TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

March 4, 1985

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Ms. Adensam:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority

Please refer to T. M. Novak's letter to H. G. Parris dated January 9, 1985 by which the staff requested additional information concerning the fire protection program at the Watts Bar Nuclear Plant (WBN). TVA, by letter dated February 4, 1985, responded to questions 1, 2, and 4 of the subject request. Enclosure 1 consists of our response to question 3 concerning smoke removal. Please note that the necessary equipment will not be at the Watts Bar site until April 19, 1985.

By letter dated January 4, 1985 which, in part, concerned deviations from 10 CFR 50 Appendix R, TVA provided justification for the withdrawal of deviation 5 regarding fire door ratings. During a January 23, 1985 telephone conference, the Staff expressed their concern that the Underwriters Laboratories (UL) report indicated a general concern, but our response only addressed a specific aspect. Based upon our reevaluation, we believe that the following clarification should adequately address the UL concern.

> All hardware components on fire doors have been checked for UL listing. Many of the top and bottom flush bolts were found to be unlisted. These are being replaced with UL-listed flush bolts. The remaining hardware has the required UL approval.

Enclosure 2 consists of a discussion concerning compliance with NFPA 13-1975 with regard to the installation of the sprinkler systems at WBN. Enclosure 3 consists of a revised response to question 1 of our September 9, 1980 fire protection submittal. Enclosure 4 is a statement concerning the qualification of cable tray penetrations.

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Director of Nuclear Reactor Regulation March 4, 1985

If you have any questions concerning this matter, please get in touch with K. Mali at FTS 858-2682.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. A. Domer
Nuclear Engineer

Sworn to and subscribed before me
this 4th day of Mar 1985.

Bryant M. Lawery
Notary Public

My Commission Expires 4/8/86

Enclosures (4)
cc: U.S. Nuclear Regulatory Commission (Enclosures)
Region II
Attn: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

ENCLOSURE 1
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
RESPONSE TO NRC REQUEST FOR INFORMATION

NRC Question No. 3

In general, if a fire occurs in any area of the plant, the applicant proposes to vent the products of combustion from the fire area into adjoining plant areas manually by portable fans and rely on the normal ventilation systems to establish a tenable environment. This is a deviation from the guidelines contained in Section D.4(a) of Branch Technical Position (BTP) APCSB 9.5-1 which states that smoke and corrosive gases should be ". . . automatically discharged directly outside to a safe location." In addition, the power supply and controls for the normal mechanical ventilation systems are not everywhere located outside the fire area as stipulated in Section D.4(c) of BTP APCSB 9.5-1. The licensee has not justified these deviations from our fire protection guidelines. We are concerned that venting smoke and heat into adjoining fire areas may adversely affect the plant's capability to achieve and maintain safe shutdown conditions with systems that are not located in the area involved by the fire. We are also concerned that the presence of the power supply and controls for the normal ventilation systems, which are located in the fire area, will adversely affect the fire brigade's ability to gain access to the fire. The applicant should comply with the above referenced guidelines.

TVA Response

As required by Appendix A of BTP 9.5-1, Section D.4(a), TVA has evaluated all fire areas containing safe shutdown equipment to determine how products of combustion will be removed. A summary of this evaluation is included as Attachments 1 through 8. This summary includes separate descriptions of the method of smoke removal for each safety-related structure, and for each elevation of the auxiliary building. The detailed analysis for each room in these structures has been completed, and supporting documentation will be available onsite prior to fuel loading. TVA intends to use a combination of the normal ventilation exhaust system and portable fans equipped with generator(s) as necessary to remove smoke from specific rooms in fire areas, as needed to provide access for fire brigade activities. These smoke removal methods will provide ventilation rates which generally meet the guidelines of Appendix A of BTP 9.5-1, Section D.4(g). Exceptions to these guidelines will be identified and justified in the documentation for each room.

The normal ventilation exhaust systems generally duct smoke directly to the outside. When the normal exhaust paths are interrupted either due to isolation of the one room or a group of rooms to contain the fire, or due to action of the fire brigade, smoke will be contained within the rooms by appropriate fire-rated barriers.

Hot gases caused by combustion within the rooms will be contained within the fire-rated barriers where there are low combustible loadings, or controlled by automatic area suppression systems.

When it is necessary to remove products of combustion from a room using portable equipment, the fire brigade will take necessary actions using hose streams to enter and control the release of hot gases from the fire-affected rooms. This will prevent hot gases from breaching a fire-rated barrier and will maintain required separation between the fire-affected rooms and equipment or cabling outside the rooms.

When necessary, portable fans and flexible duct will be used to remove cooled smoke from the fire-affected room and exhaust it either to the outside or to appropriate rooms. From these rooms smoke will be removed by the normal ventilation exhaust system or by natural venting to the outside. Where smoke is ducted to other rooms, the normal ventilation rates, or the natural vent area in these rooms is sufficient to prevent smoke from stratifying or excessively concentrating in the rooms. The smoke will be removed from these rooms directly to the outside.

When necessary, portable fans and flexible duct will be used to remove cooled smoke from the fire-affected room and exhaust it either to the outside or to appropriate rooms. From these rooms smoke will be removed by the normal ventilation exhaust system or by natural venting to the outside. Where smoke is ducted to other rooms, the normal ventilation rates, or the natural vent area in these rooms is sufficient to prevent smoke from stratifying or excessively concentrating in the rooms. The smoke will be removed from these rooms directly to the outside.

When fixed ventilation equipment is used as the means of smoke removal, the availability of the required ventilation equipment is assured by verifying that all necessary equipment and cabling is separated from the fire-affected room by equivalent 1-1/2-hour fire-rated barrier. TVA has evaluated manual operations required to achieve and maintain hot standby conditions to ensure that removal of smoke from the fire-affected room would allow operator access to the fire-affected room, if required, within the time for necessary manual operations.

Sufficient visibility will be maintained by the smoke removal methods to ensure access for required operator actions. The summary descriptions, attached, address access requirements for manual operations. Manual operations required to achieve cold shutdown are not required within the time expected to extinguish a fire and remove smoke.

TVA has evaluated the effect of smoke and corrosive gases removed from a fire-affected room to adjacent rooms to determine its effect on electrical or electronic equipment required for safe shutdown. The use of portable fans and flexible duct will minimize smoke in rooms other than those used for smoke removal. In rooms receiving smoke from portable fans, the normal ventilation exhaust system will provide sufficient flow to dilute the smoke. The rooms affected by the smoke were evaluated to ensure that no electronics packages which might be sensitive to the smoke were located in these rooms. In addition, the electrical equipment found in the affected rooms were evaluated for short-term damage due to smoke. The electrical

equipment evaluated contained representative samples of all types found in the plant including both power and control functions. In our engineering judgment no problems were found. The long-term corrosive effects of the smoke were not evaluated explicitly. It is TVA's position that cleanup activities would be initiated after a fire was extinguished. Long-term corrosion problems would thus be eliminated.

Based on our evaluation, it is TVA's position that the plant is in compliance with our commitment to Appendix A of BTP 9.5-1, Sections D.4(a) and (e) since methods of smoke removal have been evaluated to ensure that they can be controlled. TVA will incorporate appropriate portions of the smoke control study in the plant prefire plans.

ATTACHMENT 1

WATTS BAR NUCLEAR PLANT
SMOKE REMOVAL EVALUATION
FOR
AUXILIARY BUILDING GENERAL VENTILATION AREA
AND
FUEL HANDLING AREA

1. Auxiliary Building Supply and Exhaust Systems (General Ventilation and Fuel Handling Ventilation)

There are four 50-percent-capacity auxiliary building general supply (ABGS) fans, two being located in each of the two mechanical equipment rooms at el 737.0'. During normal operation, one fan in each equipment room is in operation with the remaining fan in the standby mode. Supply air is ducted to various areas of the auxiliary building before being exhausted through a duct system by the exhaust fans.

The general exhaust air from the auxiliary building is provided by four 50-percent-capacity auxiliary building general exhaust (ABGE) fans located on the roof of the auxiliary building. These fans are controlled in blocks of two; during normal operation one fan is in operation with the remaining fan in standby mode. These discharge into the auxiliary building exhaust stack.

There are two 100-percent-capacity fuel handling exhaust (FHE) fans located near the roof in the auxiliary building. During normal operation one fan is in operation while the other is on standby. The fuel handling area is supplied with outdoor air from the auxiliary building general ventilation air supply system. The FHE fans exhaust air from the fuel handling portion of the auxiliary building where it is exhausted into the auxiliary building exhaust stack.

Power and control cables associated with the ABGS, ABGE, FHE fans, and the system motor-operated dampers are all routed on el 737.0' or above. El 737.0 separated from the lower elevations of the auxiliary building by a floor that is equivalent to 1-1/2-hour fire rated construction except for two open stairwells that are provided with automatic water curtain suppression systems, , an unprotected stairwell and an unprotected equipment hatch. The power and control cables are separated from the two unprotected openings by greater than 40 feet. This provides assurance the supply and exhaust systems will be available to the lower elevations of the building in the event of a fire. Also, the supply and exhaust fans are connected to the emergency power system so that they will be available in case of loss of offsite power. The use of supply and exhaust systems for smoke removal from the upper elevations are discussed in the section on those elevations.

The availability of nonessential control air to pneumatic-operated dampers in the ABGS and ABGE systems is assured through the loop configuration of the control air header in the auxiliary building. Although the branch lines utilize copper tubing, the control air header is constructed of carbon steel with isolation valves located at numerous locations on each elevation of the building. This provides the capability to isolate sections of the building without degrading the rest of the nonessential control air system.

A high radiation signal from the auxiliary building exhaust stack radiation monitor will cause the ventilation fan operations to cease and isolation dampers in the intake and exhaust ducts to close. Airflow patterns and air cleanup operations appropriate for accident mitigation during the accident mode of operation will be established and maintained by the auxiliary building gas treatment system.

2. General Smoke Removal Methods

The ABGS, ABGE, and FHE fans will be used where possible to dilute the smoke concentration and exhaust the smoke to the outside of the building. Rooms evaluated to be utilized for smoke removal from other rooms are based on their high volume of exhaust rate. Smoke ducted to these rooms will prevent the spread of smoke to other parts of the building. The location of power and control cables, and nonessential control air for the supply and exhaust fans, and associated system motor-operated dampers has been evaluated to assure operation of at least one set of supply and exhaust fans.

The following methods of smoke removal will be used in the auxiliary building where applicable:

Method A

A combination of either the ABGS and ABGE fans or ABGS and FHE fans will be used to dilute and to purge the smoke from the fire area to the outside of the building.

Method B

The closure of room or system fire dampers will interrupt the exhaust airflow from the fire area. In case of interrupted airflow, portable fans will be used to evacuate smoke from the room and direct it to specific rooms from which it can be exhausted to the outside of the building through the fixed exhaust system.

In case of loss of offsite power, portable generator(s) will be used as necessary with the portable fans.

Method C

The failure of the supply or exhaust system fans, or the manual shutdown of these fans by the fire brigade will interrupt the exhaust airflow. In these instances portable fans will be used to direct smoke, either directly to the outside of the building or to specific rooms, for natural venting to the outside of the building.

In case of loss of offsite power, portable generator(s) will be used with the portable fans.

3. Analysis of Smoke Removal for Individual Fire Compartments

The following is an evaluation of smoke removal philosophy for each elevation throughout the building. A detailed evaluation of the smoke removal for each room will be available onsite.

Building	Auxiliary Building
Elevation	676.0
Access Path	Stairs No. 3 from el 692.0
Flow Diagrams	47W866-2, 11
Reference Drawings	47W920-1, SK-1001

Under normal conditions, the ABGS fans located in room 737.0-A5 provide fresh air to the rooms associated with unit one and the ABGS fans located in room 737.0-A12 provide fresh air to the rooms associated with unit two. This is accomplished by discharging fresh air into the corridor near the elevator shaft on el. 676.0'.

Rooms 674.0-A1 and -A2, and 676.0-A8 through -A11 draw air in from the corridor and exhaust through unit one ABGE fans. The remaining rooms, 676.0-A4 through -A7 and -A12 through -A15 exhaust through unit two ABGE fans.

A temporary barrier has been placed over stair No. 3 at el 692.0 which restricts the access to the unit 2 side of the auxiliary building. This barrier will remain until the reduced perimeter security fence is extended to include the unit 2 side of the auxiliary building. During this interim period the fire brigade will use a ladder located in the hatch for personnel and equipment access from el 692.0 to el 676.0. Limited use of the elevator may be required as necessary.

In the event of a fire, the following sequence of events will take place.

A. Initially, smoke generated in any individual room will be exhausted through the exhaust ducts to the outside of the building by way of the ABGE fans. The slight negative pressure maintained in the rooms with respect to corridor 676.0-A1 will prevent the spread of smoke to other parts of the floor and building. Smoke generated in the corridor will be exhausted through stairwell No. 3 to el 692.0 as well as through the individual rooms on el 676.0. Exhaust ducts located in the individual rooms on el 676.0 and ducts on el 692.0 will remove the smoke to the outside of the building through the ABGE fans. Smoke vented through stairwell No. 3 will be confined to the north end of el 692.0 because the supply air is directed away from the elevator on the south end of corridor 692.0-A1.

B. The airflow in the building exhaust system may be interrupted either by automatic closure of fire dampers located in the exhaust duct or by the shutdown of one exhaust fan by the fire brigade. This will result in some accumulation of smoke to other parts of the floor. Should an interruption be caused by the closure of fire dampers in the exhaust

duct, the continued operation of the ABGE fans will purge the smoke to the outside of building through adjacent rooms. Because of the large area, the smoke density will be diluted and hot gases dissipated such that further fire damper closure should not occur. Also, the stairway and hatch openings provide natural venting for el 676.0 preventing any significant amount of hot gases from accumulating on el 676.0.

C. To facilitate fire brigade activities and purging of the smoke from the building, portable fans may be placed at the door entrances to individual rooms. Portable ducting will allow smoke to be ducted to a specific area which will reduce the amount of smoke that would otherwise spread out to other parts of the building. Smoke will be ducted to rooms 676.0-A5, 674.0-A1 or 674.0-A2. There is no equipment in rooms 676.0-A5, 674.0-A1 or 674.0-A2 which requires manual operation to achieve and maintain hot standby. The building's fixed exhaust system will be utilized to exhaust the smoke from the building through the remaining ABGE fans.

Building	Auxiliary Building
Elevation	692.0
Access Path	Stairs No. 3, 5, and 6 from el 713.0
Flow Diagrams	47W866-2, 10, and 11
Reference Drawings	47W920-2, SK-1001

Under normal conditions, the auxiliary building general supply (ABGS) fans located in room 737.0-A5 provide fresh air to the rooms associated with unit one and the ABGS fans located in room 737.0-A12 provide fresh air associated with unit two. This is accomplished by discharging fresh air into the corridor near the elevator shaft on el 692.0.

Rooms 676.0-A2 and -A3, 692.0-A2 and -A4, and 692.0-A6 through -A13 draw air in from the corridor and exhaust through unit one ABGE fans. The remaining rooms, 692.0-A17 through -A27 and -A29 through -A31 exhaust through unit two ABGE fans.

The portion of el 692.0 which extends into the fuel handling area is supplied directly from the ABGS fans and exhausted through the FHE fans to the outside of the building. This area is separated from the rest of the building by the fuel transfer canal.

Temporary barriers have been employed on el 692.0 restricting the access to the unit 2 side of the auxiliary building. These barriers will remain until the reduced perimeter security fence is extended to include the unit 2 side of the auxiliary building. During this interim period, the fire brigade will have access through these temporary barriers as necessary.

In the event of a fire, the following sequence of events will take place.

A. Initially smoke generated in any individual room in the auxiliary building will be exhausted through the exhaust ducts to the outside of the building by way of the ABGE fans. The slight negative pressure

maintained in the [redacted]ms with respect to corridor 692[redacted]-A1 will prevent the spread of smoke to other parts of the floor and building. Smoke generated in the corridor will be exhausted through either stairwell No. 3, 5, or 6 to el 713.0 as well as through the individual rooms on el 692.0. Exhaust ducts located in the individual rooms on el 692.0 and ducts on el 713.0 will remove the smoke to the outside of the building through the ABGE fans. Smoke vented through stairwell No. 3 will be confined to the north end of el 713.0, and smoke vented through stairwell No. 5 or 6 will be confined to the south side of el 713.0 because the supply air is directed away from the elevator in corridor 713.0-A1. Smoke generated in the fuel handling area, el 692.0, rooms 692.0-A14 through -A16, will be exhausted through the exhaust ducts to the outside of the building by way of the FHE fans.

B. The airflow in the ABGE system or the FHE system may be interrupted either by automatic closure of the fire dampers located in the exhaust duct or by the shutdown of the exhaust fans by the fire brigade.

In the auxiliary building, smoke will accumulate in other parts of the floor. Should the interruption be caused by the closure of fire dampers in the exhaust duct, the continued operation of the ABGE fans will purge the smoke to the outside of the building through adjacent rooms. Because of the large area, the smoke density will be diluted and hot gases dissipated such that further fire damper closure should not occur. Also, the stairway and hatch openings provide natural venting for el 692.0 preventing any significant amount of hot gases from accumulating on el 692.0. Automatic suppression and detection systems in corridor 692.0-A1 will provide additional assurance that smoke and hot gases are minimized.

In the fuel handling area, smoke will be vented through stairway No. 4 to el 729.0. Should an interruption be caused by the closure of fire dampers in the exhaust duct, the continued operation of the FHE fans will purge smoke to the outside of the building through the exhaust ducts on el 729.0. Because of the high ceiling, the smoke density will be diluted and hot gases dissipated such that further fire damper closure should not occur. Automatic suppression and detection systems in the fuel handling area will provide additional assurance that smoke and hot gases are minimized.

C. To facilitate the fire brigade activities and purging of the smoke from the building, portable fans may be placed at the door entrances to individual rooms. Portable ducting will allow smoke to be ducted to a specific area which will reduce the amount of smoke that would otherwise spread out to other areas of the building. Smoke will be ducted to rooms 692.0-A8, 692.0-A18, 692.0-A24, 692.0-A30, 692.0-A31, 676.0-A2, or 676.0-A3. Manual operation of equipment in room 692.0-A8 is only required for a fire in 692.0-A1. For a fire in 692.0-A1, smoke removal methods will not affect required access for manual operation. The building's fixed exhaust system will be utilized to exhaust the smoke from the building through the remaining ABGE fans and FHE fans.

In case of loss of offsite power, portable generator(s) will be used as necessary with the portable fans.

Building	Auxiliary Building
Elevation	713.0
Access Path	Stairs No. 3, 5, and 6 from el 737.0
Flow Diagrams	47W866-2, 11
Reference Drawings	47W920-4, SK-1002

Rooms 713.0-A6, A7, A9 through A13 and A24 through A28 draw air in from the corridor and exhaust through unit one ABGE fans. The remaining rooms, 713.0-A14 through A20, A22, A23, and A29 exhaust through unit two ABGE fans.

Under normal conditions, the ABGS fans located in room 737.0-A5 provide fresh air to the rooms associated with unit one and the ABGS fans located in room 737.0-A12 provide fresh air associated with unit two. This is accomplished by discharging fresh air into the corridor near the elevator shaft on el 713.0.

Temporary barriers have been employed on el 713.0 restricting the access to the unit 2 side of the auxiliary building. In addition, a barrier has been placed over stair No. 5 at el 713.0. These barriers will remain until the reduced perimeter security fence is extended to include the unit 2 side of the auxiliary building. During this interim period, the fire brigade will have access through these temporary barriers as necessary and access to lower building elevations will be by stair Nos. 1 and 3.

In the event of a fire, the following sequence of events will take place.

A. Initially, smoke generated in any individual room in the auxiliary building will be exhausted through the exhaust ducts to the outside of the building by way of the ABGE fans. The slight negative pressure maintained in the rooms with respect to corridor 713.0-A1 will prevent the spread of smoke to other parts of the floor and building. Smoke generated in the corridor will be exhausted through either stairwell No. 3, 5, or 6 to el 737.0 as well as through the individual rooms on el 713.0. Exhaust ducts located in the individual rooms on el 713.0 and ducts on el 737.0 will remove the smoke to the outside of the building through the ABGE fans. Smoke vented through stairwell Nos. 3, 5, and 6 will be confined to the north end of el 737.0.

B. The airflow in the ABGE system may be interrupted either by automatic closure of the fire dampers located in the exhaust duct or by the shutdown of one exhaust fan by the fire brigade.

   An interruption in the ventilation system will cause smoke to accumulate in other parts of the floor. Should the interruption be caused by the closure of fire dampers in the exhaust duct, the continued operation of the ABGE fans will purge the smoke to the outside of the building through adjacent rooms. Because of the large area, the smoke density will be diluted and hot gases dissipated such that further fire damper closure should not occur. Also, the stairway openings provide natural venting

for el 713.0 preventing any significant amount of hot gases from accumulating on el 713.0. Automatic suppression and detection systems in room 713.0-A1 will provide additional assurance that smoke and hot gases are minimized.

C. To facilitate fire brigade activities and purging of the smoke from the building, portable fans may be placed at the door entrances to individual rooms. Portable ducting will allow smoke to be ducted to a specific area which will reduce the amount of smoke that would otherwise spread out to other areas of the building. Smoke will be ducted to rooms 713.0-A7, 713.0-A20, 713.0-A26, 713.0-A28, or 713.0-A29. The only rooms which will have smoke ducted to them and which have equipment which requires manual operation are rooms 713.0-A7 and 713.0-A20. The valves in these rooms are not required to be operated for 24 hours. Therefore, smoke removal activities will be completed prior to the time required for operator access to these valves. The building's fixed exhaust system will be utilized to exhaust the smoke from the building through the remaining ABGE fans.

In case of loss of offsite power, portable generator(s) will be used as necessary with the portable fans.

Building	Auxiliary Building
Elevation	737.0 and 729.0
Access Path	Stairs No. 3, 5, and 6 from el 713.0 Stair 3 from el 757.0 Stair 4 from el 757.0 or el 692.0
Flow Diagrams	47W866-2, 10, and 11
Reference Drawings	47W920-6 and 7, SK-1003

Under normal conditions the ABGS fans located in rooms 737.0-A5 and 737.0-A12 provide fresh air to the fuel handling area, individual rooms, and to the south portion of corridor 737.0-A1. The air is then exhausted to the outside of the building by the auxiliary building general exhaust (ABGE) fans which draw air from the individual rooms and the north portion of corridor 737.0-A1. Air is exhausted from the fuel handling area through the FHE fans. The fuel handling area is separated from the rest of the building by the fuel the fuel transfer canal.

Temporary barriers have been employed on el 692 restricting the access to the unit 2 side of the auxiliary building. These barriers will remain until the reduced perimeter security fence is extended to include the unit 2 side of the auxiliary building. During this interim period, the fire brigade will have access through these temporary barriers as necessary.

In the event of a fire, the following sequence of events will take place:

A. Initially smoke generated on el 737.0 will migrate toward the south end of the auxiliary building because of the exhaust and supply system arrangement. Smoke will be exhausted to the outside of the building through the ABGE fans.

Smoke generation in the fuel handling area will also be exhausted to the outside of the building by the FHE fans.

B. The airflow in the ABGE system may be interrupted either by the automatic closure of the fire dampers, by the manual shutdown of the fans by the fire brigade, or by damage to ventilation equipment or cabling. Because of the large area, the smoke density will be diluted and hot gases will dissipate. Automatic suppression and detection systems in corridor 737.0-A1 will provide additional assurance that smoke and hot gases are minimized. Portable fans and ducts will be used to route smoke to the outside of the building.

Similarly, the FHE system may be interrupted. Should the interruption be caused by the closure of fire dampers in the exhaust duct, portable fans may be used to purge the smoke to the outside of the building. Smoke will be ducted to rooms 737.0-A5 or 737.0-A9. There is no equipment in these rooms which requires manual operation to achieve and maintain hot standby.

In case of loss of offsite power, portable generator(s) will be used as necessary with the portable fans.

Building	Auxiliary Building
Elevation	757.0 and 782.0
Access Path	Stairs 3 and 4 from el 737.0
Flow Diagrams	47W866-2, 10, and 11
Reference Drawings	47W920-7, 8, and 10
	SK-1004, 1005

Under normal conditions the ABGS fans located in room 737.0-A5 provide fresh air to the rooms associated with unit one and to the fuel handling area. The ABGS fans located in room 737.0-A12 provide fresh air to the rooms associated with unit two and the refueling room. Air is exhausted from elevation 757.0 and elevation 782.0 to the outside of the building by the FHE fans.

Temporary barriers have been employed on el 737 restricting the access to the unit 2 side of the auxiliary building. These barriers will remain until the reduced perimeter security fence is extended to include the unit 2 side of the auxiliary building. During this interim period, the fire brigade will have access through these temporary barriers as necesary.

In the event of fire, the following sequence of events will take place:

A. Initially, smoke generated from a fire will be exhausted through exhaust ducts to the outside of the building by way of the FHE fans. Due to the large volume of room 757.0-A13, smoke will be diluted and will not hamper fire fighting activities.

B. The airflow in the building exhaust system may be interrupted either by automatic closure of fire dampers located in the exhaust duct or by the shutdown of one exhaust fan by the fire brigade. This will result in some accumulation of smoke in room 757.0-A13; however, due to the high ceiling in this room and the continued operation of the FHE fans, there should be no dense accumulation of smoke. Should the interruption be caused by the closure of fire dampers in the exhaust duct, the continued operation of the FHE fans will purge the smoke to the outside of building through room 757.0-A13. Because of the large area, the smoke density will be diluted and hot gases dissipated such that further fire damper closure should not occur. Automatic suppression by adjacent rooms' detection systems throughout these areas will provide additional assurance that smoke and hot gases will be minimized.

C. To further facilitate fire brigade activities and purging of the smoke from the building, portable fans may be placed at the door entrances to individual rooms. Portable ducting will allow smoke to be ducted to the outside of the building. Natural venting to the outside of the building is also provided through the pressure relief vent, which can be manually opened, and through stairway No. 2 which opens to the outside of the building. Smoke will be ducted through rooms 757.0-A10. There is no equipment on these elevations which require manual operation to achieve and maintain hot standby.

In case of loss of offsite power, portable generator(s) will be used as necessary with the portable fans.

ATTACHMENT 2

WATTS BAR NUCLEAR PLANT
SMOKE REMOVAL EVALUATION
FOR
480V SHUTDOWN BOARD ROOM
AND
AUXILIARY BOARD ROOM

1. Shutdown Board Room Air-Conditioning Systems and Auxiliary Board Room Air-Conditioning System

The shutdown board rooms are located on el 757.0 of the auxiliary building with a firewall separating units 1 and 2 equipment, except for the auxiliary control room which is common for both units. There are four 50-percent-capacity fan coil units, two being located in each of the two mechanical equipment rooms on el 757.0. During normal operation one fan coil in each mechanical equipment room is in operation while the other is on standby. Four 50-percent-capacity pressurizing fans supply fresh air to maintain the shutdown board rooms at a slightly positive pressure with respect to the outdoors. During normal operation one pressurizing fan in each mechanical equipment room is in operation while the other is on standby.

The auxiliary board rooms located on el 772.0 are separated into two subareas per unit (four subareas per entire floor). Four separate 100-percent-capacity air-conditioning systems are provided, one to serve each of the four subareas of the floor. There are two 100-percent-capacity pressurizing fans per air-conditioning system. While one fan is in normal operation, the other is on standby.

The battery rooms located on el 772.0 are cooled by the auxiliary board room air-conditioning systems and vented by separate roof ventilators.

2. General Smoke Removal Methods

The shutdown board room and auxiliary board room air-conditioning systems are 100-percent recirculation type systems except for the small amount of fresh air provided by the pressurizing fans. The location of power and control cables, and nonessential control air to fans and associated motor operated dampers are not considered because the 480V transformer rooms have roof mounted air intake motor operated dampers that fail in the open position. This will be used for a natural vent.

The following methods of smoke removal will be used where applicable.

Method A

Portable fans may be used to purge the smoke from the fire area to the 480V transformer rooms (772.0-A6 or 772.0-A11) where it will be exhausted to the outside of the building through the roof ventilator exhaust fans.

In case of loss of offsite power, portable generator(s) will be used as necessary with the portable fans.

Method B

The failure of the 480V transformer room roof mounted ventilator exhaust fans in rooms 772.0-A6 or 772.0-A11, or the shutdown of these fans by the fire brigade, will interrupt the exhaust airflow. However,

since the roof mounted air intake damper fails in the open position natural venting will be available to vent the smoke to the outside of the building.

Building	Auxiliary Board Room
Elevation	772.0 and 786.0
Access Path	Stairways 7 and 8 from el 757.0 Stairway 2 from roof
Flow Diagrams	47W866-3
Reference Drawings	47W920-9, 47W920-29, SK-1005

The auxiliary board room air-conditioning units supply air to the 480V board rooms for recirculation and to the battery rooms where it is exhausted to the outside through roof mounted exhaust fans. The 480V transformer rooms are supplied with outside air through roof mounted air intakes equipped with motor operated dampers, which fail in the open position. Roof mounted exhaust fans discharge air from the 480V transformer rooms to the outside of the building.

In the event of fire, the following sequence of events will take place:

A. Initially, smoke generated from a fire in the 480V board room will be distributed to the area served by the air-conditioning unit. Smoke which enters the battery room from the 480V board room or is generated in the battery room will be exhausted to the outside of the building through the battery room roof-mounted exhaust fans.

B. Should the airflow be interrupted in the 480V board room, either by closure of a fire damper or the manual shutdown of the fans by the fire brigade, the smoke generated by the fire will remain in the room. Interruption of airflow in the battery room will continue to allow natural venting of smoke to the outside because of the fail open dampers. Automatic suppression and detection systems in these rooms will provide additional assurance that smoke and hot gases are minimized.

C. To facilitate the fire brigade activities and purging of smoke from the building, portable fans may be placed in the door entrance to the individual room. Portable ducting will allow smoke to be ducted to rooms 772.0-A6 or 772.0-A11 to be exhausted or vented naturally from the building. This will minimize the amount of smoke which will spread to the other parts of the building.

Building	Shutdown Board Room
Elevation	757.0
Access Path	Control Building el 755, Room 755.0-C12 Auxiliary Building el 757, Room 757.0-A13
Flow Diagrams	47W866-3
Reference Drawings	47W920-8, 47W920-17 SK-1004, SK-1005

Under normal conditions the shutdown board room air-conditioning units located in room 757.0-A9 recirculate air from room 757.0-A2 to individual rooms on the west end of the building. Similarly the air-conditioning units located in room 757.0-A17 recirculate air from room 757.0-A16 to individual rooms on the east end of the building. These is a minimum amount of fresh air supplied and no controlled exhaust provided for this elevation of the building.

In the event of fire, the following sequence of events will take place:

A. Initially, smoke generated from a fire will be recirculated throughout the portion of the building served by the air-conditioning units. Smoke will be confined to one end of the elevation because of the fire wall and system separation.

B. The airflow in the shutdown board room may be interrupted either by the automatic closure of the fire dampers in the ducts or by the shutdown of the air-conditioning units by the fire brigade. Smoke generated from a fire will tend to localize itself to the room in which the fire has occurred. Automatic suppression and detection systems in these rooms will provide additional assurance that smoke and hot gases are minimized.

C. To facilitate fire brigade activities and purging of the smoke from the building, portable fans may be placed in the door entrance to the individual room. Portable ducting will allow smoke to be ducted to rooms 772.0-A6 or 772.0-A11 to be exhausted by the roof mounted exhaust fans or vented naturally from the building through the roof mounted air intakes. This will minimize the amount of smoke which will spread to other parts of the building.

ATTACHMENT 3

WATTS BAR NUCLEAR PLANT
SMOKE REMOVAL EVALUATION
FOR
CONTROL BUILDING VENTILATION AREA

1. Control Building Ventilation System

The control building is located between the turbine and auxiliary buildings and is separated from them by an equivalent 3-hour rated fire wall. It is divided into three fire areas: the 755.0 elevation, the 708.0 and 729.0 elevations, and the 692.0 elevation. Each fire area is separated by an equivalent 3-hour rated floor slab. The 755.0 and 692.0 elevations are further subdivided into fire cells with equivalent 1-1/2-hour rated fire walls. Mechanical equipment rooms housing all the ventilating and air-conditioning equipment are located on elevations 755.0 and 692.0.

The air-conditioning system is comprised of two separate chilled water air handling unit systems (main control room air handling units and electrical board room air handling units). These provide cooling to all floor elevations except elevation 729.0 which is cooled by outside air. Outside air is supplied by the control building pressurization fans and distributed via the air-conditioning system ductwork. On elevation 729.0 outside air is supplied by the spreading room supply fans. This elevation is kept under negative pressure with respect to the rest of the building by the spreading room exhaust fans which discharge air directly to the outside of the building. The battery room exhaust fans and the toilet and locker room exhaust fans exhaust air directly to the outside of the building from their respective areas. A smoke removal fan is also provided to remove smoke from mechanical equipment rooms 692.0-C1, 692.0-C2, and 755.0-C1 and discharge it to the outside of the building.

2. General Smoke Removal Methods

Many of the fire/smoke dampers in the control building are closed by actuation of the area smoke detector system, thus isolating the fire area and interupting the exhaust airflow. In areas where smoke/fire dampers have closed or fans have been shut down by the fire brigade, portable fans may be brought in to exhaust smoke to the outside of the building.

Each of the floor elevations in the control building has a doorway access to the turbine building except el 692.0. These doorways will be used to route portable ductwork from the control building for exhausting smoke to the turbine building. El 692.0 has two large 8' x 15' equipment hatches which open up into the turbine building. These are located in the ceilings of mechanical equipment rooms at either end of the building and provide a natural vent path for smoke to exit the building.

On elevation 692.0, rooms 692.0-C1 and 692.0-C2 will be used as smoke exhaust rooms to which smoke from other rooms on elevation 692.0 will be directed. Smoke in these two rooms can then be directed to the outside of the building by the smoke removal fan or by natural venting to the

turbine building through the equipment hatches. The smoke removal fan will also be utilized to draw smoke from the mechanical equipment room on el 755.0 and discharge it to the outside of the building. The toilet and locker room exhaust fan will be used to exhaust smoke from the toilet, kitchen, and locker areas on el 755.0 to the outside of the building.

Loss of power to the permanent fans or loss of air supply to air operated isolation dampers will not prevent smoke in the control building from being exhausted out of the building. Portable ductwork and portable fans powered by portable generators can be used at any location within the building to direct smoke through doorways or hatches to the outside of the building via the turbine building. The turbine building has no equipment which requires manual operation to achieve or maintain a hot standby condition thereby providing a good location to discharge smoke. Automatic suppression and detection systems where available will provide additional assurance that smoke and hot gases are minimized.

ATTACHMENT 4

WATTS BAR NUCLEAR PLANT
SMOKE REMOVAL EVALUATION
FOR
REACTOR BUILDING

1. Reactor Building Purge Ventilation System

The reactor building purge ventilation system is designed to maintain the air quality in the primary containment, instrument room, and annulus within acceptable limits for personnel access during inspection, testing, maintenance, and refueling operations, and to limit the release of radioactivity to the environment during normal purging conditions. The system supplies fresh air to the primary containment, the instrument room located within the containment, and the annulus located between the containment and the shield building. The exhaust air is filtered to limit the potential release of radioactivity to the environment.

The purge air supply and the purge air exhaust systems for each unit consists of two trains; each train is designed to provide 50 percent of the capacity needed for normal purging. Each train consists of a supply fan, exhaust fan, a HEPA-charcoal filter assembly, containment isolation valves, and associated dampers and ductwork. Also provided are separate instrument room supply and exhaust fans.

The purge air supply fans are located within the auxiliary building in the penetration room at el 737.0. Air is taken from the auxiliary building air intake plenum where it is filtered and heated as necessary. The fans are each supplied with inlet and outlet dampers which close when the fan is not operating.

The 50-percent capacity air cleanup exhaust units are located on el 713 penetration rooms of the auxiliary building adjacent to the reactor building which they serve. Before the air is exhausted through the shield building exhaust vent, it passes through a section of prefilters, HEPA filters, and a charcoal adsorber section.

The purge air ventilation system is a safety related system that has trained nondivisional power to the supply and exhaust fans. These fans are not on the emergency power system. The primary containment double isolation valves are trained divisional power, safety related, supplied with essential control air and fail normally closed.

2. Emergency Gas Treatment System

The emergency gas treatment system (EGTS) consists of two subsystems. One of these is called the annulus vacuum control subsystem and the other is called the air cleanup subsystem. The annulus vacuum control subsystem is a fan and duct network used to establish and keep a negative pressure level within the annular space between the two reactor containment structures during normal reactor operation.

The air cleanup subsystem consists of redundant fans, HEPA and charcoal filters, prefilters, moisture separators and ductwork used to establish and keep a negative pressure in the annular space between the two reactor containment structures after a containment isolation signal.

The airflow network for the air cleanup subsystem was designed to provide the redundant services needed for either reactor secondary containment annulus. The air cleanup subsystem does not provide services for the containment. The intakes and ducting in this network used to bring annulus air to the EGTS room on el 757.0 in the auxiliary building are those also used by the annulus vacuum control subsystem. The intake is centrally located within each shield building above the steel containment dome. Within the EGTS room the network branches out in a manner to supply two air dampers to serve either annulus air volume. After the air is processed, the air cleanup subsystem airflow network directs the air to redundant damper controlled flow dividers in each reactor unit annulus. At these points, the flow network contains two airflow paths leading to the reactor unit vent and two airflow paths to a manifold that distributes and releases the air uniformly around the bottom of the annulus. Power for the air cleanup subsystem is on the emergency power system.

The air cleanup subsystem of the EGTS is trained divisional power and has essential control air to the system components.

3. General Smoke Removal Methods

Primarily the reactor building purge air ventilation system will be utilized to dilute the concentration of smoke and exhaust the smoke to the outside of the building. The power and control cables associated with the purge air supply and exhaust fans do not penetrate the reactor building which will provide assurance that the system will be available. Due to the large volume of reactor building, it is highly unlikely that there would be sufficient heat buildup in the upper containment to fail both inboard supply valves or both inboard exhaust valves. This also applies to the lower containment. This provides assurance that at least one supply and exhaust will be available to evacuate smoke to the outside of the building.

The reactor building instrument room has only one supply and exhaust system. In the event of the failure of either the supply or exhaust system, portable fans may be utilized in mode 5 or 6 to duct the smoke into the auxiliary building where it will be exhausted to the outside of the building.

In case of loss of offsite power, portable generator(s) will be used with the portable fans.

In the event that the annulus contains radioactive smoke and gas, the emergency gas treatment system will be used to filter the smoke and gas before being exhausted to the outside of the building.

4. Detailed Analysis for Smoke Removal - Individual Compartments

The following is a compartment-by-compartment evaluation of smoke removal philosophy for each compartment throughout the building:

Depending on the location of the fire, there are four possible modes of operation that can be used for smoke removal.

The four possible modes are:

a. Entire containment
b. Lower compartment only
c. Upper compartment only
d. Instrument room only

Mode a

Compartment	Entire Containment
Flow Diagrams	47W866-1

To purge smoke from the entire containment, valves FCV-30-7 through 10, 14 through 17, 19 and 20 will be open on the supply side. Valves FCV-30-50 through 53, 40 and 37, and 56 through 59 will be opened on the exhaust side. This will purge the smoke, from the upper and lower containment and instrument room, to the outside of the building.

In addition, part of the air may be diverted from the upper containment to the annulus to allow purging of the secondary containment.

Mode b

Compartment	Lower Containment
Flow Diagram	47W866-1

To purge smoke from the lower containment, valves FCV-30-14 and 15 and/or FCV-30-16 and 17 will be open on the supply side. Valves FCV-30-37 and 40 and/or FCV-30-56 and 57 will be open on the exhaust side. Under this mode of operation, a greater-than-design flow rate will purge smoke to the outside of the building at a faster rate.

Mode c

Compartment	Upper Containment
Flow Diagram	47W866-1

To purge smoke from the upper containment valves FCV-30-7 and 8 and/or FCV-30-9 and 10 will be open on the supply side. Valves FCV-30-50 and 51 and/or FCV-30-52 and 53 will be open on the exhaust side. Under this mode of operation, a greater-than-design flow rate will purge smoke to the outside of the building at a faster rate.

Mode d

Compartment	Instrument Room
Flow Diagram	47W866-1

To purge smoke from the instrument room, valves FCV-30-19 and 20 will be open on the supply side and valves FCV-30-58 and 59 will be open on the exhaust side. The separate instrument room supply and exhaust fans will be utilized to purge the smoke to the outside of the building.

In the event of a supply or exhaust valve failure, portable fans may be used to purge the smoke to the auxiliary building where it will be exhausted to the outside of the building. In unit 1 a portable fan should be placed in the personnel airlock located on el 713.0, azmith 62°. Smoke will be ducted into the auxiliary building across room 713.0-A6 to room 713.0-A7 where it will be exhausted into the fixed building exhaust system.

In unit 2 a portable fan may be placed in the personnel airlock located on el 713.0, azmith 62°. Smoke could be ducted into the auxiliary building across room 713.0-A19 to room 713-A20 where it will be exhausted into the fixed building exhaust.

There are valves in rooms 713.0-A7 and 713.0-A20 which have manual operations required to achieve and maintain hot standby. However, operation of these valves is not required for 24 hours. Therefore, smoke removal operations will be completed prior to the time that manual operations are required.

ATTACHMENT 5

WATTS BAR NUCLEAR PLANT
SMOKE REMOVAL EVALUATION
FOR
ADDITIONAL EQUIPMENT BUILDING (UNITS 1 AND 2)

1. Additional Equipment Building Ventilation System

The unit 1 additional equipment building is a seismic category I structure located adjacent to the auxiliary building and reactor building unit 1 and separated from each by an equivalent 3-hour rated fire wall. It consists of seven elevations, each one open to the next by a large grated floor opening. The building itself is considered one fire compartment.

The air-conditioning system is comprised of three non-safety-related air-conditioners. One air-conditioner is located on the bottom floor and is ducted to serve the bottom three floors in the building. The second and third air-conditioners are located on the top two floors and are ducted to serve the top three floors. The grated floor openings provide an air path for the return air back to each air-conditioner. The building is drawn under a slight negative pressure by the auxiliary building fuel handling area exhaust fan. This is accomplished via a 12" x 12" wall opening penetration into the auxiliary building fuel handling area which exhausts infiltrated air from the additional equipment building.

2. General Smoke Removal Methods

A fire in any location in the additional equipment building will produce smoke throughout the building via the air-conditioning ductwork. Smoke will be exhausted from the building by opening door A117 to the outside. A portable fan and portable ductwork could be brought into the auxiliary building fuel handling area elevation 757 and routed through the wall opening into the additional equipment building such that air from the fuel handling area will be discharged into the additional equipment building. The smoke will then travel downward to the bottom floor and exit through doorway A117 to the outside of the building. A portable fan placed in doorway A117 will aid in exhausting the smoke out of the building. This flow path is consistent with the direction of the return airflow to the air-conditioners. The air-conditioning ductwork system will provide sufficient mixing of the air so that the smoke will be expelled from the building.

The unit 2 additional equipment building is functionally identical to the unit 1 additional equipment building. However, this building has only two floor elevations and one air-conditioner which is located on the top floor. The air-conditioning system ductwork is routed to both floors and a grated floor opening provides the return air path to the air-conditioner from the lower floor. A 12" x 12" wall opening is provided in the upper floor elevation into the auxiliary building fuel handling area for the purpose of ventilation. Smoke will be exhausted from the building by opening door A118 to the outside. A portable fan and portable ductwork will be brought into the auxiliary building fuel handling area elevation 757 and routed through the wall opening into the

unit 2 additional equipment building such that the air from the fuel handling area will be discharged into the additional equipment building. The smoke will then travel to the bottom floor and exit through doorway A118 to the outside of the building. The air-conditioning system will be turned off because its return air path between floors would be opposite to that of the smoke removal effort. There is no equipment in the additional equipment building which requires manual operation to achieve or maintain hot standby.

ATTACHMENT 6

WATTS BAR NUCLEAR PLANT
SMOKE REMOVAL EVALUATION
FOR
DIESEL GENERATOR BUILDING VENTILATION AREAS

1. Diesel Generator Building Ventilation System

The diesel generator building is a remotely located safety related structure housing four diesel generators. Each diesel generator room and its associated air intake room, air exhaust room, and electrical board room makes up a single fire area bounded by an equivalent 3-hour rated barrier. The remainder of the building is divided into three other fire areas, each separated by an equivalent 3-hour rated barrier and subdivided into smaller rooms within the fire area that have an equivalent 1-1/2-hour fire barrier.

The diesel generator building contains exhaust fans which draw fresh air into the building under negative pressure to provide ventilation. The diesel room in each fire area is ventilated by a dedicated diesel generator exhaust fan which draws outside air into the air intake room through the diesel generator room and into the air exhaust room where the fan discharges it to the outside. A battery hood exhaust fan is also available for each diesel generator room and discharges air directly to the outside. The electrical board room in each fire area is ventilated by a dedicated exhaust fan which draws air directly from the outside into the room and discharges it to the outside. Other exhaust fans include fuel oil transfer room exhaust fan, toilet room exhaust fan, CO_2 and lube oil storage room exhaust fan, and the muffler room exhaust fan. Each of these fans draws air from its respective area and discharges it to the outside. The battery hood exhaust, toilet exhaust, CO_2 and lube oil storage exhaust, fuel oil transfer room exhaust, and the electrical board room exhaust fans all operate continuously. The diesel generator room exhaust and muffler room exhaust fans operate when the diesel generators are started.

2. General Smoke Removal Methods

Some air exhaust fans and their electrically operated isolation dampers have their control and power cables routed through areas which they ventilate. Therefore, operability of all exhaust fans for smoke removal cannot be assured due to possible fire damage. Portable fans and duct may be used to direct smoke in these areas to the outside of the building or into adjacent rooms that have operating exhaust fans. All isolation dampers fail in the closed position upon loss of power except the air intake damper to each diesel generator room which fails open. However, closure of isolation dampers and loss of exhaust fans due to fire or CO_2 discharge will not prevent smoke removal from any area of the building. Portable generator(s) are available as necessary to power portable fans if offsite power is lost.

In the event of a fire, the following sequence of events will take place:

Method A

Initially, smoke generated in any room can be exhausted to the outside of the building by diesel generator room exhaust fan 1 or 2, the electrical board room exhaust fan, the CO_2 and lube oil storage room

exhaust fan, the toilet room exhaust fan, and the battery hood exhaust fan. During cold weather, some fans may not be in continuous operation. However, all fans can be remotely operated by hand switches located outside the fire area.

Method B

The airflow exhausting smoke may be interrupted due to the CO_2 system actuation which causes closure of air exhaust fire dampers, air intake dampers, sliding fire doors, and fan shutdown for areas of CO_2 discharge. This will prevent airflow through rooms whose air is supplied through the affected area. Accumulation of hot gases within the CO_2 discharge area will be prevented by the rapid extinguishment of the fire.

Airflow may also be interrupted in the pipe gallery and corridor by closing of exhaust duct fire dampers in the toilet room and the fuel oil transfer room. Air is exhausted from the pipe gallery and corridors through door louvers into these rooms and then ducted to the outside of the building. Accumulation of hot gases in this area would be diminished by the cooling effect of the preaction sprinkler system. With the high ceiling and sprinkler protection in the corridor, it is highly unlikely that temperatures necessary to close the fire dampers in exhaust ducts (whose inlets are located approximately 8 feet below the ceiling) will be reached. Smoke will continue to be vented to the outside of the building via normal exhaust ducts.

Method C

To facilitate the fire brigade activities and to purge smoke from building areas sealed by activation of the CO_2 system or closing of duct mounted fire dampers, portable fans and duct will be used to exhaust smoke to the outside of the building. The exhaust fans, which were shut down by the CO_2 fire suppression system can be restarted to augment smoke control objectives once the dampers are reset.

The large volume of the Diesel Generator Room and corridor, along with the early activation of the fire suppression system will minimize accumulation of smoke or hot gases.

ATTACHMENT 7

WATTS BAR NUCLEAR PLANT
SMOKE REMOVAL EVALUATION
FOR
ADDITIONAL DIESEL GENERATOR BUILDING VENTILATION AREAS

1. Additional Diesel Generator Building Ventilation System

The additional diesel generator building is a remotely located building housing a separate fifth diesel generator and associated equipment. The building is considered a single fire area bounded by an equivalent 3-hour fire barrier. The building consists of two elevations (el 742.0 and el 760.5).

The additional diesel generator building contains exhaust fans which draw outside air into rooms within the building to provide ventilation. The diesel generator room, 480V electrical board room, fuel oil transfer room, and the transformer and switchgear room are each ducted to their own dedicated exhaust fan which is located in the air exhaust room and discharges directly to the outside. The janitor closet and the muffler room each have their own dedicated roof mounted exhaust fans. All of these fans operate continuously with the exception of the diesel generator room and muffler room exhaust fans which operate when the diesel generators are started. However, these fans can also be operated by local or remote hand switches.

2. General Smoke Removal Methods

Initially, smoke generated in any room will be exhausted by its associated room exhaust fan to the outside of the building. The various additional diesel generator building exhaust fans will continue to be used when operable to remove smoke to the outside of the building. However, airflow may be interrupted due to the closure of fire dampers, air intake dampers, or the loss of the exhaust fan from the fire. In the event of loss of airflow, smoke in any room will be removed by portable fans and portable ductwork routed through doorways to the outside of the building. A door is located on each elevation for direct access to the outside of the building. Also, portable generator(s) will be available as necessary to power the portable fans if offsite power is lost.

The building fire suppression system consists of a closed head foam-water and water sprinkler system that is charged by activation of the detector system. The large volume of the diesel generator room along with early activation of the fire detection and suppression systems will minimize accumulation of hot gases.

ATTACHMENT 8

WATTS BAR NUCLEAR PLANT
SMOKE REMOVAL EVALUATION
FOR
INTAKE PUMPING STATION VENTILATION AREA

1. Intake Pumping Ventilation System

The intake pumping station is a category I seismic structure remotely located from the powerhouse. It consists of two enclosed pump rooms, one electrical board room, and two pump areas open to the atmosphere. Each of these areas/rooms is separated from the adjacent area/room by an equivalent 3-hour fire barrier. The three enclosed rooms are ventilated by roof ventilation fans mounted on the open floors above. Each one of these enclosed rooms has its own dedicated supply and exhaust fan to provide ventilation. A motor operated damper is contained in each fan which closes to isolate the area when the fan is not operating. Each of the enclosed rooms has an ionization type smoke detection system. The electrical board room has a fire suppression system (water sprinkler).

2. General Smoke Removal Methods

Smoke generated from a fire in any one of the enclosed rooms will be removed by the associated exhaust fan. Two large equipment hatches in the ceiling of each enclosed room may also be removed to allow natural venting of smoke to the outside of the building.

ENCLOSURE 2

COMPLIANCE WITH NFPA 13-1975 IN REGARD TO THE INSTALLATION OF SPRINKLER SYSTEMS AT WATTS BAR NUCLEAR PLANT

NFPA 13-1975, "Standard for the Installation of Sprinkler Systems," is a standard which has been written to provide guidance for the installation of sprinkler systems for a wide range of industrial and commercial properties. NRC also issues guidelines for the provision of fire protection in nuclear power plants. Some portions of NRC guidelines modify the requirements contained in NFPA 13-1975. NRC guidelines take precedence over portions of NFPA 13-1975 when NRC guidelines modify those particular portions of NFPA 13-1975.

Other publications and standards are referenced in NFPA 13-1975. Compliance with the referenced publications and standards is not implied when NFPA 13-1975 is used as a design basis document. Any commitment to comply with a particular publication or standard in whole or in part has been stated as a specific commitment.

Therefore, NFPA 13-1975 is the design basis document for the sprinkler systems at Watts Bar Nuclear Plant except for specific portions which have been modified or deleted in lieu of NRC guidelines or which are not applicable in the nuclear power plant environment, or which have been modified or deleted in lieu of established TVA procedures. The specific portions of NFPA 13-1975 which have been deleted or modified are listed below.

NFPA 13-1975	TVA Position
Section 1-5.2 Maintenance	Maintenance and operation of installed systems is performed in accordance with plant operating and maintenance procedures.
Section 1-9 Working Plans	Plans are prepared, reviewed, and approved in accordance with TVA design, construction, and modification procedures.
Section 1-10 Approval of Sprinkler Systems	Approval of sprinkler systems is performed in accordance with TVA design, construction, and modification procedures.
Section 1-11 Acceptance Tests	System tests are performed in accordance with TVA design, construction, and modification procedures.
Section 1-12 Contractor's Material and Test Certificate	Material and test documentation are prepared and maintained in accordance with TVA design, construction, and modification procedures.

NFPA 13-1975	TVA Position
Section 2-7 Fire Department Connections	Fire department pumper connections are not of significant benefit in a nuclear power plant environment and are not provided.
Section 3-7.3 Provision for Flushing System	Flushing connections are not of significant benefit in a nuclear power plant environment and are not provided. Strainers are provided in the supply to each preaction sprinkler system.
Section 3-9.3 Protection of Piping Against Damage Where Subject to Earthquakes	NRC guidelines and other appropriate standards for support of piping is used in lieu of the guidelines contained in this section.
Section 3-10.3.4 Auxiliary Drains	Auxiliary drains for trapped sections of pipe are provided but the drains are not installed in the exact configuration specified in section 3-10.3.4. However, the drains, as installed, will perform the required function.
Section 3-11.2 Welded Piping	Installation of welded piping is performed in accordance with TVA design, construction, modification, and operational procedures. These procedures allow field welding on sprinkler system installations and modifications. All such welding is controlled by the appropriate safety procedures.
Sections 3-12.1.5 Fittings on Risers	Due to other factors affecting the design of sprinkler systems in a nuclear power plant environment, flange joints are not used on the riser at each floor level.
Section 3-13.3 Identification of Valves	Valve identification is accomplished in accordance with TVA design, construction, modification, and operational procedures.
Section 3-14 Hangers	NRC guidelines and other appropriate standards are used for support of piping in lieu of the guidelines contained in this section.
Section 3-15.7 Stock of Spare Sprinklers	TVA procedures for the procurement and storage of spare parts are used in lieu of the guidelines set forth in this section.
Section 4-4.8 Elevators, Stairs and Shafts	Only those openings specifically documented in previous commitments to NRC are protected in accordance with the guidelines contained in this section.

NFPA 13-1975	TVA Position
Chapter 7 Hydraulically Designed Sprinkler Systems	TVA design and documentation procedures are used in lieu of the guidelines set forth in this chapter.

Any other minor deviation to requirements contained in applicable portions of NFPA 13-1975 which have not been listed above will be analyzed in accordance with 10 CFR 50.59. Any such deviation which does not adversely affect safety will be documented in accordance with established plant procedures. Corrective action will be initiated for any such deviation which could adversely affect safe operation of the plant.

RET:MJS
2/7/85

ENCLOSURE 3

REVISED RESPONSE TO NRC QUESTION 16
OF THE 1980 FIRE PROTECTION SUBMITTAL

16. Page 23, Item D3(e)

You state that because the design of the plant uses the fire cell concept, additional fire breaks are not required within a fire cell. It is our position that fire stops be installed every 20 feet along horizontal uncoated cable routings in areas not protected by automatic water systems. Between levels or in vertical uncoated cable chases, fire stops should be installed at the mid-height if the vertical run is 20 feet or more, but less than 30 feet or at 15-feet intervals in vertical runs of 30 feet or more unless such vertical cable routings are protected by automatic water systems directed on the cable trays. Individual fire stop designs should prevent the progagation of a fire for a minimum period of 30 minutes when tested for the largest number of cable routings and maximum cable density. Confirm that your design will meet this position.

TVA Response

Standard Review Plan (NUREG-0800, Section 9.5.1R3) dated July 1981 no longer requires the use of fire stops in cable trays; therefore, TVA does not propose to install fire stops in cable trays or to coat exposed cable surfaces in lieu of fire stops. However, in areas of the reactor building annulus, auxiliary building, and control building, TVA will continue to coat all exposed surfaces of cable not qualified to IEEE-383 flame test requirements or equivalent to reduce combustibility hazards.

ENCLOSURE 4

QUALIFICATION OF CABLE TRAY PENETRATIONS

In L. M. Mills' letter to H. R. Denton dated October 18, 1984, it was stated that TVA was discontinuing coating of exposed surfaces of cables which were qualified to IEEE-383. This did not negate TVA's commitment to coat all cables (qualified or nonqualified) for a distance of 5 feet on each side of a cable tray penetration seal. TVA has since performed an investigation to determine whether the 5-feet cable coating requirement at cable tray penetration seals could likewise be relaxed for IEEE-383 flame-qualified cables. In this regard, we have compared TVA's penetration seal test with Factor Mutual's (FM) penetration seal test (Test No. 26543). (The FM test is referenced in the FSAR as being similar to TVA's configuration.) From our evaluation, the two test configurations are identical in all areas examined except two: (1) FM only tested PVC-type cables, and (2) FM did not coat exposed surfaces of cables. Of the two tests, the FM test configuration was less conservative in design than the TVA configuration.

Accordingly, we believe this comparison provides adequate justification for qualification of TVA's penetration seal without the additional requirement of coating IEEE-383 flame-qualified cables within 5 feet of the penetration or waiting the penetration seal.

Effective immediately, this 5-feet cable coating requirement will be discontinued if the cables have been qualified to the IEEE-383 flame test or equivalent. Coating of cables not qualified to the IEEE-383 flame test requirements or equivalent will be continued.

TVA will proceed to revise our 1980 fire protection submittal and FSAR to be in accordance with this position.