) 4KV power from Transf. CT3 would no longer be available to 4KV Bus 1, Unit 3 and 4KV Bus 2, Unit 3. In addition, the 4KV bus installed between Swgr. B1T, Compt. 7 and Swgr. 3B1T, Compt. 3 would be affected by the fire and would no longer be available. Breakers B1T-7, 3B1T-1, 3B1T-5, 3B2T-5, 3TC-1, 3TD-1 and 3TE-1 would be opened to clear the transformer and associated affected busses from the switchgear busses. Power from Standby Bus No. 1

LOCATION OF LOSS

EFFECT

would not be available for 4KV Bus No. 1, Unit No. 3. As the 4KV Bus No. 2, Unit No. 3 is run between Swgr. B2T-7 and Swgr. 3B1T-2 inside the Turbine Building, this bus is not affected by the fire and is available. Power to 4KV Bus 2, Unit 3 would be available from Transf. 3T if Unit 3 was in service or from Standby Bus No. 2 (thru Swgr. Bkr. B2T-7) if Unit No. 3 was not in service.

Because of the double-bus scheme used at Oconee, all safe shutdown systems on Unit No. 3 would be fully operational utilizing power from Standby Bus No. 2. Power for Units 1 and 2 would be available from their normal power sources or from Standby Bus No. 1 and Standby Bus No. 2. All safe shutdown systems would be operational.

4. Loss of busses in Area of Transf. 3T located near Col. CS4-36a-b (See Dwg. 0-2976A)

- (a) 7KV power to 7KV Swgr. 3TA and 3TB would be unavailable from Transf. 3T. Power would be available to this switchgear from Transf. CT3, however, it is possible that a fire in this area would involve the switchgear. In any case, loss of 7KV Swgr. 3TA and 3TB would have no effect upon safe shutdown of the station.
- (b) 4KV power from Transf. 3T would no longer be available to 4KV Bus 1, Unit 3 and 4KV Bus 2, Unit 3. Breakers 3B1T-5 and 3B2T-1 would be opened to clear Transformer 3T from the switchgear busses. In addition, 4KV Bus No. 1, Unit No. 3 installed between Swgr. 3B1T, Compt. 3 and the Unit 3 indoor 4KV switchgear would be effected by the fire and would no longer be available. Breakers B1T-7, 3B1T-1, 3B1T-5, 3TC-1, 3TD-1 and 3TE-1 would be opened to clear this bus. Power from Standby Bus No. 1 would not be available for 4KV Bus No. 1, Unit No. 3. Power to the Unit No. 3 indoor swgr. would be available via 4KV Bus 2, Unit No. 3. 4KV Bus 2, Unit No. 3 can be energized using Standby Bus No. 2 or Transf. CT3 power fed thru Swgr. Breaker 3B2T-5. All safe shutdown systems would be fully operational.

Question 26

Identify the location of ventilation air intake and exhaust openings and describe the potential for smoke being drawn into air intakes after being exhausted from another area.

Response

The closest ventilation air intake is approximately 12 feet horizontally and 145 feet vertically from the unit vent. All exhaust from the Auxiliary Building is routed to the unit vent. Any products of combustion from a fire would be well diluted by exhaust taken from other areas of the Auxiliary Building prior to reaching the unit vent. The exit velocity from the unit vent is approximately 3900 fpm which would tend to make it unlikely that smoke would be drawn into the intake. Thus the separation and exit velocity combine to minimize the occurrence of such an event. The proximity of turbine building exhaust to the nearest Auxiliary Building air intake is approximately 12 feet horizontally and 7 feet vertically. The turbine exhaust is above this intake and fans of the upblast type are utilized. The fan exit velocity is approximately 2400 fpm, therefore, the location and the exit velocity would tend to preclude the potential for combustion products being drawn into the Auxiliary Building intake. See attachment No. 1 for the auxiliary intake and exhaust arrangement.

Question 27

Provide drawings on the Turbine Building ventilation system showing location of dampers and capacities of fans. Describe the capability of this system to remove smoke and heat from the Turbine Building.

Response

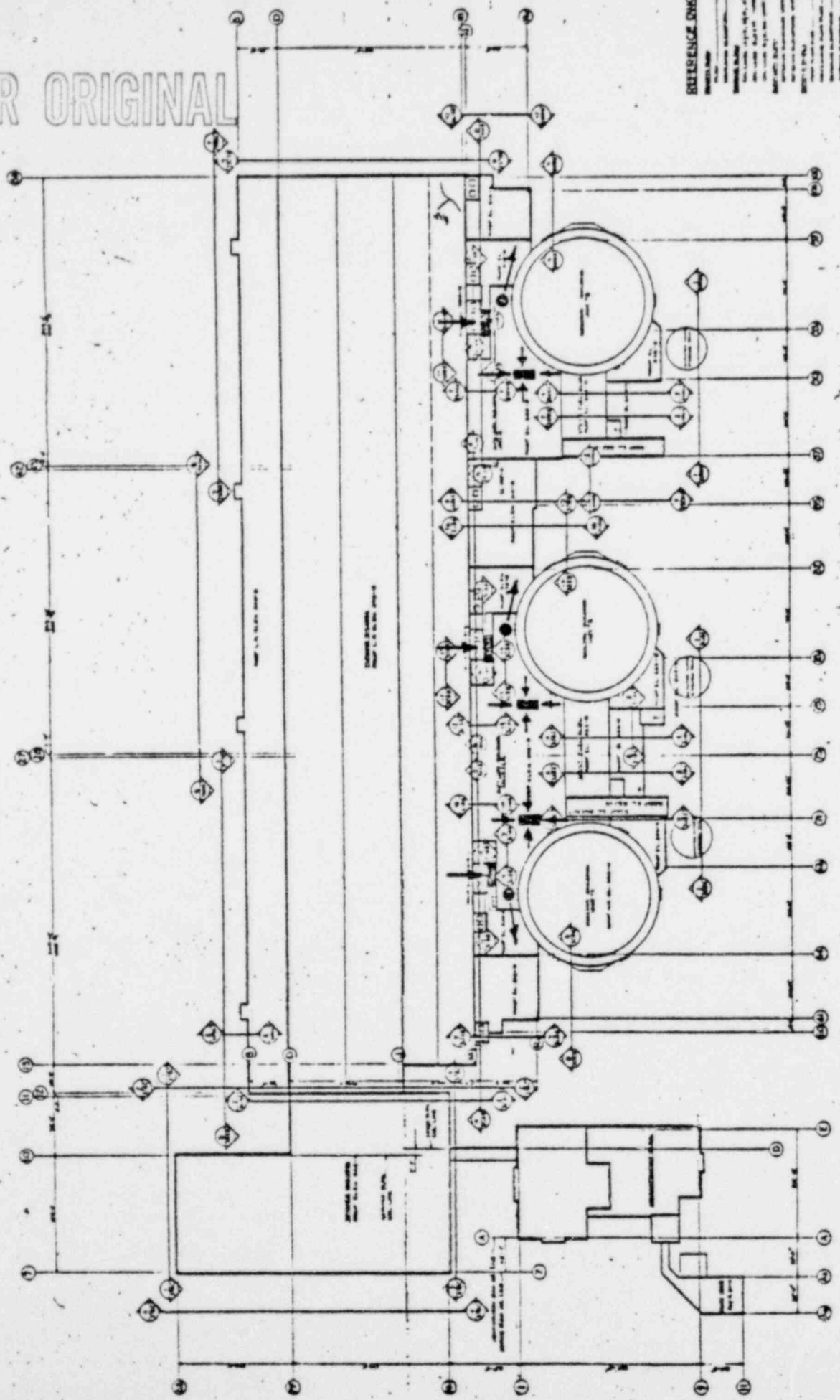
See attachments 2, 3 & 4 depicting the Turbine Building Ventilation System.

The Turbine Building ventilation fans remain in an operable status at all times. Should a fire occur, they would be available to remove smoke and heat from the Turbine Building. Since a fire would most likely occur on the operating level, or below, the fans would be at least 57 feet above the fire and hence, the probability of a mechanical or electrical failure due to heat generation by the fire itself would be very low due to dilution with cooler air adjacent to the fire zone. If a fire were to occur closer to a fan or fans and this fire rendered the local fans inoperable, the remainder of the Turbine Building ventilation fans would be available for smoke and heat venting. With two fans inoperable, the total system capacity would be rendered only 6.2% which is more than adequate for smoke and heat venting.



POOR ORIGINAL

ATTACHMENT I



REFERENCE DWGS.

- MECHANICAL
- PLUMBING
- ELECTRICAL
- STRUCTURAL
- MECHANICAL
- PLUMBING
- ELECTRICAL
- STRUCTURAL
- MECHANICAL
- PLUMBING
- ELECTRICAL
- STRUCTURAL

KEY PLAN

INTAKE LOUVER (Top of openings ± El. 85010)

STATION VENT (Top El. 995+0)

INTAKE LOUVERS (Top of openings ± 862+0)

KEY TO SYMBOLS

KEY PLAN

MECHANICAL

PLUMBING

ELECTRICAL

STRUCTURAL

DATE: 10/15/50

BY: J. H. [unclear]

PROJECT: [unclear]

NO. 0-302 A

### Question 28

Provide information on the location of charcoal filters in relation to safety-related systems and the quality of charcoal in each filter. Also, provide details of the analysis that indicates 5 hours is available after loss of cooling air flow before ignition.

### Response

Redundant fans, cross connected piping, and locked open filter inlet valves render incredible a loss of cooling air flow to the filters. However, for the postulated case of loss of air flow through a filter, the heatup time until charcoal ignition temperature is reached was determined using the following conservative assumptions:

- (a) MHA iodine release to Reactor Building
- (b) Iodine input to Penetration Room filter based on Reactor Building leak rate of one-fourth percent per day for the first day and one-eighth percent per day thereafter. Iodine evenly distributed over a single filter (120 lbs. charcoal)
- (c) No heat loss from filter
- (d) Peak heating rate of 2630 btu per hour
- (e) Specific heat for charcoal equals 0.2 btu per pound F
- (f) Initial charcoal temperature equals 104F; charcoal ignition temperature equals 660F.

An analysis based on the following relationship shows that there is at least five hours between loss of air flow and the time at which charcoal ignition temperature is reached. This is ample time to start the standby fan and restore air flow.

$$Q = W c \Delta T$$

Where: Q = Btu required to increase charcoal temperature by  $\Delta T$

W = 120 lbs. charcoal

c = 0.2 Btu per pound F

$\Delta T = 660 F - 104 F = 556 F$

### Question 29

Describe the quantity and type of portable lights available for the fire brigade.

### Response

Eight sealed beam portable lights and nine flash lights are available for fire brigade use.

Question 30

Describe the number and availability of portable radios for use by fire fighters.

Response

The following portable radios are available:

Security - 12

Operations - 1

I-E - 2

In addition, there are two mobile units.

Question 31

Describe the method used to seal pipe penetrations in fire barriers.

Response

Where necessary to restrict air flow, pipe penetrations are sealed with either Moni-kote and Armaflex, similar to electrical penetrations, or with Armaflex.

Question 32

Provide data showing the adequacy of fire doors, such as laboratory certifications for unlabeled fire doors and frames in required fire barriers.

Response

Data on fire door penetrations will be provided February 1, 1978.

Question 33

Identify the systems in each fire area, including the Turbine Building, which are required for safe shutdown. This information need not duplicate that provided in the response to staff request number 3 previously provided.

Response

Discussions regarding the separate shutdown facility will be held January 18, 1978.

Question 34

Clarify the combustible loading tables contained in the fire protection layout drawings submitted December 31, 1976. The following items are not clear:

- (1) Fire loadings are provided for some rooms containing combustibles, but not for other rooms;
- (2) Total combustibles are provided only for certain rooms;
- (3) The sum of the total combustibles or even the individual room combustibles do not equate or even approximate the totals for oil and cable insulation provided at the bottom of the chart;
- (4) What type and quantity of combustible material is located in each fire area.

Response

This information was provided in the response to question 4 of the November 22, 1977 submittal.