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November 4, 1983

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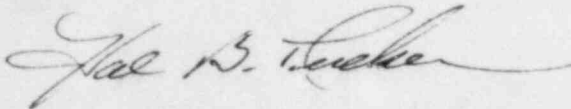
Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414
Fire Protection Review

Dear Mr. Denton:

Enclosed are ten (10) copies of Duke Power Company's revised response to Branch Technical Position APCSB (CMEB) 9.5-1. This document supersedes our previous submittal of October 23, 1981.

Very truly yours,



Hal B. Tucker

ROS/php

Enclosures

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November 4, 1983
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CATAWBA NUCLEAR STATION
FIRE PROTECTION REVIEW

by

DUKE POWER COMPANY

DECEMBER, 1977

REVISED JUNE, 1979

REVISED AUGUST, 1981

REVISED JULY, 1983

DUKE POWER COMPANY
422 SOUTH CHURCH STREET
CHARLOTTE, NORTH CAROLINA 28242

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INTRODUCTION

The following report regarding the fire protection program at the Catawba Nuclear Station is in response to positions presented in Appendix A to Branch Technical Position APCS 9.5-1. This is a complete revision to report dated August, 1981. Responses follow paragraph headings as shown in the Position.

Duke Power Company has installed a Standby Shutdown System (SSS) at Catawba Nuclear Station to provide an additional means of achieving and maintaining the unit in a hot standby condition. Damage control measures would then be utilized as necessary to bring the unit from a hot standby to a cold shutdown condition.

This fire hazard analysis will be reviewed as necessary and revised as changes are made in areas affecting the analysis.

Reference drawings included with the August, 1981 revision are applicable to this revision with the exception of four CFP drawings which have been revised. All referenced CFP drawings are included in Appendix B. Details of the hazards analysis are in Appendix C.

POSITIONS

A. OVERALL REQUIREMENTS OF NUCLEAR PLANT FIRE PROTECTION PROGRAM

1. PERSONNEL

RESPONSIBILITY FOR THE OVERALL FIRE PROTECTION PROGRAM SHOULD BE ASSIGNED TO A DESIGNATED PERSON IN THE UPPER LEVEL OF MANAGEMENT. THIS PERSON SHOULD RETAIN ULTIMATE RESPONSIBILITY EVEN THOUGH FORMULATION AND ASSURANCE OF PROGRAM IMPLEMENTATION IS DELEGATED. SUCH DELEGATION OF AUTHORITY SHOULD BE TO STAFF PERSONNEL PREPARED BY TRAINING AND EXPERIENCE IN FIRE PROTECTION AND NUCLEAR PLANT SAFETY TO PROVIDE A BALANCED APPROACH IN DIRECTING THE FIRE PROTECTION PROGRAMS FOR NUCLEAR POWER PLANTS. THE QUALIFICATION REQUIREMENTS FOR THE FIRE PROTECTION ENGINEER OR CONSULTANT WHO WILL ASSIST IN THE DESIGN AND SELECTION OF EQUIPMENT, INSPECTION AND TEST THE COMPLETED PHYSICAL ASPECTS OF THE SYSTEM, DEVELOP THE FIRE PROTECTION PROGRAM, AND ASSIST IN THE FIRE-FIGHTING TRAINING FOR THE OPERATING PLANT SHOULD BE STATED.

THE FIRE PROTECTION STAFF SHOULD BE RESPONSIBLE FOR:

- (a) COORDINATION OF BUILDING LAYOUT AND SYSTEMS DESIGN WITH FIRE AREA REQUIREMENTS, INCLUDING CONSIDERATION OF POTENTIAL HAZARDS ASSOCIATED WITH POSTULATED DESIGN BASIS FIRES,
- (b) DESIGN AND MAINTENANCE OF FIRE DETECTION, SUPPRESSION, AND EXTINGUISHING SYSTEMS.
- (c) FIRE PREVENTION ACTIVITIES,
- (d) TRAINING AND MANUAL FIRE-FIGHTING ACTIVITIES OF PLANT PERSONNEL AND THE FIRE BRIGADE.

The Vice President, Design Engineering has the responsibility for providing technical expertise and support related to fire protection at Duke Power Company's nuclear stations. The formulation and assurance of this program has been delegated to the Chief Engineer, Civil and Environmental Division. Within the Civil-Environmental Division, the responsibility for fire protection has been placed with the Environmental and Architectural Section. An Engineer, with the title Fire Protection

Engineer, has been assigned to the Environmental and Architectural Section full time to assist in the design and selection of equipment and development of the fire protection program.

To provide additional multi-discipline review of the Company fire protection program, a Fire Protection Task Force has been formed with membership from the Design Engineering, Construction, Nuclear Production, Fossil Production, Transmission, Retail Operations, Corporate Safety and Insurance Departments. This Task Force is responsible for reviewing policies and methods used to implement the Company fire protection program. The Task Force Chairman is Section Head, Environmental and Architectural Section.

To assist the Fire Protection Engineer and Task Force, a consulting firm was retained to provide fire protection engineering services. A copy of the resume for the consultant is included in Appendix A of this report.

The Vice President, Construction Department has delegated responsibility for implementation of the fire protection program to the Project Manager, Catawba Nuclear Station during the construction phase.

When the unit becomes operational, the Vice President, Nuclear Production Department will assume responsibility for implementing the fire protection program. He will delegate responsibility for implementation of the fire protection program through the General Manager, Nuclear Stations to the Station Manager, Catawba Nuclear Station.

In the station organization, the Station Safety Supervisor provides review, approval, expertise, guidance and support in the implementation of the program.

Placing responsibility for fire protection with the Civil and Environmental Division - Environmental and Architectural Section - fits in well with its responsibility for building layout and coordination of equipment location. The layout of fire zones is accomplished within this group.

The Fire Protection Engineer will review the design, layout and installation of the fire detection and suppression systems. The Fire Protection Engineer will have the services of the Fire Protection Task Force and Consultant available during these review periods.

2. DESIGN BASES

THE OVERALL FIRE PROTECTION PROGRAM SHOULD BE BASED UPON EVALUATION OF POTENTIAL FIRE HAZARDS THROUGHOUT THE PLANT AND THE EFFECT OF POSTULATED DESIGN BASIS FIRES RELATIVE TO MAINTAINING ABILITY TO PERFORM SAFETY SHUTDOWN FUNCTIONS AND MINIMIZE RADIOACTIVE RELEASES TO THE ENVIRONMENT.

The fire protection program at Catawba is based upon an evaluation of potential fire hazards throughout the Auxiliary, Diesel Generator and Reactor Buildings and the Nuclear Service Water Pump Structure and those portions of the Turbine and Service Buildings adjacent to these facilities.

Each area was inspected and the combustible material considered over the affected area to obtain a fire loading in pounds per square foot.

Using the calculated fire load of each area, Table A-1 (page 6), Criteria For Fire Protection, was utilized as a guideline for establishing the level of fire protection. Considering the criteria of Table A-1, equipment orientation, and areas immediately adjacent to the area under review, an appropriate level of fire protection was developed.

3. BACKUP

TOTAL RELIANCE SHOULD NOT BE PLACED ON A SINGLE AUTOMATIC FIRE SUPPRESSION SYSTEM. APPROPRIATE BACKUP FIRE SUPPRESSION CAPABILITY SHOULD BE PROVIDED.

Total reliance is not placed on a single fixed suppression system. In areas protected by fixed sprinklers or automatic CO₂ systems, backup hose stations and portable extinguishers are provided.

4. SINGLE FAILURE CRITERION

A SINGLE FAILURE IN THE FIRE SUPPRESSION SYSTEM SHOULD NOT IMPAIR BOTH THE PRIMARY AND BACKUP FIRE SUPPRESSION CAPABILITY. FOR EXAMPLE, REDUNDANT FIRE WATER PUMPS WITH INDEPENDENT POWER SUPPLIES AND CONTROLS SHOULD BE PROVIDED. POSTULATED FIRE OR FIRE PROTECTION SYSTEM FAILURES NEED NOT BE CONSIDERED CONCURRENT WITH OTHER PLANT ACCIDENTS OR THE MOST SEVERE NATURAL PHENOMENA. THE EFFECTS OF LIGHTNING STRIKES SHOULD BE INCLUDED IN THE OVERALL PLANT FIRE PROTECTION PROGRAM.

A single failure in the fire suppression system will not impair both the primary and backup fire suppression capability.

TABLE A-1
CRITERIA FOR FIRE PROTECTION

FIRE LOAD	FIRE CONTROL		PROTECTION FOR SAFE SHUTDOWN
	PRIMARY	BACKUP	
0 to 2 LB/FT ²	HS	PE	AE -or- FW
2 to 7 LB/FT ²	AE (AD+HS)	HS PE	AE -or- FW
7 to 20 LB/FT ²	AE	HS	AE ¹ -or- FW
Greater than 20 LB/FT ²	AE (w)	HS	FW

Notes:

- 1 Redundant AE System

Legend:

- HS Hose Station
- AD Automatic Detection with local alarm and Alarm and Annunciation in the Control Room
- AE Fixed Extinguishing System (Sprinklers or CO₂)
- PE Portable Extinguishers
- AE(W) Fixed Water Sprinklers
- FW Three - hour rated fire wall

Fixed Extinguishing Systems will not be employed in areas containing safety equipment which would be jeopardized by that extinguishing system.

Separate feeders from the fire protection header to fixed sprinkler systems and backup hose stations will assure available fire protection. Portable fire extinguishers are also provided. Three fire pumps, each capable of supporting the fire protection system, are provided with separate sources of power. Backup power from the diesel generators is also available during a blackout condition for two of the three fire pumps.

Fire pump discharge piping is arranged to minimize potential of a single failure impairing redundant fire pumps. Jockey Pumps and pressure tank arrangement taking suction from the Filtered Water (YF) system would be adequate for 2-1½ inch hose streams.

There are three (Unit 1) or two (Unit 2) fire protection headers supplying the fire protection systems located within each Reactor Building.

One header supplies water to the extinguishing systems protecting the Pipe Corridor, Reactor Coolant Pumps, and Lower Containment Carbon Filters (Units 1 and 2).

A second header supplies all manual hose stations located within the building (Units 1 and 2).

Each of these headers is equipped with a normally closed electric motor operated control valve.

The remaining header, equipped with a normally open electric motor operated control valve, supplies the sprinklers located within the Annulus (Unit 1 only).

All of the electric motor operated valves are manually operable or may be remotely operated from the control room. When the area is available for personnel access, an administrative procedure will require manual extinguishers be available as backup protection.

5. FIRE SUPPRESSION SYSTEMS

FAILURE OR INADVERTENT OPERATION OF THE FIRE SUPPRESSION SYSTEM SHOULD NOT INCAPACITATE SAFETY RELATED SYSTEMS OR COMPONENTS. FIRE SUPPRESSION SYSTEMS THAT ARE PRESSURIZED DURING NORMAL PLANT OPERATION SHOULD MEET THE GUIDE LINES SPECIFIED IN APCSB BRANCH TECHNICAL POSITION 3-1, "PROTECTION AGAINST POSTULATED PIPING FAILURES IN FLUID SYSTEMS OUTSIDE CONTAINMENT."

Orifice plates will be installed in the two yard fire protection headers which supply water to fire protection systems within safety related areas. Hydraulic calculations verify that the available water supply is adequate based on fire protection design criteria and the maximum potential quantity is within the limit of guidelines specified in APCSB Branch Technical Position 3-1. "Protection Against Postulated Piping Failures in Fluid Systems Outside Containment".

In areas protected with fixed sprinkler systems, shields will prevent direct impingement of water on safe shutdown equipment which might be incapacitated by water contact.

6. FUEL STORAGE AREAS

SCHEDULE FOR IMPLEMENTATION OF MODIFICATIONS, IF ANY, WILL BE ESTABLISHED ON A CASE-BY-CASE BASIS.

THE FIRE PROTECTION PROGRAM (PLANS, PERSONNEL AND EQUIPMENT) FOR BUILDING STORING NEW REACTOR FUEL AND FOR ADJACENT FIRE ZONES WHICH COULD AFFECT THE FUEL STORAGE ZONE SHOULD BE FULLY OPERATIONAL BEFORE FUEL IS RECEIVED AT THE SITE.

The fire protection program, to include plans, personnel and equipment, for the new fuel storage area and for adjacent fire zones which could affect the fuel storage zone will be operational before fuel is received at the site.

7. FUEL LOADING

SCHEDULE FOR IMPLEMENTATION OF MODIFICATIONS, IF ANY, WILL BE ESTABLISHED ON A CASE-BY-CASE BASIS.

THE FIRE PROTECTION PROGRAM FOR AN ENTIRE REACTOR UNIT SHOULD BE FULLY OPERATIONAL PRIOR TO INITIAL FUEL LOADING IN THAT REACTOR UNIT.

The Fire Protection Program will be operational prior to initial fuel loading for Unit 1.

8. MULTIPLE-REACTOR SITES

ON MULTIPLE-REACTOR SITES WHERE THERE ARE OPERATING REACTORS AND CONSTRUCTION OF REMAINING UNITS IS BEING COMPLETED, THE FIRE PROTECTION PROGRAM SHOULD PROVIDE CONTINUING EVALUATION AND INCLUDE ADDITIONAL FIRE BARRIERS, FIRE PROTECTION CAPABILITY AND ADMINISTRATIVE CONTROLS NECESSARY TO PROTECT THE OPERATING UNITS FROM CONSTRUCTION FIRE HAZARDS. THE SUPERINTENDENT OF THE OPERATING PLANT SHOULD HAVE THE LEAD RESPONSIBILITY FOR SITE FIRE PROTECTION.

As the Construction Department turns Unit 1 over to the Nuclear Production Department, the units will be separated to provide additional fire

protection capabilities. Administrative controls will be implemented to protect the operating unit from construction fire hazards.

The Station Manager will have lead responsibility for the site fire protection program.

Security barriers and administrative controls will be used to separate the operating unit from the unit under construction.

9. SIMULTANEOUS FIRES

SIMULTANEOUS FIRES IN MORE THAN ONE REACTOR NEED NOT BE POSTULATED, WHERE SEPARATION REQUIREMENTS ARE MET. A FIRE INVOLVING MORE THAN ONE REACTOR UNIT NEED NOT BE POSTULATED EXCEPT FOR FACILITIES SHARED BETWEEN UNITS.

The fire hazard analysis postulated a single fire which would affect both units only in those facilities shared between units.

CONCLUSION

Based on this evaluation, the Catawba Nuclear Station is in compliance with the intent of Appendix A to Branch Technical Position 9.5-1 under Section A, Overall Requirements of Nuclear Plant Fire Protection Program.

B. ADMINISTRATIVE PROCEDURES, CONTROLS AND FIRE
BRIGADE

1. ADMINISTRATIVE PROCEDURES CONSISTENT WITH THE NEED FOR MAINTAINING THE PERFORMANCE OF THE FIRE PROTECTION SYSTEM AND PERSONNEL IN NUCLEAR POWER PLANTS SHOULD BE PROVIDED.

GUIDANCE IS CONTAINED IN THE FOLLOWING PUBLICATIONS:

NFPA 4 - ORGANIZATION FOR FIRE SERVICES

NFPA 4A - ORGANIZATION FOR FIRE DEPARTMENT

NFPA 6 - INDUSTRIAL FIRE LOSS PREVENTION

NFPA 7 - MANAGEMENT OF FIRE EMERGENCIES

NFPA 8 - MANAGEMENT RESPONSIBILITY FOR
EFFECTS OF FIRE ON OPERATIONS

NFPA 27 - PRIVATE FIRE BRIGADES

A Station Directive will cover the organization of the fire brigade and training requirements for the station.

Guidance for the Directive will be obtained from the National Fire Protection Association Codes.

2. EFFECTIVE ADMINISTRATIVE MEASURES SHOULD BE IMPLEMENTED TO PROHIBIT BULK STORAGE OF COMBUSTIBLE MATERIALS INSIDE OR ADJACENT TO SAFETY RELATED BUILDINGS OR SYSTEMS DURING OPERATION OR MAINTENANCE PERIODS. REGULATORY GUIDE 1.39, "HOUSEKEEPING REQUIREMENTS FOR WATER-COOLED NUCLEAR POWER PLANTS," PROVIDES GUIDANCE ON HOUSEKEEPING, INCLUDING THE DISPOSAL OF COMBUSTIBLE MATERIALS.

A Station Directive will prohibit bulk storage of combustible materials inside or adjacent to safety related buildings or systems. Periodic inspections by members of the Fire Protection Task Force and station personnel will assure adherence to the Directive.

3. NORMAL AND ABNORMAL CONDITIONS OR OTHER ANTICIPATED OPERATIONS SUCH AS MODIFICATIONS (e.g., BREAKING FIRE STOPS, IMPAIRMENT OF FIRE DETECTION AND SUPPRESSION SYSTEMS) AND REFUELING ACTIVITIES SHOULD BE REVIEWED BY APPROPRIATE LEVELS OF MANAGEMENT AND APPROPRIATE SPECIAL ACTIONS AND PROCEDURES SUCH AS FIRE WATCHES OR TEMPORARY FIRE BARRIERS IMPLEMENTED TO ASSURE ADEQUATE FIRE PROTECTION AND REACTOR SAFETY. IN PARTICULAR:

- (a) WORK INVOLVING IGNITION SOURCES SUCH AS WELDING AND FLAME CUTTING SHOULD BE DONE UNDER CLOSELY CONTROLLED CONDITIONS. PROCEDURES GOVERNING SUCH WORK SHOULD BE REVIEWED AND APPROVED BY PERSONS TRAINED AND EXPERIENCED IN FIRE PROTECTION. PERSONS PERFORMING AND DIRECTLY ASSISTING IN SUCH WORK SHOULD BE TRAINED AND EQUIPPED TO PREVENT AND COMBAT FIRES. IF THIS IS NOT POSSIBLE, A PERSON QUALIFIED IN FIRE PROTECTION SHOULD DIRECTLY MONITOR THE WORK AND FUNCTION AS A FIRE WATCH.

The Catawba Planning Section will review work requests to determine the effects of these activities on station fire barriers and will alert maintenance supervisors to special precautions which must be taken. Maintenance Procedures will provide guidance for precautions taken during welding and cutting operations.

- (b) LEAK TESTING, AND SIMILAR PROCEDURES SUCH AS AIR FLOW DETERMINATION, SHOULD USE ONE OF THE COMMERCIALY AVAILABLE AEROSOL TECHNIQUES. OPEN FLAMES OR COMBUSTION GENERATED SMOKE SHOULD NOT BE PERMITTED.

Leak testing, and similar procedures such as air flow determinations, will be accomplished with available aerosol techniques. Open flame or combustion generated smoke will not be used for leak testing.

Periodic test procedures, written by experienced personnel, will cover steps in testing for each situation. Supervisors and maintenance personnel will be experienced in their areas of responsibility.

- (c) USE OF COMBUSTIBLE MATERIAL, e.g., HEPA AND CHARCOAL FILTERS, DRY ION EXCHANGE RESINS OR OTHER COMBUSTIBLE SUPPLIES IN SAFETY RELATED AREAS SHOULD BE CONTROLLED. USE OF WOOD INSIDE BUILDINGS CONTAINING SAFETY RELATED SYSTEMS OR EQUIPMENT SHOULD BE PERMITTED ONLY WHEN SUITABLE NON-COMBUSTIBLE SUBSTITUTES ARE NOT AVAILABLE. IF WOOD MUST BE USED, ONLY FIRE RETARDANT TREATED WOOD (SCAFFOLDING, LAY DOWN BLOCKS) SHOULD BE PERMITTED. SUCH MATERIALS SHOULD BE ALLOWED INTO SAFETY RELATED AREAS ONLY WHEN THEY ARE TO BE USED IMMEDIATELY. THEIR POSSIBLE AND PROBABLE USE SHOULD BE CONSIDERED IN THE FIRE HAZARD ANALYSIS TO DETERMINE THE ADEQUACY OF THE INSTALLED FIRE PROTECTION SYSTEMS.

Station Directives and procedures require control of combustible material required for operation of the plant.

Station directives permit use of fire retardant treated wood in the station only when suitable non-combustible substitutes are not available.

The periodic inspections by task force personnel and station personnel, assure compliance with the Directive.

- 4. NUCLEAR POWER PLANTS ARE FREQUENTLY LOCATED IN REMOTE AREAS, AT SOME DISTANCE FROM PUBLIC FIRE DEPARTMENTS. ALSO, FIRST RESPONSE FIRE DEPARTMENTS ARE OFTEN VOLUNTEER. PUBLIC FIRE DEPARTMENT RESPONSE SHOULD BE CONSIDERED IN THE OVERALL FIRE PROTECTION PROGRAM. HOWEVER, THE PLANT SHOULD BE DESIGNED TO BE SELF-SUFFICIENT WITH RESPECT TO FIRE FIGHTING ACTIVITIES AND RELY ON THE PUBLIC RESPONSE ONLY FOR SUPPLEMENTAL OR BACKUP CAPABILITY.

The Catawba Nuclear Station fire brigade will be self-sufficient with respect to fire fighting activities. Training and drills will be conducted on a regular basis. Sufficient fire protection equipment is provided in appropriate locations.

The nearest fire department is the Bethel Volunteer Fire Department located approximately six miles from the station.

Request for assistance from the local fire department would be considered only by the Station Manager or his designated representative.

5. THE NEED FOR GOOD ORGANIZATION, TRAINING AND EQUIPPING OF FIRE BRIGADES AT NUCLEAR POWER PLANT SITES REQUIRES EFFECTIVE MEASURES BE IMPLEMENTED TO ASSURE PROPER DISCHARGE OF THESE FUNCTIONS. THE GUIDANCE IN REGULATORY GUIDE 1.101, "EMERGENCY PLANNING FOR NUCLEAR POWER PLANTS," SHOULD BE FOLLOWED AS APPLICABLE.

- (a) SUCCESSFUL FIRE FIGHTING REQUIRES TESTING AND MAINTENANCE OF THE FIRE PROTECTION EQUIPMENT, EMERGENCY LIGHTING AND COMMUNICATION, AS WELL AS PRACTICE AS BRIGADES FOR THE PEOPLE WHO MUST UTILIZE THE EQUIPMENT. A TEST PLAN THAT LISTS THE INDIVIDUALS AND THEIR RESPONSIBILITIES IN CONNECTION WITH ROUTINE TEST AND INSPECTIONS OF THE FIRE DETECTION AND PROTECTION SYSTEMS SHOULD BE DEVELOPED. THE TEST PLAN SHOULD CONTAIN THE TYPES, FREQUENCY AND DETAILED PROCEDURES FOR TESTING. PROCEDURES SHOULD ALSO CONTAIN INSTRUCTION ON MAINTAINING FIRE PROTECTION DURING THOSE PERIODS WHEN THE FIRE PROTECTION SYSTEM IS IMPAIRED OR DURING PERIODS OF PLANT MAINTENANCE, e.g., FIRE WATCHES OR TEMPORARY HOSE CONNECTIONS TO WATER SYSTEMS.

Periodic tests will be conducted to assure the reliability of the fire protection system at Catawba.

The Catawba Nuclear Station Procedure Index will define periodic tests to be conducted, personnel to conduct tests and the frequency of test.

The fire protection Station Directive covers requirements for fire watches during periods of fire protection system impairments.

- (b) BASIC TRAINING IS A NECESSARY ELEMENT IN EFFECTIVE FIRE FIGHTING OPERATION. IN ORDER FOR A FIRE BRIGADE TO OPERATE EFFECTIVELY, IT MUST OPERATE AS A TEAM. ALL MEMBERS MUST KNOW WHAT THEIR INDIVIDUAL DUTIES ARE. THEY MUST BE FAMILIAR WITH THE LAYOUT OF THE PLANT AND EQUIPMENT LOCATION AND OPERATION IN ORDER TO PERMIT EFFECTIVE FIRE-FIGHTING OPERATIONS DURING TIMES WHEN A PARTICULAR AREA IS FILLED WITH SMOKE OR IS INSUFFICIENTLY LIGHTED. SUCH TRAINING CAN ONLY BE ACCOMPLISHED BY CONDUCTING DRILLS SEVERAL TIMES A YEAR (AT LEAST QUARTERLY) SO THAT ALL MEMBERS OF THE FIRE BRIGADE HAVE HAD THE OPPORTUNITY TO TRAIN AS A TEAM, TESTING ITSELF IN THE MAJOR AREAS OF THE PLANT. THE DRILLS SHOULD INCLUDE THE SIMULATED USE OF EQUIPMENT IN EACH AREA AND SHOULD BE PREPLANNED AND POSTCRITIQUED TO ESTABLISH THE TRAINING OBJECTIVE OF THE DRILLS AND DETERMINE HOW WELL THESE OBJECTIVES HAVE BEEN MET. THESE DRILLS SHOULD PERIODICALLY (AT LEAST ANNUALLY) INCLUDE LOCAL FIRE DEPARTMENT PARTICIPATION WHERE POSSIBLE. SUCH DRILLS ALSO PERMIT SUPERVISING PERSONNEL TO EVALUATE THE EFFECTIVENESS OF COMMUNICATIONS WITHIN THE FIRE BRIGADE AND WITH THE ON-SCENE FIRE TEAM LEADER, THE REACTOR OPERATOR IN THE CONTROL ROOM, AND THE OFFSITE COMMAND POST.

The fire brigade training and refresher training will be conducted in using guidelines from the National Fire Protection Association.

- (c) TO HAVE PROPER COVERAGE DURING ALL PHASES OF OPERATION, MEMBERS OF EACH SHIFT CREW SHOULD BE TRAINED IN FIRE PROTECTION. TRAINING OF THE PLANT FIRE BRIGADE SHOULD BE COORDINATED WITH THE LOCAL FIRE DEPARTMENTS SO THAT RESPONSIBILITIES AND DUTIES ARE DELINEATED IN ADVANCE.

THIS COORDINATION SHOULD BE PART OF THE TRAINING COURSE AND IMPLEMENTED INTO THE TRAINING OF THE LOCAL FIRE DEPARTMENT STAFF. LOCAL FIRE DEPARTMENTS SHOULD BE EDUCATED IN THE OPERATIONAL PRECAUTIONS WHEN FIGHTING FIRES ON NUCLEAR POWER PLANT SITES. LOCAL FIRE DEPARTMENTS SHOULD BE MADE AWARE OF THE NEED FOR RADIOACTIVE PROTECTION OF PERSONNEL AND THE SPECIAL HAZARDS ASSOCIATED WITH A NUCLEAR POWER PLANT SITE.

Each operating shift will provide individuals to the fire brigade.

Local fire departments will be provided orientation training.

- (d) NFPA 27, "PRIVATE FIRE BRIGADE" SHOULD BE FOLLOWED IN ORGANIZATION, TRAINING, AND FIRE DRILLS. THIS STANDARD ALSO IS APPLICABLE FOR THE INSPECTION AND MAINTENANCE OF FIRE FIGHTING EQUIPMENT. AMONG THE STANDARDS REFERENCED IN THIS DOCUMENT, THE FOLLOWING SHOULD BE UTILIZED: NFPA 194, "STANDARD FOR SCREW THREADS AND GASKETS FOR FIRE HOSE COUPLINGS," NFPA 196, "STANDARD OR FIRE HOSE," NFPA 197, "TRAINING STANDARD ON INITIAL FIRE ATTACKS," NFPA 601, "RECOMMENDED MANUAL OF INSTRUCTIONS AND DUTIES FOR THE PLANT WATCHMAN OR GUARD." NFPA BOOKLETS AND PAMPHLETS LISTED ON PAGE 27-11 OF VOLUME 8, 1971-72 ARE ALSO APPLICABLE FOR GOOD TRAINING REFERENCES. IN ADDITION, COURSES IN FIRE PREVENTION AND FIRE SUPPRESSION WHICH ARE RECOGNIZED AND/OR SPONSORED BY THE FIRE PROTECTION INDUSTRY SHOULD BE UTILIZED.

The fire brigade organization and training is established and supervised by qualified fire training instructors. NFPA Standards are used for guidance in establishing requirements for watchpersons.

CONCLUSION

With the initiation of Station Directives, the Catawba Nuclear Station is in compliance with the intent of Appendix A to Branch Technical Position 9.5-1 under Section B, Administrative Procedures, Controls and Fire Brigade.

C. QUALITY ASSURANCE PROGRAM

QUALITY ASSURANCE (QA) PROGRAMS OF APPLICANTS AND CONTRACTORS SHOULD BE DEVELOPED AND IMPLEMENTED TO ASSURE THAT THE REQUIREMENTS FOR DESIGN, PROCUREMENT, INSTALLATION, AND TESTING AND ADMINISTRATIVE CONTROLS FOR THE FIRE PROTECTION PROGRAM FOR SAFETY RELATED AREAS AS DEFINED IN THIS BRANCH POSITION ARE SATISFIED. THE PROGRAM SHOULD BE UNDER THE MANAGEMENT CONTROL OF THE QA ORGANIZATION. THE QA PROGRAM CRITERIA THAT APPLY TO THE FIRE PROTECTION PROGRAM SHOULD INCLUDE THE FOLLOWING:

1. DESIGN CONTROL AND PROCUREMENT
DOCUMENT CONTROL

MEASURES SHOULD BE ESTABLISHED TO ASSURE THAT ALL DESIGN-RELATED GUIDELINES OF THE BRANCH TECHNICAL POSITION ARE INCLUDED IN DESIGN AND PROCUREMENT DOCUMENTS AND THAT DEVIATIONS THEREFROM ARE CONTROLLED.

Only those revisions to the fire protection program negotiated after January 1, 1978, are under the Duke Power Quality Assurance Program to assure they conform to guidelines of the Branch Technical Position or are controlled deviations.

References to the Quality Assurance Program mentioned hereafter were effective May 1, 1978.

2. INSTRUCTIONS, PROCEDURES AND DRAWINGS

INSPECTIONS, TESTS, ADMINISTRATIVE CONTROLS, FIRE DRILLS AND TRAINING THAT GOVERN THE FIRE PROTECTION PROGRAM SHOULD BE PRESCRIBED BY DOCUMENTED INSTRUCTIONS, PROCEDURES OR DRAWINGS AND SHOULD BE ACCOMPLISHED IN ACCORDANCE WITH THESE DOCUMENTS.

Inspections, tests, administrative controls, fire drills and training governing the fire protection program will be prescribed in Station

Directives to include instructions, procedures or drawings and frequencies.

3. CONTROL OF PURCHASED MATERIAL, EQUIPMENT
AND SERVICES

MEASURES SHOULD BE ESTABLISHED TO ASSURE THAT PURCHASED MATERIAL, EQUIPMENT AND SERVICES CONFORM TO THE PROCUREMENT DOCUMENTS.

The Duke Power Quality Assurance Program will assure that purchased material, equipment and services conform to the procurement documents.

4. INSPECTION

A PROGRAM FOR INDEPENDENT INSPECTION OF ACTIVITIES AFFECTING FIRE PROTECTION SHOULD BE ESTABLISHED AND EXECUTED BY, OR FOR, THE ORGANIZATION PERFORMING THE ACTIVITY TO VERIFY CONFORMANCE WITH DOCUMENTED INSTALLATION DRAWINGS AND TEST PROCEDURES FOR ACCOMPLISHING THE ACTIVITIES.

The Quality Assurance program will verify the organization performing the activity conforms with documented installation drawings and test procedures for accomplishing the activities.

5. TEST AND TEST CONTROL

A TEST PROGRAM SHOULD BE ESTABLISHED AND IMPLEMENTED TO ASSURE THAT TESTING IS PERFORMED AND VERIFIED BY INSPECTION AND AUDIT TO DEMONSTRATE CONFORMANCE WITH DESIGN AND SYSTEM READINESS REQUIREMENTS. THE TESTS SHOULD BE PERFORMED IN ACCORDANCE WITH WRITTEN TEST PROCEDURES. TEST RESULTS SHOULD BE PROPERLY EVALUATED AND ACTED ON.

Station Directives and manufacturers recommendations will establish the required test programs and procedures for the station. The QA program will audit these inspections.

6. INSPECTION, TEST AND OPERATING STATUS

MEASURES SHOULD BE ESTABLISHED TO PROVIDE FOR THE IDENTIFICATION OF ITEMS THAT HAVE SATISFACTORILY PASSED REQUIRED TESTS AND INSPECTIONS.

Documentation of audits and inspections conducted under the QA program will identify items that have satisfactorily passed required tests and inspections.

Station procedures will control tags or other methods used to physically identify those items needing additional recognition.

7. NON-CONFORMING ITEMS

MEASURES SHOULD BE ESTABLISHED TO CONTROL ITEMS THAT DO NOT CONFORM TO SPECIFIED REQUIREMENTS TO PREVENT INADVERTENT USE OR INSTALLATION.

Procedures under the QA program will be used to control those items that do not conform to specified requirements to prevent inadvertent use or installation.

8. CORRECTIVE ACTION

MEASURES SHOULD BE ESTABLISHED TO ASSURE THAT CONDITIONS ADVERSE TO FIRE PROTECTION, SUCH AS FAILURES, MALFUNCTIONS, DEFICIENCIES, DEVIATIONS, DEFECTIVE COMPONENTS, UNCONTROLLED COMBUSTIBLE MATERIAL AND NON-CONFORMANCES ARE PROMPTLY IDENTIFIED, REPORTED AND CORRECTED.

Regularly scheduled inspections and testing will be conducted in accordance with Station Directives to assure that conditions adverse to fire protection are promptly identified, reported and corrected.

These actions will be audited under the provisions of the QA program.

9. RECORDS

RECORDS SHOULD BE PREPARED AND MAINTAINED TO FURNISH EVIDENCE THAT THE CRITERIA ENUMERATED ABOVE ARE BEING MET FOR ACTIVITIES AFFECTING THE FIRE PROTECTION PROGRAM.

Records kept in the Station Master File will furnish evidence that the criteria enumerated above are being met for activities affecting the fire protection program.

10. AUDITS

AUDITS SHOULD BE CONDUCTED AND DOCUMENTED TO VERIFY COMPLIANCE WITH THE FIRE PROTECTION PROGRAM INCLUDING DESIGN AND PROCUREMENT DOCUMENTS; INSTRUCTIONS; PROCEDURES AND DRAWINGS; AND INSPECTION AND TEST ACTIVITIES.

The QA Department will conduct and document audits to verify compliance with the fire protection program including design and procurement documents; instructions; procedures and drawings; and inspection and test activities.

In addition to the QA Department audits, internal audits will be conducted for each unit on a regular basis to review the fire protection program to include, but not limited to the following:

- 1) Initial and periodic testing of all fire protection systems and equipment
- 2) Adequate separation of hazardous materials

- 3) Controlled use of combustible building materials
- 4) Compliance with Station Directives

CONCLUSION

With the initiation of the Quality Assurance Program and periodic internal inspections, the Catawba Nuclear Station is in compliance with the intent of Appendix A to Branch Technical Position 9.5-1 under Section C, Quality Assurance Program.

D. GENERAL GUIDELINES FOR PLANT PROTECTION

1. BUILDING DESIGN

(a) PLANT LAYOUTS SHOULD BE ARRANGED TO:

(1) ISOLATE SAFETY RELATED SYSTEMS FROM UN-ACCEPTABLE FIRE HAZARDS, AND

(2) ALTERNATIVES:

(a) REDUNDANT SAFETY RELATED SYSTEMS THAT ARE SUBJECT TO DAMAGE FROM A SINGLE FIRE HAZARD SHOULD BE PROTECTED BY A COMBINATION OF FIRE RETARDANT COATINGS AND FIRE DETECTION AND SUPPRESSION SYSTEMS, OR

(b) A SEPARATE SYSTEM TO PERFORM THE SAFETY FUNCTION SHOULD BE PROVIDED.

The Catawba Nuclear Station plant layout is arranged to isolate safety related systems from unacceptable fire hazards as demonstrated by the hazards analysis.

Areas where redundant safety related systems are subject to damage from a single fire hazard are protected by a combination of fire barriers, fire detection and suppression capability.

(b) IN ORDER TO ACCOMPLISH 1.(a) ABOVE, SAFETY RELATED SYSTEMS AND FIRE HAZARDS SHOULD BE IDENTIFIED THROUGHOUT THE PLANT. THEREFORE, A DETAILED FIRE HAZARD ANALYSIS SHOULD BE MADE. THE FIRE HAZARDS ANALYSIS SHOULD BE REVIEWED AND UPDATED AS NECESSARY.

The hazard analysis is presented in Appendix C.

(c) FOR MULTIPLE REACTOR SITES, CABLE SPREADING ROOMS SHOULD NOT BE SHARED BETWEEN REACTORS. EACH CABLE SPREADING ROOM SHOULD BE SEPARATED FROM OTHER AREAS OF THE PLANT BY BARRIERS (WALLS

AND FLOORS) HAVING A MINIMUM FIRE RESISTANCE OF THREE HOURS. CABLING FOR REDUNDANT SAFETY DIVISIONS SHOULD BE SEPARATED BY WALLS HAVING THREE-HOUR FIRE BARRIERS.

The Cable Spreading Rooms are addressed in Section F.3, Guideline for Specific Plant Areas Cable Spreading Room.

- (d) INTERIOR WALL AND STRUCTURAL COMPONENTS, THERMAL INSULATION MATERIALS AND RADIATION SHIELDING MATERIALS AND SOUND-PROOFING SHOULD BE NON-COMBUSTIBLE. INTERIOR FINISHES SHOULD BE NON-COMBUSTIBLE OR LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY, SUCH AS FACTORY MUTUAL OR UNDERWRITERS LABORATORY, INC. FOR FLAME SPREAD, SMOKE AND FUEL CONTRIBUTION OF 25 OR LESS IN ITS USE CONFIGURATION (ASTM E-84 TEST, "SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS").

Interior wall and structural components, thermal insulation materials and radiation shielding materials and sound proofing are non-combustible.

Interior finishes have a flame spread rating of 25 or less and a smoke and fuel contribution of 50 or less in its use configuration.

- (e) METAL DECK ROOF CONSTRUCTION SHOULD BE NON-COMBUSTIBLE (SEE THE BUILDING MATERIALS DIRECTORY OF THE UNDERWRITERS LABORATORY, INC.) OR LISTED AS CLASS I BY FACTORY MUTUAL SYSTEM APPROVAL GUIDE.

The Reactor Buildings, Auxiliary Building, Diesel Generator Buildings, and Nuclear Service Water Pump Structure all have reinforced concrete roofs.

- (f) SUSPENDED CEILINGS AND THEIR SUPPORTS SHOULD BE OF NON-COMBUSTIBLE CONSTRUCTION. CONCEALED SPACES SHOULD BE DEVOID OF COMBUSTIBLES.

Suspended ceilings and their supports are of non-combustible construction. Concealed spaces contain only necessary electrical wiring.

- (g) HIGH-VOLTAGE - HIGH AMPERAGE TRANSFORMERS INSTALLED INSIDE BUILDINGS CONTAINING SAFETY RELATED SYSTEMS SHOULD BE OF THE DRY TYPE OR INSULATED AND COOLED WITH NON-COMBUSTIBLE LIQUID.

High voltage - high amperage load-center transformers located in the Auxiliary Building are gas filled. All other transformers located in safety related buildings are dry type, air cooled.

- (h) BUILDINGS CONTAINING SAFETY RELATED SYSTEMS, HAVING OPENINGS IN EXTERIOR WALLS CLOSER THAN 50 FEET TO FLAMMABLE OIL FILLED TRANSFORMERS SHOULD BE PROTECTED FROM THE EFFECTS OF A FIRE BY:
 - (i) CLOSING OF THE OPENING TO HAVE FIRE RESISTANCE EQUAL TO THREE HOURS.
 - (ii) CONSTRUCTING A THREE-HOUR FIRE BARRIER BETWEEN THE TRANSFORMERS AND THE WALL OPENINGS; OR
 - (iii) CLOSING THE OPENING AND PROVIDING THE CAPABILITY TO MAINTAIN A WATER CURTAIN IN CASE OF A FIRE.

There are no oil-filled transformers located within fifty (50) feet of buildings containing safety related equipment necessary for shutdown.

Openings in exterior walls of buildings containing safety related systems which are exposed to fire hazards will be closed with penetration seals with fire resistance equal to rating of the barrier.

- (i) FLOOR DRAINS, SIZED TO REMOVE EXPECTED FIRE FIGHTING WATER FLOW SHOULD BE PROVIDED IN THOSE

AREAS WHERE FIXED WATER FIRE SUPPRESSION SYSTEMS ARE INSTALLED. DRAINS SHOULD BE PROVIDED IN OTHER AREAS WHERE HAND HOSE LINES MAY BE USED IF SUCH FIRE FIGHTING WATER COULD CAUSE UNACCEPTABLE DAMAGE TO EQUIPMENT IN THE AREA. EQUIPMENT SHOULD BE INSTALLED ON PEDESTALS, OR CURBS SHOULD BE PROVIDED AS REQUIRED TO CONTAIN WATER AND DIRECT IT TO FLOOR DRAINS. (SEE NFPA 92M, "WATERPROOFING AND DRAINING OF FLOORS.") DRAINS IN AREAS CONTAINING COMBUSTIBLE LIQUIDS SHOULD HAVE PROVISIONS FOR PREVENTING THE SPREAD OF THE FIRE THROUGHOUT THE DRAIN SYSTEM. WATER DRAINAGE FROM AREAS WHICH MAY CONTAIN RADIOACTIVITY SHOULD BE SAMPLED AND ANALYZED BEFORE DISCHARGE TO THE ENVIRONMENT.

IN OPERATING PLANTS OR PLANTS UNDER CONSTRUCTION, IF ACCUMULATION OF WATER FROM THE OPERATION OF NEW FIRE SUPPRESSION SYSTEMS DOES NOT CREATE UNACCEPTABLE CONSEQUENCES, DRAINS NEED NOT BE INSTALLED.

Floor drains are provided in areas protected by fixed water suppression systems. These floor drains are adequate for the expected water flow from the fire suppression system in these areas.

Floor drains in areas of potential radiation are connected to the Liquid Waste System and will be monitored for acceptable limits prior to discharge to the environment.

In the event additional areas are equipped with fixed water suppression systems, a study will be performed to determine the effect of water accumulation.

- (j) FLOORS, WALLS AND CEILINGS ENCLOSING SEPARATE FIRE AREAS SHOULD HAVE MINIMUM FIRE RATING OF THREE HOURS. PENETRATIONS IN THESE FIRE BARRIERS, INCLUDING CONDUITS AND PIPING, SHOULD BE SEALED OR CLOSED TO PROVIDE A FIRE RESISTANCE RATING AT LEAST EQUAL TO THAT OF THE FIRE BARRIER ITSELF. DOOR OPENINGS SHOULD BE PROTECTED WITH EQUIVALENT RATED DOORS, FRAMES AND

HARDWARE THAT HAVE BEEN TESTED AND APPROVED BY A NATIONALLY RECOGNIZED LABORATORY. SUCH DOORS SHOULD BE NORMALLY CLOSED AND LOCKED OR ALARMED WITH ALARM AND ANNUNCIATION IN THE CONTROL ROOM. PENETRATIONS FOR VENTILATION SYSTEM SHOULD BE PROTECTED BY A STANDARD "FIRE DOOR DAMPER" WHERE REQUIRED. (REFER TO NFPA 80, "FIRE DOORS AND WINDOWS.")

THE FIRE HAZARD IN EACH AREA SHOULD BE EVALUATED TO DETERMINE BARRIER REQUIREMENTS. IF BARRIER FIRE RESISTANCE CANNOT BE MADE ADEQUATE, FIRE DETECTION AND SUPPRESSION SHOULD BE PROVIDED, SUCH AS:

- (i) WATER CURTAIN IN CASE OF FIRE,
- (ii) FLAME RETARDANT COATINGS,
- (iii) ADDITIONAL FIRE BARRIERS.

Floors, walls and ceilings enclosing separate fire areas have minimum fire ratings of three hours. Penetrations through rated walls that are sealed provide fire resistance equivalent to the barrier itself. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning exceptions.)

Doors and hardware installed in fire boundaries have fire rating equal to the boundary rating. Doors and hardware are listed by or constructed to standards of a nationally recognized testing laboratory. Variances are discussed in the Hazard Analysis. (Ref. Correspondence - W. O. Parker's letter of July 29, 1982 and H. B. Tucker's letter of December 15, 1982 to Harold R. Denton (NRR) concerning exceptions.)

Ventilation penetrations through barriers are protected by rated fire dampers where required. These dampers are installed in accordance with

manufacturer's recommendations. (Ref. Correspondence - April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning exception.)

The fire hazard analysis was used to evaluate the need for fire barriers.

2. CONTROL OF COMBUSTIBLES

- (a) SAFETY RELATED SYSTEMS SHOULD BE ISOLATED OR SEPARATED FROM COMBUSTIBLE MATERIALS. WHEN THIS IS NOT POSSIBLE BECAUSE OF THE NATURE OF THE SAFETY SYSTEM OR THE COMBUSTIBLE MATERIAL, SPECIAL PROTECTION SHOULD BE PROVIDED TO PREVENT A FIRE FROM DEFEATING THE SAFETY SYSTEM FUNCTION. SUCH PROTECTION MAY INVOLVE A COMBINATION OF AUTOMATIC FIRE SUPPRESSION, AND CONSTRUCTION CAPABLE OF WITHSTANDING AND CONTAINING A FIRE THAT CONSUMES ALL COMBUSTIBLES PRESENT. EXAMPLES OF SUCH COMBUSTIBLE MATERIALS THAT MAY NOT BE SEPARABLE FROM THE REMAINDER OF ITS SYSTEM ARE:

- (1) EMERGENCY DIESEL GENERATOR FUEL OIL DAY TANKS
- (2) TURBINE-GENERATOR OIL AND HYDRAULIC CONTROL FLUID SYSTEMS
- (3) REACTOR COOLANT PUMP LUBE OIL SYSTEM

Safety related systems are separated from combustible materials except when required for system operation. (Ref. Correspondence - April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning flammable gases.)

(1) EMERGENCY DIESEL GENERATOR FUEL OIL DAY TANKS

Emergency diesel generator fuel oil day tanks and related equipment are located inside the Diesel Generator Building's three-hour barriers. Automatic detection is provided to alarm and annunciate

in the Control Room and activate the automatic carbon dioxide system protecting the area. Hose stations and portable extinguishers are provided as backup to the automatic suppression system. A dike around the day tank will contain the entire contents of the tank in the event of a spill. Tanks are vented to the exterior of the Diesel Generator Room. The day tank can be isolated from the Main Fuel Oil Tanks by means of a valve located exterior to the Diesel Generator Room.

(2) TURBINE-GENERATOR OIL AND HYDRAULIC CONTROL FLUID SYSTEMS

Turbine-generator oil and hydraulic control fluid systems are not exposed to safety related equipment required for shutdown.

(3) REACTOR COOLANT PUMP MOTOR LUBE OIL SYSTEM

The Reactor Coolant Pump Motors are equipped with oil collection systems designed to contain oil leakage and direct it to piping which goes to drain tanks. In addition to the pump motor design features for containing oil, each Reactor Coolant Pump is protected with a fixed water extinguishing system.

Heat sensing cable detectors around the pumps and motors alarm and annunciate in the Control Room. The operator then activates a remote manual valve from the Control Room to pressurize the fire protection header in the Reactor Building. Individual heads will then fuse as necessary to provide suppression.

(b) BULK GAS STORAGE (EITHER COMPRESSED OR CRYOGENIC), SHOULD NOT BE PERMITTED INSIDE STRUC-

TURES HOUSING SAFETY RELATED EQUIPMENT. STORAGE OF FLAMMABLE GAS SUCH AS HYDROGEN, SHOULD BE LOCATED OUTDOORS OR IN SEPARATE DETACHED BUILDINGS SO THAT A FIRE OR EXPLOSION WILL NOT ADVERSELY AFFECT ANY SAFETY RELATED SYSTEMS OR EQUIPMENT.

(REFER TO NFPA 50A, "GASEOUS HYDROGEN SYSTEMS.")

CARE SHOULD BE TAKEN TO LOCATE HIGH PRESSURE GAS STORAGE CONTAINERS WITH THE LONG AXIS PARALLEL TO BUILDING WALLS. THIS WILL MINIMIZE THE POSSIBILITY OF WALL PENETRATION IN THE EVENT OF A CONTAINER FAILURE. USE OF COMPRESSED GASES (ESPECIALLY FLAMMABLE AND FUEL GASES) INSIDE BUILDINGS SHOULD BE CONTROLLED. (REFER TO NFPA 6, "INDUSTRIAL FIRE LOSS PREVENTION.")

Bulk gas storage is located in a separate detached building with each tank restrained to prevent potential damage in the event of tank failure. (Ref. Correspondence - April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning flammable gases.)

- (c) THE USE OF PLASTIC MATERIALS SHOULD BE MINIMIZED. IN PARTICULAR, HALOGENATED PLASTICS SUCH AS POLYVINYL CHLORIDE (PVC) AND NEOPRENE SHOULD BE USED ONLY WHEN SUBSTITUTE NON-COMBUSTIBLE MATERIALS ARE NOT AVAILABLE. ALL PLASTIC MATERIALS, INCLUDING FLAME AND FIRE RETARDANT MATERIALS, WILL BURN WITH AN INTENSITY AND BTU PRODUCTION IN A RANGE SIMILAR TO THAT OF ORDINARY HYDROCARBONS. WHEN BURNING, THEY PRODUCE HEAVY SMOKE THAT OBSCURES VISIBILITY AND CAN PLUG AIR FILTERS, ESPECIALLY CHARCOAL AND HEPA. THE HALOGENATED PLASTICS ALSO RELEASE FREE CHLORINE AND HYDROGEN CHLORIDE WHEN BURNING WHICH ARE TOXIC TO HUMANS AND CORROSIVE TO EQUIPMENT.

Power/Control/Instrumentation cable used in the Auxiliary, Reactor Buildings, Diesel Generator Buildings, and Nuclear Service Water Pump

Structure is bare armored construction with exception of a few computer interface cables which are routed through enclosed cable tray(s). Refer to Section D.3(f) for a discussion of the construction and use of cable at Catawba. The use of other plastic materials will be controlled by Administrative Procedure. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) for additional information concerning jacketed cables.)

- (d) STORAGE OF FLAMMABLE LIQUIDS SHOULD, AS A MINIMUM, COMPLY WITH THE REQUIREMENTS OF NFPA 30, "FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE."

Station Directives will require storage of flammable liquids to, as a minimum, comply with intent of NFPA 30, "Flammable and Combustible Liquids Code."

3. ELECTRIC CABLE CONSTRUCTION, CABLE TRAYS AND CABLE PENETRATIONS

- (a) ONLY NON-COMBUSTIBLE MATERIALS SHOULD BE USED FOR CABLE TRAY CONSTRUCTION.

All cable trays are constructed of galvanized steel.

- (b) SEE SECTION F.3 FOR FIRE PROTECTION GUIDELINES FOR CABLE SPREADING ROOMS.

Fire protection for the Cable Spreading Room is discussed in Section F.3.

- (c) AUTOMATIC WATER SPRINKLER SYSTEMS SHOULD BE PROVIDED FOR CABLE TRAYS OUTSIDE THE CABLE SPREADING ROOM. CABLES SHOULD BE DESIGNED TO ALLOW WETTING DOWN WITH DELUGE WATER WITHOUT ELECTRICAL FAULTING. MANUAL HOSE STATIONS AND PORTABLE HAND EXTINGUISHERS SHOULD BE PROVIDED AS BACKUP. SAFETY RELATED EQUIPMENT IN THE VICINITY OF SUCH CABLE TRAYS, THAT DOES NOT ITSELF REQUIRE WATER FIRE PROTECTION, BUT IS SUBJECT TO UNACCEPTABLE DAMAGE FROM SPRINKLER WATER DISCHARGE, SHOULD BE PROTECTED FROM SPRINKLER SYSTEM OPERATION OR MALFUNCTION.

WHEN SAFETY RELATED CABLES DO NOT SATISFY THE PROVISIONS OF REGULATORY GUIDE 1.75, ALL EXPOSED CABLES SHOULD BE COVERED WITH AN APPROVED FIRE RETARDANT COATING AND A FIXED AUTOMATIC WATER FIRE SUPPRESSION SYSTEM SHOULD BE PROVIDED.

The results of the fire hazard analysis were used to determine the methods and extent of fire protection required in each area of the plant.

In areas with fixed sprinkler systems and/or hose stations, shields will be provided as necessary to protect safety related equipment from water damage.

Cable routing at Catawba satisfies the following criteria:

The separation of redundant safety related cables is provided by routing in separate cable trays, conduits, ducts, or other suitable wireways over different routes with adequate separation. Routing of redundant safety related cables located above

each other is intended to be avoided. Where this is not possible and they are located vertically above each other, the minimum vertical spacing is 60 inches in the general plant area and 36 inches in the Control Complex Area without additional protection or 12 inches with a barrier over the lower cables and a barrier under the upper cables. Where redundant safety related cables are located along side each other horizontally, 36 inches minimum separation is maintained in the general plant area and 12 inches in the Control Complex Area without additional protection. Cable tray covers, cable tray sides, conduits, armored cables, metal barriers and other barriers may provide this additional protection. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) detailing Appendix R cable separation information.)

- (d) CABLE AND CABLE TRAY PENETRATION OF FIRE BARRIERS (VERTICAL AND HORIZONTAL) SHOULD BE SEALED TO GIVE PROTECTION AT LEAST EQUIVALENT TO THAT FIRE BARRIER. THE DESIGN OF FIRE BARRIERS FOR HORIZONTAL AND VERTICAL CABLE TRAYS SHOULD, AS A MINIMUM, MEET THE REQUIREMENTS OF ASTM E-119, "FIRE TEST OF BUILDING CONSTRUCTION AND MATERIALS," INCLUDING THE HOSE STREAM TEST.

WHERE INSTALLED PENETRATION SEALS ARE DEFICIENT WITH RESPECT TO FIRE RESISTANCE, THESE SEALS MAY BE PROTECTED BY COVERING BOTH SIDES WITH AN APPROVED FIRE RETARDANT MATERIAL. THE ADEQUACY OF USING SUCH MATERIAL SHOULD BE DEMONSTRATED BY SUITABLE TESTING.

Cable and cable tray penetrations of fire barriers will be sealed to provide protection equivalent to the rating of the original barrier.

The design of the penetration seals will, as a minimum, meet the requirements of IEEE 634-1978 Standard on electrical cable penetration firestops including the hose stream test. The cable penetration firestops will meet the station differential pressure requirements. Test reports demonstrating compliance to IEEE 634-1978 have been submitted for review.

- (e) FIRE BREAKS SHOULD BE PROVIDED AS DEEMED NECESSARY BY THE FIRE HAZARDS ANALYSIS. FLAME OR FLAME RETARDANT COATINGS MAY BE USED AS A FIRE BREAK FOR GROUPED ELECTRICAL CABLES TO LIMIT SPREAD OF FIRE IN CABLE VENTINGS. (POSSIBLE CABLE DERATING OWING TO USE OF SUCH COATING MATERIALS MUST BE CONSIDERED DURING DESIGN.)

Requirements for fire barriers are determined from results of the fire hazard analysis. In addition, the armored cable design used for Catawba Nuclear Station has demonstrated high resistance to propagation as evidenced by testing of this design in a fully loaded, randomly filled, 400,000 BTU/hr exposure fire at the Underwriters Laboratories. The fully loaded trays showed no tendency for self-propagation; therefore, fire breaks are not required.

- (f) ELECTRICAL CABLE CONSTRUCTIONS SHOULD AS A MINIMUM PASS THE CURRENT IEEE NO. 383 FLAME TEST. (THIS DOES NOT IMPLY THAT CABLES PASSING THIS TEST WILL NOT REQUIRE ADDITIONAL FIRE PROTECTION.)

FOR CABLE INSTALLATION IN OPERATING PLANTS AND PLANTS UNDER CONSTRUCTION THAT DO NOT MEET THE IEEE NO. 383 FLAME TEST REQUIREMENTS, ALL CABLES MUST BE COVERED WITH AN APPROVED FLAME RETARDANT COATING AND PROPERLY DERATED.

The cable used at Catawba, classified as either power, control or instrumentation, passes the IEEE 383-1974 Flame Test.

The five, eight and fifteen KV cables are three conductor power cables with exception of the single conductor 15KV cables for the Nuclear Service Water Pump Motors which are routed through conduit. The tinned copper conductors are covered with a semi-conductive extruded strand shield, insulated with ethylene propylene rubber (EPR) and wrapped with a tinned copper shield tape. The three conductors are then twisted with a non-hygroscopic filler, bound together with asbestos binder tape, encased in a 25 mil galvanized steel interlocked armor jacket. (See Figures 1 and 2, pages 36 and 37.)

The three conductor 2KV power cable, which is used for 600 V systems, is constructed using a unipass flame retardant ethylene propylene rubber insulation over the tinned copper conductor. This is encased in 25 mil galvanized steel interlocked armor.

Control cables are multi-conductor cables. The tinned copper conductor has unipass ethylene propylene rubber or flame retardant cross-linked polyethylene (XLPE) insulation over the singles; the singles have been cabled with the non-hydroscopic fillers and covered with glass reinforced asbestos tape or fiberglass scrim tape. This is encased in 25 mil galvanized steel interlocked armor.

Instrumentation cable is single or multipaired cable consisting of No 16 AWG copper conductor with unipass EPR or XLPE insulation. The singles

5, 8, 15 KV POWER CABLE CONSTRUCTION

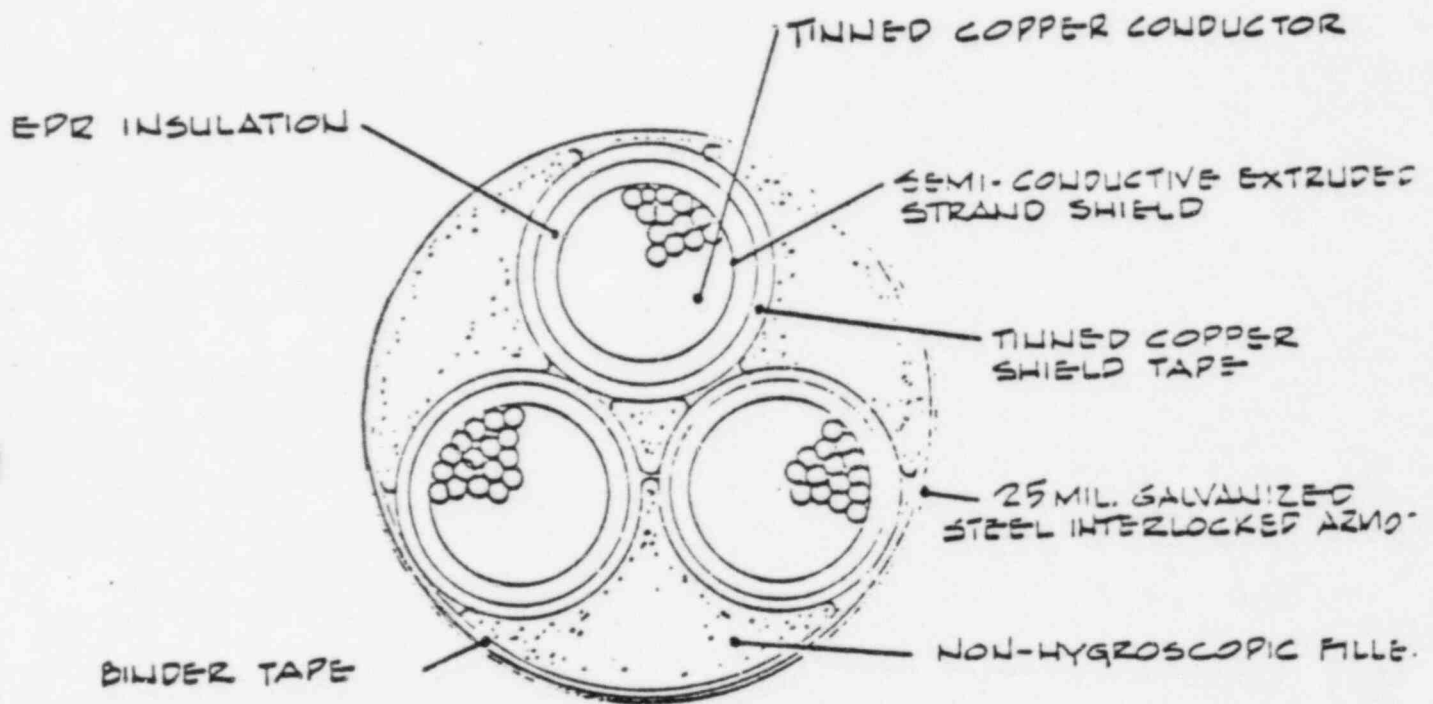


FIGURE 1

CONTROL CABLE CONSTRUCTION

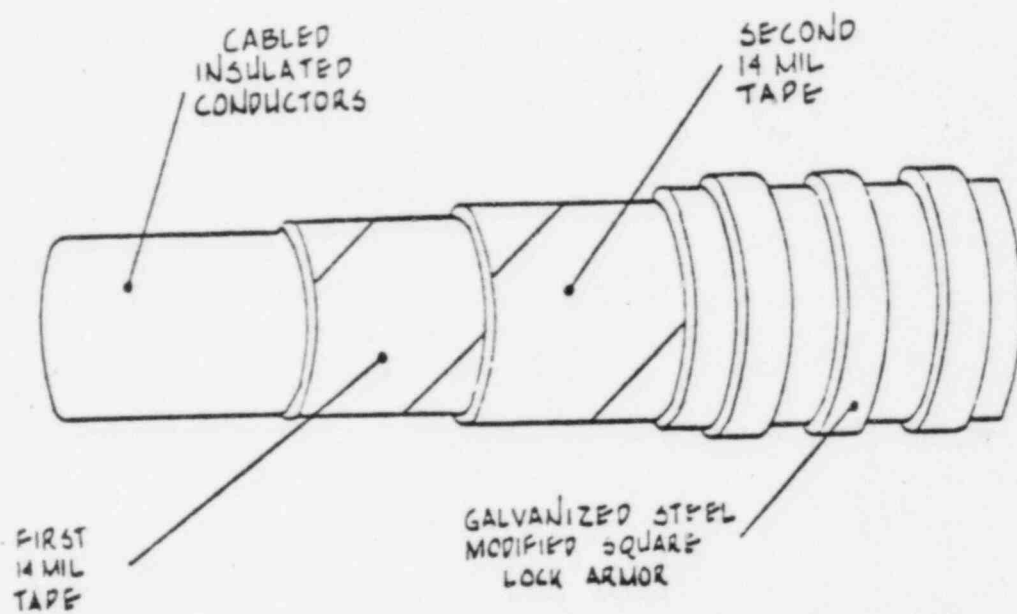


FIGURE 2

are paired and twisted with an aluminum mylar shield and cabled with glass reinforced asbestos tape or fiberglass scrim tape. This is encased in a 25 mil galvanized steel interlocked armor.

In addition to passing the IEEE 383 Flame Test, extensive flame testing of this particular interlocked armor design in typical plant configurations has been conducted. This test program culminated in a test series at the Underwriters Laboratories, Northbrook, Illinois, where a fully loaded tray consisting of seven conductor, number twelve, interlocked armor control cable, placed in a random lay, was exposed to a 400,000 BTU/hr heat flux. This is known as the UL corner test which consists of a sixteen foot cable run placed one foot from each corner and exposed to the heat flux of two ribbon burners.

This particular cable passed the 400,000 BTU/hr fully loaded test with no tendency for propagation on its own. Salient observations of the test series were as follows:

- (1) A time delay of five to six minutes was observed before the cable began to smoke or burn.
- (2) Burning of the cable took place in the immediate area of the source fire. Controlled propagation was evident from emission of gasses through the armor during the burn time.

- (3) Flame height and smoke emissions can be controlled by changing tapes under the armor.
- (4) Maximum burn time of this cable was five to eight minutes; whereafter the source flame receded to its original height for the test duration.
- (5) As a result of the above, this design provides a low smoking cable with a minimum amount of combustibles. There is a time delay before burning is initiated during which a source fire is self-consuming with no contribution from the cable. Cable burning is controlled with a demonstrated burn time of five to eight minutes.
- (6) Additionally, Steiner Tunnel Tests demonstrated this cable design to have an extremely low flame spread and smoke factor, further demonstrating its resistance to fire.

The use of armor on cables ensures they are more resistant to mechanical damage and electrostatic and electromagnetic interferences. The armor has also been demonstrated to provide protection from short circuits and overloads.

Short circuit tests performed at the Westinghouse High Power Laboratories, East Pittsburgh, Pennsylvania, have demonstrated the cable performance under short circuit. When deliberately faulted cables were exposed to short circuit currents of 50,000 amperes at 4160 and 6900

volts, adjacent power cables and control cables in trays directly above and beneath the faulted cables were not damaged.

In many overload test series, it was demonstrated that overloaded cables would not self-ignite and cause fire propagation within the overloaded tray or adjacent trays.

- (g) TO THE EXTENT PRACTICAL, CABLE CONSTRUCTION THAT DOES NOT GIVE OFF CORROSIVE GASES WHILE BURNING SHOULD BE USED IN NEW CABLE INSTALLATIONS.

Interlocked armor cable within the Auxiliary Building, Reactor Buildings, Diesel Generator Buildings, and Nuclear Service Water Pump Structure at Catawba have no outer jacket over the armor. The combustible loadings in these cables consist of the insulation over the single conductors underneath the armor, and the small quantity of fillers.

This is a low smoking cable design with no significant amount of halogen materials such as PVC'S. This cable design has a minimum amount of combustible material.

- (h) CABLE TRAYS, RACEWAYS, CONDUIT, TRENCHES, OR CULVERTS SHOULD BE USED ONLY FOR CABLES. MISCELLANEOUS STORAGE SHOULD NOT BE PERMITTED, NOR SHOULD PIPING FOR FLAMMABLE OR COMBUSTIBLE LIQUIDS OR GASES BE INSTALLED IN THESE AREAS.

Cable trays are used only to route cable. Cable located in pipe trenches is to service equipment located in that trench.

Miscellaneous storage in cable tray will be administratively prohibited by Station Directives.

- (i) THE DESIGN OF CABLE TUNNELS, CULVERTS AND SPREADING ROOMS SHOULD PROVIDE FOR AUTOMATIC OR MANUAL SMOKE VENTING AS REQUIRED TO FACILITATE MANUAL FIRE FIGHTING CAPABILITY.

Smoke venting to facilitate manual fire fighting capability in areas will be accomplished with portable fans.

- (j) CABLES IN THE CONTROL ROOM SHOULD BE KEPT TO THE MINIMUM NECESSARY FOR OPERATION OF THE CONTROL ROOM. ALL CABLES ENTERING THE CONTROL ROOM SHOULD TERMINATE THERE. CABLES SHOULD NOT BE INSTALLED IN FLOOR TRENCHES OR CULVERTS IN THE CONTROL ROOM.

Only those cables required for operation are routed to the Control Room. Cable entering the Control Room terminates there.

There are no floor trenches or culverts in the Control Room.

Cable run in the ceiling is for power and control of HVAC and lighting equipment located in the ceiling space. These cables terminate in the Control Room.

4. VENTILATION

- (a) THE PRODUCTS OF COMBUSTION THAT NEED TO BE REMOVED FROM A SPECIFIC FIRE AREA SHOULD BE EVALUATED TO DETERMINE HOW THEY WILL BE CONTROLLED. SMOKE AND CORROSIVE GASES SHOULD GENERALLY BE AUTOMATICALLY DISCHARGED DIRECTLY OUTSIDE TO A SAFE LOCATION.

SMOKE AND GASES CONTAINING RADIOACTIVE MATERIALS SHOULD BE MONITORED IN THE FIRE AREA TO DETERMINE IF RELEASE TO THE ENVIRONMENT IS WITHIN THE PERMISSIBLE LIMITS OF THE PLANT TECHNICAL SPECIFICATIONS.

Continuous monitoring is provided in appropriate areas throughout the Auxiliary Building to assure safe conditions of radioactivity and to alert operating personnel of any abnormality.

Specific areas with designated HVAC subsystems are addressed in the following paragraphs.

ELEVATION 594+0

FUEL HANDLING AREA

Outside air is provided for each fuel handling area by a separate supply subsystem consisting of a 100 percent capacity fan with heating and cooling coils and a medium efficiency (30 percent) air filter.

The fuel handling ventilation exhaust subsystem consists of four 50 percent capacity fans and filters (preheater prefilter, demister, absolute, carbon and absolute) and associated ductwork. Exhaust air is

directed either through the filters or the filter train bypass, as determined by a duct mounted radiation monitor, to the unit vent.

This operation affords a minimum of ten air changes per hour in the fuel pool area.

CONTROL AREA

The Control Area Ventilation and Air Conditioning Systems are designed to maintain the environment in the Control, Cable and Equipment Rooms within acceptable limits for the operation of the units.

Because of the uninterrupted safe occupancy during post-accident shutdown criteria, this system is designed as an Engineered Safety Feature System with absolute and carbon filtration in the outside air intakes and equipment redundancies for use as conditions require.

Two 100 percent capacity redundant air handling systems are provided for the Control Room.

Essential electrical apparatus involved with the cooling, heating and pressurizing of the Control Room during accident conditions is connected to emergency standby power.

A 2000 CFM purge fan is provided to purge smoke through the station vent. In addition, the Control Room Area pressurizing fans provide a continuous 2000 CFM of outside air to the Control Room.

Smoke from other areas on the 594+0 Elevation will be handled by the Auxiliary Building exhaust system assisted by portable fans.

ELEVATION 577+0 and 574+0

The Cable, MCC, and Switchgear Rooms for Unit 1 and Unit 2 are served by the Control Room Area Ventilation System as described on page 42.

The Control Room Area pressurizing fans which serve all areas of the Control Complex, except for the Switchgear Rooms, supply 2000 CFM of outside air to these areas.

The ventilation units for these areas (not including the Switchgear Rooms) supply 73,510 CFM each. The ventilation units for the Switchgear Rooms supply 10,400 CFM to each room.

The remainder of Elevation 577+0 is served by the Auxiliary Building ventilation system. Portable fans would be used to remove smoke from affected areas to the exhaust system as required.

ELEVATION 560+0 and 554+0

The Battery, MCC and Switchgear Rooms are served by the Control Area Ventilation System.

The Control Room Area pressurizing fans serve all areas of the Control Complex except for the Switchgear Rooms. Refer also to Elevation 577+0 for pressurizing fan and ventilation unit capacities.

DIESEL BUILDING

The Diesel Building Ventilation System is designed to provide a suitable environment for the operation of equipment and personnel access as required for inspection, operation and maintenance.

The system is composed of the following components:

- (1) A set of filters for normal ventilation supply air to the system.
- (2) One ventilating fan and one heating coil for maintenance of building temperature.
- (3) Two 50 percent capacity ventilation fans, ducts, diffusers, automatic return air and outside air dampers are arranged to maintain ventilation requirements during diesel operation.

Upon actuation of the carbon dioxide fire suppression system, the Diesel Building Ventilation System is automatically de-energized and the outside air and exhaust dampers are closed.

ELEVATIONS 543+0 AND 522+0

These areas are served by the Auxiliary Building Ventilation System with portable fans utilized as required.

CONTAINMENT

The Containment Ventilation System is designed to maintain temperature in the various portions of the Containment within acceptable limits for operation of equipment and for personnel access for inspection, main-

tenance and testing as required. In addition, the Containment Purge System is provided for purging the Containment atmosphere to the environment via the unit vent. These systems are not Engineered Safety Features.

The Containment Purge and Containment Ventilation Systems consist of the independent subsystems described below:

Containment Purge Supply and Exhaust

Purge air is supplied to the Containment through two 50 percent capacity fans and their associated filters and heating coils. Purged air is exhausted through two 50 percent capacity fans and filter networks to the unit vent where it is monitored during release to the atmosphere. The purge air supply and exhaust fans and filters are located in the Auxiliary Building.

There are four purge air supply penetrations and three purge air exhaust penetrations in the Containment. These penetrations are in the upper compartment and lower compartment. Two normally closed isolation valves in each penetration provide Containment isolation.

The system has the capacity to assure approximately 1.5 complete air changes per hour. Purge capacity is controlled by throttling dampers.

The upper compartment purge exhaust ductwork is so arranged to draw exhaust air into a plenum around the periphery of the refueling canal,

effecting a ventilation sweep of the canal, during the refueling process. The lower compartment purge exhaust ductwork is arranged so as to sweep the reactor well during the refueling process.

Containment Upper Compartment Ventilation

The Containment upper compartment ventilation subsystem consists of four freestanding, recirculating ventilation units (three for normal operation, one standby) and their associated cooling coils, and ductwork.

Containment Lower Compartment Ventilation

The Lower Containment compartment ventilation subsystem consists of four recirculating ventilation units (three in normal operation, one standby) and their associated cooling coils, and ductwork. This equipment is located in the annular concrete chambers around the periphery of the lower Containment compartment.

Control Rod Drive Ventilation System

The control rod drive ventilation subsystem consists of four recirculating fans (three in normal operation, one standby) and associated ductwork. The fans are located in the lower compartment outside the primary shield and the supply ducts are arranged to maintain the required flow of cooling air through the control rod drive mechanism shroud.

Air is drawn from the lower compartment and is returned to the lower compartment after passing through the mechanism shroud.

In-core Instrument Room Ventilation

The In-core Instrumentation Room is a dead-ended part of the lower Containment compartment. The In-core Instrumentation Room ventilation subsystem consists of two freestanding ventilation units (one in normal operation, one standby) and associated cooling coils, and ductwork.

In-core Instrument Room Purge

Purge air is supplied to the In-core Instrumentation Room through one 100 percent capacity fan and its associated filters, heating coil, and ductwork. Purged air is exhausted through one 100 percent capacity fan and filter train to the unit vent where it is monitored during release to the atmosphere. Two normally closed isolation valves in each of the two penetrations (one supply and one exhaust) provide In-core Instrumentation Room isolation.

Containment Auxiliary Carbon Filter

This system consists of two fan-filter units located in the lower Containment compartment, arranged to assure uniform mixing of the lower compartment atmosphere with either or both units operating. Prefilters, absolute and carbon filters are provided in each unit for reduction of fission product activity which may be airborne in the lower compartment as the result of fuel cladding defects and reactor coolant leakage.

The lower compartment atmosphere is continuously monitored for radioactivity during reactor power operation for display in the Control Room. The number of auxiliary carbon filter units in operation (one or two) depends on the airborne activity levels observed. Sufficient redundancy is included to assure proper operation of the system with one active component out of service.

- (b) ANY VENTILATION SYSTEM DESIGNED TO EXHAUST SMOKE OR CORROSIVE GASES SHOULD BE EVALUATED TO ENSURE THAT INADVERTENT OPERATION OR SINGLE FAILURES WILL NOT VIOLATE THE CONTROLLED AREAS OF THE PLANT DESIGN.

THIS REQUIREMENT INCLUDES CONTAINMENT FUNCTIONS FOR PROTECTION OF THE PUBLIC AND MAINTAINING HABITABILITY FOR OPERATIONS PERSONNEL.

The air exhausted to the environment from potentially contaminated areas is monitored and filtered, as required, such that limits of 10CFR20 and Technical Specifications are not exceeded.

- (c) THE POWER SUPPLY AND CONTROLS FOR MECHANICAL VENTILATION SYSTEMS SHOULD BE RUN OUTSIDE THE FIRE AREA SERVED BY THE SYSTEM.

The power supply and controls for redundant mechanical ventilation systems are located at separate motor control centers and will not be affected by a single fire.

- (d) FIRE SUPPRESSION SYSTEMS SHOULD BE INSTALLED TO PROTECT CHARCOAL FILTERS IN ACCORDANCE WITH

REGULATORY GUIDE 1.52, "DESIGN TESTING AND
MAINTENANCE CRITERIA FOR ATMOSPHERIC CLEANUP AIR
FILTRATION."

Carbon filters are protected by built-in water spray systems. Upon receipt of an alarm, the valves to the carbon filter involved will be manually opened at the discretion of the responding operator.

- (e) THE FRESH AIR SUPPLY INTAKES TO AREAS CONTAINING SAFETY RELATED EQUIPMENT OR SYSTEMS SHOULD BE LOCATED REMOTE FROM THE EXHAUST AIR OUTLETS AND SMOKE VENTS OF OTHER FIRE AREAS TO MINIMIZE THE POSSIBILITY OF CONTAMINATING THE INTAKE AIR WITH THE PRODUCTS OF COMBUSTION.

Outside air for the Control Area is taken from two locations such that a source of uncontaminated air is available regardless of wind direction following an event which releases radioactivity to the atmosphere. Each intake is provided with radiation, chlorine, and smoke detection to automatically close the intake in the event of contamination. Should an intake be automatically closed, it will remain closed until it is manually reopened. If both intakes close at the same time the operator will manually reopen the least contaminated intake to reestablish pressurization in the Control Room. The fresh air intakes are at elevation 594+0 located such that each is placed on the outside of Reactor Building diametrically opposed to that unit's vent. Normally air is taken from both intakes.

- (f) STAIRWELLS SHOULD BE DESIGNED TO MINIMIZE SMOKE INFILTRATION DURING A FIRE. STAIRCASES SHOULD SERVE AS ESCAPE ROUTES AND ACCESS ROUTES FOR

FIRE FIGHTING. FIRE EXIT ROUTES SHOULD BE CLEARLY MARKED. STAIRWELLS, ELEVATORS AND CHUTES SHOULD BE ENCLOSED IN MASONRY TOWERS WITH MINIMUM FIRE RATING OF THREE HOURS AND AUTOMATIC FIRE DOORS AT LEAST EQUAL TO THE ENCLOSURES CONSTRUCTION, AT EACH OPENING INTO THE BUILDING. ELEVATORS SHOULD NOT BE USED DURING FIRE EMERGENCIES.

Stairwells, duct shafts and elevator shafts are enclosed with three-hour rated walls. Three hour rated doors are provided for duct shafts and stairwells. Elevator doors are 1½ hour fire rated. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning unprotected spiral stairs.)

Stairwells are centrally located and marked as emergency exits.

Station procedures will prevent the use of elevators as fire exits.

- (g) SMOKE AND HEAT VENTS MAY BE USEFUL IN SPECIFIC AREAS SUCH AS CABLE SPREADING ROOMS AND DIESEL FUEL OIL STORAGE AREAS AND SWITCHGEAR ROOMS. WHEN NATURAL-CONVECTION VENTILATION IS USED, A MINIMUM RATIO OF 1 SQ FOOT OF VENTING AREA PER 200 SQ FEET OF FLOOR AREA SHOULD BE PROVIDED. IF FORCED CONVECTION VENTILATION IS USED, 300 CFM SHOULD BE PROVIDED FOR EVERY 200 SQ FEET OF FLOOR AREA. SEE NFPA 204 FOR ADDITIONAL GUIDANCE ON SMOKE CONTROL.

The Control Room is equipped with a 2000 CFM fan to purge smoke to the station vent.

Portable fans will be used to remove smoke from affected areas to the exhaust systems as required.

- (h) SELF-CONTAINED BREATHING APPARATUS, USING FULL FACE POSITIVE PRESSURE MASKS, APPROVED BY NIOSH (NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH - APPROVAL FORMERLY GIVEN BY THE U S BUREAU OF MINES) SHOULD BE PROVIDED FOR FIRE BRIGADE, DAMAGE CONTROL AND CONTROL ROOM PERSONNEL. CONTROL ROOM PERSONNEL MAY BE FURNISHED BREATHING AIR BY A MANIFOLD SYSTEM PIPED FROM A STORAGE RESERVOIR IF PRACTICAL. SERVICE OR OPERATING LIFE SHOULD BE A MINIMUM OF ONE HALF HOUR FOR THE SELF-CONTAINED UNITS.

AT LEAST TWO EXTRA AIR BOTTLES SHOULD BE LOCATED ONSITE FOR EACH SELF-CONTAINED BREATHING UNIT. IN ADDITION, AN ONSITE 6-HOUR SUPPLY OF RESERVE AIR SHOULD BE PROVIDED AND ARRANGED TO PERMIT QUICK AND COMPLETE REPLENISHMENT OF EXHAUSTED SUPPLY AIR BOTTLES AS THEY ARE RETURNED. IF COMPRESSORS ARE USED AS A SOURCE OF BREATHING AIR, ONLY UNITS APPROVED FOR BREATHING AIR SHOULD BE USED. SPECIAL CARE MUST BE TAKEN TO LOCATE THE COMPRESSOR IN AREAS FREE OF DUST AND CONTAMINANTS.

Self-contained breathing apparatus, approved by NIOSH, will be provided for the fire brigade and damage control personnel.

A breathing air compressor will be provided for refilling expended self-contained breathing apparatus.

A portable cascade system and/or self-contained breathing apparatus will be provided for Control Room personnel.

- (i) WHERE TOTAL FLOODING GAS EXTINGUISHING SYSTEMS ARE USED, AREA INTAKE AND EXHAUST VENTILATION

DAMPERS SHOULD CLOSE UPON INITIATION OF GAS FLOW TO MAINTAIN NECESSARY GAS CONCENTRATION. (SEE NFPA 12, "CARBON DIOXIDE SYSTEMS," AND 12A, "HALON 1301 SYSTEMS.")

A carbon dioxide system is used in the Diesel Generator Buildings and Auxiliary Feedwater Pump pits. The dampers in intake and exhaust ducts will close upon initiation of the protection system.

5. LIGHTING AND COMMUNICATION

LIGHTING AND TWO-WAY VOICE COMMUNICATIONS ARE VITAL TO SAFE SHUTDOWN AND EMERGENCY RESPONSE IN THE EVENT OF FIRE. SUITABLE FIXED AND PORTABLE EMERGENCY LIGHTING AND COMMUNICATION DEVICES SHOULD BE PROVIDED TO SATISFY THE FOLLOWING REQUIREMENTS:

- (a) FIXED EMERGENCY LIGHTING SHOULD CONSIST OF SEALED BEAM UNITS WITH INDIVIDUAL 8-HOUR MINIMUM BATTERY POWER SUPPLIES.

Emergency lights with individual 8-hour battery powered supplies are provided in the Control Room, Auxiliary Shutdown Panel (ASP) area, in areas containing motor control centers and valves which are required to be manned when bringing the unit to a hot shutdown condition and along the access way from the Control Room to the ASP area. Appendix R emergency lighting requirements are addressed in Appendix D.

Emergency Lighting System

For each of the units, there is a separate emergency 250 volt dc lighting system and a separate emergency 208Y/120 volt ac lighting system.

Emergency 250 Volt DC Lighting System

The 250 volt dc lighting system, which is normally de-energized, provides operating level lighting in the Control Room and lighting at selected stairs and corridors in the Containment, Auxiliary, and Turbine Buildings. The emergency lighting circuits are energized automatically as needed by undervoltage sensing relays mounted on the normal ac lighting panelboards. A test button is provided at each panelboard to test the operability of the system without affecting normal lighting.

Emergency AC Lighting System

The emergency ac lighting system, which is normally de-energized, provides lighting in the following parts of the Auxiliary Building: Control Room, Cable Room and Equipment Room, stairs, exits, corridors, Switchgear Rooms, Hot Machine Shop, Fuel Pool, Fuel Unloading Area, Decontamination Rooms, Pump and Tank Room areas, Fan and Ventilation Rooms, Penetration Rooms, Purge Rooms and Diesel Rooms. The stairs and platforms in the Containment are also provided lighting to enable personnel to leave or enter the structure. Power is provided from two essential 600 volt ac motor control centers through two panelboards located in the Auxiliary Building. The emergency ac lighting is energized automatically by undervoltage sensing relays monitoring the normal 600 volt ac feeder voltage. Should a blackout occur, the emergency ac lighting system will be energized by the diesel generator sequencer. Should a blackout occur simultaneously with a LOCA, the operator may energize this lighting system as soon as the diesel generator LOCA loading sequence has been completed.

- (b) SUITABLE SEALED BEAM BATTERY POWERED PORTABLE HAND LIGHTS SHOULD BE PROVIDED FOR EMERGENCY USE.

Portable hand lights will be provided for emergency use.

- (c) FIXED EMERGENCY COMMUNICATION SHOULD USE VOICE POWERED HEAD SETS AT PRESELECTED STATIONS.

There are two communication systems at the Catawba Station: (a) the station Telephone System and (b) the Public Address System. These systems are designed in such a manner as to satisfy the single failure requirement. In addition, there are a limited number of telephones on a direct line from the commercial telephone system and a limited number of telephones on a direct line from the Duke Power microwave system.

Direct voice communications within the station is handled by the Station Telephone System by use of extension telephones with direct dialing between extensions. Station personnel may be paged by use of the station telephones and a special interface between the telephone switch (i.e., PAX) equipment and the PA amplifiers. In the event of a failure of the telephone switch, voice paging and direct conversation can be accomplished by the use of PA handsets.

Commercial telephone lines or Duke microwave lines may be accessed for outside calls by any extension telephone of the switch. These calls may be placed either by direct dialing or through the station console opera-

tor, depending upon which extension telephone is being used to place the call. Incoming outside calls may be received from the commercial telephone lines or the Duke microwave lines by the station console operator, who can then transfer the calls to any extension telephone of the switch. In addition to these interfaced lines, a commercial line and a Duke microwave line are extended directly to specific telephones in several vital locations in the station.

The Station Telephone System provides the primary means of communication for both direct conversation and for voice paging. For paging from telephones, a special interface is provided between the telephone switch and the PA system amplifiers. The telephone equipment is comparable to that of the local telephone company in operation and in equipment quality. Telephones are located so as to be accessible from any occupied area of the plant. Therefore, the telephone system should be considered adequate for communication purposes should the PA system be destroyed or disabled. 120V AC power is supplied by an AC-DC-AC battery-inverter system to the telephone switch. In the event of failure of the ac power source, the battery-inverter system can maintain the telephone switch for a minimum of one hour.

In the event of a failure of the telephone switch, the PA system remains with an adequate number of PA handsets for general coverage of the station site. The necessary power for speaker amplifiers and handset preamplifiers is from a supply which is separate from the supply feeding the Station Telephone System.

In addition to the previously described systems, a fixed repeater will be installed to provide an additional communications net for the containment. The repeater will be connected only during unit outages and when the fire brigade must enter containment. Also Electro Sound Power jacks complete with head sets are provided throughout the containment for additional voice communication.

E. FIRE DETECTION AND SUPPRESSION

1. FIRE DETECTION

- (a) FIRE DETECTION SYSTEMS SHOULD AS A MINIMUM COMPLY WITH THE NFPA 72D, "STANDARD FOR THE INSTALLATION, MAINTENANCE AND USE OF PROPRIETARY PROTECTIVE SIGNALING SYSTEMS."

The Fire Detection System complies with the intent of NFPA 72D, 1975. It is a "Type I" supervised system which provides alarm and trouble indication to the Control Room from all detectors and tested by operating personnel to insure system integrity. Back-up batteries are provided for emergency operation with alarm indication in the Control Room if normal power is lost.

While the Fire Detection System design complies with the intent of NFPA 72D, 1975, and 72E, 1974, specific features of the Catawba Nuclear Station design may differ in certain areas. Clarification of these areas is provided below:

Paragraph 1223 -

The Control Room operator will acknowledge "Fire Alarm" or "Trouble Alarm" from the Fire Detection System and take appropriate action.

Paragraphs 1231 and 1232 -

The Fire Detection System is continually supervised. System operability including individual detection instruments will be verified in accordance with Catawba Technical Specification.

Paragraph 2110 -

Installation of wiring and equipment is in accordance with Duke Power Company Standards which meet the requirements for Nuclear Power Plant Design.

Paragraph 2213 -

Conductors are protected in accordance with their current-carrying capacities. They meet Duke Power Company Standard Design for Nuclear Power Plants.

Paragraph 2224 -

Power to the Fire Detection System Processing Control Center is supplied from the Station Auxiliary Control Power System. This power system is backed by both batteries and the station diesel generators. Loss of power to the Processing Control Center is annunciated in the Control Room.

Paragraph 2471-

Trouble alarms on the containment area local alarms (Public Address System) are not provided. Any Public Address System failure will be readily apparent due to its frequent use when the containment area is accessible. Since failure of the tone generator equipment would not be readily apparent, the Reactor Building evacuation alarm will be manually activated upon verification of a fire inside containment when personnel may be in the area.

Paragraph 2551-C-

The distinct local fire alarm broadcast over the Public Address System in the Reactor Building could have a lower priority than the reactor building radiation alarm, evacuating alarm, or the site assembly alarm, all of which are broadcast in the same manner. The response of personnel will be the same for all four of the above alarms inside the Reactor Building.

Paragraph 3330 -

The Fire Detection System has been designed and installed by persons trained in Fire Protection System engineering to meet the intent of NFPA 72E, 1974.

Paragraph 3520 -

Smoke detection equipment will be installed in accordance with the intent of NFPA 72E, 1974 as recommended by persons trained in Fire Protection System engineering.

- (b) FIRE DETECTION SYSTEM SHOULD GIVE AUDIBLE AND VISUAL ALARM AND ANNUNCIATION IN THE CONTROL ROOM. LOCAL AUDIBLE ALARMS SHOULD ALSO SOUND AT THE LOCATION OF THE FIRE.

The activation of any detector provides a local alarm in the area of the activation as well as an audible and visual alarm in the Control Room.

- (c) FIRE ALARMS SHOULD BE DISTINCTIVE AND UNIQUE. THEY SHOULD NOT BE CAPABLE OF BEING CONFUSED WITH ANY OTHER PLANT SYSTEM ALARMS.

In addition to the local alarm, the PA System is used to alert fire brigade personnel. The fire alarm is sufficiently different from other plant system alarms to preclude confusion.

- (d) FIRE DETECTION AND ACTUATION SYSTEMS SHOULD BE CONNECTED TO THE PLANT EMERGENCY POWER SUPPLY.

The Fire Detection System Processing Control Center is powered from the battery-backed Auxiliary Control Power System. In the event of a black-out, the Auxiliary Control Power System is powered from the emergency diesel generators. Each data gathering panel of the detection system is equipped with back-up batteries.

2. FIRE PROTECTION WATER SUPPLY SYSTEMS

- (a) AN UNDERGROUND YARD FIRE MAIN LOOP SHOULD BE INSTALLED TO FURNISH ANTICIPATED FIRE WATER REQUIREMENTS. NFPA 24 - STANDARD FOR OUTSIDE PROTECTION - GIVES NECESSARY GUIDANCE FOR SUCH INSTALLATION. IT REFERENCES OTHER DESIGN CODES AND STANDARDS DEVELOPED BY SUCH ORGANIZATIONS AS THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) AND THE AMERICAN WATER WORKS ASSOCIATION (AWWA). LINED STEEL OR CAST IRON PIPE SHOULD BE USED TO REDUCE INTERNAL TUBERCULATION. SUCH TUBERCULATION DEPOSITS IN AN UNLINED PIPE OVER A PERIOD OF YEARS CAN SIGNIFICANTLY REDUCE WATER FLOW THROUGH THE COMBINATION OF INCREASED FRICTION AND REDUCED PIPE DIAMETER. MEANS FOR TREATING AND FLUSHING THE SYSTEMS SHOULD BE PROVIDED. APPROVED VISUALLY INDICATING SECTIONAL CONTROL VALVES, SUCH AS POST INDICATOR VALVES, SHOULD BE PROVIDED TO ISOLATE PORTIONS OF THE MAIN FOR MAINTENANCE OR REPAIR WITHOUT SHUTTING OFF THE ENTIRE SYSTEM. VISIBLE LOCATION MARKING SIGNS FOR UNDERGROUND VALVES IS ACCEPTABLE. ALTERNATIVE VALVE POSITION INDICATORS SHOULD ALSO BE PROVIDED.

An underground fire loop (12" cement-lined ductile iron) is provided around the perimeter of the plant site as shown on drawing CFP-9 in Appendix B.

Normally open control valves on the exterior fire protection yard main which are locked open or have supervisory tamper switch alarms will be inspected monthly. Regularly scheduled, recorded inspections and key control procedures will assure availability of fire protection water.

The exterior fire protection is arranged in accordance with the intent of NFPA 24-1978 "Outside Protection." Isolation valves are not provided for individual fire hydrants, which is at variance with the aforementioned code. Fire hydrants are isolated by operation of divisional valves on the fire protection yard loop. An impairment due to a broken fire hydrant will not impair or affect delivering an adequate water supply to Fire Protection Systems in the Auxiliary Building, Diesel Generator Buildings, Reactor Buildings, or Nuclear Service Water Pump Structure due to piping configuration of the fire protection yard loop.

A portion of the underground fire protection yard loop is routed beneath the Administration Building. Spread footing foundation reduce the possibility of foundation settlement breaking underground piping.

- (b) A COMMON YARD FIRE MAIN LOOP MAY SERVE MULTI-UNIT NUCLEAR POWER PLANT SITES, IF CROSS-CONNECTED BETWEEN UNITS. SECTIONAL CONTROL VALVES SHOULD PERMIT MAINTAINING INDEPENDENCE OF THE INDIVIDUAL LOOP AROUND EACH UNIT. FOR SUCH INSTALLATIONS, COMMON WATER SUPPLIES MAY ALSO BE UTILIZED. THE WATER SUPPLY SHOULD BE SIZED FOR THE LARGEST SINGLE EXPECTED FLOW. FOR MULTIPLE

REACTOR SITES WITH WIDELY SEPARATED PLANTS
(APPROACHING 1 MILE OR MORE), SEPARATE YARD FIRE
MAIN LOOPS SHOULD BE USED.

One fire main loop serves both Unit 1 and Unit 2 with multiple connections to interior Fire Protection Systems.

Redundant yard mains, supply the Auxiliary Building fire protection header.

The water flow is adequate to meet the demand from the largest Automatic Sprinkler System in the safety related portion of the station with an allowance of 1000 gpm for hose stations. (Ref. Correspondence - April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning water demand information.)

- (c) IF PUMPS ARE REQUIRED TO MEET SYSTEM PRESSURE OR FLOW REQUIREMENTS, A SUFFICIENT NUMBER OF PUMPS SHOULD BE AVAILABLE WITH ONE PUMP INACTIVE (e.g., THREE 50 PERCENT PUMPS OR TWO 100 PERCENT PUMPS). THE CONNECTION TO THE YARD FIRE MAIN LOOP FROM EACH FIRE PUMP SHOULD BE WIDELY SEPARATED, PREFERABLY LOCATED ON OPPOSITE SIDES OF THE PLANT. EACH PUMP SHOULD HAVE ITS OWN DRIVER WITH INDEPENDENT POWER SUPPLIES AND CONTROL. AT LEAST ONE PUMP (IF NOT POWERED FROM THE EMERGENCY DIESELS) SHOULD BE DRIVEN BY NON-ELECTRICAL MEANS, PREFERABLY DIESEL ENGINE. PUMPS AND DRIVERS SHOULD BE LOCATED IN ROOMS SEPARATED FROM THE REMAINING PUMPS AND EQUIPMENT BY A MINIMUM THREE-HOUR FIRE WALL. ALARMS INDICATING PUMP RUNNING, DRIVER AVAILABILITY, OR FAILURE TO START SHOULD BE PROVIDED IN THE CONTROL ROOM.

DETAILS OF THE FIRE PUMP INSTALLATION SHOULD AS A MINIMUM CONFORM TO NFPA 20, "STANDARD FOR THE INSTALLATION OF CENTRIFUGAL FIRE PUMPS."

The water supply is provided by three full capacity electric motor driven fire pumps supplied with water from Lake Wylie. Each pump is designed for 2500 gpm at 144 psig. Each pump can meet the maximum water demand of a sprinkler or deluge system, plus 1000 gpm (750 gpm Turbine Buildings) for hose streams. The set pressures at which the pumps are activated are staggered. Once the fire pumps are started, they can only be shut off manually. The three fire pumps have independent power supplies and controls. Two fire pumps are supplied by station diesel generators during blackout conditions.

In addition to the fire pumps, one 200 gpm and two 25 gpm jockey pumps are provided to prevent frequent starting of the fire pumps by maintaining pressure in the yard mains at 125 psig. These pumps maintain the system pressure above the set point pressures of the fire pumps by replenishing any water lost by leakage in fire mains.

The Fire Protection System is designed to meet the intent of standards developed by the National Fire Protection Association (NFPA) where practicable. In addition, the design of the system will be in accordance with the Nuclear Regulatory Commission's 10CFR50 Appendix A, Criterion 3.

A 5000 gallon pressurizer tank is provided in the system to act as an accumulator or surge tank for the jockey pumps. The tank has a nitrogen volume in the top of the tank which expands or contracts with pressure fluctuations in the Fire Protection System.

Each fire pump is driven by a 300 HP motor. One 25 HP and two 5 HP jockey pumps are driven by 600V motors.

Power to Fire Pump A is from Unit 1, 6.9KV Switchgear 1TC; Fire Pump B is from Unit 1, 4.16KV Switchgear 1FTB; Fire Pump C is from Unit 2, 4.16KV Switchgear 2FTA.

A redundant starting scheme based on system pressure drop is utilized for the three main fire pumps. If a fire occurs, the drop in line pressure caused by sprinkler, deluge system or hose operation actuates a set of pressure switches. The set points are staggered so that if the first pump set to start fails, the second pump automatically starts. If the second pump also fails, the third pump operates.

A manual start pushbutton for each pump is provided in the Control Room for further redundancy.

Annunciator alarms are provided for each pump to indicate control power failure or failure to start. Computer alarms are also provided for each pump to indicate that a pump is running or that a pump has failed to start.

Two of the three fire pumps located in the same bay of the intake structure are separated by a three hour fire rated wall. The other fire pump is located in an adjacent bay of the intake structure. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to

Harold R. Denton concerning fire pump arrangement detail and supply information.)

Fire pumps and fire pump power supplies are arranged in accordance with the intent of NFPA 20-1978 "Centrifugal Fire Pumps" except as follows:

An OS&Y control valve is not provided in the pump suction piping. This isolation valves is not necessary to isolate the fire pump suction piping.

Section 6-3.2 All fire pump motor power supply cables are armored cable; in addition, one power supply cable is routed in metal conduit.

Section 6-3.3.2 Paragraph 2, Fire pump power supplies are routed through the Power House. The arrangement is acceptable due to redundancy, fire barriers and spatial separation.

Section 6-3.3.3 Fire Pump Motors are designed to start at 80% voltage and operate at 90% voltage.

Section 6-3.3.4 Voltage drop during start in excess of 15% is acceptable because fire pump motors are designed to start at 80% voltage.

Section 6-4.2 Isolation. Nuclear safety precludes shedding all loads except fire pumps "when necessary."

Section 7-1.1.1 Switchgear which is not "Specifically" listed for electric motor driven fire pump service is used as pump controllers.

Section 7-1.1.2 The controllers are 4.16KV and 6.9KV metal-clad switchgear breakers which are part of the 4.16KV blackout and 6.9KV Normal Auxiliary Power Systems, respectively.

Section 7-1.1.3 Each switchgear cubicle, housing a breaker feeding the fire pump motors, is labeled with an engraved nameplate: "Main Fire Pump Motor _____."

Section 7-2 The 4.16KV blackout and 6.9KV switchgear lineups are located in the Service and Turbine Buildings, respectively.

Section 7-2.1 Controllers are located for adequate redundancy and environmental control.

Section 7-3.5 Overcurrent protection is acceptable on fire pump controller circuits due to redundancy. (Fuses are installed in control power circuits.)

Section 7-3.7.1 and Section 7-3.7.9 Documents are retained in the Station Master Files.

Section 7-4.1 A switchgear circuit breaker serves as both fire pump controller and isolation means.

Section 7-4.1.1 In the test or disconnect position, the breaker is physically and electrically removed from the circuit.

Section 7-4.1.3 A safety shutter automatically covers all high voltage bus/connectors when the breaker is racked out from the operate position.

Section 7-4.1-4 The breaker is mechanically interlocked such that it cannot be racked out from the operate position unless the breaker is tripped.

Section 7-4.2 Protective relaying and metering are accomplished through the use of potential and current transformers serving their respective busses. These transformers are wired through test switches which allow easy accessibility for testing and calibrating the relays and metering devices. Motor protection is accomplished by solid state instantaneous/time delay overcurrent and ground fault relays. Relay settings are coordinated with the motors' damage curves to offer both motor availability and protection.

Section 7-4.2.7 Circuit trip time is 2 - 3 seconds.

Section 7-4.2.11 Circuit breakers are tripped from the Control Room (rather than at the controller).

Section 7-4.3 Motors are started across the line.

Section 7-4.4 Red and green panel lights, which are an integral part of the breaker control switches, indicate if a breaker is closed (red) or open (green). (See Section 7-6.6)

Section 7-4.5 Local and Control Room indicating lights, digital computer points and an annunciator alarm are activated when any fire pump controller is operated into a motor running condition and are powered by 125VDC control power. Loss of switchgear bus voltage is indicated by annunciator and computer alarms and video graphics display with their input derived from a single phase undervoltage relay on each switchgear bus.

Section 7-6.1 The components comprising a Catawba fire pump controller are as follows:

- 1) 4.16KV and 6.9KV switchgear breakers and associated protective relaying and metering devices,
- 2) Remove control switch,
- 3) Loss of control voltage alarm relay,
- 4) Pressure switch or initiating automatic start, and
- 5) Local control devices

Of these components, the control switches, alarm relay and pressure switches are all UL approved.

If the automatic start components fail, manual start capability is provided by the local or remote control devices. No automatic method of de-activating a fire pump is provided. Manual stop capability for each

pump is provided by the local control device located at the switchgear breaker and by the remote control switch in the Control Room. Upon receipt of fire pump start or trouble alarms in the Control Room, the appropriate personnel will be dispatched as provided for in administrative procedures.

The UL approval is not applicable to the switchgear assembly. This equipment is designed in conformance to the following standards and requirements:

ANSI C37.03 - 1969 - Definitions for AC High Voltage Circuit
Breakers

C37.04 - 1964 - Rating Structure for AC High Voltage Circuit
Breakers

C37.04a - Supplement to C37.04-1964

C37.04b - Supplement to C37.04-1964

C37.06 - 1971 - AC High Voltage Circuit Breakers Rated on a
Symmetrical Current Basis

USAS C37.07 - 1969 - Interrupting Capability Factor for Reclosing
Service for AC High Voltage Circuit Breakers

ANSI N45.2.2- 1972 - Packaging, Shipping, Receiving, Storage and
Handling of Items for Nuclear Power Plants

C37.20c- 1974 - Switchgear Assemblies (IEEE Std. 27-1974)

C37.100- 1972 - Power Switchgear, Definitions of

IEEE 344-1971 - Seismic Qualification of Class IE Electrical
Equipment for Nuclear Power Generating

Stations, Rev. 4, 4/30/75 - (Where it interfaces with Duke's seismic requirements)

The switchgear equipment is of a proven design and is similar to that being utilized in nuclear safety-related applications.

Section 7-6.2 Provisions are made for reading secondary CT current on the test switch of each phase of the overcurrent relays. In addition, a single phase current transducer is provided in the Y phase of each motor's current transformer secondary with output to a meter in the Control Room. A single phase bus voltmeter is connected to the secondary side of the switchgear bus potential transformers of each 4.16KV blackout and 6.9KV switchgear and is calibrated to indicate bus voltage. These voltmeters are also located in the Control Room.

Section 7-6.5 The low voltage control circuits are powered from separate 125VDC sources.

Section 7-6.6 Breaker position lamps, connected in the 125VDC control circuit, are provided on each switchgear cubicle. Alarms from the switchgear controller include: (1) bus undervoltage and (2) loss of fire pump motor breaker DC control power.

Section 7-6.7 A safety shutter automatically covers all high voltage bus/connectors when the breaker is racked out from the operate position.

Two of the three fire pumps can be powered from the emergency diesels in the event of a blackout condition.

- (d) TWO SEPARATE RELIABLE WATER SUPPLIES SHOULD BE PROVIDED. IF TANKS ARE USED TWO 100 PERCENT (MINIMUM OF 300,000 GALLONS EACH) SYSTEM CAPACITY TANKS SHOULD BE INSTALLED. THEY SHOULD BE SO INTERCONNECTED THAT PUMPS CAN TAKE SUCTION FROM EITHER OR BOTH. HOWEVER, A LEAK IN ONE TANK OR ITS PIPING SHOULD NOT CAUSE BOTH TANKS TO DRAIN. THE MAIN PLANT FIRE WATER SUPPLY CAPACITY SHOULD BE CAPABLE OF REFILLING EITHER TANK IN A MINIMUM OF EIGHT HOURS.

COMMON TANKS ARE PERMITTED FOR FIRE AND SANITARY OR SERVICE WATER STORAGE. WHEN THIS IS DONE, HOWEVER, MINIMUM FIRE WATER STORAGE REQUIREMENTS SHOULD BE DEDICATED BY MEANS OF A VERTICAL STANDPIPE FOR OTHER WATER SERVICES.

The water supply for the fire protection system is Lake Wylie.

- (e) THE FIRE WATER SUPPLY (TOTAL CAPACITY AND FLOW RATE) SHOULD BE CALCULATED ON THE BASIS OF THE LARGEST EXPECTED FLOW RATE FOR A PERIOD OF TWO HOURS, BUT NOT LESS THAN 300,000 GALLONS. THIS FLOW RATE SHOULD BE BASED (CONSERVATIVELY ON 1000 GPM FOR MANUAL HOSE STREAMS PLUS THE GREATER OF:
 - (1) ALL SPRINKLER HEADS OPENED AND FLOWING IN THE LARGEST DESIGNED FIRE AREA; OR
 - (2) THE LARGEST OPEN HEAD DELUGE SYSTEM(S) OPERATING.

Each fire pump has the capacity to meet the maximum water demand for sprinklers in any safety related area with an allowance of 1000 gpm for hose streams. (Ref. Correspondence - April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning water demand information.)

- (f) LAKES OR FRESH WATER PONDS OF SUFFICIENT SIZE MAY QUALIFY AS SOLE SOURCE OF WATER FOR FIRE PROTECTION, BUT REQUIRE AT LEAST TWO INTAKES TO THE PUMP SUPPLY. WHEN A COMMON WATER SUPPLY IS PERMITTED FOR FIRE PROTECTION AND THE ULTIMATE HEAT SINK, THE FOLLOWING CONDITIONS SHOULD ALSO BE SATISFIED:
 - (1) THE ADDITIONAL FIRE PROTECTION WATER REQUIREMENTS ARE DESIGNED INTO THE TOTAL STORAGE CAPACITY; AND
 - (2) FAILURE OF THE FIRE PROTECTION SYSTEM SHOULD NOT DEGRADE THE FUNCTION OF THE ULTIMATE HEAT SINK.

Fire pumps have separate suction piping. One pump is located in a separate bay of the intake structure. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning fire pump arrangement detail and water demand information.)

The Ultimate Heat Sink for Catawba is the Standby Nuclear Service Water (SNSW) Pond. The fire hose stations in the Diesel Generator Building and Nuclear Service Water Pump Structure are the only connection to the SNSW Pond and the comparatively small flow or a failure in the fire protection system will not degrade the function of the Ultimate Heat Sink.

- (g) OUTSIDE MANUAL HOSE INSTALLATION SHOULD BE SUFFICIENT TO REACH ANY LOCATION WITH AN EFFECTIVE HOSE STREAM. TO ACCOMPLISH THIS HYDRANTS SHOULD BE INSTALLED APPROXIMATELY EVERY 250 FEET ON THE YARD MAIN SYSTEM. THE LATERAL TO EACH HYDRANT FROM THE YARD MAIN SHOULD BE CONTROLLED BY A VISUALLY INDICATING OR KEY OPERATED (CURB) VALVE. A HOSE HOUSE, EQUIPPED WITH HOSE AND COMBINATION NOZZLE, AND OTHER AUXILIARY EQUIPMENT RECOMMENDED IN NFPA 24, "OUTSIDE PROTECTION," SHOULD BE PROVIDED AS NEEDED BUT AT LEAST EVERY 1000 FEET.

THREADS COMPATIBLE WITH THOSE USED BY LOCAL FIRE DEPARTMENTS SHOULD BE PROVIDED ON ALL HYDRANTS, HOSE COUPLINGS AND STANDPIPE RISERS.

Hydrants are located about 250 feet apart with hose houses at alternate hydrants. Any location within the security boundary can be reached with an effective hose stream.

Post indicator or key operated valves are provided to isolate sections of the fire loop for maintenance or repairs.

Hydrant hose houses are equipped with hose nozzles and other auxiliary equipment useful for manual fire fighting.

Threads compatible with those used by local fire departments will be provided either on hydrants, hose couplings and standpipe rises or by adaptors.

3. WATER SPRINKLERS AND HOSE STANDPIPE SYSTEM

- (a) EACH AUTOMATIC SPRINKLER SYSTEM AND MANUAL HOSE STATION STANDPIPE SHOULD HAVE AN INDEPENDENT CONNECTION TO THE PLANT UNDERGROUND WATER MAIN. HEADERS FED FROM EACH END ARE PERMITTED INSIDE BUILDINGS TO SUPPLY MULTIPLE SPRINKLER AND STANDPIPE SYSTEMS. WHEN PROVIDED, SUCH HEADERS ARE CONSIDERED AN EXTENSION OF THE YARD MAIN SYSTEM. THE HEADER ARRANGEMENT SHOULD BE SUCH THAT NO SINGLE FAILURE CAN IMPAIR BOTH THE PRIMARY AND BACKUP FIRE PROTECTION SYSTEMS.

EACH SPRINKLER AND STANDPIPE SYSTEM SHOULD BE EQUIPPED WITH OS&Y (OUTSIDE SCREW AND YOKE) GATE VALVE, OR OTHER APPROVED SHUTOFF VALVE, AND WATER FLOW ALARM. SAFETY RELATED EQUIPMENT THAT DOES NOT ITSELF REQUIRE SPRINKLER WATER FIRE PROTECTION, BUT IS SUBJECT TO UNACCEPTABLE DAMAGE IF WETTED BY SPRINKLER WATER DISCHARGE SHOULD BE PROTECTED BY WATER SHIELDS OR BAFFLES.

Each sprinkler system and manual hose station standpipe has an independent connection to the fire protection header; therefore, a single failure cannot impair both the primary and backup Fire Protection Systems outside containment.

Four butterfly control valves, arranged for operation by use of a chain wheel assembly, are installed in the Fire Protection System in the Auxiliary Building.

Shields will be provided to direct water spray away from equipment which might be impaired by water impingement.

- (b) ALL VALVES IN THE FIRE WATER SYSTEMS SHOULD BE ELECTRICALLY SUPERVISED. THE ELECTRICAL SUPERVISION SIGNAL SHOULD INDICATE IN THE CONTROL ROOM AND OTHER APPROPRIATE COMMAND LOCATIONS IN THE PLANT (SEE NFPA 26, "SUPERVISION OF VALVES.")

WHEN ELECTRICAL SUPERVISION OF FIRE PROTECTION VALVES IS NOT PRACTICABLE, AN ADEQUATE MANAGEMENT SUPERVISION PROGRAM SHOULD BE PROVIDED. SUCH A PROGRAM SHOULD INCLUDE LOCKING VALVES OPENING WITH STRICT KEY CONTROL; TAMPER PROOF SEALS; AND PERIODIC, VISUAL CHECK OF ALL VALVES.

Valves in the Fire Protection System which are not electrically supervised, with indication to the Control Room, will be locked or sealed in normal operating position and checked periodically to assure fire protection is available.

- (c) AUTOMATIC SPRINKLER SYSTEMS SHOULD AS A MINIMUM CONFORM TO REQUIREMENTS OF APPROPRIATE STANDARDS SUCH AS NFPA 13, "STANDARD FOR THE INSTALLATION

OF SPRINKLER SYSTEMS," AND NFPA 15, "STANDARD
FOR WATER SPRAY FIXED SYSTEMS."

Automatic Sprinkler Systems are designed in accordance with the intent of NFPA 13-1978 "Installation of Sprinkler Systems." A variance to the code is the use of seismically qualified control valves in safety related areas. UL Listed, or FM Approved seismically qualified control valves were not available when these valves were procured. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R Denton (NRR) detailing valve exceptions.)

- (d) INTERIOR MANUAL HOSE INSTALLATION SHOULD BE ABLE TO REACH ANY LOCATION WITH AT LEAST ONE EFFECTIVE HOSE STREAM. TO ACCOMPLISH THIS, STANDPIPES WITH HOSE CONNECTIONS EQUIPPED WITH A MAXIMUM OF 75 FEET OF 1-½ INCH WOVEN JACKET LINED FIRE HOSE AND SUITABLE NOZZLES SHOULD BE PROVIDED IN ALL BUILDINGS, INCLUDING CONTAINMENT, ON ALL FLOORS AND SHOULD BE SPACED AT NOT MORE THAN 100-FOOT INTERVALS. INDIVIDUAL STANDPIPES SHOULD BE OF AT LEAST 4-INCH DIAMETER FOR MULTIPLE HOSE CONNECTIONS AND 2-½ INCH DIAMETER FOR SINGLE HOSE CONNECTIONS. THESE SYSTEMS SHOULD FOLLOW THE REQUIREMENTS OF NFPA 14 FOR SIZING, SPACING AND PIPE SUPPORT REQUIREMENTS (NELPIA).

HOSE STATIONS SHOULD BE LOCATED OUTSIDE ENTRANCES TO NORMALLY UNOCCUPIED AREAS AND INSIDE NORMALLY OCCUPIED AREAS. STANDPIPES SERVING HOSE STATIONS IN AREAS HOUSING SAFETY RELATED EQUIPMENT SHOULD HAVE SHUTOFF VALVES AND PRESSURE REDUCING DEVICES (IF APPLICABLE) OUTSIDE THE AREA.

Interior manual hose installations are provided and equipped to reach any location with at least one effective hose stream.

Hose stations are equipped with 1½-inch woven jacket lined fire hose or fiber reinforced synthetic water hose in appropriate lengths with spray nozzle to provide adequate coverage.

The Fire Protection Piping System for hose stations conforms to the intent of NFPA 14-1978 "Standpipe and Hose Stations" and are located for the most efficient and practical coverage. Fire Department pumper connections are not provided on hose standpipes. This variance from the NFPA code is appropriate based on the use of high pressure fire pumps as primary and secondary water supply.

- (e) THE PROPER TYPE OF HOSE NOZZLES TO BE SUPPLIED TO EACH AREA SHOULD BE BASED ON THE FIRE HAZARD ANALYSIS. THE USUAL COMBINATION SPRAY/STRAIGHT-STREAM NOZZLE MAY CAUSE UNACCEPTABLE MECHANICAL DAMAGE (FOR EXAMPLE, THE DELICATE ELECTRONIC EQUIPMENT IN THE CONTROL ROOM) AND BE UNSUITABLE. ELECTRICALLY SAFE NOZZLES SHOULD BE PROVIDED AT LOCATIONS WHERE ELECTRICAL EQUIPMENT OR CABLING IS LOCATED.

Hoses are provided with spray nozzles for fighting fires in the geographical area. In addition, fire brigade training emphasizes the proper techniques for fighting the different type fires.

- (f) CERTAIN FIRES SUCH AS THOSE INVOLVING FLAMMABLE LIQUIDS RESPOND WELL TO FOAM SUPPRESSION. CONSIDERATION SHOULD BE GIVEN TO USE OF ANY OF THE AVAILABLE FOAMS FOR SUCH SPECIALIZED PROTECTION APPLICATION. THESE INCLUDE THE MORE COMMON CHEMICAL AND MECHANICAL LOW EXPANSION FOAMS, HIGH EXPANSION FOAM AND THE RELATIVELY NEW AQUEOUS FILM FORMING FOAM (AFFF).

Foam suppression is not used for fire protection. Fire protection capabilities consist of primary and secondary systems including fixed extinguishing systems, fire hose stations and portable extinguishers.

4. HALON SUPPRESSION SYSTEMS

THE USE OF HALON FIRE EXTINGUISHING AGENTS SHOULD AS A MINIMUM COMPLY WITH THE REQUIREMENTS OF NFPA 12A AND 12B, "HALOGENATED FIRE EXTINGUISHING AGENT SYSTEMS - HALON 1301 AND HALON 1211." ONLY UL OR FM APPROVED AGENTS SHOULD BE USE.

IN ADDITION TO THE GUIDELINES OF NFPA 12A AND 12B, PREVENTATIVE MAINTENANCE AND TESTING OF THE SYSTEMS, INCLUDING CHECK WEIGHTING OF THE HALON CYLINDERS SHOULD BE DONE AT LEAST QUARTERLY.

PARTICULAR CONSIDERATION SHOULD ALSO BE GIVEN TO:

- (a) MINIMUM REQUIRED HALON CONCENTRATION AND SOAK TIME.
- (b) TOXICITY OF HALON.
- (c) TOXICITY AND CORROSIVE CHARACTERISTICS OF THERMAL DECOMPOSITION PRODUCTS OF HALON.

Halon Suppression Systems are not utilized for fire protection of safety related equipment/areas.

5. CARBON DIOXIDE SUPPRESSION SYSTEMS

THE USE OF CARBON DIOXIDE EXTINGUISHING SYSTEMS SHOULD AS A MINIMUM COMPLY WITH THE REQUIREMENTS OF NFPA 12, "CARBON DIOXIDE EXTINGUISHING SYSTEMS."

PARTICULAR CONSIDERATION SHOULD ALSO BE GIVEN TO:

- (a) MINIMUM REQUIRED CO₂ CONCENTRATION AND SOAK TIME;
- (b) TOXICITY OF CO₂;
- (c) POSSIBILITY OF SECONDARY THERMAL SHOCK (COOLING) DAMAGE;

- (d) OFFSETTING REQUIREMENTS FOR VENTING DURING CO₂ SYSTEMS BEING OUT-OF-SERVICE BECAUSE OF PERSONNEL SAFETY CONSIDERATION. CO₂ SYSTEMS ARE DISARMED WHENEVER PEOPLE ARE PRESENT IN AN AREA SO PROTECTED. AREAS ENTERED FREQUENTLY (EVEN THOUGH DURATION TIME FOR ANY VISIT IS SHORT) HAVE OFTEN BEEN FOUND WITH CO₂ SYSTEMS SHUT OFF.

The concentration of the CO₂ System is designed for the particular fire hazard in the diesel generator rooms and auxiliary feed water pump pits. Provisions are made to isolate each area during the soak time. Electric motor driven auxiliary feedwater pump pits do not have covers. The volume of CO₂ gas in the system has been calculated to allow for "boil-over" during discharge.

Oxygen monitors are provided in the CO₂ protected areas. System sight and sound warning alarms activate before agent discharge. Equipment is designed to accommodate for the rapid cooling by CO₂.

Administrative procedures will assure CO₂ Systems are returned to service following maintenance in the protected areas. Indication is provided locally and in the Control Room when the system is disarmed.

All carbon dioxide systems are designed and installed to meet the intent of NFPA 12. - 1980.

6. PORTABLE EXTINGUISHERS

FIRE EXTINGUISHERS SHOULD BE PROVIDED IN ACCORDANCE WITH GUIDELINES OF NFPA 10 AND 10A, "PORTABLE FIRE EXTINGUISHERS, MAINTENANCE AND USE." DRY CHEMICAL EXTINGUISHERS SHOULD BE INSTALLED WITH DUE CONSIDER-

ATION GIVEN TO CLEANUP PROBLEMS AFTER USE AND POSSIBLE ADVERSE EFFECTS ON EQUIPMENT INSTALLED IN THE AREA.

An adequate number of portable extinguishers, will be provided in accordance with intent of NFPA-10 1978 "Portable Fire Extinguishers." A 150 lb wheeled carbon dioxide extinguisher and portable extinguishers will be provided in equipment rooms (ELEV 560) of each unit, located near entrances of the protected area (as shown on drawing CFP-3). Maximum travel distance may be at variances to NFPA 10 in some instances.

Portable extinguishers will not be permanently located within containment. Station Directives will assure extinguishers are available when personnel are in the area.

F. GUIDELINES FOR SPECIFIC PLANT AREAS

1. PRIMARY AND SECONDARY CONTAINMENT

(a) NORMAL OPERATION

FIRE PROTECTION REQUIREMENTS FOR THE PRIMARY AND SECONDARY CONTAINMENT AREAS SHOULD BE PROVIDED ON THE BASIS OF SPECIFIC IDENTIFIED HAZARDS. FOR EXAMPLE:

LUBRICATING OIL OR HYDRAULIC FLUID SYSTEM FOR THE PRIMARY COOLANT PUMPS.

As previously stated, in Section D.2(a)(3), the Reactor Coolant Pumps are designed to prevent oil fires and, a fire detection system is provided for additional protection, a manual preaction sprinkler system is provided.

CABLE TRAY ARRANGEMENTS AND CABLE PENETRATIONS

Automatic detection with alarm and annunciation in the Control Room is provided for safety related cable trays and penetrations. Protection will be provided by hose stations located in the Reactor Building and portable extinguishers for use by fire brigade personnel provide secondary fire suppression capabilities. Appendix R requirements for fire detection within the Reactor Buildings are addressed in Appendix D.

CHARCOAL FILTERS

Carbon filters are protected with fixed manual water spray systems.

BECAUSE OF THE GENERAL INACCESSIBILITY OF THESE AREAS DURING NORMAL PLANT OPERATIONS, PROTECTION SHOULD BE PROVIDED BY AUTOMATIC FIXED SYSTEMS. AUTOMATIC SPRINKLERS SHOULD BE INSTALLED FOR THOSE HAZARDS IDENTIFIED AS REQUIRING FIXED SUPPRESSION.

Automatic detection and manual sprinklers are provided where necessary in the primary and secondary Containment.

FIRE DETECTION SYSTEMS SHOULD ALARM AND ANNUNCIATE IN THE CONTROL ROOM. THE TYPE OF DETECTION USED AND THE LOCATION OF THE DETECTORS SHOULD BE MOST SUITABLE TO THE PARTICULAR TYPE OF FIRE THAT COULD BE EXPECTED FROM THE IDENTIFIED HAZARD. A PRIMARY CONTAINMENT GENERAL AREA FIRE DETECTION CAPABILITY SHOULD BE PROVIDED AS BACKUP FOR THE ABOVE DESCRIBED HAZARD DETECTION. TO ACCOMPLISH THIS, SUITABLE SMOKE DETECTION (e.g., VISUAL OBSCURATION, LIGHT SCATTERING AND PARTICLE COUNTING) SHOULD BE INSTALLED IN THE AIR RECIRCULATION SYSTEM AHEAD OF ANY FILTERS.

The fire detection system alarms and annunciates in the Control Room. In addition to detection over safety related cables and penetrations, smoke detectors and rate-of-rise heat detectors are provided over the lower containment carbon filters.

(b) REFUELING AND MAINTENANCE

REFUELING AND MAINTENANCE OPERATIONS IN CONTAINMENT MAY INTRODUCE ADDITIONAL HAZARDS SUCH AS CONTAMINATION CONTROL MATERIALS, DECONTAMINATION SUPPLIES, WOOD PLANKING, TEMPORARY WIRING, WELDING AND FLAME CUTTING (WITH PORTABLE COMPRESSED FUEL GAS SUPPLY). POSSIBLE FIRES WOULD NOT NECESSARILY BE IN THE VICINITY OF FIXED DETECTION AND SUPPRESSION SYSTEMS.

Station procedures direct additional fire protection measures be implemented during refueling and maintenance operations to include:

- (1) Fire watches during welding and cutting operations.
- (2) Additional fire suppression equipment, i.e., portable extinguishers, be present during maintenance activities.
- (3) Security personnel present on a twenty-four hour basis to control entry.

IN ADDITION, MANUAL FIRE FIGHTING CAPABILITY SHOULD BE PERMANENTLY INSTALLED IN CONTAINMENT. STANDPIPES WITH HOSE STATIONS, AND PORTABLE FIRE EXTINGUISHERS, SHOULD BE INSTALLED AT STRATEGIC LOCATIONS THROUGHOUT CONTAINMENT FOR ANY REQUIRED MANUAL FIRE FIGHTING OPERATIONS.

Hose stations are present in the Containment. Station Directives will assure portable extinguishers are available in Containment when the area is occupied.

ADEQUATE SELF-CONTAINED BREATHING APPARATUS SHOULD BE PROVIDED NEAR THE CONTAINMENT ENTRANCES FOR FIRE FIGHTING AND DAMAGE CONTROL PERSONNEL. THESE UNITS SHOULD BE INDEPENDENT OF ANY BREATHING APPARATUS OR AIR SUPPLY SYSTEMS PROVIDED FOR GENERAL PLANT ACTIVITIES.

Self-contained breathing apparatus will be provided for fire brigade personnel as discussed in Section D.4.(h).

2. CONTROL ROOM

THE CONTROL ROOM IS ESSENTIAL TO SAFE REACTOR OPERATION. IT MUST BE PROTECTED AGAINST DISABLING FIRE DAMAGE AND SHOULD BE SEPARATED FROM OTHER AREAS OF THE PLANT BY FLOORS, WALLS AND ROOFS HAVING MINIMUM FIRE RESISTANCE RATINGS OF THREE HOURS.

The Control Room is separated from the remainder of the plant by three-hour barriers.

CONTROL ROOM CABINETS AND CONSOLES ARE SUBJECT TO DAMAGE FROM TWO DISTINCT FIRE HAZARDS:

- (a) FIRE ORIGINATING WITHIN A CABINET OR CONSOLE;
AND
- (b) EXPOSURE FIRE INVOLVING COMBUSTIBLES IN THE GENERAL ROOM AREA.

HOSE STATIONS ADJACENT TO THE CONTROL ROOM WITH PORTABLE EXTINGUISHERS IN THE CONTROL ROOM ARE ACCEPTABLE.

The Control Room is provided with ionization and rate-of-rise/fixed temperature detectors and portable extinguishers. Hose stations are located adjacent to the room and operation and fire brigade personnel will be briefed on the use of water on Control Room fires.

Nozzles on hose stations adjacent to the Control Room will not deliver a straight stream.

FIRE DETECTION IN THE CONTROL ROOM CABINETS, AND CONSOLES SHOULD BE PROVIDED BY SMOKE AND HEAT DETECTORS IN EACH FIRE AREA. ALARM AND ANNUNCIATION SHOULD BE PROVIDED IN THE CONTROL ROOM. FIRE ALARMS IN OTHER PARTS OF THE PLANT SHOULD ALSO BE ALARMED AND ANNUNCIATED IN THE CONTROL ROOM.

Cabinets in the Control Room are monitored by ceiling-mounted ionization and rate-of-rise/fixed temperature detectors. There are no cabinets in the Control Room which contain redundant trains that are needed for safe shutdown. However, ionization detectors are provided inside the main control board consoles. Fire alarms in other parts of the plant are alarmed and annunciated in the Control Room.

BREATHING APPARATUS FOR CONTROL ROOM OPERATORS SHOULD BE READILY AVAILABLE. CONTROL ROOM FLOORS, CEILING, SUPPORTING STRUCTURES, AND WALLS, INCLUDING PENETRATIONS AND DOORS, SHOULD BE DESIGNED TO A MINIMUM FIRE RATING OF THREE HOURS. ALL PENETRATION SEALS SHOULD BE AIRTIGHT.

Self-contained breathing apparatus and/or a portable cascade system will be provided and all penetration seals will be protected and sealed to maintain a positive pressure in the Control Room.

THE CONTROL ROOM VENTILATION INTAKE SHOULD BE PROVIDED WITH SMOKE DETECTION CAPABILITY TO AUTOMATICALLY ALARM LOCALLY AND ISOLATE THE CONTROL ROOM VENTILATION SYSTEM TO PROTECT OPERATORS BY PREVENTING SMOKE FROM ENTERING THE CONTROL ROOM. MANUALLY OPERATED VENTING OF THE CONTROL ROOM SHOULD BE AVAILABLE SO THAT OPERATORS HAVE THE OPTION OF VENTING FOR VISIBILITY.

The Control Area Ventilation intakes are described on page 49. The intake smoke detectors alarm in the Control Room. The Control Room can be manually purged as described on page 42.

CABLES SHOULD NOT BE LOCATED IN CONCEALED FLOOR AND CEILING SPACES. ALL CABLES THAT ENTER THE CONTROL ROOM SHOULD TERMINATE IN THE CONTROL ROOM. THAT IS, NO CABLING SHOULD BE SIMPLY ROUTED THROUGH THE CONTROL ROOM FROM ONE AREA TO ANOTHER.

Only power and control cables essential for operation of lighting and HVAC equipment are located in the concealed ceiling space. Cable entering the Control Room terminates there.

3. CABLE SPREADING ROOMS

(a) THE PREFERRED ACCEPTABLE METHODS ARE:

- (1) AUTOMATIC WATER SYSTEM SUCH AS CLOSED HEAD SPRINKLERS, OPEN HEAD DELUGE, OR OPEN DIRECTIONAL SPRAY NOZZLES. DELUGE AND OPEN SPRAY SYSTEMS SHOULD HAVE PROVISIONS FOR MANUAL OPERATION AT A REMOTE STATION; HOWEVER, THERE SHOULD ALSO BE PROVISIONS TO PRECLUDE INADVERTENT OPERATION. LOCATION OF SPRINKLER HEADS OR SPRAY NOZZLES SHOULD CONSIDER CABLE TRAY SIZING AND ARRANGEMENTS TO ASSURE ADEQUATE WATER COVERAGE. CABLES SHOULD BE DESIGNED TO ALLOW WETTING DOWN WITH DELUGE WATER WITHOUT ELECTRICAL FAULTING. OPEN HEAD DELUGE AND OPEN DIRECTIONAL SPRAY SYSTEMS SHOULD BE ZONED SO THAT A SINGLE FAILURE WILL NOT DEPRIVE THE ENTIRE AREA OF AUTOMATIC FIRE SUPPRESSION CAPABILITY. THE USE OF FOAM IS ACCEPTABLE, PROVIDED IT IS OF A TYPE CAPABLE OF BEING DELIVERED BY A SPRINKLER OR DELUGE SYSTEM, SUCH AS AN AQUEOUS FILM FORMING FOAM (AFFF).

The cables in the Cable Spreading Rooms are non-flame propagating and are described in Section D.3.

Automatic detection with alarm and annunciation in the Control Room will be provided in addition to stringent station directives regarding the exclusion of flammable materials from the Cable Spreading Rooms and the use of fire watches at any time welding or cutting operations are being conducted.

- (2) MANUAL HOSES AND PORTABLE EXTINGUISHERS SHOULD BE PROVIDED AS BACKUP.

Portable extinguishers provide primary protection for Cable Spreading Rooms. Fire hose stations are provided for secondary protection.

- (3) EACH CABLE SPREADING ROOM OF EACH UNIT SHOULD HAVE DIVISIONAL CABLE SEPARATION, AND BE SEPARATED FROM THE OTHER AND THE REST OF THE PLANT BY A MINIMUM THREE-HOUR RATED FIRE WALL (REFER TO NFPA 251 OR ASTM E-119 FOR FIRE TEST RESISTANCE RATING).

Each Cable Spreading Room is separated from other areas of the plant by three-hour fire barriers with separation of divisions as outlined in Section D.3.(c).

Penetrations and openings will be sealed with appropriate barriers which have been tested and approved by a recognized testing facility.

- (4) AT LEAST TWO REMOTE AND SEPARATE ENTRANCES PROVIDED TO THE ROOM FOR ACCESS BY FIRE BRIGADE PERSONNEL.

Each Unit's Cable Spreading Room has at least two remote and separate entrances to the room for access by fire brigade personnel.

- (5) AISLE SEPARATION PROVIDED BETWEEN TRAY STACKS SHOULD BE AT LEAST THREE FEET WIDE AND EIGHT FEET HIGH.

Aisle separation and overhead clearance is provided to permit access by personnel.

- (b) FOR CABLE SPREADING ROOMS THAT DO NOT PROVIDE DIVISIONAL CABLE SEPARATION OF (a)(3), IN ADDITION TO MEETING (a)(1), (2), (4), AND (5) ABOVE, THE FOLLOWING SHOULD ALSO BE PROVIDED:

- (1) DIVISIONAL CABLE SEPARATION SHOULD MEET THE GUIDELINES OF REGULATORY GUIDE 1.75 "PHYSICAL INDEPENDENCE OF ELECTRICAL SYSTEMS".

As stated in (a)(3), separation criteria is outlined in Section D.3.(c).

- (2) ALL CABLING SHOULD BE COVERED WITH SUITABLE FIRE RETARDANT COATING.
- (3) AS AN ALTERNATE TO (a)(1) ABOVE, AUTOMATICALLY INITIATED GAS SYSTEMS (HALON OR CO₂) MAY BE USED FOR PRIMARY FIRE SUPPRESSION, PROVIDE A FIXED WATER SYSTEM IS USED AS A BACKUP.

Response to (a) (1) is applicable. Non-fire propagating electrical cables (refer to Section D.3.f page 34) and Station Directives which control transient combustibles minimize fire potential in Cable Spreading Rooms. Provision of portable extinguishers as primary protection and fire hose stations as secondary protection is appropriate.

- (4) PLANTS THAT CANNOT MEET THE GUIDELINES OF REGULATORY GUIDE 1.75, IN ADDITION TO MEETING (a)(1), (2), (4), AND (5) ABOVE, AN AUXILIARY SHUTDOWN SYSTEM WITH ALL CABLING INDEPENDENT OF THE CABLE SPREADING ROOM SHOULD BE PROVIDED.

Catawba Nuclear Station has a standby shutdown system with cabling independent of Cable Spreading Room to bring the plant to a hot standby condition.

4. PLANT COMPUTER ROOM

SAFETY RELATED COMPUTERS SHOULD BE SEPARATED FROM OTHER AREAS OF THE PLANT BY BARRIERS HAVING A MINIMUM THREE-HOUR FIRE RESISTANT RATING. AUTOMATIC FIRE DETECTION SHOULD BE PROVIDED TO ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND ALARM LOCALLY. MANUAL HOSE STATIONS AND PORTABLE WATER AND HALON FIRE EXTINGUISHERS SHOULD BE PROVIDED.

There are no safety related computers at the Catawba Nuclear Station.

5. SWITCHGEAR ROOMS

SWITCHGEAR ROOMS SHOULD BE SEPARATED FROM THE REMAINDER OF THE PLANT BY MINIMUM THREE-HOUR RATED FIRE BARRIERS TO THE EXTENT PRACTICABLE. AUTOMATIC FIRE DETECTION SHOULD ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND ALARM LOCALLY. FIRE HOSE STATIONS AND PORTABLE EXTINGUISHERS SHOULD BE READILY AVAILABLE.

Each unit and divisional Switchgear Room is separated from the remainder of the plant by three-hour barriers.

Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.

Hose stations equipped with nozzles which will not deliver a straight stream and portable extinguishers are provided in and adjacent to each Switchgear Room.

ACCEPTABLE PROTECTION FOR CABLES THAT PASS THROUGH THE SWITCHGEAR ROOM IS AUTOMATIC WATER OR GAS AGENT SUPPRESSION. SUCH AUTOMATIC SUPPRESSION MUST CONSIDER PREVENTING UNACCEPTABLE DAMAGE TO ELECTRICAL EQUIPMENT AND POSSIBLE NECESSARY CONTAINMENT OF AGENT FOLLOWING DISCHARGE.

Power and control cable passing through this area is limited to one power train in each Switchgear Room.

6. REMOTE SAFETY RELATED PANELS

THE GENERAL AREA HOUSING REMOTE SAFETY RELATED PANELS SHOULD BE PROVIDED WITH AUTOMATIC FIRE DETECTORS THAT ALARM LOCALLY AND ALARM AND ANNUNCIATE IN THE CONTROL ROOM. COMBUSTIBLE MATERIALS SHOULD BE CONTROLLED AND LIMITED TO THOSE REQUIRED FOR OPERATION. PORTABLE EXTINGUISHERS AND MANUAL HOSE STATIONS SHOULD BE PROVIDED.

The auxiliary shutdown panels for Train A and Train B are located in separate three-hour rated rooms in the vicinity of Auxiliary Feedwater Pump Room Area. Each room is provided with automatic detection with local alarm and alarm and annunciation in the Control Room as are the Auxiliary Feedwater Pump Rooms.

In addition to these auxiliary shutdown panels another shutdown panel is provided in the Standby Shutdown Facility. This provides a separate means of bringing the plant to a hot standby condition.

7. STATION BATTERY ROOMS

BATTERY ROOMS SHOULD BE PROTECTED AGAINST FIRE EXPLOSIONS. BATTERY ROOMS SHOULD BE SEPARATED FROM EACH OTHER AND OTHER AREAS OF THE PLANT BY BARRIERS HAVING A MINIMUM FIRE RATING OF THREE HOURS INCLUSIVE OF ALL PENETRATIONS AND OPENINGS. (SEE NFPA 69 "STANDARD ON EXPLOSION PREVENTION SYSTEMS"). VENTILATION SYSTEM IN THE BATTERY ROOMS SHOULD BE CAPABLE OF MAINTAINING THE HYDROGEN CONCENTRATION WELL BELOW 2 VOL PERCENT HYDROGEN CONCENTRATION. STANDPIPE AND HOSE AND PORTABLE EXTINGUISHERS SHOULD BE PROVIDED.

ALTERNATIVES:

- (a) PROVIDE A TOTAL FIRE RATED BARRIER ENCLOSURE OF THE BATTERY ROOM COMPLEX THAT EXCEEDS THE FIRE LOAD CONTAINED IN THE ROOM,
- (b) REDUCE THE FIRE LOAD TO BE WITHIN THE FIRE BARRIER CAPABILITY OF 1-½ HOURS, OR

- (c) PROVIDE A REMOTE MANUAL ACTUATED SPRINKLER SYSTEM IN EACH ROOM AND PROVIDE THE 1-½ HOUR FIRE BARRIER SEPARATION.

An Equipment Room is provided for each Unit and is separated from the remainder of the plant by three-hour barriers. Individual Battery Rooms are located in the Equipment Room and are separated from each other and surrounding areas by non-combustible construction. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning construction of battery rooms and equipment separation.)

Each individual Battery Room is equipped with redundant exhaust ventilation to prevent the buildup of hydrogen. Loss of exhaust ventilation is annunciated in the Control Room.

8. TURBINE LUBRICATION AND CONTROL OIL STORAGE AND USE AREAS

A BLANK FIRE WALL HAVING A MINIMUM RESISTANCE RATING OF THREE HOURS SHOULD SEPARATE ALL AREAS CONTAINING SAFETY RELATED SYSTEMS AND EQUIPMENT FROM THE TURBINE OIL SYSTEM.

The Turbine and Auxiliary Buildings are separated by a three-hour barrier; therefore, the turbine oil system is separated from all equipment required for safe shutdown.

9. DIESEL GENERATOR AREAS

DIESEL GENERATORS SHOULD BE SEPARATED FROM EACH OTHER AND OTHER AREAS OF THE PLANT BY FIRE BARRIERS HAVING A MINIMUM FIRE RESISTANCE RATING OF THREE HOURS.

AUTOMATIC FIRE SUPPRESSION SUCH AS AFFF FOAM, OR SPRINKLERS SHOULD BE INSTALLED TO COMBAT ANY DIESEL GENERATOR OR LUBRICATING OIL FIRES. AUTOMATIC FIRE

DETECTION SHOULD BE PROVIDED TO ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND ALARM LOCALLY. DRAINAGE FOR FIRE FIGHTING WATER AND MEANS FOR LOCAL MANUAL VENTING OF SMOKE SHOULD BE PROVIDED.

The Diesel Generator Buildings are separate from the Auxiliary Building and Reactor Building.

Each redundant diesel generator is separated from other areas of the plant by three-hour fire barriers.

Diesel Generator Rooms are protected by an automatic carbon dioxide system. The system is activated by fixed temperature detectors which alarm and annunciate in the Control Room.

Automatic alarm of carbon dioxide activation is provided in the Control Room.

The carbon dioxide system may also be activated manually if required. Hose stations, connected to the safety related Nuclear Service Water System, and portable extinguishers are provided as backup suppression.

WHEN DAY TANKS CANNOT BE SEPARATED FROM THE DIESEL GENERATOR, ONE OF THE FOLLOWING SHOULD BE PROVIDED FOR THE DIESEL GENERATOR AREA:

- (a) AUTOMATIC OPEN HEAD DELUGE OR OPEN HEAD SPRAY NOZZLE SYSTEM(S)
- (b) AUTOMATIC CLOSED HEAD SPRINKLERS
- (c) AUTOMATIC AFFF THAT IS DELIVERED BY A SPRINKLER DELUGE OR SPRAY SYSTEM

- (d) AUTOMATIC GAS SYSTEM (HALON OR CO₂) MAY BE USED IN LIEU OF FOAM OR SPRINKLERS TO COMBAT DIESEL GENERATOR AND/OR LUBRICATING OIL FIRES.

As noted in 9 above, the automatic carbon dioxide system is provided.

10. DIESEL FUEL OIL STORAGE AREAS

DIESEL FUEL OIL TANKS WITH A CAPACITY GREATER THAN 1100 GALLONS SHOULD NOT BE LOCATED INSIDE THE BUILDING CONTAINING SAFETY RELATED EQUIPMENT. THEY SHOULD BE LOCATED AT LEAST 50 FEET FROM ANY BUILDING CONTAINING SAFETY RELATED EQUIPMENT. OR IF LOCATED WITHIN 50 FEET, THEY SHOULD BE HOUSED IN A SEPARATE BUILDING WITH CONSTRUCTION HAVING A MINIMUM FIRE RESISTANCE RATING OF THREE HOURS. BURIED TANKS ARE CONSIDERED AS MEETING THE THREE-HOUR FIRE RESISTANCE REQUIREMENTS. SEE NFPA 30, "FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE", FOR ADDITIONAL GUIDANCE.

WHEN LOCATED IN A SEPARATE BUILDING, THE TANK SHOULD BE PROTECTED BY AN AUTOMATIC FIRE SUPPRESSION SYSTEM SUCH AS AFFF OR SPRINKLERS.

TANKS, UNLESS BURIED, SHOULD NOT BE LOCATED DIRECTLY ABOVE OR BELOW SAFETY RELATED SYSTEMS OR EQUIPMENT REGARDLESS OF THE FIRE RATING OF SEPARATING FLOORS OR CEILINGS.

The Diesel Fuel Oil Storage Tanks are buried and therefore meet the three-hour fire barrier criteria.

11. SAFETY RELATED PUMPS

PUMP HOUSES AND ROOMS HOUSING SAFETY RELATED PUMPS SHOULD BE PROTECTED BY AUTOMATIC SPRINKLER PROTECTION UNLESS A FIRE HAZARDS ANALYSIS CAN DEMONSTRATE THAT A FIRE WILL NOT ENDANGER OTHER SAFETY RELATED EQUIPMENT REQUIRED FOR SAFE PLANT SHUTDOWN. EARLY WARNING FIRE DETECTION SHOULD BE INSTALLED WITH ALARM AND ANNUNCIATION LOCALLY AND IN THE CONTROL ROOM. LOCAL HOSE STATIONS AND PORTABLE EXTINGUISHERS SHOULD ALSO BE PROVIDED.

The Motor Driven Auxiliary Feedwater Pumps for each unit are separated from the Turbine Driven Auxiliary Feedwater Pump by three-hour rated fire boundaries.

Automatic detection with local alarm and alarm and annunciation in the Control Room is provided. Where the Hazard Analysis and Criteria for Fire Protection indicated the need, a sprinkler system is provided. Auxiliary feedwater pumps are separated from other safety related pumps by three-hour fire boundaries.

Local hose stations or portable extinguishers are provided as secondary protection as appropriate.

12. NEW FUEL AREA

HAND PORTABLE EXTINGUISHERS SHOULD BE LOCATED WITHIN THIS AREA. ALSO, LOCAL HOSE STATIONS SHOULD BE LOCATED OUTSIDE BUT WITHIN HOSE REACH OF THIS AREA. AUTOMATIC DETECTION SHOULD ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND ALARM LOCALLY. COMBUSTIBLES SHOULD BE LIMITED TO A MINIMUM IN THE NEW FUEL AREA. THE STORAGE AREA SHOULD BE PROVIDED WITH A DRAINAGE SYSTEM TO PRECLUDE ACCUMULATION OF WATER.

THE STORAGE CONFIGURATION OF NEW FUEL SHOULD ALWAYS BE SO MAINTAINED AS TO PRECLUDE CRITICALITY FOR ANY WATER DENSITY THAT MIGHT OCCUR DURING FIRE WATER APPLICATION.

Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.

Administrative policy has been established to preclude the use of hydrogenous fire fighting material from the vault. Extinguishers are of the dry chemical or CO₂ type.

Combustible material storage in the New Fuel Area is administratively prohibited.

Floor drains are provided in the New Fuel Area to preclude accumulation of water.

13. SPENT FUEL POOL AREA

PROTECTION FOR THE SPENT FUEL POOL AREA SHOULD BE PROVIDED BY LOCAL HOSE STATIONS AND PORTABLE EXTINGUISHERS. AUTOMATIC FIRE DETECTION SHOULD BE PROVIDED TO ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND TO ALARM LOCALLY.

The Spent Fuel Pool Area is provided with automatic detection with local alarm and annunciation in the Control Room. Hose stations and portable extinguishers are provided as primary protection.

14. RADWASTE BUILDING

THE RADWASTE BUILDING SHOULD BE SEPARATED FROM OTHER AREAS OF THE PLANT BY FIRE BARRIERS HAVING AT LEAST THREE-HOUR RATINGS. AUTOMATIC SPRINKLERS SHOULD BE USED IN ALL AREAS WHERE COMBUSTIBLE MATERIALS ARE LOCATED. AUTOMATIC FIRE DETECTION SHOULD BE PROVIDED TO ANNUNCIATE AND ALARM LOCALLY. DURING A FIRE, THE VENTILATION SYSTEMS IN THESE AREAS SHOULD BE CAPABLE OF BEING ISOLATED. WATER SHOULD DRAIN TO LIQUID RADWASTE BUILDING SUMPS.

ACCEPTABLE ALTERNATIVE FIRE PROTECTION IS AUTOMATIC FIRE DETECTION TO ALARM AND ANNUNCIATE IN THE CONTROL ROOM, IN ADDITION TO MANUAL HOSE STATIONS AND PORTABLE EXTINGUISHERS CONSISTING OF HAND HELD AND LARGE WHEELED UNITS.

The Radwaste Area is provided with automatic detection with alarm and annunciation in the Control Room. Primary protection is hose stations and portable extinguishers.

15. DECONTAMINATION AREAS

THE DECONTAMINATION AREAS SHOULD BE PROTECTED BY AUTOMATIC SPRINKLERS IF FLAMMABLE LIQUIDS ARE STORED. AUTOMATIC FIRE DETECTION SHOULD BE PROVIDED TO ANNUNCIATE AND ALARM IN THE CONTROL ROOM AND ALARM LOCALLY. THE VENTILATION SYSTEM SHOULD BE CAPABLE OF BEING ISOLATED. LOCAL HOSE STATIONS AND HAND PORTABLE EXTINGUISHERS SHOULD BE PROVIDED AS BACKUP TO THE SPRINKLER SYSTEM.

Decontamination Areas are provided with hose stations and portable extinguishers as primary fire protection. The fire hazard analysis indicated this protection is appropriate.

16. SAFETY RELATED WATER TANKS

STORAGE TANKS THAT SUPPLY WATER FOR SAFE SHUTDOWN SHOULD BE PROTECTED FROM THE EFFECTS OF FIRE. LOCAL HOSE STATIONS AND PORTABLE EXTINGUISHERS SHOULD BE PROVIDED. PORTABLE EXTINGUISHERS SHOULD BE LOCATED IN NEARBY HOSE HOUSES. COMBUSTIBLE MATERIALS SHOULD NOT BE STORED NEXT TO OUTDOOR TANKS. A MINIMUM OF 50 FEET OF SEPARATION SHOULD BE PROVIDED BETWEEN OUTDOOR TANKS AND COMBUSTIBLE MATERIALS WHERE FEASIBLE.

Safety related water tanks are separated from combustible materials.

Local hose stations and portable extinguishers are provided.

17. COOLING TOWERS

COOLING TOWERS SHOULD BE OF NON-COMBUSTIBLE CONSTRUCTION OR SO LOCATED THAT A FIRE WILL NOT ADVERSELY AFFECT ANY SAFETY RELATED SYSTEMS OR EQUIPMENT. COOLING TOWERS SHOULD BE OF NON-COMBUSTIBLE CONSTRUCTION WHEN THE BASINS ARE USED FOR THE ULTIMATE HEAT SINK OR FOR THE FIRE PROTECTION WATER SUPPLY.

Cooling towers are not used as fire protection water supply or the ultimate heat sink. Cooling towers are of non-combustible construction and located such that a fire would not adversely affect any safety related systems or equipment.

18. MISCELLANEOUS AREAS

MISCELLANEOUS AREAS SUCH AS RECORDS STORAGE AREAS, SHOPS, WAREHOUSES, AND AUXILIARY BOILER ROOMS SHOULD BE SO LOCATED THAT A FIRE OR EFFECTS OF A FIRE, INCLUDING SMOKE, WILL NOT ADVERSELY AFFECT ANY SAFETY RELATED SYSTEMS OR EQUIPMENT. FUEL OIL TANKS FOR AUXILIARY BOILERS SHOULD BE BURIED OR PROVIDED WITH DIKES TO CONTAIN THE ENTIRE TANK CONTENTS.

The fire hazard analysis was a primary medium for determining that safe shutdown equipment was isolated from unacceptable fire hazards, including those listed as Miscellaneous Areas.

G. SPECIAL PROTECTION GUIDELINES

1. WELDING AND CUTTING, ACETYLENE -
OXYGEN FUEL GAS SYSTEMS

THIS EQUIPMENT IS USED IN VARIOUS AREAS THROUGHOUT THE PLANT. STORAGE LOCATIONS SHOULD BE CHOSEN TO PERMIT FIRE PROTECTION BY AUTOMATIC SPRINKLER SYSTEMS. LOCAL HOSE STATIONS AND PORTABLE EQUIPMENT SHOULD BE PROVIDED AS BACKUP. THE REQUIREMENTS OF NFPA 51 and 51B ARE APPLICABLE TO THESE HAZARDS. A PERMIT SYSTEM SHOULD BE REQUIRED TO UTILIZE THIS EQUIPMENT. (ALSO REFER TO 2f HEREIN).

Equipment will be stored in an area protected by sprinklers or isolated from combustibles. Local hose stations or portable extinguishers will be provided as backup.

Maintenance Procedures will require permits for all uses of this equipment.

2. STORAGE AREAS FOR DRY ION EXCHANGE RESINS

DRY ION EXCHANGE RESINS SHOULD NOT BE STORED NEAR ESSENTIAL SAFETY RELATED SYSTEMS. DRY UNUSED RESINS SHOULD BE PROTECTED BY AUTOMATIC WET PIPE SPRINKLER INSTALLATIONS. DETECTION BY SMOKE AND HEAT DETECTORS SHOULD ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND ALARM LOCALLY. LOCAL HOSE STATIONS AND PORTABLE EXTINGUISHERS SHOULD PROVIDE BACKUP FOR THESE AREAS. STORAGE AREAS OF DRY RESINS SHOULD HAVE CURBS AND DRAINS. (REFER TO NFPA 92M, "WATERPROOFING AND DRAINING OF FLOORS").

Dry ion exchange resins will be stored in accordance with the manufacturer's recommendations and protected from fire hazards.

Storage areas are not located adjacent to safe shutdown equipment.

3. HAZARDOUS CHEMICALS

HAZARDOUS CHEMICALS SHOULD BE STORED AND PROTECTED IN ACCORDANCE WITH THE RECOMMENDATIONS OF NFPA 49, "HAZARDOUS CHEMICALS DATA". CHEMICALS STORAGE AREAS SHOULD BE WELL VENTILATED AND PROTECTED AGAINST FLOODING CONDITIONS SINCE SOME CHEMICALS MAY REACT WITH WATER TO PRODUCE IGNITION.

Hazardous chemicals will be stored and protected in accordance with "Good Practice" and manufacturer's recommendations.

4. MATERIALS CONTAINING RADIOACTIVITY

MATERIALS THAT COLLECT AND CONTAIN RADIOACTIVITY SUCH AS SPENT ION EXCHANGE RESINS, CHARCOAL FILTERS, AND HEPA FILTERS SHOULD BE STORED IN CLOSED METAL TANKS OR CONTAINERS THAT ARE LOCATED IN AREAS FREE FROM IGNITION SOURCES OR COMBUSTIBLES. THESE MATERIALS SHOULD BE PROTECTED FROM EXPOSURE TO FIRES IN ADJACENT AREAS AS WELL. CONSIDERATION SHOULD BE GIVEN TO REQUIREMENTS FOR REMOVAL OF ISOTOPIC DECAY HEAT FROM ENTRAINED RADIOACTIVE MATERIALS.

Materials that collect and contain radioactivity will be stored in closed metal containers.

Handling of materials will be in accordance with applicable standards and Station Directives.

APPENDIX A

Resume of Fire Protection Consultant

McNeary Insurance Consultants, Inc. provide Fire Protection Consultation Service for Catawba Nuclear Station. McNeary Insurance Consultants, Inc. was formed in 1956 by Mr. W. J. L. McNeary, P.E. following nearly twenty years of engineering experience in industrial loss management and control with major insurance interests.

In the early 1970's the firm was incorporated and merged into Boone and Company - Consultants and Actuaries.

The McNeary office in Charlotte, North Carolina operates as a Property and Casualty Division of the parent company. The Engineering Section of McNeary provides design and consulting services to commercial, governmental, institutional, industrial, professional and public utility clients throughout the southeast.

The Engineering Section is staffed by engineers and technician to complete design and drafting for assignments which include:

1. Automatic sprinkler system design, analysis, inspection and testing.
2. Building fire and life safety hazard analysis for existing and proposed structures, storage and protection of materials.
3. High-rise structures' Building Code and Standards Compliance studies.

4. Certification of structures for Accreditation as health care facilities.

Engineers in the firm maintain Member status in the Society of Fire Protection Engineers, National Society of Professional Engineers and the National Fire Protection Association.

APPENDIX B

Drawings

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REASON

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APPENDIX C

Fire Hazards Analysis

A hazards analysis was conducted by a team consisting of an engineer assigned full time duties in the area of fire protection and a fire protection consultant.

Combustible materials were considered to be:

1. Flammable liquids including lubricants used in motors, pumps and other equipment.
2. Combustible portions of power and control cable used in the plant.
3. Other material which was observed during the inventory that would contribute to the combustible loading.

Combustible loadings for each of these were:

1. Flammable liquids, lubricants = 20,000 BTU/LB.
2. Power/Control Cable = 10,000 BTU/LB of insulation and filler material.
3. Other materials (Class A) = 8,000 BTU/LB.

Quantities of combustible liquids and lubricants were obtained from documents and personnel associated with the purchase of equipment. Estimated quantities of power and control cable were obtained from computer programs which were used to route cables. Using this information, a BTU contribution was calculated.

The following hazard analysis was conducted for each fire area. A fire area is considered that portion of the plant which is separated from the

remainder of the plant by three hour rated barriers, i.e. walls, floors or ceilings. Fire Areas 4, 11, 18, 22, 38, and 47 have been separated within the Hazards Analysis to delineate information. These areas could be combined into a single fire area without degradation of shutdown capability.

The analysis was conducted in the Auxiliary, Diesel, Reactor Buildings and Nuclear Service Water Pump Structure and that portion of the Service Building which is adjacent to the Auxiliary Building.

The analysis defined each fire area, identified the equipment located in the area, noting the equipment necessary for shutdown of the units, and demonstrated the capabilities for bringing the unit to a hot standby condition with and without the suppression system functioning as designed.

Auxiliary Building

FIRE AREA 1 (Reference Drawings CFP-1, CN-1200-1.1 and 1.2)

A. Description of Fire Area

Drawing CFP-1 shows the boundaries of Fire Area 1 and CN-1200-1.1 and 1.2 show the location of the following major equipment:

<u>EQUIPMENT (SYSTEM)</u>	<u>SAFETY RELATED</u>	<u>SAFE SHUTDOWN</u>
RHR Pumps (ND)	X	X
Containment Spray Pumps (NS)	X	
RHR and Cont Spray Rooms		
Sump Pumps (WL)		

Combustible materials, quantities and fire loads are listed in Table C-1.

B. Construction

Boundaries of Fire Area 1 are walls, floors and ceilings of reinforced concrete which provide three hour fire barriers. The boundary adjoining the pipe corridor has a louvered metal door which permits air flow in to the pipe corridor. The pipe corridor is a Radiation Control Zone. Significant pressure differential assures air flow into the Radiation Control Zone. Radiological shield wall,

in a labyrinth arrangement and lack of continuity of combustibles on each side of the wall reduce the possibility of fire spread. (Ref. Correspondence - W. O. Parker's July 29, 1982 letter and H. B. Tucker's December 15, 1982 letter to Harold R. Denton (NRR) concerning louvered fire doors.)

Spiral stairs provide access into Fire Area 1 from the elevation above (543+0). The entrances to these stairs from elevation 543 + 0 are enclosed with three hour fire rated walls and ceilings.

The access wall opening of each enclosure is equipped with a three hour fire rated door and frame approved by Underwriter's Laboratory or of equivalent construction.

Three-hour rated reinforced concrete walls separate redundant Residual Heat Removal Pumps.

Floor drains are provided and will handle the sprinkler water flow.

Mechanical and Electrical penetrations in rated barriers are sealed with an approved, 3-hour rated fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

C. Fire Detection and Suppression

Each room is provided with automatic detection which alarms and annunciates in the Control Room.

Fixed water sprinklers are provided in each RHR Pump Room and connecting corridor.

Manual hose stations and portable extinguishers are provided in the corridors leading to each pump room.

D. Consequences of a Fire

1) With Suppression system functioning:

The fixed water sprinklers in the RHR Pump Rooms are designed to extinguish fires in the area should they occur and prevent their spread to redundant equipment. Rated barriers forming area boundaries ensure the fire would be contained.

Rated barriers between redundant pumps assure availability of at least one pump.

2) With no suppression functioning:

A fire in any room could possibly cause loss of that piece of equipment if no suppression system functioned.

With barriers between redundant pumps, normal shutdown capability would not be affected.

The area boundary would ensure that the fire would be contained in Fire Area 1.

In addition to normal unit systems and equipment, the Auxiliary Shutdown Panels (ASP) and Standby Shutdown System (SSS) each provide an independent means to bring the unit to a hot shutdown condition.

TABLE C-1

BUILDING: AUXILIARY
ELEVATION: 522 + 0 (Ref. Dwg. CFP-1)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU'S	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
100	Comp Cooling Sump Pump 1A, 1B, 2A, 2B Refueling Water Recir Pumps 1A, 1B, 2A, 2B RHR & Cont Spray Rooms Sump Pumps 1A, 1B, 2A, 2B	Cable Ins	-	4,961,880	.5	I-R/R	AE	HS
101	Corridor	Cable Ins	-	1,164,240	.5	I-R/R	AE	HS
102	Cont Spray Pump 1A	Lube Oil, Cable Ins	3 Gal.	456,000 720,720	.6	I-R/R	HS	PE
103	Cont Spray Pump 1B	Lube Oil, Cable Ins	3 Gal.	456,000 720,720	.6	I-R/R	HS	PE
104	RHR Pump 1B	Lube Oil, Cable Ins	8 Gal.	1,216,000 803,880	.7	I-R/R	AE	HS
105	RHR Pump 1A	Lube Oil, Cable Ins	8 Gal.	1,216,000 831,600	1.0	I-R/R	AE	HS
106	Corridor	Cable Ins	-	346,500	.5	I-R/R	AE	HS
107	Cont Spray Pump 2A	Lube Oil, Cable Ins	3 Gal.	456,000 720,720	.6	I-R/R	HS	PE
108	Cont Spray Pump 2B	Lube Oil, Cable Ins	3 Gal.	456,000 720,720	.6	I-R/R	HS	PE
109	RHR Pump 2B	Lube Oil, Cable Ins	8 Gal.	1,216,000 803,880	.7	I-R/R	AE	HS
110	RHR Pump 2A	Lube Oil, Cable Ins	8 Gal.	1,216,000 831,600	1.0	I-R/R	AE	HS
111	Corridor	Cable Ins	-	346,500	.5	I-R/R	AE	HS
112	Corridor	Cable Ins	-	1,164,240	.5	I-R/R	AE	HS

NOTES FOR TABLES C-1 THRU C-9

Symbols for Primary and Backup Protection

AE - Fixed Suppression System

HS - Hose Station

PE - Portable Extinguishers

* Fire Load Expressed In Pounds Per Square Foot

DETECTION

- | | | |
|----|------------------------|----------------------------|
| a. | I - Ionization | May be used in combination |
| b. | R/R - Rate of Rise | or separately as suggested |
| c. | FT - Fixed Temperature | by the manufacturer |
| d. | UV - Ultraviolet | |

SUMMARY OF FIRE PROTECTION FOR ELEVATION 522 + 0

1. Automatic detection with local alarm and alarm and annunciation in the control room for rooms 100 through 112.
2. Fixed water sprinklers in RHR Pump rooms 104, 105, 109, and 110.
3. Penetrations through rated barriers are sealed with a 3-hour rated fire barrier.
4. Hose stations and portable extinguishers are provided for backup protection.
5. Sprinklers in the RHR Pump rooms are extended to provide protection for the corridor connecting the two pump room entrances.
6. Spatial separation is adequate to prevent a single fire affecting both Train A and Train B cables for equipment required for shutdown.

FIRE AREAS 2 and 3 (Reference Drawings CFP-2, CN-1200-5.4)

A. Description of Fire Area

Drawing CFP-2 shows the boundaries of Fire Areas 2 and 3 and drawing CN-1200-5.4 shows the location of the following major equipment:

<u>EQUIPMENT (SYSTEM)</u>	<u>SAFETY RELATED</u>	<u>SAFE SHUTDOWN</u>
Auxiliary Shutdown Panels Air Conditioning Units (VA)	X	
Motor Driven Auxiliary Feedwater Pumps (CA)	X	X
Containment Ventilation Unit Condensate Drain Tank (WL)		
Air Handling Units		
Air Handling Unit Control Panel		

Combustible materials and quantities and fire loads are listed in Table C-2.

B. Construction

The boundaries for Fire Areas 2 and 3 are walls, floors and ceilings constructed using concrete block and reinforced concrete providing 3-hour barriers for each area.

Access to Fire Area 2 and 3 is by stairwells enclosed by 3-hour rated block walls with 3-hour rated fire doors and frames approved by Underwriter's Laboratory or of equivalent construction.

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour fire barrier. Mechanical penetration seals in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated dampers.

C. Fire Detection and Suppression

Each area is provided with automatic detection which alarms and annunciates in the Control Room.

Fixed water sprinklers are provided for rooms 250 and 260.

A fixed Carbon Dioxide System is provided to protect the Motor Driven Auxiliary Feedwater Pumps.

Manual hose stations and portable extinguishers are provided as backup to the fixed Fire Protection Systems.

D. Consequences of a Fire

1) With suppression system functioning:

The suppression systems are designed to extinguish a fire should it occur in the area and prevent its spread to other areas.

Unit shutdown capability would be available from the SSS using the Turbine Driven Auxiliary Feedwater Pump.

2) With no suppression system functioning:

A fire could possibly cause loss of the area; however, the rated barriers would contain the fire in the area. Shutdown would be available from the SSS using the Turbine Driven Auxiliary Feedwater Pump.

FIRE AREAS 31, 32, 33 and 34 (Reference Drawings CFP-2 and CN-1200-5.4)

A. Description of Fire Area

Drawing CFP-2 shows the boundaries of Fire Areas 31, 32, 33 and 34 and drawing CN-1200-5.4 shows the location of the following major equipment:

<u>EQUIPMENT</u>	<u>SAFETY RELATED</u>	<u>SAFE SHUTDOWN</u>
Auxiliary Shutdown Panel	X	X

Combustible materials, quantities and fire loads are listed in Table C-2

B. Construction

The boundaries of Fire Areas 31, 32, 33 and 34 reinforced concrete and block walls providing a 3-hour rated barrier.

Access to Fire Areas 31, 32, 33 and 34 is by a 3-hour rated door and frame approved by Underwriter's Laboratory or of equivalent construction.

Mechanical and Electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

C. Fire Detection and Suppression

Each area is provided with automatic detection which alarms and annunciates in the Control Room.

Portable extinguishers are provided for suppression.

D. Consequences of a Fire

1) With suppression system functioning:

Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

2) With no suppression system functioning:

(a) A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area. Shutdown capability would be available from the Control Room, using the Emergency Core Cooling System, or the SSS.

Drawing CFP-2 shows the boundaries of Fire Areas 36 and 37 and drawing CN-1200-5.4 shows the location of the following major equipment:

<u>EQUIPMENT</u>	<u>SAFETY</u>	
	<u>RELATED</u>	<u>SHUTDOWN</u>
aux. Feedwater Pump Turbine Pnl.	X	X

combustible materials, quantities and fire loads are listed in Table 2.

Construction

The boundaries for Fire Areas 36 and 37 are floors and ceilings constructed using reinforced concrete and walls constructed using reinforced concrete and concrete block providing a 3-hour rated fire barrier.

Access to Fire Area 36 and 37 is by 3-hour rated door and frame approved by Underwriter's Laboratory, or of equivalent construction.

FIRE AREAS 36 and 37 (Reference Drawings CFP-2 and CN-1200-5.4)

A. Description of Fire Area

Drawing CFP-2 shows the boundaries of Fire Areas 36 and 37 and drawing CN-1200-5.4 shows the location of the following major equipment:

<u>EQUIPMENT</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
Aux. Feedwater Pump Turbine Pnl.	X	X

Combustible materials, quantities and fire loads are listed in Table C-2.

B. Construction

The boundaries for Fire Areas 36 and 37 are floors and ceilings constructed using reinforced concrete and walls constructed using reinforced concrete and concrete block providing a 3-hour rated barrier.

Access to Fire Area 36 and 37 is by 3-hour rated door and frame approved by Underwriter's Laboratory, or of equivalent construction.

Mechanical and Electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

C. Fire Detection and Suppression

The area is provided with automatic detection which alarms and annunciates in the Control Room.

Portable extinguishers are provided for suppression.

D. Consequences of a Fire

- 1) With suppression system functioning: Portable extinguishers and manual hose stations would be used to extinguish a fire should it occur and normal shutdown capability would be available from the Motor Driven Auxiliary Feedwater Pumps.
- 2) With no suppression system functioning: A fire could possibly cause loss of Auxiliary Feedwater Pump Turbine Panel if no suppression system functioned; however, the fire would be contained in this area and normal shutdown capability would be available from the Control Room or ASP using Motor Driven Auxiliary Feedwater Pumps.

FIRE AREAS 39 and 40 (Reference Drawings CFP-2 and CN-1200-5.4)

A. Description of Fire Area

Drawing CFP-2 shows the boundaries of Fire Areas 39 and 40 and drawing CN-1200-5.4 shows the location of the following major equipment:

<u>EQUIPMENT</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
Turbine Driven Auxiliary Feedwater Pump (CA)	X	X

Combustible materials, and quantities and fire loads are listed in Table C-2.

B. Construction

The boundaries for Fire Areas 39 and 40 are walls, floors and ceilings constructed using reinforced concrete providing 3-hour barriers for each area.

Access to Fire Area 39 and 40 is by a rated hatch constructed to UL 3-hour specifications, located in the ceiling.

Mechanical and Electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

C. Fire Detection and Suppression

Each area is provided with automatic detection which alarms and annunciates in the Control Room.

A fixed Carbon Dioxide System is provided to protect the Turbine Driven Auxiliary Feedwater Pump.

Portable extinguishers are provided as backup to the fixed Carbon Dioxide system.

D. Consequences of a Fire

- 1) With suppression system functioning: The suppression systems are designed to extinguish a fire should it occur in the area and prevent its spread to other areas.

Unit shutdown capability would be available from Control Room or ASP's using one of the Motor Driven Auxiliary Feedwater Pumps.

- 2) With no suppression system functioning: A fire could possibly cause loss of the area however, the rated barriers would contain the fire in the area. Shutdown would be available from the Control Room or ASP's using one of the Motor Driven Auxiliary Feedwater Pumps.

FIRE AREA 4 (Reference Drawings CFP-2, 3 & 4, CN-1200-5.1, 5.2 and 5.3, 8.2, 8.3, 9.2 and 9.3)

A. Description of Fire Area

Drawings CFP-2, 3 and 4 shows the boundaries of Fire Area 4 and Drawings CN-1200-5.1, -5.2,-5.3, -8.2, -8.3 -9.2 and -9.3, show locations of the following major pieces of safety related equipment.

<u>EQUIPMENT (SYSTEM) (ROOM NO)</u>	<u>SAFETY RELATED</u>	<u>SAFE SHUTDOWN</u>
Evaporator Feed Pumps (NB) (210)	X	
Safety Injection Pumps (NI) (234, 235, 245, 242)	X	
Waste Gas Comp Pkg (WG) (206B, 207)	X	
Centrifugal Charging Pumps (NV) (231, 230, 241, 240)	X	X
Reciprocating Charging Pump (NV) (233, 243)	X	
Waste Drain Tank Pump (WL) (215A)	X	
Waste Drain Tank (WL) (215C)	X	

Combustible materials, quantities, fire loads and location of other pieces of equipment are listed in Table C-2.

B. Construction

The boundaries for Fire Area 4 are walls, floors and ceilings constructed using reinforced concrete and concrete block which provides 3-hour barriers for the area.

A three-hour fire rated reinforced concrete wall separates redundant Centrifugal Charging Pumps.

Access to Fire Area 4 is by any of four stairwells enclosed by 3-hour rated block walls with 3-hour rated fire doors and frames approved by Underwriter's Laboratory or of equivalent construction.

Floor drains provided in areas protected by fixed water sprinklers will handle sprinkler flow.

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour rated fire barrier. Mechanical penetration seals in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated dampers.

C. Fire Detection and Suppression

Cable tray runs, safety related pump rooms and areas containing combustibles are provided with automatic detection which alarms and

annunciates in the Control Room. Individual rooms are listed in Table C-2.

Fixed water sprinklers are provided with alarm to the Control Room for the Centrifugal Charging Pumps.

Manual hose stations and portable extinguishers are provided throughout the elevation.

D. Consequences of a Fire

1. With suppression system functioning:

The fixed water sprinklers are designed to extinguish fires should they occur in those protected areas and either normal, ASP or SSS shutdown capability would be available.

2. With no suppression functioning:

A fire could possibly cause loss of equipment in an area if no suppression systems functioned; however, the fire rated boundaries would contain the fire within Area 4 and the SSS provides an alternate means to shutdown the unit separate from the Control Room and ASP.

TABLE C-2

BUILDING: AUXILIARY
ELEVATION: 543 + 0 (Ref. Dwg. CFP-2)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
200, 204 204A, 212B	Equipment Area	Cable Ins	-	100,193,940	1.9	I-R/R	HS	PE
200A	Stairway	-	-	-	-	-	HS	PE
200B	Aisle	-	-	-	-	-	HS	PE
200C	Groundwater Drainage Sump Pumps	-	-	-	-	-	HS	PE
200D	Stairway	-	-	-	-	-	HS	PE
201	Aisle	-	-	-	-	-	HS	PE
202	Valve Gallery	-	-	-	-	-	HS	PE
203	Waste Gas Decay Tanks Shutdown Waste Gas Tanks	-	-	-	-	-	HS	PE
204	Hydrogen Recombiner Control (See 200) Panel Area					I-R/R	HS	PE
204A	Exhaust Fan Concrete Pad (See 200)					-	HS	PE
204B	Waste Gas Analysis Rack "A"	-	-	-	-	-	HS	PE
205	Waste Gas Hydrogen Recombiner "A"	-	-	-	-	-	HS	PE
205A	Gas Analysis Rack	-	-	-	-	-	HS	PE
206A	Waste Gas Hydrogen Recombiner "B"	-	-	-	-	-	HS	PE
206B	Waste Gas Compressor Package "B"	-	-	-	-	-	HS	PE
207	Waste Gas Compressor Package "A"	-	-	-	-	-	HS	PE
208	Corridor	-	-	-	-	I-R/R	HS	PE
209	Corridor	Cable Ins	-	8,607,060	2.2	I-R/R	HS	PE
209A	Stairway	-	-	-	-	-	HS	PE
210	Corridor	-	-	-	-	-	HS	PE

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TABLE C-2

BUILDING: AUXILIARY
ELEVATION: 543 + 0 (Ref. Dwg. CFP-2)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
210A	Recycle Evap. Feed Pump "A" & "B"	-	-	-	-	-	HS	PE
210B	Valve Gallery	-	-	-	-	-	HS	PE
211	Recycle Evap. Cond. Return Unit, Recycle Evap Package, Air Handling Unit	-	-	-	-	-	HS	PE
212	Corridor	Cable Ins	-	8,607,060	2.2	I-R/R	HS	PE
212A	Stairway	-	-	-	-	-	HS	PE
212B	Exhaust Fan Concrete Pad	(See 200)	-	-	-	-	HS	PE
213	Gas Decay Tank Drain Pump	-	-	-	-	-	HS	PE
214	Chemical Drain Tank & Pump, Floor Drain Sump Pump, Waste Evap Feed Tank Pump	-	-	-	-	-	HS	PE
215	Corridor	-	-	-	-	-	HS	PE
215A	Waste Drain Tank Pumps	-	-	-	-	-	HS	PE
215B	Waste Evap. Feed Pumps	-	-	-	-	-	HS	PE
215C	Waste Drain Tank	-	-	-	-	-	HS	PE
215D	Waste Evap. Feed Tank	-	-	-	-	-	HS	PE
216	Waste Evap. Package	-	-	-	-	-	HS	PE
217,333 333A,333B	Mechanical Penetration Room - Unit 1	Cable Ins	-	13,139,280	.6	I-R/R	HS	PE
220	Mixing & Settling Tank Pump, Mixing & Settling Tank Sludge Pump	-	-	-	-	-	HS	PE

TABLE C-2

BUILDING: AUXILIARY
ELEVATION: 543 + 0 (Ref. Dwg. CFP-2)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
221	Mixing & Settling Tank	-	-	-	-	-	HS	PE
222	Spent Resin Valve Body Room	-	-	-	-	-	HS	PE
222A	Spent Resin Storage Tank "B"	-	-	-	-	-	HS	PE
222B	Spent Resin Storage Tank "A"	-	-	-	-	-	HS	PE
223	Spent Resin Sluicing Pump	-	-	-	-	-	HS	PE
224	Laundry & Hot Shower Tank Pump	-	-	-	-	-	HS	PE
225	Floor Drain Tank, Laundry & Hot Shower Tank	-	-	-	-	-	HS	PE
226	Floor Drain Tank Pump	-	-	-	-	-	HS	PE
227,323 323A,323B	Mechanical Penetration Room - Unit 2	Cable Ins	-	13,139,280	.6	I-R/R	HS	PE
230	Centrifugal Charging Pump "1A"	Lube Oil	56 gal.	8,512,000	1.3	I-R/R	AE	HS
231	Centrifugal Charging Pump "1B"	Lube Oil	56 gal.	8,512,000	1.3	I-R/R	AE	HS
232	Corridor	-	-	-	-	I-R/R	HS	PE
233	Reciprocal Charging Pump - Unit 1	Lube Oil	96.25 gal.	14,630,000	3.8	I-R/R	HS	PE
234	High Pressure Safety Injection Pump "1B"	Lube Oil	3.5 gal.	532,000	.1	I-R/R	HS	PE
235	High Pressure Safety Injection Pump "1A"	Lube Oil	3.5 gal.	532,000	.1	I-R/R	HS	PE

TABLE C-2

BUILDING: AUXILIARY
ELEVATION: 543 + 0 (Ref. Dwg. CFP-2)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
236	Floor Drain Sump Pump, Vent Condensate Drain Tank, Train A & B Air Handling Units	-	-	-	-	I-R/R	HS	PE
237	Restricted Instrument Shop	-	-	-	-	I-R/R	HS	PE
238	Sample Panel - Unit 1	-	-	-	-	I-R/R	HS	PE
239	Cable Shaft	Cable Ins	-	1,118,040	.3	I-R/R	HS	PE
240	Centrifugal Charging Pump "2A"	Lube Oil	56 gal.	8,512,000	1.3	I-R/R	AE	HS
241	Centrifugal Charging Pump "2B"	Lube Oil	56 gal.	8,512,000	1.3	I-R/R	AE	HS
242	Corridor	-	-	-	-	I-R/R	HS	PE
243	Reciprocal Charging Pump - Unit 2	Lube Oil	96.25 gal.	14,630,000	3.8	I-R/R	HS	PE
244	High Pressure Safety Injection Pump "2B"	Lube Oil	3.5 gal.	532,000	.1	I-R/R	HS	PE
245	High Pressure Safety Injection Pump "2A"	Lube Oil	3.5 gal.	532,000	.1	I-R/R	HS	PE
246	Floor Drain Sump Pump, Vent Condensate Drain Tank, Train A & B Air Handling Units	-	-	-	-	I-R/R	HS	PE
247	Restricted Instrument Shop	-	-	-	-	I-R/R	HS	PE
248	Sample Panel - Unit 2	-	-	-	-	I-R/R	HS	PE
250,255 256	Auxiliary Feedwater Pump Room - Unit 1	Lube Oil Cable Ins	3 gal.	456,000 12,593,196	0.4	I-R/R	AE	HS
250A	Stairway	-	-	-	-	-	HS	PE

TABLE C-2

BUILDING: AUXILIARY
ELEVATION: 543 + 0 (Ref. Dwg. CFP-2)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
251	Auxiliary Feedwater Pump Turbine Panel	Cable Ins	-	554,400	0.6	I-R/R	PE	HS
252	Train A Shutdown Panel	Cable Ins	-	2,328,480	0.9	I-R/R	PE	HS
253	Train B Shutdown Panel	Cable Ins	-	853,776	0.7	I-R/R	PE	HS
254	Turbine Driven Auxiliary Feedwater Pump "1A"	Lube Oil	8.5 Gal.	1,292,000	.2	Photoelectric	AE	PE
255	Motor Driven Auxiliary Feedwater Pump "1B"	(See 250)				I-R/R	AE	HS
256	Motor Driven Auxiliary Feedwater Pump "1A"	(See 250)				I-R/R	AE	HS
260,265 266	Auxiliary Feedwater Pump Room - Unit 2	Lube Oil Cable Ins	3 Gal.	456,000 11,239,097	0.3	I-R/R	AE	HS
260A	Stairway	-	-	-	-	-	HS	PE
261	Auxiliary Feedwater Pump Turbine Panel	Cable Ins	-	582,120	0.7	I-R/R	PE	HS
262	Train A Shutdown Panel	Cable Ins	-	2,383,920	0.9	I-R/R	PE	HS
263	Train B Shutdown Panel	Cable Ins	-	583,378	0.5	I-R/R	PE	HS
264	Turbine Driven Auxiliary Feedwater Pump "2A"	Lube Oil	8.5 Gal.	1,292,000	.2	Photoelectric	AE	PE
265	Motor Driven Auxiliary Feedwater Pump "2B"	(See 260)				I-R/R	AE	HS
266	Motor Driven Auxiliary Feedwater Pump "2A"	(See 260)				I-R/R	AE	HS
314	Recycle Holdup Tank "A"	-	-	-	-	-	HS	PE
316	Recycle Holdup Tank "B"	-	-	-	-	-	HS	PE

SUMMARY OF FIRE PROTECTION FOR ELEVATION 543+0

AUXILIARY FEEDWATER PUMP (AFP) ROOMS

1. Automatic detection with local alarm and alarm and annunciation in the control room.
2. Automatic sprinklers and fixed carbon dioxide systems provide primary protection.
3. Photo-electric detectors are provided in the turbine-driven AFP rooms.
4. Hose stations and portable extinguishers are provided as backup protection for Sprinkler and Carbon Dioxide Systems.
5. Penetrations in fire barriers and stairwells are sealed with a 3-hour rated fire barrier.

REMAINDER OF ELEVATION 543+0

1. Fixed water sprinklers are provided for the Centrifugal Charging Pump rooms 231, 230, 241 and 240.
2. Penetrations in fire barriers and stairwells are sealed with a 3-hour fire rated fire barrier.

3. Curbs are provided as necessary to control sprinkler discharge.
4. Hose stations and portable extinguishers are provided as backup to sprinkler systems.
5. Automatic detection with local alarm and alarm and annunciation in the control room is provided for cable trays.

FIRE AREAS 5 and 6 (Reference Drawings CFP-3 and CN-1200-8.5)

A. Description of Fire Area

Drawing CFP-3 shows the boundaries of Fire Areas 5 and 6 and Drawing CN-1200-8.5 shows the location of the following major pieces of equipment.

<u>EQUIPMENT (SYSTEM)</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
RCP D Switchgear		
RCP B Switchgear		
Pressurizer Htr Panel B		X
Pressurizer Htr Panel D		X
600V MCC MXN		
600V MCC MXZ		
ATC 16		
ATC 17		

Combustible materials, quantities and fire loads are listed in Table C-3.

B. Construction

Floors and ceilings forming the fire boundaries of Fire Areas 5 and 6 are reinforced concrete construction providing 3-hour barriers.

Boundary walls separating Fire Areas 5 and 6 from other fire areas are reinforced concrete and concrete block providing 3-hour barriers.

Access to each of these fire areas is by a stairwell enclosed by 3-hour rated blockwalls with 3-hour rated fire doors and frames approved by Underwriter's Laboratory or of equivalent construction.

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour rated fire barrier. Mechanical penetrations in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated dampers.

C. Fire Detection and Suppression

Each Fire Area is provided with automatic detection which alarms and annunciates in the Control Room. Manual hose stations and portable extinguishers are provided for suppression.

D. Consequences of a Fire

1. With suppression system functioning:

Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

2. With no suppression system functioning:

A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area. Shutdown capability would be available from the Control Room, ASP, or SSS.

FIRE AREAS 7 and 8 (Reference Drawings CFP-3 and CN-1200-8.5)

A. Description of Fire Area

Drawing CFP-3 shows the boundaries of Fire Area 7 and 8 Drawing CN-1200-8.5 shows the location of the following major pieces of equipment:

<u>EQUIPMENT (SYSTEM)</u>	SAFETY	SAFE
	<u>RELATED</u>	<u>SHUTDOWN</u>
Transf ELXD (EPC)	X	X
600V LC ELXD (EPE)	X	X
Transf ELXF (EPC)	X	
600V LC LEXB (EPE)	X	X
Transf LEXB (EPC)	X	X
600V MCC EMXL (EPE)	X	X
600V MCC EMXP (EPE)	X	X
4 KV SWGR ETB (EPC)	X	X
EATC 2	X	X
Switchgear Air Handling Units (VC)	X	

Combustible materials, quantities and fire loads are listed in Table C-3.

B. Construction

Boundary walls separating Fire Areas 7 and 8 from other fire areas are 3-hour rated concrete block or concrete.

Access to these fire areas is by 3-hour rated fire doors and frames approved by Underwriter's Laboratory or equivalent construction.

Mechanical and electrical penetrations are sealed with an approved 3-hour rated fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

C. Fire Detection and Suppression

Each Fire Area is provided with automatic detectors which alarm and annunciate in the Control Room. Manual hose stations and portable extinguishers are provided for suppression.

D. Consequences of a Fire

1. With suppression system functioning:

Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

2. With no suppression system functioning:

A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area. Shutdown capability would be available from the Control Room, ASP, or SSS.

FIRE AREAS 9 and 10 (Reference Drawings CFP-3, CFP-4, CN-1200-8.4, and CN-1200-9.4)

A. Description of Fire Area

Drawings CFP-3 and CFP-4 show the boundaries of Fire Areas 9 and 10 and drawing CN-1200-8.4 shows the location of the following major pieces of equipment:

<u>EQUIPMENT (SYSTEM)</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
Vital Batteries EBA, EBB, EBC, EBD	X	X
Aux Control Batteries CBA, CBB		
Vital Battery Chargers	X	X
Reg Pwr Dist Centers		
Vital DC Dist Center & Panelboards	X	X
Volt Regulators		
Vital Inverters & AC Panelboards	X	X
Auxiliary Control Battery Chargers		
Auxiliary Control DC Dist Centers		
Auxiliary Control Inverters & AC Panelboards		
Battery Room Exhaust Fans (VC)	X	

Combustible materials, quantities and fire loads are listed in Table C-3.

B. Construction

Floor and ceiling fire area boundaries are reinforced concrete construction providing 3-hour barriers. Boundary walls are 3-hour rated concrete block.

Each battery noted in A above is separated from the remainder of Fire Areas 9 and 10 by 3-hour rated concrete block walls provided with UL approved, or of equivalent construction, 3-hour rated fire doors and frames. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) for additional information concerning battery room separation.)

Access to either area 9 or 10 is through any of the four (4) entrances which are equipped with 3-hour UL approved doors or of equivalent construction.

Floor drains are provided in the pipe trenches along column lines 54 and 60 and will handle water from hose stations located in the area.

Mechanical and electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are sealed with 3-hour UL rated fire dampers.

C. Fire Detection and Suppression

Each Fire Area is provided with automatic detectors which alarm and annunciate in the Control Room. Manual hose stations and portable extinguishers are provided for suppression.

D. Consequences of a Fire

1. With suppression systems functioning:

Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur. If redundant trains in this area were involved in the fire, shutdown capability would be available from the ASP's or the SSS.

2. With no suppression systems functioning:

A fire could possibly cause loss of redundant trains if no suppression systems functioned; however, the fire barriers would contain the fire within the area and shutdown capability would be available from the ASP's or the SSS.

FIRE AREA 11 (Reference Drawings CFP-2 & 3, CN-1200-8.1, 8.2, 8.3 and 5.2)

A. Description of Fire Area

Drawings CFP-2 and 3 shows the boundaries of Fire Area 11 and drawings CN-1200-8.1 8.2, 8.3 and 5.2 show locations of the following major pieces of safety related equipment:

<u>EQUIPMENT (SYSTEM) (ROOM NO.)</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
Seal Water HX (NV) (331, 321)	X	X
Unit 1 - Component Cooling Pumps (KC) (300)	X	X
Volume Control Tank (NV) (319, 309)	X	
RC Filters (NV) (456, 455)	X	
Boron Injection Tank (NI) (318, 308A)	X	
Boron Injection Tank Pumps (NI) (318, 308A)	X	
Boric Acid Tanks (NV) (305, 307)	X	X
Seal Water Injection Filter (NV) (471, 470, 463, 462)	X	X
Boron Recycling Hold Up Tanks (316, 314)	X	

Combustible materials, quantities, fire loads and location of other pieces of equipment are listed in Table C-3.

B. Construction

Walls, floors and ceilings are reinforced concrete construction providing 3-hour boundaries for the Fire Area.

A 3-hour fire rated concrete block wall separates Train A and Train B Component Cooling Pumps.

Three hour fire rated concrete block and concrete walls provide protection for safety related 600V motor control centers.

Access to Fire Area 11 is through any of six (6) entrances which are equipped with 3-hour rated doors except in radiation control areas where louvered metal doors permit air flow into radiation control zones. Significant pressure differential assures air flow into radiation control zones. Shield walls, inside the radiation control zones, in a labyrinth arrangement and lack of continuity of combustibles on each side of the boundary reduce the possibility of fire spread. (Ref. Correspondence - W. O. Parker's letter of July 29, 1982 and H. B. Tucker's letter of December 15, 1982 concerning louvered fire doors.)

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated fire dampers.

C. Fire Detection and Suppression

Cable tray runs, safety related pumps and areas containing combustibles are provided with automatic detectors which alarm and annunciate in the Control Room.

Fixed water sprinklers, with alarm to the Control Room, are provided for the Component Cooling Pumps.

Manual hose stations and portable extinguishers are provided throughout the elevation as backup to the sprinklers.

D. Consequences of a Fire

1. With suppression system functioning:

The fixed water sprinklers are designed to extinguish fires should they occur in those protected areas and either the normal, ASP or SSS shutdown capability would be available.

2. With no suppression functioning:

A fire could possibly cause loss of equipment in an area if no suppression systems functioned; however, rated boundaries would contain the fire within the area. The SSS provides a means to shutdown the unit separate from the normal unit functions.

TABLE C-3

BUILDING: AUXILIARY
ELEVATION: 560 + 0 (Ref. Dwg. CFP-3)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU'S	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
300	Component Cooling Pumps (4)	Lube Oil Cable Ins	1 Gal. Each	608,000 32,439,280	2.5	I-R/R	AE	PE
300A	Stairway	-	-	-	-	-	HS	PE
300B	Aisle	-	-	-	-	-	HS	PE
300C	Duct Shaft	-	-	-	-	-	HS	PE
300D	Duct Shaft	-	-	-	-	-	HS	PE
301	Boric Acid Transfer Pumps - Unit 2	-	-	-	-	-	HS	PE
302	Boric Acid Transfer Pumps - Unit 1	-	-	-	-	-	HS	PE
303,306	Corridor	Cable Ins	-	30,187,000	1.5	I-R/R	HS	PE
303A	Stairway	-	-	-	-	-	HS	PE
303B	Duct Shaft	-	-	-	-	-	HS	PE
304	Valve Gallery	-	-	-	-	I-R/R	HS	PE
305	Boric Acid Tank "A"	-	-	-	-	-	HS	PE
306	Valve Gallery	-	(See 303)	-	-	I-R/R	HS	PE
307	Boric Acid Tank "B"	-	-	-	-	-	HS	PE
308	Corridor	Cable Ins	-	6,514,200	2.0	I-R/R	HS	PE
308A	Boron Injection Tank & Pumps - Unit 2	-	-	-	-	I-R/R	HS	PE
309	Volume Control Tank Unit 2	-	-	-	-	-	HS	PE
310,315	Corridor	Cable Ins	-	30,181,000	1.5	I-R/R	HS	PE
310A	Stairway	-	-	-	-	-	HS	PE

TABLE C-3

BUILDING: AUXILIARY
ELEVATION: 560 + 0 (Ref. Dwg. CFP-3)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU'S	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
310B	Duct Shaft	-	-	-	-	-	HS	PE
311	Pipe Trench	-	-	-	-	-	HS	PE
312	Pipe Trench	-	-	-	-	-	HS	PE
313	Valve Gallery	-	-	-	-	I-R/R	HS	PE
314	Boron Recycle Holdup Tank "A"	(See Table C-2)						
315	Valve Gallery	(See 310)				I-R/R	HS	PE
316	Boron Recycle Holdup Tank "B"	(See Table C-2)						
317	Valve Gallery	-	-	-	-	-	HS	PE
318	Corridor	Cable Ins	-	6,514,200	2.0	I-R/R	HS	PE
318A	Boron Injection Tank & Pumps - Unit 1	-	-	-	-	I-R/R	HS	PE
319	Volume Control Tank - Unit 1	-	-	-	-	-	HS	PE
320	MCC 2EMXB, Terminal Cabinets MCC 2EMXJ	Cable Ins	-	15,100,000	2.5	I-R/R	HS	PE
321	Seal Water Heat Exchanger - Unit 2	-	-	-	-	-	HS	PE
322	Cable Tray Access - Unit 2	Cable Ins	-	13,600,000	1.7	I-R/R	HS	PE
322A	Stairway	-	-	-	-	-	HS	PE
323	Pipe Chase	(See Table C-2, 227)				I-R/R	HS	PE
323A	Pipe Chase	(See Table C-2, 227)				-	HS	PE
323B	Pipe Chase	(See Table C-2, 227)				I-R/R	HS	PE

TABLE C-3

BUILDING: AUXILIARY
ELEVATION: 560 + 0 (Ref. Dwg. CFP-3)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU'S	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
324	Boronometer - Unit 2	-	-	-	-	-	HS	PE
330	MCC 1EMXB, Terminal Cabinets MCC1EMXJ	Cable Ins	-	15,100,000	2.5	I-R/R	HS	PE
331	Sea Water Heat Exchanger - Unit 1	-	-	-	-	-	HS	PE
332	Boronometer - Unit 1	-	-	-	-	-	HS	PE
333	Pipe Chase	(See Table C-2, 217)				I-R/R	HS	PE
333A	Pipe Chase	(See Table C-2, 217)				-	HS	PE
333B	Pipe Chase	(See Table C-2, 217)				I-R/R	HS	PE
334	Cable Tray Access - Unit 1	Cable Ins	-	13,600,000	1.7	I-R/R	HS	PE
340	Battery Room - Unit 2	Cable Ins	-	346,543,243	5.9	I	HS	PE
340A	Cable Shaft	(See Table C-4, 483)				-	HS	PE
340B	Duct Shaft	-	-	-	-	-	HS	PE
341	Vital Battery 2EBA	Battery Casing	-	7,326,000	2.3	I-R/R	HS	PE
342	Vital Battery 2EBB	Battery Casing	-	7,326,000	2.3	I-R/R	HS	PE
342A	Battery Charger 2ECB	(See 340)				I	HS	PE
343	Vital Battery 2EBC	Battery Casing	-	7,326,000	2.3	I-R/R	HS	PE
344	Vital Battery 2EBD	Battery Casing	-	7,326,000	2.3	I-R/R	HS	PE
345	Auxiliary Control Power Battery 2CBB	Battery Casing	-	17,838,000	4.5	I-R/R	HS	PE
346	Auxiliary Control Power Battery 2CBA	Battery Casing	-	17,838,000	4.5	I-R/R	HS	PE
350	Battery Room Unit 1	Cable Ins	-	339,666,466	5.8	I	HS	PE
350A	Cable Shaft	(See Table C-4, 493)				-	HS	PE

TABLE C-3

BUILDING: AUXILIARY
ELEVATION: 560 + 0 (Ref. Dwg. CFP-3)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU'S	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
350B	Duct Shaft	-	-	-	-	-	HS	PE
351	Vital Battery 1EBA	Battery Casing	-	7,326,000	2.3	I-R/R	HS	PE
352	Vital Battery 1EBB	Battery Casing	-	7,326,000	2.3	I-R/R	HS	PE
352A	Battery Charger 1ECB	(See 350)				I	HS	PE
353	Vital Battery 1EBC	Battery Casing	-	7,326,000	2.3	I-R/R	HS	PE
354	Vital Battery 1EBD	Battery Casing	-	7,326,000	2.3	I-R/R	HS	PE
355	Auxiliary Control Power Battery 1CBB	Battery Casing	-	17,838,000	4.5	I-R/R	HS	PE
356	Auxiliary Control Power Battery 1CBA	Battery Casing	-	17,838,000	4.5	I-R/R	HS	PE
360	Electrical Penetration Room - Unit 2	Cable Ins	-	119,157,192	3.3	I	HS	PE
360A	Stairway	-	-	-	-	-	HS	PE
362	Loadcenters 2ELXB, 2ELXD Switchgear 2ETB MCC-2EMXP MCC-2EMXL MCC-2EMXR	Cable Ins	-	84,379,600	3.0	I	HS	PE
363	Switchgear HVAC Equipment Room	(See 362)				I	HS	PE
370	Electrical Penetration Room - Unit 1	Cable Ins	-	111,926,430	3.1	I	HS	PE
370A	Stairway	-	-	-	-	-	HS	PE
372	Load Centers 1ELXB, 1ELXD, Switchgear 1ETB MCC-1EMXP MCC-1EMXL MCC-1EMXR	Cable Ins	-	86,637,197	3.1	I	HS	PE

TABLE C-3

BUILDING: AUXILIARY
ELEVATION: 560 + 0 (Ref. Dwg. CFP-3)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU'S	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
373	Switchgear HVAC Equipment Room	(See 372)				I	HS	PE
410	Recycle Evaporator Feed Demin (Hatch)	-	-	-	-	-	HS	PE
411	Recycle Evaporator Condensate Demin (Hatch)	-	-	-	-	-	HS	PE
412	Recycle Evaporator Condensate Filter (Hatch)	-	-	-	-	-	HS	PE
413	Boric Acid Filters (2 Hatches)	-	-	-	-	-	HS	PE
414	Recycle Evaporator Feed Demin. (Hatch)	-	-	-	-	-	HS	PE
415	Recycle Evaporator Concentrate Filter (Hatch)	-	-	-	-	-	HS	PE
416A	Recycle Evaporator Feed Filter (Double Hatch)	-	-	-	-	-	HS	PE
416B	Recycle Evaporator Feed Filter (Double Hatch)	-	-	-	-	-	HS	PE
420	Fuel Pool Cooling Pre-Filters, Fuel Pool Cooling Post Filters (6 Hatches)	-	-	-	-	-	HS	PE
421	Thermal Regenerative Demineralizer 2B (Hatch)	-	-	-	-	-	HS	PE
422	Thermal Regenerative Demineralizer 2C (Hatch)	-	-	-	-	-	HS	PE
423	Cation Bed Demineralizer 2A (Hatch)	-	-	-	-	-	HS	PE
424	Waste Monitor Tank Demineralizer (Hatch)	-	-	-	-	-	HS	PE

TABLE C-3

BUILDING: AUXILIARY
 ELEVATION: 560 + 0 (Ref. Dwg. CFP-3)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU'S	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
428	Laundry/Hot Shower Carbon Filter (Hatch)	-	-	-	-	-	HS	PE
430	Waste Evap. Cond. Filter, Fuel Pool Skimmer Filter (3 Hatches)	-	-	-	-	-	HS	PE
431	Thermal Regenerative Demineralizer "1E" (Hatch)	-	-	-	-	-	HS	PE
432	Thermal Regenerative Demineralizer "1C" (Hatch)	-	-	-	-	-	HS	PE
433	Cation Bed Demineralizer "1A" (Hatch)	-	-	-	-	-	HS	PE
441	Floor Drain Tank Filter (Hatch)	-	-	-	-	-	HS	PE
442	Laundry & Hot Shower Tank Primary & Secondary Filters (Hatch)	-	-	-	-	-	HS	PE
443	Thermal Regenerative Demineralizer "2A" (Hatch)	-	-	-	-	-	HS	PE
444	Thermal Regenerative Demineralizer "2D" (Hatch)	-	-	-	-	-	HS	PE
445	Mixed Bed Demineralizer (Hatch)	-	-	-	-	-	HS	PE
446	Reactor Coolant Filter "2B" (Hatch)	-	-	-	-	-	HS	PE
447	Seal Water Return Filter (Hatch)	-	-	-	-	-	HS	PE
448	Thermal Regenerative Demineralizer "2E" (Hatch)	-	-	-	-	-	HS	PE
449	Mixed Bed Demineralizer "2A" (Hatch)	-	-	-	-	-	HS	PE

TABLE C-3

BUILDING: AUXILIARY
 ELEVATION: 560 + 0 (Ref. Dwg. CFP-3)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU'S	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
450	Fuel Pool Cooling Post Filters - Unit 1 (5 Hatches)	-	-	-	-	-	HS	PE
451	Seal Water Return Filter - Unit 1 (2 Hatches)	-	-	-	-	-	HS	PE
452	Thermal Regenerative Demineralizer "1D" (Hatch)	-	-	-	-	-	HS	PE
453	Thermal Regenerative Demineralizer "1B" (Hatch)	-	-	-	-	-	HS	PE
454	Mixed Bed Demineralizer "1B" (Hatch)	-	-	-	-	-	HS	PE
455	Reactor Coolant Filter "1B" (2 Hatches)	-	-	-	-	-	HS	PE
456	Reactor Coolant Filter "1A" (2 Hatches)	-	-	-	-	-	HS	PE
457	Waste Evaporator Condensate Demineralizer (1 Hatch)	-	-	-	-	-	HS	PE
458	Thermal Regenerative Demineralizer "1A" (Hatch)	-	-	-	-	-	HS	PE
459	Mixed Bed Demineralizer "1A" (Hatch)	-	-	-	-	-	HS	PE
460	Reactor Coolant Filter 2A (Hatch)	-	-	-	-	-	HS	PE
461	Waste Monitor Tank Filter (Hatch)	-	-	-	-	-	HS	PE

TABLE C-3

BUILDING: AUXILIARY
 ELEVATION: 560 + 0 (Ref. Dwg. CFP-3)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU'S	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
462	Seal Water Injection Filter "2B" (Hatch)	-	-	-	-	-	HS	PE
463	Seal Water Injection Filter "2A" (Hatch)	-	-	-	-	-	HS	PE
464	Spent Resin Sluice Filter (Hatch)	-	-	-	-	-	HS	PE
470	Seal Water Injection Filter "1A" (Hatch)	-	-	-	-	-	HS	PE
471	Seal Water Injection Filter "1B" (Hatch)	-	-	-	-	-	HS	PE
472	Waste Evaporator Feed Filter "B" (Hatch)	-	-	-	-	-	HS	PE
473	Waste Evaporator Feed Filter "A" (Hatch)	-	-	-	-	-	HS	PE

SUMMARY OF FIRE PROTECTION FOR ELEVATION 554+0 and 560+0

BATTERY ROOM (350, 340)

1. Hose stations are provided as primary protection.
2. Automatic detection is provided with local alarm and alarm and annunciation in the control room.
3. Penetrations through rated barriers are sealed with a 3-hour rated fire barrier.
4. Dampers in HVAC ducts are UL rated 3-hours.

SWITCHGEAR ROOMS (372 and 362)

1. Automatic detection is provided with local alarm and alarm and annunciation in the control room.
2. Hose stations provide primary protection.
3. Penetrations through rated barriers are sealed with 3-hour rated fire barrier.

ELECTRICAL PENETRATION ROOMS (370 and 360)

1. Automatic detection is provided with local alarm and alarm and annunciation in the control room.
2. Hose stations provide primary protection.
3. Penetrations through rated barriers and stairwells are sealed with a 3-hour rated fire barrier.

REMAINDER OF ELEVATION 560+0

1. Automatic detection is provided with local alarm and alarm and annunciation in the Control Room.
2. Fixed water sprinklers are provided to protect the Component Cooling Pumps.
3. A 3-hour rated fire barrier is constructed between the Train A and Train B component cooling water pumps.
4. Curbs are provided as necessary to control sprinkler discharge.
5. Hose stations and portable extinguishers are provided as backup for sprinklers.
6. Penetrations through rated barriers and stairwells are sealed with a 3-hour rated fire barrier.

FIRE AREAS 12 and 13 (Reference Drawings CFP-4 and
CN-1200-9.5)

These Fire Areas correspond to Fire Areas 5 and 6 on Elevation 560+0.

The Description, Construction, and Fire Detection and Suppression are the same as described in Fire Areas 5 and 6.

D. Consequences of a Fire

1. With fire suppression systems functioning:

Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

2. With no fire suppression system functioning:

A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area. Shutdown capability would be available from the Control Room using the Emergency Core Cooling System.

FIRE AREAS 14 AND 15 (Reference Drawings CFP-4 and
CN-1200-9.5)

These Fire Areas correspond to Fire Areas 7 and 8 on Elevation 560+0.

The Description, Construction, and Fire Detection and Suppression are the same as described in Fire Areas 7 and 8.

D. Consequences of a Fire

1. With fire suppression systems functioning:

Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

2. With no fire suppression system functioning:

A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area. Shutdown capability would be available from the Control Room using the Emergency Core Cooling System.

FIRE AREAS 16 and 17 (Reference Drawings CFP-4 and CN-1200-9.4)

A. Description of Fire Area

Drawing CFP-4 shows the boundaries of Fire Areas 16 and 17 and
Drawing CN-1200-9.4 shows the location of major pieces of equipment:

<u>EQUIPMENT</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
Transducer Cabinets		
Event Recorder		
Auxiliary Relay Racks	X	
Cable Shaft		

Combustible materials, quantities and fire loads are listed in Table
C-4.

B. Construction

The boundaries for Fire Areas 16 and 17 are floors and ceilings
constructed using reinforced concrete providing a 3-hour barrier.

The wall separating the Cable Rooms from the Service Building (A-A
Line) is of reinforced concrete construction providing a 3-hour
barrier.

Remaining boundary walls are concrete block which provide 3-hour barriers.

Access to Areas 16 and 17 is through any of five (5) entrances which are protected with UL Approved, or of equivalent construction, 3-hour rated fire doors and frames.

Mechanical and electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

C. Fire Detection and Suppression

The Cable Rooms are provided with automatic detectors which alarm and annunciate in the Control Room.

Portable extinguishers and fire hose stations are provided for fire suppression.

D. Consequences of a Fire

1. With fire suppression systems functioning:

Manual hose stations and portable extinguishers would be used to extinguish a fire and normal unit shutdown would be available. Safe shutdown capability would be available from the SSS.

2. With no suppression system functioning:

A fire could possibly cause loss of redundant trains of equipment if no suppression systems functioned; however, boundary walls would contain the fire within the area. Shutdown capability would be available from the SSS.

FIRE AREA 45 and 46 (Reference Drawings CFP-3 and 4,
CN-1200-8.4, and 9.4)

A. Description of Fire Area

Drawings CFP-3 and 4 shows the boundaries of Fire Area 45 and 46 and drawings CN-1200-8.4 and 9.4 show locations of the following major equipment:

<u>EQUIPMENT</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
------------------	---------------------------------	--------------------------------

Corridor

Cable Shaft

Combustible materials, and fire loads, as well as individual room inventories of equipment, are listed in Table C-4.

B. Construction

The boundaries for Fire Area 45 and 46 are walls, floors and ceilings constructed using reinforced concrete and concrete block which provides 3-hour barriers.

Access to areas 45 and 46 is through any of eight (8) entrances which are equipped with 3-hour UL approved doors or are equivalent construction label, as shown on the attached drawings.

Mechanical and electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated fire dampers.

C. Fire Detection and Suppression

Each area is provided with automatic detectors which alarm and annunciate in the Control Room. Portable extinguishers are provided for fire protection.

D. Consequence of a Fire

1. With suppression system functioning:

Portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available.

2. With no suppression system functioning:

A fire could possibly cause loss of equipment in an area if no suppression system functioned; however, the rated boundaries would contain the fire within the fire area. The Control Room, using the Emergency Core Cooling System, and the SSS provide means to shutdown the unit.

FIRE AREA 18 (Reference Drawings CFP-3, 4 and 5 CN-1200-9.1, 9.2, 9.3,
8.2, 8.3, 10.2 and 10.3)

A. Description of Fire Area

Drawings CFP-3, 4 and 5 shows the boundaries of Fire Area 18 and drawings CN-1200-9.1, 9.2 and 9.3, 8.2, 8.3, 10.2 and 10.3 show locations of the following major pieces of equipment:

<u>EQUIPMENT</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
Demister Heat Sections (VA)	X	
Unit 2-Component Cooling Pumps (KC) (400)	X	X
KC HX (KC) (400)	X	X
600V MCC 1EMXA, 1EMXI (EPE) (478)	X	X
Letdown HX (NV) (476, 467)		
Letdown Reheat, Letdown Chiller and Moderating HX's (NR) (477, 474, 475, 466, 465, 468)	X	
Boron Inj Surge Tank (NI) (419, 427)	X	
Fuel Pool Cooling Pumps (KF) (418, 409)	X	
KF HX's (KF) 418, 409)	X	
600V MCC 2EMXI, 2EMXA (EPE) (469)	X	X
RHR HX (ND) (435, 434, 425, 426)	X	X

Combustible materials, and fire loads, as well as individual room inventories of equipment, are listed in Table C-4.

B. Construction

The boundaries for Fire Area 18 are walls, floors, ceilings constructed using reinforced concrete providing a 3-hour barrier. Spiral stairs provide access from the elevation above (594 + 0). Spatial separation and lack of continuity of combustibles reduce the possibility of fire spread. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton concerning spiral stairs.)

Access to the area is by any of five (5) separate entrances protected by UL Approved, or equivalent construction, 3-hour rated fire doors and frames as shown on the attached drawings.

Mechanical and electrical penetrations in rated barriers, stairwells and exterior walls of room 403 are sealed with an approved 3-hour rated fire barrier. Mechanical penetration seals in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers, stairwells and exterior walls of room 403 are protected with 3-hour UL rated fire dampers.

C. Fire Detection and Suppression

Cable tray runs, safe shutdown pumps and areas containing combustible materials are provided with automatic detectors which alarm and annunciate in the Control Room. Individual rooms are listed in Table C-4.

Fixed water sprinklers are provided, with alarm to the Control Room, for the Component Cooling Pumps and extend twenty feet to GG line to protect cable concentration.

Manual hose stations and portable extinguishers are provided throughout the elevation.

D. Consequence of a Fire

1. With suppression system functioning:

The fixed water sprinkler systems are designed to extinguish fires should they occur. A 3-hour rated concrete block wall separates redundant Component Cooling Pumps and both the normal, ASP, and SSS shutdown capability would be available.

2. With no suppression system functioning:

A fire could possibly cause loss of equipment in an area if no suppression system functioned; however, the rated boundaries would contain the fire within the fire area. The SSS provide a

means to shutdown the unit separate from the normal unit functions.

TABLE C-4

BUILDING: AUXILIARY
ELEVATION: 577 + 0 (Ref. Dwg. CFP-4)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
400, 400C 400D, 400F 400G, 407	Component Cooling Pumps (4), Component Cooling Heat Exchangers	Lube Oil Cable Ins	1 Gal. (ea.)	608,000 139,546,080	1.8	I-R/R	HS	PE
400A	Stairway	-	-	-	-	-	HS	PE
400B	Stairway	-	-	-	-	-	HS	PE
400C	Duct Shaft	(See 400)	-	-	-	-	HS	PE
400D	Duct Shaft	(See 400)	-	-	-	-	HS	PE
400E	Stairway	-	-	-	-	-	HS	PE
400F	Duct Shaft	(See 400)	-	-	-	-	HS	PE
400G	Duct Shaft	(See 400)	-	-	-	-	HS	PE
401	Ice Cond Glycol Mixing & Storage Tank	-	-	-	-	I-R/R	HS	PE
401A	Stairway	-	-	-	-	-	HS	PE
402	Corridor	-	-	-	-	I-R/R	HS	PE
403	Container & Drum Storage	-	-	-	-	I-R/R	HS	PE
404	Access Corridor	-	-	-	-	-	HS	PE
404A	Dewatering Pump Skid	-	-	-	-	I-R/R	HS	PE
404B	Radwaste Feed Skid	-	-	-	-	I-R/R	HS	PE
404C	Evaporator Concentrate Holdup Tank	-	-	-	-	I-R/R	HS	PE
405	Filter Bunkers	-	-	-	-	I-R/R	HS	PE
407	Corridor	(See 400)	-	-	-	I-R/R	HS	PE
408	Fuel Pool Cooling Demineralizer	-	-	-	-	I-R/R	HS	PE

TABLE C-4

BUILDING: AUXILIARY
ELEVATION: 577 + 0 (Ref. Dwg. CFP-4)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
409	Fuel Pool Cooling Pumps, Fuel Pool Skimmer Pump, Fuel Pool Cooling Heat Exchanger	Cable Ins	-	5,950,000	.5	I-R/R	HS	PE
417	Fuel Pool Cooling Demineralizer	-	-	-	-	I-R/R	HS	PE
418	Fuel Pool Cooling Pumps, Fuel Pool Cooling Heat Exchanger, Fuel Pool Skimmer Pump	Cable Ins	-	5,950,000	.5	I-R/R	HS	PE
419	Mechanical Penetration Room	Cable Ins	-	13,998,600	.8	I-R/R	HS	PE
425	Containment Spray & Residual Heat Removal Heat Exchangers "2A"	-	-	-	-	I-R/R	HS	PE
426	Containment Spray & Residual Heat Removal Heat Exchangers "2B"	-	-	-	-	I-R/R	HS	PE
427	Mechanical Penetration	Cable Ins	-	13,998,600	.8	I-R/R	HS	PE
434	Containment Spray & Residual Heat Removal Heat Exchangers "1A"	-	-	-	-	I-R/R	HS	PE
435	Containment Spray & Residual Heat Removal Heat Exchangers "1B"	-	-	-	-	I-R/R	HS	PE
465	Letdown Reheat Heat Exchanger - Unit 2	-	-	-	-	I-R/R	HS	PE
466	Letdown Chiller Heat Exchanger - Unit 2	-	-	-	-	I-R/R	HS	PE
467	Letdown Heat Exchanger - Unit 2	-	-	-	-	I-R/R	HS	PE

TABLE C-4

BUILDING: AUXILIARY
ELEVATION: 577 + 0 (Ref. Dwg. CFP-4)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
468	Moderating Heat Exchanger - Unit 2	-	-	-	-	I-R/R	HS	PE
469	MCC 2EMXA MCC 2EMXI	Cable Ins	-	15,523,200	2.6	I-R/R	HS	PE
474	Letdown Reheat Heat Exchanger - Unit 1	-	-	-	-	I-R/R	HS	PE
475	Letdown Chiller Heat Exchanger - Unit 1	-	-	-	-	I-R/R	HS	PE
476	Letdown Heat Exchanger - Unit 1	-	-	-	-	I-R/R	HS	PE
477	Moderating Heat Exchanger - Unit 1	-	-	-	-	I-R/R	HS	PE
478	MCC 1EMXA MCC 1EMXI	Cable Ins	-	15,523,000	2.6	I-R/R	HS	PE
480	Corridor	(See 483)				I-R/R	PE	HS
480A	Cable Shaft	(See Table C-3, 340)				I-R/R	PE	HS
481,481A	Cable Room Unit 2	Cable Ins	-	522,839,394	14.5	I-R/R	PE	HS
481A	Electrical Boards - Unit 2	(See 480A)				I-R/R	PE	HS
482	Duct Shaft	-	-	-	-	-	PE	HS
483	Corridor	Cable Ins	-	89,522,294	4.2	I-R/R	PE	HS
484	MCC-2MXV, 2MXO, 2MXM, RCP Switchgear, Pressurizer Heater Control, Terminal Cabinets	Cable Ins	-	123,467,652	3.4	I	HS	PE
484A	Stairway	-	-	-	-	-	HS	PE
485	Switchgear & HVAC Equipment	(See Room 486)				I	HS	PE

TABLE C-4

BUILDING: AUXILIARY
ELEVATION: 577 + 0 (Ref. Dwg. CFP-4)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
486& 485	Load Centers 2ELXA, 2ELXC, Switchgear 2ETA, MCC 2EMXC, 2EMXK, 2EMXQ	Cable Ins	-	89,906,355	3.2	I	HS	PE
490	Corridor	(See 493)				I-R/R	PE	HS
490A	Cable Shaft	(See Table C-3, 350)				I-R/R	PE	HS
491, 491A	Cable Room - Unit 1	Cable Ins	-	515,780,773	14.3	I-R/R	PE	HS
491A	Electric Boards - Unit 1	(See 491)				I-R/R	PE	HS
492	Duct Shaft	-	-	-	-	-	HS	PE
493	Corridor	Cable Ins	-	91,418,342	4.3	I-R/R	PE	HS
494	MCC-1MXY, 1MXO, 1MXM RCP Switchgear Pressurizer Heater Control Terminal Cabinets	Cable Ins	-	191,663,060	3.9	I	HS	PE
494A	Stairs	-	-	-	-	-	HS	PE
495	Switchgear & HVAC Equipment	(See Room 496)				I	HS	PE
496 & 495	Load Centers 1ELXA, 1ELXC Switchgear 1ETA MCC-1EMXC, 1EMXK, 1EMXQ	Cable Ins	-	90,247,450	3.2	I	HS	PE

SUMMARY OF FIRE PROTECTION FOR ELEVATION 574 + 0 and 577 + 0

CABLE ROOM 481, 491

1. Automatic detection with local alarm and alarm and annunciation in the Control Room.
2. Portable extinguishers are provided as primary protection.
3. Penetrations through fire walls are sealed with a 3-hour fire barrier.

SWITCHGEAR AND PENETRATION ROOMS

Same as Elevation 560+0

REMAINDER OF ELEVATION 577+0

1. Automatic detection with local alarm and alarm and annunciation in the Control Room.
2. Fixed water sprinklers are installed to protect Component Cooling water pumps.
3. A 3-hour, concrete block, barrier is constructed between Train A and Train B Component Cooling Pumps.

4. Penetrations through fire barriers, stairwells and exterior walls of room 403 are sealed with a 3-hour fire barrier.
5. Hose stations and portable extinguishers are provided throughout the elevation.
6. A 3-hour, reinforced concrete barrier is constructed between Train A and Train B Residual Heat Removal Heat Exchangers and Containment Spray Heat Exchangers.

FIRE AREAS 19 and 20 (Reference Drawings CFP-5 and CN-1200-10.5)

A. Description of Fire Area

Drawing CFP-5 shows the boundaries of Fire Areas 19 and 20 and CN-1200-10.5 shows locations of the following major pieces of equipment:

<u>EQUIPMENT (SYSTEM)</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
MG Sets		
Rod Power Gen		
Reactor Trip SWGR (IRE)	X	X

Combustible materials, quantities and fire loads are listed in Table C-5.

B. Construction

Boundaries for Fire Areas 19 and 20 are walls, floors and ceilings of reinforced concrete and concrete block construction providing 3-hour barriers.

Access to these Areas is through UL Approved doors, or doors of equivalent construction, 3-hour rated fire doors and frames.

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour rated fire barrier. Mechanical penetration seals in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with UL Listed, 3-hour rated fire dampers.

C. Fire Detection and Suppression

Each Area is provided with automatic detectors with alarm and annunciation in the Control Room.

Manual hose stations and portable extinguishers are provided for fire protection.

D. Consequences of a Fire

1. With suppression system functioning:

Manual hose stations and portable extinguishers would be used to extinguish fires should they occur. The normal unit, ASP or SSS shutdown capability would be available.

2. With no suppression system functioning:

A fire could possibly cause loss of functions in this area if no suppression system functioned; however, the Control Room, ASP or SSS shutdown capability would be available.

FIRE AREA 21 (Reference Drawings CFP-5 and CN-1200-10.4)

A. Description of Fire Area

Drawing CFP-5 shows the boundaries of Fire Area 21 and Drawing CN-1200-10.4 shows the arrangement of the Control Room.

B. Construction

Walls forming the boundaries of Fire Area 21 on the Auxiliary Building side of A-A Line are 3-hour rated concrete block construction. The boundary wall separating the Control Room from the Service Building is reinforced concrete construction providing a 3-hour barrier.

Access to the Control Room is through UL Approved, or of equivalent construction labeled, 3-hour rated fire doors (and frames) located in all four walls.

Mechanical and electrical penetrations in rated barriers are sealed with an approved 3-hour rated fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated fire dampers.

C. Fire Detection and Suppression

The Control Room is provided with automatic detectors located throughout the room and in the control board which alarm and annunciate in the Control Room.

Portable extinguishers are provided in the Control Room. Manual hose stations are located in each Electrical Penetration Room located adjacent to the Control Room.

D. Consequences of a Fire

The Control Room is manned twenty four (24) hours per day and if a fire should start, fire suppression is available as stated in paragraph C.

In the unlikely event that the Control Room shutdown capability is lost, the ASP's or the SSS would be available for shutdown.

FIRE AREA 35 (Reference Drawings CFP-5 and CN-1200-10.4)

A. Description of Fire Area

Drawing CFP-5 shows the boundaries of Fire Areas 35 and Drawing CN-1200-10.4 shows the arrangement of the Interface Office and the Operator's Room.

B. Construction

Walls forming the boundaries of Fire Areas 35 are concrete block construction and reinforced concrete construction each providing a 3-hour barrier.

The floor and ceiling of these rooms is reinforced concrete construction providing 3-hour barrier. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning non-rated doors.)

Access to each of these rooms is from the Control Room. Doors (to these office areas) will not be normally locked or alarmed. These areas will be normally attended by personnel.

Mechanical and Electrical penetrations in rated barriers are sealed with an approved 3-hour rated fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated fire dampers.

C. Fire Detection and Suppression

Each room is provided with automatic detectors which alarm and annunciate in the Control Room.

Portable extinguishers are provided in the adjacent Control Room. Manual hose stations are located in each Electrical Penetration Room adjacent to the Control Room.

D. Consequences of a Fire

The Control Room is manned twenty-four (24) hours per day and if a fire should occur, fire suppression is available as stated in Paragraph C.

These rooms do not contain any equipment required for shutdown.

FIRE AREA 22 (Reference Drawings CFP-5, CN-1200-10.1, 10.2 and 10.3)

A. Description of Fire Area

Drawing CFP-5 shows the boundaries of Fire Area 22 and Drawings CN-1200-10.1, 10.2 and 10.3 show locations of the following major pieces of equipment:

<u>EQUIPMENT (SYSTEM)</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
Control Room Area Fans (VC)	X	
Control Room Area Air Handling Units (VC)	X	
Fuel Handling Area Exhaust Filter Units (VF)	X	
Auxiliary Building Filtered Exhaust Filter Units (VA)	X	
Annulus Ventilation Filter Units (VE)	X	
Control Area Vent System (VC)	X	X
Comp Cooling Surge Tanks (KC)	X	
Ice Machines (NF)		
Boron Chiller Surge Tanks (NR)		
Aux Bldg AHU (VA)		
Fuel Pool AHU (VF)		
RB Purge Filter Units (VP)		
Control Room Air Handling Units (VC)	X	
Control Room Area Pressurizing Filter Units (VC)	X	

Combustible materials, quantities and fire loads are listed in Table C-5.

B. Construction

Walls, floors and ceilings are reinforced concrete or concrete block constructed providing 3-hour fire boundaries for Fire Area 22. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning unprotected spiral stairways.)

Access to the area is through UL Approved, or of equivalent construction, 3-hour rated fire doors and frames as shown on attached drawings.

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour fire barrier. Mechanical penetration seals in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated fire dampers.

C. Fire Detection and Suppression

Cable tray runs and areas containing combustibles are provided with automatic detectors which alarm and annunciate in the Control Room.

Fixed manual water spray systems are installed in carbon filters.

Manual hose stations and portable extinguishers are provided throughout the area to protect equipment.

D. Consequences of a Fire

1. With suppression system functioning:

The fixed manual water sprays are designed to extinguish fires should they occur in the carbon filters.

Manual hose stations and portable extinguishers would extinguish fires and normal unit, ASP or SSS capability would be available.

2. With no suppression system functioning:

Fire area boundaries would contain the fire. The SSS would be available even if no suppression systems functioned in Fire Area 22.

TABLE C-5

BUILDING: AUXILIARY
ELEVATION: 594 + 0 (Ref. Dwg. CFP-5)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
500	HVAC Filters Ice Machines Tanks, MCC	Cable Ins	-	297,349,000	3.0	I-R/R	AE	HS
500A	Stairway	-	-	-	-	-	HS	PE
500B	Stairway	-	-	-	-	-	HS	PE
500C	Stairway	-	-	-	-	-	HS	PE
500D	Stairway	-	-	-	-	-	HS	PE
510	Counting Room	-	-	-	-	-	HS	PE
511	Environment Lab	-	-	-	-	I-R/R	HS	PE
512	Health Physics	-	-	-	-	I-R/R	HS	PE
530	New Fuel Storage - Unit 1	-	-	-	-	Ultraviolet	PE	HS
531	New Fuel Receiving Area - Unit 1	-	-	-	-	Ultraviolet	PE	HS
540	New Fuel Storage - Unit 2	-	-	-	-	Ultraviolet	PE	HS
541	New Fuel Receiving Area - Unit 2	-	-	-	-	Ultraviolet	PE	HS
550	Manway To Spent Resin Batching Tank	-	-	-	-	I-R/R	HS	PE
551	Inst. Calibration	-	-	-	-	-	HS	PE
551A	Corridor	-	-	-	-	-	HS	PE
560	Equipment Area (Vent)	-	-	-	-	I	HS	PE
561	Corridor	-	-	-	-	-	HS	PE
561A	Stairway	-	-	-	-	-	HS	PE
561B	Stairway	-	-	-	-	-	HS	PE
563	Reactor Trip Swgr.	Cable Ins	-	30,134,412	0.8	I	HS	PE

TABLE C-5

BUILDING: AUXILIARY
ELEVATION: 594 + 0 (Ref. Dwg. CFP-5)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
564	RMC Room	-	-	-	-	I	HS	PE
570	HVAC, MCC	Cable Ins	-	88,371,360	3.7	I	HS	PE
571	Corridor	-	-	-	-	-	HS	PE
571A	Stairway	-	-	-	-	-	HS	PE
573	Control Room	-	-	-	-	I (throughout room and inside main control boards) R/R (Partially covered)	PE	HS
574	Operators Office	-	-	-	-	I	PE	HS
575	Interface Office	-	-	-	-	I	PE	HS
576	Reactor Trip Swgr.	Cable Ins	-	31,810,363	0.9	I	PE	HS

SUMMARY OF FIRE PROTECTION FOR ELEVATION 594 + 0

CONTROL ROOM (573, 575, 574)

1. Automatic detection with local alarm is provided.
2. Portable extinguishers are provided for primary protection.

ELECTRICAL PENETRATION ROOMS (563, 576)

1. Automatic detection with local alarm and alarm and annunciation is provided.
2. Hose stations and portable extinguishers are provided for fire protection.

REMAINDER OF ELEVATION 594 + 0

1. Built-in manual water spray systems are provided for carbon filters.
2. Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.
3. Hose stations and portable extinguishers are provided for fire protection.

FIRE AREAS 23 and 24 (Reference Drawings CFP-5, CFP-6, CN-1200-11.2, 11.3, 12.2 and 12.3)

A. Description of Fire Area

Drawings, CFP-5 and CFP-6 shows the boundaries of Fire areas 23 and 24 and Drawings CN-1200-11.2, 11.3, 12.2 and 12.3 show details of the Fuel Buildings.

Combustible materials, quantities and fire load are listed in Tables C-5 and C-6.

B. Construction

Walls, floor and ceiling fire boundaries are reinforced concrete construction providing a 3-hour barrier between the Fuel Pool and the Auxiliary Building.

Access to the area is via 3-hour rated stairways equipped with UL Approved, or of equivalent construction, 3-hour fire rated doors and frames.

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour fire rated barrier. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated fire dampers.

C. Fire Detection and Suppression

Each area is provided with automatic detectors which alarm and annunciate in the Control Room.

Manual hose stations and portable extinguishers are provided for fire suppression.

D. Consequences of a Fire

- 1) With suppression system functioning:

Normal unit shutdown would not be affected if a fire occurred in the Fuel Pool Area.

- 2) With no suppression system functioning:

Normal unit shutdown would not be affected if a fire occurred in the Fuel Pool Area.

FIRE AREAS 38 and 47 (Reference Drawing CFP-6, CN-1200-11.4 and 12.4)

A. Description of Fire Area

Drawing CFP-6 shows the boundaries of Fire Area 38 and 47 and drawings CN-1200-11.4 and 12.4 shows the location of the following major equipment:

<u>Equipment</u>	<u>Safety</u> <u>Related</u>	<u>Safe</u> <u>Shutdown</u>
Fuel Handling Area		
Exhaust Filter		

B. Construction

The boundaries of Fire Areas 38 and 47 are walls floors and ceilings constructed using reinforced concrete which provides 3-hour barriers.

Spiral stairs provide access into the fire areas from the elevation below (605+10). Spatial separation and lack of continuity of combustibles reduce the possibility of fire spread. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton concerning additional spiral stair information.)

C. Fire Detection and Suppression

Automatic detection is provided which alarms and annuciates in the Control Room.

Manual hose stations and portable fire extinguishers are provided for suppression.

D. Consequences of a Fire

1. With suppression system functioning:

Normal unit shutdown would not be affected if a fire occurred in the Fire Areas.

2. With no suppression system functioning:

Normal unit shutdown would not be affected if a fire occurred in the Fire Areas.

TABLE C-6

BUILDING: AUXILIARY
ELEVATION: 605 + 10 and 631 + 6 (Ref. Dwg. CFP-6)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
530	New Fuel Storage - Unit 1	(See Table C-5, 530)						
531	New Fuel Receiving Area - Unit 1	(See Table C-5, 531)						
540	New Fuel Storage - Unit 2	(See Table C-5, 540)						
541	New Fuel Receiving Area - Unit 2	(See Table C-5, 541)						
600	Fuel Pool Operating Floor, Unit 1	Cable Ins	-	33,458,040	0.5	I-R/R	HS	PE
600A	Duct Room	-	-	-	-	-	HS	PE
601	Reactor Personnel #1 Lock Area (Aisle)	-	-	-	-	-	HS	PE
601A	Reactor Personnel #1 Lock Area (Aisle)	-	-	-	-	I-R/R	HS	PE
602	Contaminated Decontamination Tool Storage	-	-	-	-	I-R/R	HS	PE
614	Fuel Pool Operating Floor, Unit 2	Cable Ins	-	33,458,040	0.5	I-R/R	HS	PE
614A	Duct Room	-	-	-	-	-	HS	PE
615	Reactor Personnel #2 Lock Area (Aisle)	-	-	-	-	-	HS	PE
615A	Reactor Personnel #2 Lock Area (Aisle)	-	-	-	-	I-R/R	HS	PE
616	Contaminated Decontamination Tool Storage	-	-	-	-	I-R/R	HS	PE
801	Fuel Handling Area Exhaust Filter (Fuel Pool Purge) #1	-	-	-	-	-	HS	PE
802	Fuel Handling Area Exhaust Filter (Fuel Pool Purge Unit) #2	-	-	-	-	-	HS	PE

SUMMARY OF THE FIRE PROTECTION FOR ELEVATION 605 + 10

1. Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.
2. Hose stations and portable extinguishers are provided for fire protection.

SUMMARY OF THE FIRE PROTECTION FOR ELEVATION 631 + 6

1. Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.
2. Hose stations are provided for primary fire protection.

Diesel Generator Building

CE5011G

FIRE AREAS 25, 26, 27 and 28 (Reference Drawings CFP-7, CN-1200-14.1 and 14.4)

A. Description of Fire Area

Drawing CFP-7 shows the boundaries of Fire Areas 25, 26, 27 and 28 and drawings CN-1200-14.1 and 14.4 show the location of the following major pieces of safety related equipment.

<u>EQUIPMENT (SYSTEM)</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
Emergency Diesel Generator and associated equipment, instrumentation and controls	X	X

Combustible materials, quantities and fire loads are listed in Table C-7.

B. Construction

The boundaries of Fire Areas 25, 26, 27 and 28 are:

The Diesel Generator Buildings are physically separated from the Auxiliary Building by 44 feet.

Redundant diesels are separated from each other by a three hour barrier.

Access to these Fire Areas is by outside stairwells and corridors from the Auxiliary Building, Elev. 560 + 0, Essential Switchgear Rooms.

Floor drains provided in each area will handle water from hose stations.

Mechanical and electrical penetrations are sealed with an approved 3-hour rated fire barrier.

C. Fire Detection and Suppression

Each Fire Area (25, 26, 27 and 28) is provided with automatic detection which alarms and annunciates in the Control Room.

An automatic Carbon Dioxide system is provided for protection of the diesels. The system is actuated by fixed temperature detectors which also alarm and annunciate in the Control Room.

The CO₂ system may also be activated manually if required. Manual hose stations are provided as backup for the CO₂ protection.

D. Consequences of a Fire

1. With suppression system functioning:

The CO₂ system is designed to extinguish fires should they occur in one of these areas and normal shutdown capacity would be available from offsite power or the redundant diesel generator as conditions warrant.

2. With no suppression system functioning:

A fire could possibly cause loss of one train if no suppression system functioned; however, the rated barriers separating redundant trains would contain the fire and normal shutdown capability would be available from the Control Room, ASP (if blackout condition does not occur simultaneously) or the SSS.

FIRE AREAS 41, 42, 43, 44 (Reference Drawings CFP-7, and CN-1200-14.4)

A. Description of Fire Area

Drawing CFP-7 shows the boundaries of Fire Areas 41, 42, 43, 44 and Drawings 1200-14.4 show locations of the following equipment.

<u>EQUIPMENT (SYSTEM)</u>	SAFETY	SAFE
	<u>RELATED</u>	<u>SHUTDOWN</u>
Diesel Generator Sequencer Panels	X	

Combustible materials, quantities and fire loads are listed in Table C-7.

B. Construction

Walls, floor and ceiling fire boundaries are reinforced concrete construction providing a 3-hour barrier between Diesel Generators and the Auxiliary Building.

C. Fire Detection and Suppression

Each area is provided with automatic detectors which alarm and annunciates in the Control Room.

Portable extinguishers are provided in adjacent rooms for fire suppression.

D. Consequences of a Fire

1. With suppression system functioning:

Normal unit shutdown would not be affected if a fire occurred in Fire Areas 41, 42, 43, 44.

2. With no suppression system functioning:

Normal unit shutdown would not be affected if a fire occurred in Fire Areas 41, 42, 43, 44.

TABLE C-7

BUILDING: DIESEL
ELEVATION: 556 + 0 (Ref. Dwg. CFP-7)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
302	Diesel Control Panel	Cable Ins Lube & Fuel Oil	880 Gal.	56,437,920	4.0	FT	AE	HS
Diesel 1A	Diesel - Generator, Lube Oil Cooler, Lube Oil Filter, Fuel Oil Day Tk, Fuel Oil Booster Pump, Battery Racks, Lube Oil Sump Tk			133,760,000				
302C	Diesel Gen. Sequencer Panels	Cable Insulation		11,088,000	4.2	I-R/R	PE	HS
304	(See Room 302)							
304C	Diesel Generator Sequencer Panels	Cable Insulation		11,088,000	5.1	I-R/R	PE	HS
306	(See Room 302)							
306C	Diesel Generator Sequencer Panels	Cable Insulation		11,088,000	4.2	I-R/R	PE	HS
308	(See Room 302)							
308C	Diesel Generator Sequencer Panels	Cable Insulation		11,088,000	5.1	I-R/R	PE	HS

SUMMARY OF FIRE PROTECTION FOR ELEVATION 556 + 0

DIESEL GENERATOR ROOMS (302, 304, 306 and 308)

1. A Carbon Dioxide system provides primary protection.
2. Hose stations provide backup for the CO₂ system.
3. Penetrations through fire barriers are sealed with a three hour rated fire barrier.
4. Automatic detection is provided with local alarm and alarm and annunciation in the Control Room.

Nuclear Service Water

Pump Structure

FIRE AREA 29 and 30 (Reference Drawings CFP-8 and CN-1040-11)

A. Description of Fire Area

Drawing CFP-8 shows the boundaries of Fire Areas 29 and 30 and drawing CN-1040-11 shows the location of the following major equipment.

<u>Equipment</u>	<u>Safety</u> <u>Related</u>	<u>Safe</u> <u>Shutdown</u>
Nuclear Service Water Pump	X	X
Nuclear Service Water Strainer	X	X
Nuclear Service Water Pump Structure		
Vent Fans	X	

Combustible materials, quantities and fire loads are listed in Table C-8.

B. Construction

Boundaries of Fire Areas 29 and 30 are walls, floors and ceiling of reinforced concrete which provide a three hour fire barrier.

Access to the area is by doors opening to the yard.

C. Fire Detection and Suppression

Each room is provided with automatic detection with local alarm and alarm and annunciation in the Control Room.

Manual hose stations and portable extinguishers are provided for suppression.

D. Consequences of a Fire

1. With suppression systems functioning:

Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

2. With no suppression system functioning:

A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area and shutdown capability from the Control Room, ASP's or the SSS would be available.

TABLE C-8

BUILDING: Nuclear Service Water Pump Structure
(Ref Dwg. CFP-8)

EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	LOAD BTU's	FIRE* LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
NSWP 1A & 2A (Room 662)	Lube Oil Cable Ins	7 gal. (ea.)	2,128,000 9,200,000	0.7	I-R/R	HS	PE
NSWP 1B & 2B (Room 663)	Lube Oil Cable Ins	7 gal. (ea.)	2,128,000 9,200,000	0.7	I-R/R	HS	PE

SUMMARY OF FIRE PROTECTION FOR NUCLEAR SERVICE WATER PUMP STRUCTURE

1. Automatic detection is provided with local alarm and alarm and annunciation in the Control Room for each room.
2. Penetrations through fire barriers are sealed with a 3-hour rated fire barrier.
3. Hose stations and portable extinguishers are provided for fire suppression.

Reactor Building

The Reactor Building is considered separately from the Auxiliary Building. Each Reactor Building, although considered to be a single fire area, has been divided into three areas to delineate information.

Area RB-1 (Reference Drawing CN-1041-2)

A. Description of Area RB-1

Drawing CN-1041-2 shows the boundaries of Area RB-1, Annulus.

Combustible materials are listed in Table C-9.

B. Construction

The outer wall of the Annulus is 3'-0" thick reinforced concrete construction. The inner wall is the containment liner plate.

Access to the area is from the Electrical Penetration Room on Elevation 560 + 0.

Floor drains are provided to handle sprinkler discharge water.

Mechanical and electrical penetrations are sealed to preserve the pressure boundaries. Penetration seals for the Reactor Building boundary walls have been qualified through testing and/or analysis. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning HVAC duct penetrations).

C. Fire Detection and Suppression

The annulus is provided with automatic detectors which alarm and annunciate in the Control Room.

Fixed water sprinklers are provided to extinguish fires should they occur in the Annulus. (Unit 1 only)

Manual hose stations and portable extinguishers are provided in the Auxiliary Building Electrical Penetration Room. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) for details of fire protection based on Appendix R cable separation.)

D. Consequences of a Fire

1. With suppression system functioning:

The fixed water sprinklers are designed to extinguish fires should they occur and unit shutdown would be by either normal equipment, ASP, or SSS.

2. With no suppression system functioning:

The automatic detection would alert station personnel of the fire condition and manual suppression with hose stations and portable extinguishers would be used.

Unit shutdown would employ either normal shutdown equipment ASP, or SSS.

Areas RB-2 and RB-3 are inside the containment liner plate and not accessible during operation.

If a fire should occur, the unit would be shutdown and the fire brigade would enter when conditions permitted.

Safe shutdown would be maintained by either normal shutdown equipment, ASP, or SSS.

AREA RB-2 (Reference Drawing CN-1041-2)

A. Description of Fire Area

Drawing CN-1041-2 shows the boundaries of Area RB-2, Pipe Corridor.

Combustible materials are listed in Table C-9.

B. Construction

The floor, interior wall and ceiling are reinforced concrete construction. The exterior wall is the containment liner plate.

Access to this area is from Elevation 565 + 3 through a hatch in the Emergency Personnel Lock area.

Floor drains are provided to handle sprinkler discharge water.

C. Fire Detection and Suppression

Automatic detection is provided with alarm and annunciation in the Control Room.

Fixed manual water sprinklers are provided to extinguish fires should they occur.

Manual hose stations are provided to backup the fixed manual water
sprinklers.

AREA RB-3 (Reference Drawing CN-1041-2)

A. Description of Area RB-3

Drawing CN-1041-2 shows the boundaries of Area RB-3 and the location of the following equipment:

<u>EQUIPMENT</u>	<u>SAFETY</u> <u>RELATED</u>	<u>SAFE</u> <u>SHUTDOWN</u>
Reactor Coolant Pumps		
Pressurizer Relief Tank		
Steam Generators		
Lower Containment Filters		

Combustible materials are listed in Table C-9.

B. Construction

The floor, ceiling and walls are reinforced concrete construction.

Access to the area is from Elevation 565 + 3 through the pressure door at the Emergency Personnel Lock.

C. Fire Detection and Suppression

Automatic detection which alarms and annunciates in the Control Room is provided over safety related cable tray runs, the Reactor Coolant Pumps and other areas containing combustibles. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning Appendix R requirements for detection within the Reactor Building.)

Fixed manual water sprinklers are provided to protect the RCP's and the motors have been designed to prevent oil spills as described in Section D., Paragraph 2.(a)(3).

Fixed manual preaction waterspray systems are provided to protect the Lower Containment Filters.

SUMMARY OF FIRE PROTECTION FOR THE REACTOR BUILDINGS

1. Automatic detection is provided with local alarm and alarm and annunciation in the Control Room.
2. Fixed water sprinklers are provided for the pipe corridor, annulus (Unit 1 only), reactor coolant pumps and carbon filters.
3. Hose stations are provided as backup for sprinklers.
4. Fixed repeaters are provided for communication within containment.

TABLE C-9

BUILDING: REACTOR
ELEVATIONS: AS SHOWN

EQUIPMENT/USE	COMBUSTIBLE MATERIAL	QUANTITY	LOAD BTU's	FIRE LOAD	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
Annulus Unit 1	Cable Ins	-	-	-	I	AE (Partial)	HS
Annulus Unit 2	Cable Ins	-	-	-	I	PE	HS
Pipe Corridor Unit 1	Cable Ins	-	-	-	I	AE	HS
Pipe Corridor Unit 2	Cable Ins	-	-	-	I	AE	HS
Safety Related Cable Trays Unit 1	Cable Ins	-	-	-	I	PE	HS
Safety Related Cable Trays Unit 2	Cable Ins	-	-	-	I	PE	HS
Reactor Coolant Pumps 1A,1B,1C,1D	Lube Oil Cable Ins	220 gal. (ea.)	-	-	Heat Sensitive Cable	AE	HS
Reactor Coolant Pumps 2A,2B,2C,2D	Lube Oil Cable Ins	220 gal. (ea.)	-	-	Heat Sensitive Cable	AE	HS
Lower Containment Filters 1A,1B	Carbon	-	-	-	I-R/R	AE	HS
Lower Containment Filters 2A,2B	Carbon	-	-	-	I-R/R	AE	HS

CE5011C

APPENDIX D

Response to Appendix R to 10CFR Part 50

II. GENERAL REQUIREMENTS

A. FIRE PROTECTION PROGRAM

A FIRE PROTECTION PROGRAM SHALL BE ESTABLISHED AT EACH NUCLEAR POWER PLANT. THE PROGRAM SHALL ESTABLISH THE FIRE PROTECTION POLICY FOR THE PROTECTION OF STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY AT EACH PLANT AND THE PROCEDURES, EQUIPMENT, AND PERSONNEL REQUIRED TO IMPLEMENT THE PROGRAM AT THE PLANT SITE.

THE FIRE PROTECTION PROGRAM SHALL BE UNDER THE DIRECTION OF AN INDIVIDUAL WHO HAS BEEN DELEGATED AUTHORITY COMMENSURATE WITH THE RESPONSIBILITIES OF THE POSITION AND WHO HAS AVAILABLE STAFF PERSONNEL KNOWLEDGEABLE IN BOTH FIRE PROTECTION AND NUCLEAR SAFETY.

THE FIRE PROTECTION PROGRAM SHALL EXTEND THE CONCEPT OF DEFENSE-IN-DEPTH TO FIRE PROTECTION IN FIRE AREAS IMPORTANT TO SAFETY, WITH THE FOLLOWING OBJECTIVES:

- . TO PREVENT FIRES FROM STARTING;
- . TO DETECT RAPIDLY, CONTROL, AND EXTINGUISH PROMPTLY THOSE FIRES THAT DO OCCUR;
- . TO PROVIDE PROTECTION FOR STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY SO THAT A FIRE THAT IS NOT PROMPTLY EXTINGUISHED BY THE FIRE SUPPRESSION ACTIVITIES WILL NOT PREVENT THE SAFE SHUTDOWN OF THE PLANT.

The fire protection program of Catawba Nuclear Station will be stated in the Station Fire Plan which will delineate fire protection policy based on analysis contained in the Fire Hazards Analysis in Appendix C. Fire Protection responsibilities have been assigned to the Director of Safety and Training who has delegated responsibility for fire protection to the Station Safety Supervisor. A Safety Assistant is assigned to fire protection on a full time basis.

Station Directives, Administrative Controls and "Good Practice" in Operation Procedures provide emphasis to fire prevention. Fire detection systems located as stated in the Fire Hazards Analysis provide rapid fire

detection capabilities. Automatic and manual fixed fire suppression systems and manual fire fighting equipment provide capabilities for rapid fire control. Safe shutdown capabilities are assured as stated in the Fire Hazards Analysis.

B. FIRE HAZARDS ANALYSIS

A FIRE HAZARDS ANALYSIS SHALL BE PERFORMED BY QUALIFIED FIRE PROTECTION AND REACTOR SYSTEMS ENGINEERS TO (1) CONSIDER POTENTIAL IN SITU AND TRANSIENT FIRE HAZARDS; (2) DETERMINE THE CONSEQUENCES OF FIRE IN ANY LOCATION IN THE PLANT ON THE ABILITY TO SAFELY SHUTDOWN THE REACTOR OR ON THE ABILITY TO MINIMIZE AND CONTROL THE RELEASE OF RADIO-ACTIVITY TO THE ENVIRONMENT; AND (3) SPECIFY MEASURES FOR FIRE PREVENTION, FIRE DETECTION, FIRE SUPPRESSION, AND FIRE CONTAINMENT AND ALTERNATIVE SHUTDOWN CAPABILITY AS REQUIRED FOR EACH FIRE AREA CONTAINING STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY IN ACCORDANCE WITH NRC GUIDELINES AND REGULATIONS.

The Fire Hazards Analysis is presented in Appendix C.

C. FIRE PREVENTION FEATURES

FIRE PROTECTION FEATURES SHALL MEET THE FOLLOWING GENERAL REQUIREMENTS FOR ALL FIRE AREAS THAT CONTAIN OR PRESENT A FIRE HAZARD TO STRUCTURES, SYSTEMS, OR COMPONENTS IMPORTANT TO SAFETY.

1. IN SITU FIRE HAZARDS SHALL BE IDENTIFIED AND SUITABLE PROTECTION PROVIDED.
2. TRANSIENT FIRE HAZARDS ASSOCIATED WITH NORMAL OPERATION, MAINTENANCE, REPAIR, OR MODIFICATION ACTIVITIES SHALL BE IDENTIFIED AND ELIMINATED WHERE POSSIBLE. THOSE TRANSIENT FIRE HAZARDS THAT CAN NOT BE ELIMINATED SHALL BE CONTROLLED AND SUITABLE PROTECTION PROVIDED.
3. FIRE DETECTION SYSTEMS, PORTABLE EXTINGUISHERS, AND STANDPIPE AND HOSE STATIONS SHALL BE INSTALLED.
4. FIRE BARRIERS OR AUTOMATIC SUPPRESSION SYSTEMS OR BOTH.
5. A SITE FIRE BRIGADE SHALL BE ESTABLISHED, TRAINED, AND EQUIPPED AND SHALL BE ON SITE AT ALL TIMES.
6. FIRE DETECTION AND SUPPRESSION SYSTEMS SHALL BE DESIGNED, INSTALLED, MAINTAINED AND TESTED BY

PERSONNEL PROPERLY QUALIFIED BY EXPERIENCE AND TRAINING IN FIRE PROTECTION SYSTEMS.

7. SURVEILLANCE PROCEDURES SHALL BE ESTABLISHED TO ENSURE THAT FIRE BARRIERS ARE IN PLACE AND THAT FIRE SUPPRESSION SYSTEMS AND COMPONENTS ARE OPERABLE.

In situ fire hazards are recognized in the Fire Hazard Analysis. Transient combustibles will be controlled by Station Directive. Appropriate fire detection systems, portable extinguishers and standpipes/hose stations are provided. Fire barriers and automatic suppression systems are provided as stated in Appendix C. A site fire brigade will be established for all shifts. Fire detection and suppression systems are designed and installed by qualified individuals. Maintenance and testing personnel will be properly trained. Station maintenance, surveillance and periodic test procedures provide guidance to assure that fire protection equipment is operable.

D. ALTERNATIVE OR DEDICATED SHUTDOWN CAPABILITY

IN AREAS WHERE THE FIRE PROTECTION FEATURES CANNOT ENSURE SAFE SHUTDOWN CAPABILITY IN THE EVENT OF A FIRE IN THAT AREA, ALTERNATIVE OR DEDICATED SAFE SHUTDOWN CAPABILITY SHALL BE PROVIDED.

A dedicated Standby Shutdown System (SSS) is provided. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) for details of SSS and cable separation.)

III. SPECIFIC REQUIREMENTS

A. WATER SUPPLIES FOR FIRE SUPPRESSION SYSTEMS

TWO SEPARATE WATER SUPPLIES SHALL BE PROVIDED TO FURNISH NECESSARY WATER VOLUME AND PRESSURE TO THE FIRE MAIN LOOP.

EACH SUPPLY SHALL CONSIST OF A STORAGE TANK, PUMP, PIPING, AND APPROPRIATE ISOLATION AND CONTROL VALVES. TWO SEPARATE REDUNDANT SUCTIONS IN ONE OR MORE INTAKE STRUCTURES

FROM A LARGE BODY OF WATER (RIVER, LAKE, ETC.) WILL SATISFY THE REQUIREMENT FOR TWO SEPARATED WATER STORAGE TANKS. THESE SUPPLIES SHALL BE SEPARATED SO THAT A FAILURE OF ONE SUPPLY WILL NOT RESULT IN A FAILURE OF THE OTHER SUPPLY.

EACH SUPPLY OF THE FIRE WATER DISTRIBUTION SYSTEM SHALL BE CAPABLE OF PROVIDING FOR A PERIOD OF 2 HOURS THE MAXIMUM EXPECTED WATER DEMANDS AS DETERMINED BY THE FIRE HAZARDS ANALYSIS FOR SAFETY-RELATED AREAS OR OTHER AREAS THAT PRESENT A FIRE EXPOSURE HAZARD TO SAFETY-RELATED AREAS.

WHEN STORAGE TANKS ARE USED FOR COMBINED SERVICE-WATER/FIRE-WATER USES THE MINIMUM VOLUME FOR FIRE USES SHALL BE ENSURED BY MEANS OF DEDICATED TANKS OR BY SOME PHYSICAL MEANS SUCH AS A VERTICAL STANDPIPE FOR OTHER WATER SERVICE. ADMINISTRATIVE CONTROLS, INCLUDING LOCKS FOR TANK OUTLET VALVES, ARE UNACCEPTABLE AS THE ONLY MEANS TO ENSURE MINIMUM WATER VOLUME.

OTHER WATER SYSTEMS USED AS ONE OF THE TWO FIRE WATER SUPPLIES SHALL BE PERMANENTLY CONNECTED TO THE FIRE MAIN SYSTEM AND SHALL BE CAPABLE OF AUTOMATIC ALIGNMENT TO THE FIRE MAIN SYSTEM. PUMPS, CONTROLS, AND POWER SUPPLIES IN THESE SYSTEMS SHALL SATISFY THE REQUIREMENTS FOR THE MAIN FIRE PUMPS. THE USE OF OTHER WATER SYSTEMS FOR FIRE PROTECTION SHALL NOT BE INCOMPATIBLE WITH THEIR FUNCTIONS REQUIRED FOR SAFE PLANT SHUTDOWN. FAILURE OF THE OTHER SYSTEM SHALL NOT DEGRADE THE FIRE MAIN SYSTEM.

Primary and secondary water sources are provided by redundant fire pumps, each of which is adequate for the largest anticipated water demand. Two of the three fire pumps are located in the same bay of the intake structure. These two pumps are separated by a three hour rated wall. The other fire pump is located in an adjacent bay of the intake structure. Discharge piping is arranged to maintain maximum practical separation to reduce the possibility of a single failure resulting in impairment to redundant piping. The water supply available from Lake Wylie is adequate to provide the largest anticipated fire protection water demand for more than two hours. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning fire pump arrangement detail.)

B. SECTIONAL ISOLATION VALVES

SECTIONAL ISOLATION VALVES SUCH AS POST INDICATOR VALVES OR KEY OPERATED VALVES SHALL BE INSTALLED IN THE FIRE MAIN LOOP TO PERMIT ISOLATION OF PORTIONS OF THE FIRE MAIN LOOP FOR MAINTENANCE OR REPAIR WITHOUT INTERRUPTING THE ENTIRE WATER SUPPLY.

Post indicator or key operated valves are installed to provide sectional isolation for each portion of the underground fire main yard loop without affecting water supply for interior sprinkler systems and hose stations.

C. HYDRANT ISOLATION VALVES

VALVES SHALL BE INSTALLED TO PERMIT ISOLATION OF OUTSIDE HYDRANTS FROM THE FIRE MAIN FOR MAINTENANCE OR REPAIR WITHOUT INTERRUPTING THE WATER SUPPLY TO AUTOMATIC OR MANUAL FIRE SUPPRESSION SYSTEMS IN ANY AREA CONTAINING OR PRESENTING A FIRE HAZARD TO SAFETY-RELATED OR SAFE SHUT-DOWN EQUIPMENT.

The fire main system redundant connections allow isolation of any fire hydrant on the main yard loop without resulting in impairment to interior fire protection equipment located in the Auxiliary Building, Reactor Buildings, Diesel Generator Buildings, or Nuclear Service Water Pump Structure. This arrangement is in compliance with the intent of the requirement for individual fire hydrant isolation valves.

D. MANUAL FIRE SUPPRESSION

STANDPIPE AND HOSE SYSTEMS SHALL BE INSTALLED SO THAT AT LEAST ONE EFFECTIVE HOSE STREAM WILL BE ABLE TO REACH ANY LOCATION THAT CONTAINS OR PRESENTS AN EXPOSURE FIRE HAZARD TO STRUCTURES, SYSTEMS, OR COMPONENTS IMPORTANT TO SAFETY. ACCESS TO PERMIT EFFECTIVE FUNCTIONING OF THE FIRE BRIGADE SHALL BE PROVIDED TO ALL AREAS THAT CONTAIN OR PRESENT AN EXPOSURE FIRE HAZARD TO STRUCTURES, SYSTEMS, OR COMPONENTS IMPORTANT TO SAFETY.

STANDPIPE AND HOSE STATIONS SHALL BE INSIDE PWR CONTAINMENTS AND BWR CONTAINMENTS THAT ARE NOT INERTED. STANDPIPE AND HOSE STATIONS INSIDE CONTAINMENT MAY BE CONNECTED

TO A HIGH QUALITY WATER SUPPLY OF SUFFICIENT QUANTITY AND PRESSURE OTHER THAN THE FIRE MAIN LOOP IF PLANT-SPECIFIC FEATURES PREVENT EXTENDING THE FIRE MAIN SUPPLY INSIDE CONTAINMENT. FOR BWR DRYWELLS, STANDPIPE AND HOSE STATIONS SHALL BE PLACED OUTSIDE THE DRY WELL WITH ADEQUATE LENGTHS OF HOSE TO REACH ANY LOCATION INSIDE THE DRY WELL WITH AN EFFECTIVE HOSE STREAM.

Standpipes and hose systems are provided so that an effective hose stream will reach any location which is recognized in the Fire Hazard Analysis as having potential for fire which may involve or expose structures, systems and/or components important to safety. Hose stations in subject areas are accessible. Standpipes and hose stations, supplied from the fire protection system, are provided inside containment.

E. HYDROSTATIC HOSE TESTS

FIRE HOSE SHALL BE HYDROSTATICALLY TESTED AT A PRESSURE OF 300 PSI OR 50 PSI ABOVE MAXIMUM FIRE MAIN OPERATING PRESSURE, WHICHEVER IS GREATER. HOSE STORED IN OUTSIDE HOSE HOUSES SHALL BE TESTED ANNUALLY. INTERIOR STANDPIPE HOSE SHALL BE TESTED EVERY THREE YEARS.

New fire hose will be tested by the manufacturer in accordance with the applicable edition of NFPA 1961, Chapter 4, "Acceptance Hydrostatic Tests". Regularly scheduled hydrostatic tests will be conducted as specified in Catawba Technical Specifications.

Exterior fire hose will be tested annually. Interior fire hose will be tested every three years.

Fire hose care and testing will be in accordance with the intent the applicable edition of NFPA 1962.

F. AUTOMATIC FIRE DETECTION

AUTOMATIC FIRE DETECTION SYSTEMS SHALL BE INSTALLED IN ALL AREAS OF THE PLANT THAT CONTAIN OR PRESENT AN EXPOSURE FIRE HAZARD TO SAFE SHUTDOWN OR SAFETY-RELATED SYSTEMS OR COMPONENTS. THESE FIRE DETECTION SYSTEMS SHALL BE CAPABLE OF OPERATING WITH OR WITHOUT OFFSITE POWER.

Fire detection systems capable of operating without offsite power are provided as outlined in the Fire Hazard Analysis.

G. FIRE PROTECTION OF SAFE SHUTDOWN CAPABILITY

1. FIRE PROTECTION FEATURES SHALL BE PROVIDED FOR STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFE SHUTDOWN. THESE FEATURES SHALL BE CAPABLE OF LIMITING FIRE DAMAGE SO THAT:
 - A. ONE TRAIN OF SYSTEMS NECESSARY TO ACHIEVE AND MAINTAIN HOT SHUTDOWN CONDITIONS FROM EITHER THE CONTROL ROOM OR EMERGENCY CONTROL STATION(S) IS FREE OF FIRE DAMAGE: AND
 - B. SYSTEMS NECESSARY TO ACHIEVE AND MAINTAIN COLD SHUTDOWN FROM EITHER THE CONTROL ROOM OR EMERGENCY CONTROL STATION(S) CAN BE REPAIRED WITHIN 72 HOURS.
2. EXCEPT AS PROVIDED FOR PARAGRAPH G.3 OF THIS SECTION, WHERE CABLES OR EQUIPMENT, INCLUDING ASSOCIATED NONSAFETY CIRCUITS THAT COULD PREVENT OPERATION OR CAUSE MALOPERATION DUE TO HOT SHORTS, OPEN CIRCUITS, OR SHORTS TO GROUND, OR REDUNDANT TRAINS OF SYSTEMS NECESSARY TO ACHIEVE AND MAINTAIN HOT SHUTDOWN CONDITIONS ARE LOCATED WITHIN THE SAME FIRE AREA OUTSIDE OF PRIMARY CONTAINMENT, ONE OF THE FOLLOWING MEANS OF ENSURING THAT ONE OF THE REDUNDANT TRAINS IS FREE OF FIRE DAMAGE SHALL BE PROVIDED:
 - A. SEPARATION OF CABLES AND EQUIPMENT AND ASSOCIATED NONSAFETY CIRCUITS OF REDUNDANT TRAINS BY A FIRE BARRIER HAVING A 3-HOUR RATING. STRUCTURAL STEEL FORMING A PART OF OR SUPPORTING SUCH FIRE BARRIERS SHALL BE PROTECTED TO PROVIDE FIRE RESISTANCE EQUIVALENT TO THAT REQUIRED OF THE BARRIER;
 - B. SEPARATION OF CABLES AND EQUIPMENT AND ASSOCIATED NONSAFETY CIRCUITS OF REDUNDANT TRAINS BY A HORIZONTAL DISTANCE OF MORE THAN 20 FEET WITH NO INTERVENING COMBUSTIBLE OR FIRE HAZARDS. IN

ADDITION, FIRE DETECTORS AND AN AUTOMATIC FIRE SUPPRESSION SYSTEM SHALL BE INSTALLED IN THE FIRE AREA: OR

- C. ENCLOSURE OF CABLE AND EQUIPMENT AND ASSOCIATED NONSAFETY CIRCUITS OF ONE REDUNDANT TRAIN IN A FIRE BARRIER HAVING A 1-HOUR RATING. IN ADDITION, FIRE DETECTORS AND AN AUTOMATIC FIRE SUPPRESSION SYSTEM SHALL BE INSTALLED IN THE FIRE AREA;

INSIDE NONINERTED CONTAINMENTS ONE OF THE FIRE PROTECTION MEANS SPECIFIED ABOVE OR ONE OF THE FOLLOWING FIRE PROTECTION MEANS SHALL BE PROVIDED:

- D. SEPARATION OF CABLES AND EQUIPMENT AND ASSOCIATED NONSAFETY CIRCUITS OF REDUNDANT TRAINS BY A HORIZONTAL DISTANCE OF MORE THAN 20 FEET WITH NO INTERVENING COMBUSTIBLES OR FIRE HAZARDS;
 - E. INSTALLATION OF FIRE DETECTORS AND AN AUTOMATIC FIRE SUPPRESSION SYSTEM IN THE FIRE AREA; OR
 - F. SEPARATION OF CABLES AND EQUIPMENT AND ASSOCIATED NONSAFETY CIRCUITS OF REDUNDANT TRAINS BY A NONCOMBUSTIBLE RADIANT ENERGY SHIELD.
3. ALTERNATIVE OR DEDICATED SHUTDOWN CAPABILITY AND ITS ASSOCIATED CIRCUITS, 7/ INDEPENDENT OF CABLES, SYSTEMS OR COMPONENTS IN THE AREA, ROOM OR ZONE UNDER CONSIDERATION, SHALL BE PROVIDED:

7/ALTERNATIVE SHUTDOWN CAPABILITY IS PROVIDED BY REROUTING, RELOCATING OR MODIFICATING OF EXISTING SYSTEMS; DEDICATED SHUTDOWN CAPABILITY IS PROVIDED BY INSTALLING NEW STRUCTURES AND SYSTEMS FOR THE FUNCTION OF POSTFIRE SHUTDOWN.

- A. WHERE THE PROTECTION OF SYSTEMS WHOSE FUNCTION IS REQUIRED FOR HOT SHUTDOWN DOES NOT SATISFY THE REQUIREMENT OF PARAGRAPH G.2 OF THIS SECTION; OR
- B. WHERE REDUNDANT TRAINS OF SYSTEMS REQUIRED FOR HOT SHUTDOWN LOCATED IN THE SAME FIRE AREA MAY BE SUBJECT TO DAMAGE FROM FIRE SUPPRESSION ACTIVITIES OR FROM THE RUPTURE OR INADVERTENT OPERATION OF FIRE SUPPRESSION SYSTEMS.

IN ADDITION, FIRE DETECTION AND A FIXED FIRE SUPPRESSION SYSTEM SHALL BE INSTALLED IN THE AREA, ROOM, OR ZONE UNDER CONSIDERATION.

Dedicated Standby Shutdown System (SSS) assures that one train of systems necessary to achieve and maintain hot shutdown condition is available.

Systems necessary to achieve and maintain cold shutdown can be repaired within 72 hours following a design basis fire. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning cable separation, discussion of associated circuits, and SSS information.)

H. FIRE BRIGADE

A SITE FIRE BRIGADE TRAINED AND EQUIPPED FOR FIRE FIGHTING SHALL BE ESTABLISHED TO ENSURE ADEQUATE MANUAL FIRE FIGHTING CAPABILITY FOR ALL AREAS OF THE PLANT CONTAINING STRUCTURES, SYSTEMS, OR COMPONENTS IMPORTANT TO SAFETY. THE FIRE BRIGADE SHALL BE AT LEAST FIVE MEMBERS ON EACH SHIFT. THE BRIGADE LEADER AND AT LEAST TWO BRIGADE MEMBERS SHALL HAVE SUFFICIENT TRAINING IN OR KNOWLEDGE OF PLANT SAFETY-RELATED SYSTEMS TO UNDERSTAND THE EFFECTS OF FIRE AND FIRE SUPPRESSANTS ON SAFE SHUTDOWN CAPABILITY. THE QUALIFICATION OF FIRE BRIGADE MEMBERS SHALL INCLUDE AN ANNUAL PHYSICAL EXAMINATION TO DETERMINE THEIR ABILITY TO PERFORM STRENUOUS FIRE FIGHTING ACTIVITIES. THE SHIFT SUPERVISOR SHALL NOT BE A MEMBER OF THE FIRE BRIGADE. THE BRIGADE LEADER SHALL BE COMPETENT TO ASSESS THE POTENTIAL SAFETY CONSEQUENCES OF A FIRE AND ADVISE CONTROL ROOM PERSONNEL. SUCH COMPETENCE BY THE BRIGADE LEADER MAY BE EVIDENCED BY POSSESSION OF AN OPERATOR'S LICENSE OR EQUIVALENT KNOWLEDGE OF PLANT SAFETY-RELATED SYSTEMS.

THE MINIMUM EQUIPMENT PROVIDED FOR THE BRIGADE SHALL CONSIST OF PERSONAL PROTECTIVE EQUIPMENT SUCH AS TURNOUT COATS, BOOTS, GLOVES, HARD HATS, EMERGENCY COMMUNICATIONS EQUIPMENT, PORTABLE LIGHTS, PORTABLE VENTILATION EQUIPMENT, AND PORTABLE EXTINGUISHERS. SELF-CONTAINED BREATHING APPARATUS USING FULL-FACE POSITIVE - PRESSURE MASKS APPROVED BY NIOSH (NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH - APPROVAL FORMERLY GIVEN BY THE U.S. BUREAU OF MINES) SHALL BE PROVIDED FOR FIRE BRIGADE, DAMAGE CONTROL, AND CONTROL ROOM PERSONNEL. AT LEAST 10 MASKS SHALL BE AVAILABLE FOR FIRE BRIGADE PERSONNEL. CONTROL ROOM PERSONNEL MAY BE FURNISHED BREATHING AIR BY A MANIFOLD SYSTEM PIPED FROM A STORAGE RESERVOIR IF PRACTICAL. SERVICE OR RATED OPERATING LIFE SHALL BE A MINIMUM OF ONE-HALF HOUR FOR THE SELF-CONTAINED UNITS.

AT LEAST TWO EXTRA AIR BOTTLES SHALL BE LOCATED ON SITE FOR EACH SELF-CONTAINED BREATHING UNIT. IN ADDITION, AN ONSITE 6-HOUR SUPPLY OF RESERVE AIR SHALL BE PROVIDED AND ARRANGED TO PERMIT QUICK AND COMPLETE REPLENISHMENT OF EXHAUSTED SUPPLY AIR BOTTLES AS THEY ARE RETURNED. IF COMPRESSORS ARE USED AS A SOURCE OF BREATHING AIR, ONLY UNITS APPROVED FOR BREATHING AIR SHALL BE USED; COMPRESSORS SHALL BE OPERABLE ASSUMING A LOSS OF OFFSITE POWER. SPECIAL CARE MUST BE TAKEN TO LOCATE THE COMPRESSOR IN AREAS FREE OF DUST AND CONTAINMENTS.

A site fire brigade will be established to provide manual fire fighting capability. Personnel protective equipment, emergency communication equipment, portable lights and portable ventilation equipment will be provided. Breathing air for Control Room personnel will be furnished by a portable cascade system and/or self-contained breathing apparatus. Reserve air bottles and a breathing air compressor for cylinder replenishment will be provided.

I. FIRE BRIGADE TRAINING

THE FIRE BRIGADE TRAINING PROGRAM SHALL ENSURE THAT THE CAPABILITY TO FIGHT POTENTIAL FIRES IS ESTABLISHED AND MAINTAINED. THE PROGRAM SHALL CONSIST OF AN INITIAL CLASSROOM INSTRUCTION PROGRAM FOLLOWED BY PERIODIC CLASSROOM INSTRUCTION, FIRE FIGHTING PRACTICE, AND FIRE DRILLS:

1. INSTRUCTION

A. THE INITIAL CLASSROOM INSTRUCTION SHALL INCLUDE:

- (1) INDOCTRINATION OF THE PLANT FIRE FIGHTING PLAN WITH SPECIFIC IDENTIFICATION OF EACH INDIVIDUAL'S RESPONSIBILITIES.
- (2) IDENTIFICATION OF THE TYPE AND LOCATION OF FIRE HAZARDS AND ASSOCIATED TYPES OF FIRES THAT COULD OCCUR IN THE PLANT.
- (3) THE TOXIC AND CORROSIVE CHARACTERISTICS OF EXPECTED PRODUCTS OF COMBUSTION.
- (4) IDENTIFICATION OF THE LOCATION OF FIRE FIGHTING EQUIPMENT FOR EACH FIRE AREA AND FAMILIARIZATION WITH THE LAYOUT OF THE PLANT, INCLUDING ACCESS AND EGRESS ROUTES TO EACH AREA.

- (5) THE PROPER USE OF AVAILABLE FIRE FIGHTING EQUIPMENT AND THE CORRECT METHOD OF FIGHTING EACH TYPE OF FIRE. THE TYPES OF FIRES COVERED SHOULD INCLUDE FIRES IN ENERGIZED ELECTRICAL EQUIPMENT, FIRES IN CABLES AND CABLE TRAYS, HYDROGEN FIRES, FIRES INVOLVING FLAMMABLE AND COMBUSTIBLE LIQUIDS OR HAZARDOUS PROCESS CHEMICALS, FIRES RESULTING FROM CONSTRUCTION OR MODIFICATIONS (WELDING), AND RECORD FILE FIRES.
- (6) THE PROPER USE OF COMMUNICATION, LIGHTING, VENTILATION, AND EMERGENCY BREATHING EQUIPMENT.
- (7) THE PROPER METHOD FOR FIGHTING FIRES INSIDE BUILDINGS AND CONFINED SPACES.
- (8) THE DIRECTION AND COORDINATION OF THE FIRE FIGHTING ACTIVITIES (FIRE BRIGADE LEADERS ONLY).
- (9) DETAILED REVIEW OF FIRE FIGHTING STRATEGIES AND PROCEDURES.
- (10) REVIEW OF THE LATEST PLANT MODIFICATIONS AND CORRESPONDING CHANGES IN FIRE FIGHTING PLANS.

NOTE: ITEMS (9) AND (10) MAY BE DELETED FROM THE TRAINING OF NO MORE THAN TWO OF THE NON-OPERATIONS PERSONNEL WHO MAY BE ASSIGNED TO THE FIRE BRIGADE.

- B. THE INSTRUCTION SHALL BE PROVIDED BY QUALIFIED INDIVIDUALS WHO ARE KNOWLEDGEABLE, EXPERIENCED, AND SUITABLY TRAINED IN FIGHTING THE TYPES OF FIRES THAT COULD OCCUR IN THE PLANT AND IN USING THE TYPES OF EQUIPMENT AVAILABLE IN THE NUCLEAR POWER PLANT.
- C. INSTRUCTION SHALL BE PROVIDED TO ALL FIRE BRIGADE MEMBERS AND FIRE BRIGADE LEADERS.
- D. REGULAR PLANNED MEETINGS SHALL BE HELD AT LEAST EVERY 3 MONTHS FOR ALL BRIGADE MEMBERS TO REVIEW CHANGES IN THE FIRE PROTECTION PROGRAM AND OTHER SUBJECTS AS NECESSARY.
- E. PERIODIC REFRESHER TRAINING SESSIONS SHALL BE HELD TO REPEAT THE CLASSROOM INSTRUCTION PROGRAM FOR ALL BRIGADE MEMBERS OVER A TWO-YEAR PERIOD. THESE SESSIONS MAY BE CONCURRENT WITH THE REGULAR PLANNED MEETINGS.

2. PRACTICE

PRACTICE SESSIONS SHALL BE HELD FOR EACH SHIFT FIRE BRIGADE ON THE PROPER METHOD OF FIGHTING THE VARIOUS TYPES OF FIRES THAT COULD OCCUR IN A NUCLEAR POWER PLANT. THESE SESSIONS SHALL PROVIDE BRIGADE MEMBERS WITH EXPERIENCE IN ACTUAL FIRE EXTINGUISHMENT AND THE USE OF EMERGENCY BREATHING APPARATUS UNDER STRENUOUS CONDITIONS ENCOUNTERED IN FIRE FIGHTING. THESE PRACTICE SESSIONS SHALL BE PROVIDED AT LEAST ONCE PER YEAR FOR EACH FIRE BRIGADE MEMBER.

Initial and subsequent classroom instruction will be provided for brigade members. Specific responsibilities will be designated by the fire brigade leader. The Station Fire Plan will identify potential fire hazards and strategy of fire control in areas containing safety related systems, equipment and components. Instruction will include proper use of emergency equipment. Fire Brigade meetings will be held once a quarter including periodic refresher sessions of classroom instruction. Fire Brigade training includes experience in fire extinguishment and use of emergency equipment.

3. DRILLS

- A. FIRE BRIGADE DRILLS SHALL BE PERFORMED IN THE PLANT SO THAT THE FIRE BRIGADE CAN PRACTICE AS A TEAM.
- B. DRILLS SHALL BE PERFORMED AT REGULAR INTERVALS NOT TO EXCEED 3 MONTHS FOR EACH SHIFT FIRE BRIGADE. EACH FIRE BRIGADE MEMBER SHOULD PARTICIPATE IN EACH DRILL, BUT MUST PARTICIPATE IN AT LEAST TWO DRILLS PER YEAR.

A SUFFICIENT NUMBER OF THESE DRILLS, BUT NOT LESS THAN ONE FOR EACH SHIFT FIRE BRIGADE PER YEAR, SHALL BE UNANNOUNCED TO DETERMINE THE FIRE FIGHTING READINESS OF THE PLANT FIRE BRIGADE; BRIGADE LEADER, AND FIRE PROTECTION SYSTEMS AND EQUIPMENT. PERSONS PLANNING AND AUTHORIZING AN UNANNOUNCED DRILL SHALL ENSURE THAT THE RESPONDING SHIFT FIRE BRIGADE MEMBERS ARE NOT AWARE THAT A DRILL IS BEING PLANNED UNTIL IT IS BEGUN.

UNANNOUNCED DRILLS SHALL NOT BE SCHEDULED CLOSER THAN FOUR WEEKS.

AT LEAST ONE DRILL PER YEAR SHALL BE PERFORMED ON A "BACK SHIFT" FOR EACH SHIFT FIRE BRIGADE.

- C. THE DRILLS SHALL BE PREPLANNED TO ESTABLISH THE TRAINING OBJECTIVES OF THE DRILL AND SHALL BE CRITIQUED TO DETERMINE HOW WELL THE TRAINING OBJECTIVES HAVE BEEN MET. UNANNOUNCED DRILLS SHALL BE PLANNED AND CRITIQUED BY MEMBERS OF THE MANAGEMENT STAFF RESPONSIBLE FOR PLANT SAFETY AND FIRE PROTECTION. PERFORMANCE DEFICIENCIES OF A FIRE BRIGADE OR OF INDIVIDUAL FIRE BRIGADE MEMBERS SHALL BE REMEDIED BY SCHEDULING ADDITIONAL TRAINING FOR THE BRIGADE OR MEMBERS. UNSATISFACTORY DRILL PERFORMANCE SHALL BE FOLLOWED BY A REPEAT DRILL WITHIN 30 DAYS.
- D. AT 3-YEAR INTERVALS, A RANDOMLY SELECTED UNANNOUNCED DRILL SHALL BE CRITIQUED BY QUALIFIED INDIVIDUALS INDEPENDENT OF THE LICENSEE'S STAFF. A COPY OF THE WRITTEN REPORT FROM SUCH INDIVIDUALS SHALL BE AVAILABLE FOR NRC REVIEW.
- E. DRILLS SHALL AS A MINIMUM INCLUDE THE FOLLOWING:
 - (1) ASSESSMENT OF FIRE ALARM EFFECTIVENESS, TIME REQUIRED TO NOTIFY AND ASSEMBLE FIRE BRIGADE, AND SELECTION, PLACEMENT AND USE OF EQUIPMENT, AND FIRE FIGHTING STRATEGIES
 - (2) ASSESSMENT OF EACH BRIGADE MEMBER'S KNOWLEDGE OF HIS OR HER ROLE IN THE FIRE FIGHTING STRATEGY FOR THE AREA ASSUMED TO CONTAIN THE FIRE. ASSESSMENT OF THE BRIGADE MEMBER'S CONFORMANCE WITH ESTABLISHED PLANT FIRE FIGHTING PROCEDURES AND USE OF FIRE FIGHTING EQUIPMENT, INCLUDING SELF-CONTAINED EMERGENCY BREATHING APPARATUS, COMMUNICATION EQUIPMENT, AND VENTILATION EQUIPMENT, TO THE EXTENT PRACTICABLE.
 - (3) THE SIMULATED USE OF FIRE FIGHTING EQUIPMENT REQUIRED TO COPE WITH THE SITUATION AND TYPE OF FIRE SELECTED FOR THE DRILL. THE AREA AND TYPE OF FIRE CHOSEN FOR THE DRILL SHOULD DIFFER FROM THOSE USED IN THE PREVIOUS DRILL SO THAT BRIGADE MEMBERS ARE TRAINED IN FIGHTING FIRES IN VARIOUS PLANT AREAS. THE SITUATION SELECTED SHOULD SIMULATE THE SIZE AND ARRANGEMENT OF A FIRE THAT COULD REASONABLY OCCUR IN THE AREA

SELECTED, ALLOWING FOR FIRE DEVELOPMENT DUE TO THE TIME REQUIRED TO RESPOND, TO OBTAIN EQUIPMENT, AND ORGANIZE FOR THE FIRE, ASSUMING LOSS OF AUTOMATIC SUPPRESSION CAPABILITY.

- (4) ASSESSMENT OF BRIGADE LEADER'S DIRECTION OF THE FIRE FIGHTING EFFORT AS TO THOROUGHNESS, ACCURACY, AND EFFECTIVENESS.

Fire drills will be conducted at least once every three months, with periodic unannounced drills for operations shifts. Documentation of fire drill response and critique will be maintained on file.

(4) RECORDS

INDIVIDUAL RECORDS OF TRAINING PROVIDED TO EACH FIRE BRIGADE MEMBER, INCLUDING DRILL CRITIQUES, SHALL BE MAINTAINED FOR AT LEAST 3 YEARS TO ENSURE THAT EACH MEMBER RECEIVES TRAINING IN ALL PARTS OF THE TRAINING PROGRAM. THESE RECORDS OF TRAINING SHALL BE AVAILABLE FOR NCR REVIEW. RETRAINING OR BROADENED TRAINING FOR FIRE FIGHTING WITHIN BUILDINGS SHALL BE SCHEDULED FOR ALL THOSE BRIGADE MEMBERS WHOSE PERFORMANCE RECORDS SHOW DEFICIENCIES.

Fire brigade training records will be maintained and available for subsequent review.

J. EMERGENCY LIGHTING

EMERGENCY LIGHTING UNITS WITH AT LEAST AN 8-HOUR BATTERY POWER SUPPLY SHALL BE PROVIDED IN ALL AREAS NEEDED FOR OPERATION OF SAFE SHUTDOWN EQUIPMENT AND IN ACCESS AND EGRESS ROUTES THERETO.

Emergency lighting units with 8-hour battery power will be provided as necessary to illuminate the path to and immediate area of equipment required to be manned to achieve a hot standby condition.

K. ADMINISTRATIVE CONTROLS

ADMINISTRATIVE CONTROLS SHALL BE ESTABLISHED TO MINIMIZE FIRE HAZARDS IN AREAS CONTAINING STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY. THESE CONTROLS SHALL ESTABLISH PROCEDURES TO:

1. GOVERN THE HANDLING AND LIMITATION OF THE USE OF ORDINARY COMBUSTIBLE MATERIALS, COMBUSTIBLE AND FLAMMABLE GASES AND LIQUIDS, HIGH EFFICIENCY PARTICULATE AIR AND CHARCOAL FILTERS, DRY ION EXCHANGE RESINS, OR OTHER COMBUSTIBLE SUPPLIES IN SAFETY-RELATED AREAS.
2. PROHIBIT THE STORAGE OF COMBUSTIBLES IN SAFETY-RELATED AREAS OR ESTABLISH DESIGNATED STORAGE AREAS WITH APPROPRIATE FIRE PROTECTION.
3. GOVERN THE HANDLING OF AND LIMIT TRANSIENT FIRE LOADS SUCH AS COMBUSTIBLE AND FLAMMABLE LIQUIDS, WOOD AND PLASTIC PRODUCTS, OR OTHER COMBUSTIBLE MATERIALS IN BUILDINGS CONTAINING SAFETY-RELATED SYSTEMS OR EQUIPMENT DURING ALL PHASES OF OPERATING, AND ESPECIALLY DURING MAINTENANCE, MODIFICATION, OR REFUELING OPERATIONS.
4. DESIGNATE THE ONSITE STAFF MEMBER RESPONSIBLE FOR THE INPLANT FIRE PROTECTION REVIEW OF PROPOSED WORK ACTIVITIES TO IDENTIFY POTENTIAL TRANSIENT FIRE HAZARDS AND SPECIFY REQUIRED ADDITIONAL FIRE PROTECTION IN THE WORK ACTIVITY PROCEDURE.

Administrative controls outline proper use handling and storage of combustible materials, combustible and flammable gases and liquids, combustible supplies or miscellaneous, transient combustibles in safety related areas.

Storage of combustibles in safety-related areas will be restricted to controlled, designated areas.

The safety supervisor reviews proposed and inprogress work activities in safety-related areas to identify potential transient fire hazards and specify appropriate fire prevention/protection measures.

A hot work permit system will be established to control ignition sources.

5. GOVERN THE USE OF IGNITION SOURCES BY USE OF A FLAME PERMIT SYSTEM TO CONTROL WELDING, FLAME CUTTING, BRAZING, OR SOLDERING OPERATIONS. A SEPARATE PERMIT SHALL BE ISSUED FOR EACH AREA WHERE WORK IS TO BE DONE. IF WORK CONTINUES OVER MORE THAN ONE SHIFT, THE PERMIT SHALL BE VALID FOR NOT MORE THAN 24 HOURS WHEN THE PLANT IS OPERATING OR FOR THE DURATION OF A PARTICULAR JOB DURING PLANT SHUTDOWN.
6. CONTROL THE REMOVAL FROM THE AREA OF ALL WASTE, DEBRIS, SCRAP, OIL SPILLS, OR OTHER COMBUSTIBLES RESULTING FROM THE WORK ACTIVITY IMMEDIATELY FOLLOWING COMPLETION OF THE ACTIVITY, OR AT THE END OF EACH WORK SHIFT, WHICHEVER COMES FIRST.
7. MAINTAIN THE PERIODIC HOUSEKEEPING INSPECTIONS TO ENSURE CONTINUED COMPLIANCE WITH THESE ADMINISTRATIVE CONTROLS.
8. CONTROL THE USE OF SPECIFIC COMBUSTIBLES IN SAFETY-RELATED AREAS. ALL WOOD USED IN SAFETY-RELATED AREAS DURING MAINTENANCE, MODIFICATION, OR REFUELING OPERATIONS (SUCH AS LAY-DOWN BLOCKS OR SCAFFOLDING) SHALL BE TREATED WITH A FLAME RETARDANT. EQUIPMENT OR SUPPLIES (SUCH AS NEW FUEL) SHIPPED IN UNTREATED COMBUSTIBLE PACKING CONTAINERS MAY BE UNPACKED IN SAFETY-RELATED AREAS IF REQUIRED FOR VALID OPERATING REASONS. HOWEVER, ALL COMBUSTIBLE MATERIALS SHALL BE REMOVED FROM THE AREA IMMEDIATELY FOLLOWING THE UNPACKING. SUCH TRANSIENT COMBUSTIBLE MATERIAL, UNLESS STORED IN APPROVED CONTAINERS, SHALL NOT BE LEFT UNATTENDED DURING LUNCH BREAKS, SHIFT CHANGES, OR OTHER SIMILAR PERIODS. LOOSE COMBUSTIBLE PACKING MATERIAL SUCH AS WOOD OR PAPER EXCELSIOR, OR POLY-ETHYLENE SHEETING SHALL BE PLACED IN METAL CONTAINERS WITH TIGHT-FITTING SELF-CLOSING METAL COVERS.
9. CONTROL ACTIONS TO BE TAKEN BY AN INDIVIDUAL DISCOVERING A FIRE, FOR EXAMPLE, NOTIFICATION OF CONTROL ROOM, ATTEMPT TO EXTINGUISH FIRE, AND ACTUATION OF LOCAL FIRE SUPPRESSION SYSTEMS.
10. CONTROL ACTIONS TO BE TAKEN BY THE CONTROL ROOM OPERATOR TO DETERMINE THE NEED FOR BRIGADE ASSISTANCE UPON REPORT OF A FIRE OR RECEIPT OF ALARM ON CONTROL ROOM ANNUNCIATOR PANEL, FOR EXAMPLE, ANNOUNCING LOCATION OF FIRE, OVER PA SYSTEM, SOUNDING FIRE ALARMS, AND NOTIFYING THE SHIFT SUPERVISOR AND THE FIRE BRIGADE LEADER OF THE TYPE, SIZE, AND LOCATION OF THE FIRE.

11. CONTROL ACTIONS TO BE TAKEN BY THE FIRE BRIGADE AFTER NOTIFICATION BY THE CONTROL ROOM OPERATOR OF A FIRE, FOR EXAMPLE, ASSEMBLING IN A DESIGNATED LOCATION, RECEIVING DIRECTIONS FROM THE FIRE BRIGADE LEADER, AND DISCHARGING SPECIFIC FIRE FIGHTING RESPONSIBILITIES INCLUDING SELECTION AND TRANSPORTATION OF FIRE FIGHTING EQUIPMENT TO FIRE LOCATION, SELECTION OF PROTECTIVE EQUIPMENT, OPERATING INSTRUCTIONS FOR USE OF FIRE SUPPRESSION SYSTEMS, AND USE OF PRE-PLANNED STRATEGIES FOR FIGHTING FIRES IN SPECIFIC AREAS.
12. DEFINE IN THE STRATEGIES FOR FIGHTING FIRES IN ALL SAFETY-RELATED AREAS AND AREAS PRESENTING A HAZARD TO SAFETY-RELATED EQUIPMENT. THESE STRATEGIES SHALL DESIGNATE:
 - A. FIRE HAZARDS IN EACH AREA COVERED BY THE SPECIFIC PREFIRE PLANS.
 - B. FIRE EXTINGUISHANTS BEST SUITED FOR CONTROLLING THE FIRES ASSOCIATED WITH THE FIRE HAZARDS IN THAT AREA AND THE NEAREST LOCATION OF THESE EXTINGUISHANTS.
 - C. MOST FAVORABLE DIRECTION FROM WHICH TO ATTACK A FIRE IN EACH AREA IN VIEW OF THE VENTILATION DIRECTION, ACCESS HALLWAYS, STAIRS, AND DOORS THAT ARE MOST LIKELY TO BE FREE OF FIRE, AND THE BEST STATION OR ELEVATION FOR FIGHTING THE FIRE. ALL ACCESS AND EGRESS ROUTES THAT INVOLVE LOCKED DOORS SHOULD BE SPECIFICALLY IDENTIFIED IN THE PROCEDURE WITH THE APPROPRIATE PRECAUTIONS AND METHODS FOR ACCESS SPECIFIED.
 - D. PLANT SYSTEMS THAT SHOULD BE MANAGED TO REDUCE THE DAMAGE POTENTIAL DURING A LOCAL FIRE AND THE LOCATION OF LOCAL AND REMOTE CONTROLS FOR SUCH MANAGEMENT (E.G., ANY HYDRAULIC OR ELECTRICAL SYSTEMS IN THE ZONE COVERED BY THE SPECIFIC FIRE FIGHTING PROCEDURE THAT COULD INCREASE THE HAZARDS IN THE AREA BECAUSE OF OVERPRESSURIZATION OR ELECTRICAL HAZARDS).
 - E. VITAL HEAT-SENSITIVE SYSTEM COMPONENTS THAT NEED TO BE KEPT COOL WHILE FIGHTING A LOCAL FIRE. PARTICULARLY HAZARDOUS COMBUSTIBLES THAT NEED COOLING SHOULD BE DESIGNATED.
 - F. ORGANIZATION OF FIRE FIGHTING BRIGADES AND THE ASSIGNMENT OF SPECIAL DUTIES ACCORDING TO JOB TITLE SO THAT ALL FIRE FIGHTING FUNCTIONS ARE COVERED BY ANY COMPLETE SHIFT PERSONNEL COMPLE-

MENT. THESE DUTIES INCLUDE COMMAND CONTROL OF THE BRIGADE, TRANSPORTING FIRE SUPPRESSION AND SUPPORT EQUIPMENT TO THE FIRE SCENES, APPLYING THE EXTINGUISHANT TO THE FIRE, COMMUNICATION WITH THE CONTROL ROOM, AND COORDINATION WITH OUTSIDE FIRE DEPARTMENTS.

- G. POTENTIAL RADIOLOGICAL AND TOXIC HAZARDS IN FIRE ZONES.
- H. VENTILATION SYSTEM OPERATION THAT ENSURES DESIRED PLANT AIR DISTRIBUTION WHEN THE VENTILATION FLOW IS MODIFIED FOR FIRE CONTAINMENT OR SMOKE CLEARING OPERATIONS.
- I. OPERATIONS REQUIRING CONTROL ROOM AND SHIFT ENGINEER COORDINATION OR AUTHORIZATION.
- J. INSTRUCTIONS FOR PLANT OPERATORS AND GENERAL PLANT PERSONNEL DURING FIRE.

As previously stated, the Catawba Fire Plan and Fire Brigade Organization and Training will assure proper response to a fire event.

L. ALTERNATIVE AND DEDICATED SHUTDOWN CAPABILITY

- 1. ALTERNATIVE OR DEDICATED SHUTDOWN CAPABILITY PROVIDED FOR A SPECIFIC FIRE AREA SHALL BE ABLE TO ACHIEVE AND MAINTAIN SUBCRITICAL REACTIVITY CONDITIONS IN THE REACTOR, MAINTAIN REACTOR COOLANT INVENTORY, ACHIEVE AND MAINTAIN HOT STANDBY 8/CONDITIONS FOR A PWR (HOT SHUTDOWN 8/ FOR A BWR) AND ACHIEVE COLD SHUTDOWN 8/ CONDITIONS WITHIN 72 HOURS AND MAINTAIN COLD SHUTDOWN CONDITIONS THEREAFTER. DURING THE POSTFIRE SHUTDOWN, THE REACTOR COOLANT SYSTEM PROCESS VARIABLES SHALL BE MAINTAINED WITHIN THOSE PREDICTED FOR A LOSS OF NORMAL A.C. POWER, AND THE FISSION PRODUCT BOUNDARY INTEGRITY SHALL NOT BE AFFECTED: I.E., THERE SHALL BE NO FUEL CLAD DAMAGE, RUPTURE OF ANY PRIMARY COOLANT BOUNDARY, OR RUPTURE OF THE CONTAINMENT BOUNDARY.
- 2. THE PERFORMANCE GOALS FOR THE SHUTDOWN FUNCTIONS SHALL BE:
 - A. THE REACTIVITY CONTROL FUNCTION SHALL BE CAPABLE OF ACHIEVING AND MAINTAINING COLD SHUTDOWN REACTIVITY CONDITIONS.
 - B. THE REACTOR COOLANT MAKEUP FUNCTION SHALL BE CAPABLE OF MAINTAINING THE REACTOR COOLANT LEVEL ABOVE THE TOP OF THE CORE FOR BWRS AND BE WITHIN

THE LEVEL INDICIATION IN THE PRESSURIZER FOR PWRS.

- C. THE REACTOR HEAT REMOVAL FUNCTION SHALL BE CAPABLE OF ACHIEVING AND MAINTAINING DECAY HEAT REMOVAL.
 - D. THE PROCESS MONITORING FUNCTION SHALL BE CAPABLE OF PROVIDING DIRECT READINGS OF THE PROCESS VARIABLES NECESSARY TO PERFORM AND CONTROL THE ABOVE FUNCTIONS.
 - E. THE SUPPORTING FUNCTIONS SHALL BE CAPABLE OF PROVIDING THE PROCESS COOLING, LUBRICATION, ETC., NECESSARY TO PERMIT THE OPERATION OF THE EQUIPMENT USED FOR SAFE SHUTDOWN FUNCTIONS.
- 3. THE SHUTDOWN CAPABILITY FOR SPECIFIC FIRE AREAS MAY BE UNIQUE FOR EACH SUCH AREA, OR IT MAY BE ONE UNIQUE COMBINATION OF SYSTEMS FOR ALL SUCH AREAS. IN EITHER CASE, THE ALTERNATIVE SHUTDOWN CAPABILITY SHALL BE INDEPENDENT OF THE SPECIFIC FIRE AREA(S) AND SHALL ACCOMMODATE POSTFIRE CONDITIONS WHERE OFFSITE POWER IS AVAILABLE AND WHERE OFFSITE POWER IS NOT AVAILABLE FOR 72 HOURS. PROCEDURES SHALL BE IN EFFECT TO IMPLEMENT THIS CAPABILITY.
 - 4. IF THE CAPABILITY TO ACHIEVE AND MAINTAIN COLD SHUTDOWN WILL NOT BE AVAILABLE BECAUSE OF FIRE DAMAGE, THE EQUIPMENT AND SYSTEMS COMPRISING THE MEANS TO ACHIEVE AND MAINTAIN THE HOT STANDBY OR HOT SHUTDOWN CONDITION SHALL BE CAPABLE OF MAINTAINING SUCH CONDITIONS UNTIL COLD SHUTDOWN CAN BE ACHIEVED. IF SUCH EQUIPMENT AND SYSTEMS WILL NOT BE CAPABLE OF BEING POWERED BY BOTH ONSITE AND OFFSITE ELECTRIC POWER SYSTEMS BECAUSE OF FIRE DAMAGE AN INDEPENDENT ONSITE POWER SYSTEM SHALL BE PROVIDED. THE NUMBER OF OPERATING SHIFT PERSONNEL, EXCLUSIVE OF FIRE BRIGADE MEMBERS, REQUIRED TO OPERATE SUCH EQUIPMENT AND SYSTEMS SHALL BE ONSITE AT ALL TIMES.
 - 5. EQUIPMENT AND SYSTEMS COMPRISING THE MEANS TO ACHIEVE AND MAINTAIN COLD SHUTDOWN CONDITIONS SHALL NOT BE DAMAGED BY FIRE; OR THE FIRE DAMAGE TO SUCH EQUIPMENT AND SYSTEMS SHALL BE LIMITED SO THAT THE SYSTEMS CAN BE MADE OPERABLE AND COLD SHUTDOWN ACHIEVED WITHIN 72 HOURS. MATERIALS FOR SUCH REPAIRS SHALL BE READILY AVAILABLE ONSITE AND PROCEDURES SHALL BE IN EFFECT TO IMPLEMENT SUCH REPAIRS. IF SUCH EQUIPMENT AND SYSTEMS USED PRIOR TO 72 HOURS AFTER THE FIRE WILL NOT BE CAPABLE OF BEING POWERED BY BOTH ONSITE AND OFFSITE ELECTRIC POWER SYSTEMS BECAUSE OF FIRE DAMAGE, AND INDEPENDENT ONSITE POWER SYSTEM SHALL BE

PROVIDED. EQUIPMENT AND SYSTEMS USED AFTER 72 HOURS MAY BE POWERED BY OFFSITE POWER ONLY.

6. SHUTDOWN SYSTEMS INSTALLED TO ENSURE POSTFIRE SHUTDOWN CAPABILITY NEED NOT BE DESIGNED TO MEET SEISMIC CATEGORY I CRITERIA, SINGLE FAILURE CRITERIA, OR OTHER DESIGN BASIS ACCIDENT CRITERIA, EXCEPT WHERE REQUIRED FOR OTHER REASONS, E.G., BECAUSE OF INTERFACE WITH OR IMPACT ON EXISTING SAFETY SYSTEMS, OR BECAUSE OF ADVERSE VALVE ACTIONS DUE TO FIRE DAMAGE.
7. THE SAFE SHUTDOWN EQUIPMENT AND SYSTEMS FOR EACH FIRE AREA SHALL BE KNOWN TO BE ISOLATED FROM ASSOCIATED NONSAFETY CIRCUITS IN THE FIRE AREA SO THAT HOT SHORTS, OPEN CIRCUITS, OR SHORTS TO GROUND IN THE ASSOCIATED CIRCUITS WILL NOT PREVENT OPERATION OF THE SAFE SHUTDOWN EQUIPMENT. THE SEPARATION AND BARRIERS BETWEEN TRAYS AND CONDUITS CONTAINING ASSOCIATED CIRCUITS OF SAFE SHUTDOWN DIVISION AND TRAYS AND CONDUITS CONTAINING ASSOCIATED CIRCUITS OR SAFE SHUTDOWN CABLES FROM THE REDUNDANT DIVISION, OR THE ISOLATION OF THESE ASSOCIATED CIRCUITS FROM THE SAFE SHUTDOWN EQUIPMENT, SHALL BE SUCH THAT A POSTULATED FIRE INVOLVING ASSOCIATED CIRCUITS WILL NOT PREVENT SAFE SHUTDOWN.^{9/}

The Standby Shutdown System (SSS) provides, dedicated shutdown capabilities. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning cable separation, discussion of associated circuits, and SSS information.)

M. FIRE BARRIER CABLE PENETRATION SEAL QUALIFICATION

PENETRATION SEAL DESIGNS SHALL UTILIZE ONLY NONCOMBUSTIBLE MATERIALS AND SHALL BE QUALIFIED BY TESTS THAT ARE COMPARABLE TO TESTS USED TO RATE FIRE BARRIERS. THE ACCEPTANCE CRITERIA FOR THE TEST SHALL INCLUDE:

1. THE CABLE FIRE BARRIER PENETRATION SEAL HAS WITHSTOOD THE FIRE ENDURANCE TEST WITHOUT PASSAGE OF FLAME OR IGNITION OF CABLES ON THE UNEXPOSED SIDE FOR A PERIOD OF TIME EQUIVALENT TO THE FIRE RESISTANCE RATING REQUIRED OF THE BARRIER;
2. THE TEMPERATURE LEVELS RECORDED FOR THE UNEXPOSED SIDE ARE ANALYZED AND DEMONSTRATE THAT THE MAXIMUM TEMPERATURE IS SUFFICIENTLY BELOW THE CABLE INSULATION IGNITION TEMPERATURE; AND

3. THE FIRE BARRIER PENETRATION SEAL REMAINS INTACT AND DOES NOT ALLOW PROJECTION OF WATER BEYOND THE UNEXPOSED SURFACE DURING THE HOSE STREAM TEST.

Fire barrier cable penetration seals will be qualified by appropriate fire test methods and/or analysis.

N. FIRE DOORS

FIRE DOORS SHALL BE SELF-CLOSING OR PROVIDED WITH CLOSING MECHANISMS AND SHALL BE INSPECTED SEMIANNUALLY TO VERIFY THAT AUTOMATIC HOLDOPEN, RELEASE, AND CLOSING MECHANISMS AND LATCHES ARE OPERABLE.

ONE OF THE FOLLOWING MEASURES SHALL BE PROVIDED TO ENSURE THEY WILL PROTECT THE OPENING AS REQUIRED IN CASE OF FIRE:

1. FIRE DOORS SHALL BE KEPT CLOSED AND ELECTRICALLY SUPERVISED AT A CONTINUOUSLY MANNED LOCATION;
2. FIRE DOORS SHALL BE LOCKED CLOSED AND INSPECTED WEEKLY TO VERIFY THAT THE DOORS ARE IN THE CLOSED POSITION;
3. FIRE DOORS SHALL BE PROVIDED WITH AUTOMATIC HOLD-OPEN AND RELEASE MECHANISMS AND INSPECTED DAILY TO VERIFY THAT DOORWAYS ARE FREE OF OBSTRUCTIONS; OR
4. FIRE DOORS SHALL BE KEPT CLOSED AND INSPECTED DAILY TO VERIFY THAT THEY ARE IN THE CLOSED POSITION.

THE FIRE BRIGADE LEADER SHALL HAVE READY ACCESS TO KEYS FOR ANY LOCKED FIRE DOORS.

AREAS PROTECTED BY AUTOMATIC TOTAL FLOODING GAS SUPPRESSION SYSTEMS SHALL HAVE ELECTRICALLY SUPERVISED SELF-CLOSING FIRE DOORS OR SHALL SATISFY OPTION 1 ABOVE.

Automatic closure devices are provided for fire rated doors installed in Fire Boundaries as shown on drawings CFP1-8 in Appendix B. These doors will be normally locked or alarmed. An exception is the Supervisor's

Office and conference room adjoining the Control Room, which will be continuously occupied. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning exceptions to fire door monitoring.)

O. OIL COLLECTION SYSTEM FOR REACTOR COOLANT PUMP

THE REACTOR COOLANT PUMP SHALL BE EQUIPPED WITH AN OIL COLLECTION SYSTEM IF THE CONTAINMENT IS NOT INERTED DURING NORMAL OPERATION. THE OIL COLLECTION SYSTEM SHALL BE SO DESIGNED, ENGINEERED, AND INSTALLED THAT FAILURE WILL NOT LEAD TO FIRE DURING NORMAL OR DESIGN BASIS ACCIDENT CONDITIONS AND THAT THERE IS REASONABLE ASSURANCE THAT THE SYSTEM WILL WITHSTAND THE SAFE SHUTDOWN EARTHQUAKE.^{10/}

SUCH COLLECTION SYSTEMS SHALL BE CAPABLE OF COLLECTING LUBE OIL FROM ALL POTENTIAL PRESSURIZED AND UNPRESSURIZED LEAKAGE SITES IN THE REACTOR COOLANT PUMP LUBE OIL SYSTEMS. LEAKAGE SHALL BE COLLECTED AND DRAINED TO A VENTED CLOSED CONTAINER THAT CAN HOLD THE ENTIRE LUBE OIL SYSTEM INVENTORY. A FLAME ARRESTER IS REQUIRED IN THE VENT IF THE FLASH POINT CHARACTERISTICS OF THE OIL PRESENT THE HAZARD OF FIRE FLASHBACK. LEAKAGE POINTS TO BE PROTECTED SHALL INCLUDE LIFT PUMP AND PIPING, OVERFLOW LINES, LUBE OIL COOLER, OIL FILL AND DRAIN LINES AND PLUGS, FLANGED CONNECTIONS ON OIL LINES, AND LUBE OIL RESERVOIRS WHERE SUCH FEATURES EXISTS ON THE REACTOR COOLANT PUMPS. THE DRAIN LINE SHALL BE LARGE ENOUGH TO ACCOMMODATE THE LARGEST POTENTIAL OIL LEAK.

Oil collection system for Reactor Coolant pumps are designed to withstand the design basis seismic event. Leakage will be drained to a vented tank. The drain line is properly sized.

APPENDIX E
SAFETY EVALUATION REPORT
SECTION 9.5.1
FIRE PROTECTION PROGRAM

for ventilation of the building during accident conditions are connected to separate emergency Class 1E standby power supplies, thus ensuring system function in the event of a single failure.

The nuclear service water pump structure ventilation system is located completely within a seismic Category I structure and all essential components are protected from tornado-missile damage (refer to Sections 3.4.1 and 3.5.2 of this SER). The outside air intakes are tornado missile protected. Thus, the requirements of GDC 2 and 5, with respect to protection against natural phenomena and sharing between units, and the guidelines of RG 1.29, Position C.1, with respect to seismic classification, are met.

The ventilation system for the auxiliary feedwater pump rooms is included in the auxiliary building ventilation system discussed in Section 9.4.3 of this SER. However, it is not part of the safety-related filter exhaust subsystem of the auxiliary building ventilation system. As an engineered safety feature the auxiliary feedwater pump rooms and controls must receive ensured ventilation. The applicant has verified that a proper operating environment is maintained for the auxiliary feedwater pump on a loss of ventilation because of failure of the nonseismic Category I unfiltered auxiliary building exhaust system in accident conditions (including loss of offsite power).

Based on the above, the staff concludes that the engineered safety features ventilation system is in conformance with the requirements of GDC 2 and 5 as they relate to protection against natural phenomena and shared systems and the guidelines of RG 1.29 concerning seismic classification. However, the staff cannot conclude that the system is in conformance with the requirement of GDC 4 and 17 for the diesel generator building ventilation system and as it relates to assurance of the capability to maintain a proper operating environment in view of the concerns identified above. The staff will report resolution of its concerns in a supplement to this SER. The engineered safety features ventilation system meets the acceptance criteria of SRP Section 9.4.5, except as noted above.

9.5 Other Auxiliary Systems

9.5.1 Fire Protection Program

9.5.1.1 Introduction

The staff has reviewed the fire protection program for conformance with SRP Section 9.5-1, Fire Protection, (NUREG-0800). This document, in BTP CMEB 9.5-1, incorporates the guidance of Appendix A to BTP ASB 9.5-1 and the technical requirements of Appendix R to 10 CFR 50.

The applicant's Fire Protection Review transmitted by letter dated December 1977, with revisions dated June 1979 and August 1981, was in response to the staff request to evaluate the fire protection program against the guidelines of Appendix A to BTP ASB 9.5-1. The applicant also provided an evaluation against the technical requirements of Appendix R to 10 CFR 50 in the revised Fire Protection Review dated October 23, 1981.

As part of its review, the staff will visit the plant site to examine the relationship of safety-related components, systems, and structures in specific plant

areas to both combustible materials and to associated fire detection and suppression systems. The site visit will be conducted when construction of the plant has progressed to the level where such a visit would be meaningful.

The staff review included an evaluation of the automatically and manually operated water and gas fire suppression systems, the fire detection systems, fire barriers, fire doors and dampers, fire protection administrative controls, and the fire brigade size and training. The objective of the staff's review is to ensure that in the event of a fire, personnel and plant equipment would be adequate to safely shut down the reactor, to maintain the plant in a safe shutdown condition, and to minimize the release of radioactive material to the environment. Because Units 1 and 2 are of the same design, except as noted, the comments made in this report apply to both units.

The staff's consultant, Gage-Babcock, and Associates, participated in the preparation of this SER.

9.5.1.2 Fire Protection Requirements

Fire Protection Program

The bases for the fire protection program is described in the applicant's Fire Protection Review. The description includes the protection of structures, systems, and components important to safety. The staff was concerned that the station's fire program would not comply with the guidelines in Item C.1.a of BTP CMEB 9.5-1. By letter dated July 29, 1982, the applicant committed to comply with these guidelines. Based on the applicant's commitment, the staff concludes that the fire protection program will comply with BTP CMEB 9.5-1, Item C.1.a, and is, therefore, acceptable.

Fire Hazard Analyses

The applicant provided a fire hazard analysis with the Fire Protection Review. The analyses specified the combustible materials present in fire areas, identified safety-related equipment, determined the consequences of a fire on safe shutdown capability, and summarized available fire protection in accordance with BTP CMEB 9.5-1, Item C.1.b. The staff evaluation of the identified fire hazards is contained in the balance of this report.

Dedicated Shutdown Capability

The applicant will install a dedicated standby shutdown system for Catawba station. This capability is evaluated in Section 9.5.1.5 of this report.

Implementation of Fire Protection Program

The fire protection program for both units should be operational before initial fuel loading.

9.5.1.3 Administrative Controls

The administrative controls for fire protection consist of the fire protection program and organization, the fire brigade training, the controls over combus-

tibles and ignition sources, the prefire plans and procedures for fighting fires, and quality assurance. The staff was concerned that these documents would not comply with the guidelines contained in Item C.2 of BTP CMEB 9.5-1. By letter dated July 29, 1982, the applicant committed to comply with these guidelines. Based on the applicant's commitment, the staff concludes that administrative controls for fire protection will comply with BTP CMEB 9.5-1, Item C.2, and is, therefore, acceptable.

9.5.1.4 Fire Brigade and Fire Brigade Training

By letter dated July 22, 1982, the applicant committed to comply with the guidelines in Item C.3 of BTP CMEB 9.5-1 in the establishment and training of the fire brigade. Based on the applicant's commitment, the staff concludes that the fire brigade will comply with the staff's guidelines and is, therefore, acceptable.

9.5.1.5 General Plant Guidelines

Building Design

Fire areas in the Catawba station, except for those identified below, are defined by floor-to-ceiling walls and floor/ceiling assemblies having a 3-hour-fire rating. However, the following areas of the station, which have been identified by the applicant as separate fire areas, are open to each other by means of unprotected spiral stairways:

- (1) el 577 + 0 (Fire Area 18) and el 594 + 0 (Fire Area 22)
- (2) el 631 + 6 (Fire Areas 38 and 47) and el 611 + 0 (Fire Area 23)

Because of the potential for smoke and hot gases from a fire spreading from one area to another through these openings, the staff will consider these areas as a single fire area. All other stairways in the plant are either completely enclosed or enclosed at the top to prevent vertical fire spread between fire areas.

The applicant states that cable and cable tray penetrations of fire barriers will be sealed at the barrier to provide protection equivalent to the rating of the original barrier. The design of the penetration seals has been tested to verify that it meets the 3-hour-fire-rated requirements of ASTM E-119. Based on the test and the applicant's commitment, the staff concludes that cable and cable tray penetrations will comply with the requirements of Item C.5.a(3) of BTP CMEB 9.5-1, and is, therefore, acceptable.

Door openings in fire-rated barriers are, for the most part, equipped with labeled fire doors. By letters dated July 9 and December 15, 1982, the applicant identified a number of door openings that were provided with unlabeled doors. Non-fire-rated, hollow metal doors are located in the operator's room and interface office (Fire Area 35). Several hollow metal doors with louvered grills for radiological purposes are located in the station. The fire load on both sides of these doors is low. The doors are of substantial metal construction. Therefore, they will be able to prevent the spread of fire until the fire is extinguished by the station fire brigade.

Pressure doors as well as bullet- and missile-resistant doors are located in some fire boundaries. These doors have been fabricated in accordance with Underwriters Laboratories (UL) approved procedures for 3-hour-fire-rated doors. Certificates from the manufacturers are on file that verify the construction of the doors. They are not labeled because modifications necessary to satisfy leakage rates, bullet resistance, and pressure loadings are not incorporated in UL procedures. However, it is the staff's opinion that these doors will provide an equivalent level of fire protection to labeled fire doors. The staff finds use of unlabeled fire doors in the above referenced areas to be an acceptable deviation from Item C.5.a(5) of BTP CMEB 9.5-1.

The applicant has stated that 3-hour-fire-rated, UL-listed fire dampers are provided wherever ventilation ducts penetrate rated fire barriers. This commitment is in accordance with the guidelines of BTP CMEB 9.5-1, Item C.5.a, and, therefore, is acceptable.

Interior wall and structural components, thermal insulation materials, radiation shielding materials, and soundproofing materials are noncombustible. Interior finishes have a flame-spread rating of 25 or less and a smoke and fuel contribution of 50 or less in their end-use configuration, as determined by the test method of ASTM E-84. The staff finds this to be in accordance with the guidelines of BTP CMEB 9.5-1, Item C.5.a, and is, therefore, acceptable.

The high-voltage/high-amperage lead center transformers located in the auxiliary building are gas filled. All other transformers located in safety-related building areas are dry type, air cooled. There are no oil-filled transformers located within 50 ft of the exterior wall of a building containing safety-related equipment. Openings in exterior walls of buildings containing safety-related systems that are exposed to fire hazards are closed with penetrator seals with a fire resistance equal to the rating of the barrier. This meets the guidelines in BTP CMEB 9.5-1, Item C.5.a, and is, therefore, acceptable.

Safe Shutdown Capability

The information provided by the applicant is insufficient to verify compliance with the staff's guidelines. The staff will require the applicant to provide a safe shutdown analysis in accordance with the guidelines of BTP CMEB 9.5-1, Item C.5.b. The staff will report the resolution of this matter in a supplement to the SER.

Dedicated Shutdown Capability

The applicant commits to install a dedicated standby shutdown capability to provide a means of bringing the unit to a safe hot shutdown condition that is completely independent of loss of the station's normal redundant safe shutdown capability. A description has not been provided to verify the capability of the dedicated standby shutdown system for achieving hot and cold shutdown. The staff will require that the standby shutdown system comply with the guidelines contained in BTP CMEB 9.5-1, Item C.5.c. The staff will report the resolution of this matter in a supplement to the SER.

Control of Combustibles

Safety-related systems have been isolated or separated from combustible materials to the extent possible. Safety-related equipment is not exposed to the turbine generator oil and hydraulic control fluid systems.

By letter dated July 9, 1981, the applicant committed to comply with National Fire Protection Association (NFPA) Std 30-1973, "Flammable and Combustible Liquids Code." Based on this commitment, the staff concludes the control of flammable liquids in the station will comply with the guidelines contained in Item C.5 d(4) of BTP CMEB 9.5-1, and is, therefore, acceptable.

A separate building is provided for bulk gas storage. The applicant has not provided sufficient information concerning the design and routing of bulk gas piping and the configuration of storage containers to verify compliance with the staff's guidelines. The staff will require that the applicant design and install the bulk gas system in accordance with the guidelines contained in BTP CMEB 9.5-1, Item C.5.d(5). The staff will report on this item in a supplement to this SER.

Electrical Cable Construction, Cable Trays, and Cable Penetrations

The power, control, and instrumentation cable used in Catawba is of an interlocked armor design in a galvanized steel jacket. All cables pass the IEEE Std 383-1974 flame test. In addition, the applicant has submitted samples of the cable for testing at Underwriters Laboratories in their "corner test" configuration. When subjected to a 400,000 BTU/hr heat flux, the cable exhibited no tendency to propagate fire. In addition, the applicant has conducted tests that demonstrate that no fire propagation from cable to cable or tray to tray occurs as a result of an electrically initiated fire. The staff finds this acceptable.

All cable trays are constructed of galvanized steel. Cable tray penetrations have a fire rating at least equal to the rating of the fire barriers that they are penetrating.

Based on its evaluation, the staff finds that the electrical cable construction, cable trays, and cable penetrations meet the guidelines of BTP CMEB 9.5-1, Item C.5.c, and are, therefore, acceptable.

Ventilation

Fire barrier openings are provided with fire dampers that close if a fire causes room temperature to exceed a set value. Fresh air intakes to areas containing safety-related equipment or systems are located to reduce the possibility of contaminating the intake air with products of combustion. The staff finds this acceptable. Charcoal filters have been provided with a fire suppression system in accordance with RG 1.52. The staff finds this acceptable.

Where total flooding gas extinguishing systems are used, air intake and exhaust ventilation dampers are provided with mechanisms that close them upon initiation of gas flow. The staff finds this acceptable.

Based on its evaluation, the staff finds that the ventilation system meets the guidelines of BTP CMEB 9.5-1, Item C.5.f, and is, therefore, acceptable.

Lighting and Communications

Emergency lights with individual 8-hour battery-pack power supplies are provided in the control room, auxiliary shutdown panel area, and in all areas that must be manned for safe shutdown, and for access and egress routes to all fire areas in accordance with BTP CMEB 9.5-1, Item C.5(1). The staff finds this acceptable.

Emergency communication is dependent upon the station telephone system and the public address system. An additional communications net, with a fixed repeater, will be installed for the containment and would be operational only during outages and when the fire brigade enters the containment. By letter dated July 9, 1982, the applicant committed to provide a multifrequency radio system, with a dedicated frequency for fire brigade use. Based on this commitment, the staff concludes that emergency communications comply with the guidelines contained in BTP CMEB 9.5-1, Item C.5.g(4) and is, therefore, acceptable.

9.5.1.6 Safe Shutdown for Fires (Appendix R)

The staff has reviewed the applicant's submittal entitled "Response to Appendix A to Branch Technical Position APCSB 9.5-1" (August 1981 Revision) with respect to the safe shutdown capability in the event of fires anywhere in the station as defined in Appendix R to 10 CFR 50. The staff concludes the applicant's response as identified in Appendix D to this study is unsatisfactory. The applicant has not provided sufficient information for the staff to evaluate Sections III.G and III.L of Appendix R. This matter remains an open item.

9.5.1.7 Fire Detection and Suppression

Fire Detection

The fire detection systems consist of the detectors, associated electrical circuitry, electrical power supplies, and the fire communication panels. The types of detectors used are ionization, rate-of-rise, fixed temperature, and combination fixed-temperature/rate-of-rise detectors. The systems provide audible and visual alarms in the control room.

The fire detection system power is supplied from the auxiliary control power system. In the event of a power outage, the auxiliary control power system is powered from the emergency diesel generators. The systems will be continuously supervised to provide alarm and trouble indication to the control room from all detectors under single-break or ground-fault conditions.

The fire detection systems are designed and installed to conform to NFPA Std 720-1975. With the exception of the rooms listed below, fire detection systems will be installed in all areas of the station containing safety-related system components and cables.

<u>Room</u>	<u>Equipment</u>	<u>Room</u>	<u>Equipment</u>
210	recycle evaporator feed pumps	455	*
206B	waste gas compressor package	305	boric acid tanks 307 471
207	waste gas compressor package	307	*
215A	waste evaporator feed pumps	471	seal water injection filter
215C	waste drain tank	470	*
331	seal water heater	463	*
321	seal water heater	462	*
319	volume control tank	316	boron recycling holdup tank
209	*	314	*
456	reactor coolant filters		

*No specific equipment identified

The safety-related equipment in these rooms consists of tanks, piping, and components of a similar nature that would be affected only under severe fire exposures. The equipment is noncombustible and the fire load in the rooms is negligible. The staff concludes that because the amount of combustibles is low, a fire of significant magnitude and extent would not occur. If a fire should occur, the safety-related equipment is so constructed as to be able to withstand potential damage until the fire self-extinguishes or is suppressed by the station fire brigade.

Based on its evaluation, the staff concludes that requiring the installation of fire detectors in the rooms listed above would not significantly increase the level of fire safety. The staff finds that the deletion of detectors in those areas to be an acceptable deviation from Item C.6.a of BTP CMEB 9.5-1.

Fire Protection Water Supply System

The water supply system consists of three fire pumps separately connected to a buried 12-in. cement-lined water main loop around the station. All three fire pumps are electrically driven, each rated 2,500 gpm at 144 psig. The three fire pumps have independent power supplies and controls. Two fire pumps are supplied by separate station diesel generators. The fire pumps and controllers are not UL listed, but are installed and tested in accordance with NFPA Std 20. Two of the three fire pumps located in the same bay of the intake structure are separated by a three-hour-fire-rated wall. The other fire pump is located in an adjacent bay of the intake structure.

The fire protection water supply system is kept pressurized by one 200-gpm jockey pump (standby only) and two 25-gpm jockey pumps (one on standby) to prevent frequent starting of the fire pumps by maintaining pressure in the yard mains at 120 psig at grade. A 5,000-gal pressurizer tank is provided in the system to act as an accumulator or surge tank for the jockey pump. The fire pumps are automatically started by low pressure with the set pressures at which the pumps are activated staggered or manually started for each pump by the operator in the control room. Once the fire pumps are started, they can only be shut off manually. Separate annunciator alarms on separate circuits are provided in the control room to monitor the fire pump status, prime mover availability, power failure, and failure of the fire pump to start.

The water supply for fire protection is taken from Lake Wylie, which is of sufficient size to supply the anticipated fire flow. Each fire pump has its own supply suction piping.

The greatest water demand for the fixed fire suppression systems is 2,670 gpm. This quantity, coupled with 750 gpm for hose streams, creates a total water demand of 3,420 gpm. The staff finds that the water supply system can deliver the required water demand with one pump out of service. The ultimate heat sink for Catawba is the standby nuclear service pond.

Fire hydrants are provided at intervals of 250 ft along the fire protection water supply loop. Post indicator valves are provided to isolate sections of the fire loop for maintenance or repairs. Standard hose houses are provided at alternate hydrants. A single break in the water supply piping will not eliminate both the primary and secondary water suppression in any fire zone.

Valves in the fire protection water supply system are electrically supervised by alarms in the control room or locked in the normal operating position.

Based on its review, the staff concludes that the water supply system meets the guidelines of BTP CMEB 9.5-1, Item C.6.b, and is, therefore, acceptable.

Sprinkler and Standpipe Systems

The sprinkler systems and standpipe hose systems are independently connected to looped fire protection headers so as to prevent single failures from impairing both the primary and backup fire protection systems outside containment.

With the exception of the valves listed below, the automatic sprinkler systems in the plant are designed and installed in accordance with the provisions of NFPA 13-1976, and the guidelines contained in Item C.6.c(1) of BTP CMEB 9.5-1. The staff finds this acceptable.

Several isolation, vent, check, or drain RF (interior fire protection system) valves located within nuclear safety-related areas, particularly within the reactor buildings, are not UL listed or Factory Mutual (FM) approved. Of the 38 RF valves located within each reactor building, 14 valves are not UL listed. These unlisted valves are constructed of stainless steel or carbon steel bodies.

The sprinkler isolation valve and hose connection supply piping for each unit's auxiliary feedwater pump room also are unlisted. These valves are seismically qualified and were utilized so that piping within these areas could be seismically designed and a pressure boundary maintained.

The four RF valves (three motor operated, one vent) located within the auxiliary building for the three RF supply pipes to the reactor building also are unlisted. These valves required seismic qualification to maintain the reactor pressure boundary. Suitable seismically qualified UL-listed valves were not available.

The two auxiliary building RY (exterior fire protection) supply lines from the underground loop are each provided with an electric motor-operated valve. These valves are seismically designed and, therefore, unlisted.

All valves mentioned are designed to specifications outlined in ANSI/ASTM B31.1. The staff concludes that these valves will provide the same level of protection as the UL-listed valves and is, therefore, an acceptable deviation from Item C.6.c(1) of BTP CMEB 9.5-1.

The areas that are being equipped with automatic water suppression systems are:

- (1) RHR pump rooms 100, 104, 105, 109, 110 and connecting corridors
- (2) Fire Areas 2 & 3 (rooms 250 and 260)
- (3) centrifugal charging pumps, rooms 231, 230, 241 and 240
- (4) component cooling pumps and cable concentration areas
- (5) reactor building annulus
- (6) Fire Area RB-2, pipe corridor
- (7) manual preaction for the lower containment filters
- (8) reactor coolant pumps

In the Fire Hazards Analyses, the applicant identified fire areas containing safe-shutdown-related equipment that are not protected by an automatic sprinkler system. Fire protection for these areas consists of automatic fire detectors, manual hose stations, and portable fire extinguishers. The boundaries of these areas are composed of three-hour-fire-rated construction. Cable is of a galvanized steel interlocked armor design discussed in Section 9.5.1.5 of this report. The shutdown system is available to achieve safe shutdown in the event of a fire in any of these areas. This is an acceptable deviation from the guidelines of BTP CMEB 9.5-1, Item C.5.b(2).

Interior manual hose stations are provided and equipped to reach any plant location with at least one effective hose stream. Each hose station is provided with a maximum of 100 ft of 1½-in. hose with a spray nozzle to provide adequate coverage. The staff finds that the hose stations meet the guidelines of BTP CMEB 9.5-1, Item C.6.c, and are, therefore, acceptable.

The applicant has not identified seismic design of standpipe systems, which is recommended in BTP CMEB 9.5-1, Item C.6.c(1). For plants with construction permits issued before July 30, 1976, the guidelines contained in Appendix A to BTP ASB 9.5-1 have no requirement for seismic design of standpipe systems. Therefore, this is an acceptable deviation from the guidelines of CMEB 9.5-1, Item C.6.c(1).

Carbon Dioxide Suppression Systems

Low-pressure carbon dioxide, automatic total flooding, and local application systems are provided for primary protection in the diesel generator set rooms and the auxiliary feedwater pump pits. The systems are activated by detectors designed on a matrix concept that alarm and annunciate in the control room. The carbon dioxide systems may also be activated manually. By letter dated July 9, 1982, the applicant committed to design and install the systems in accordance with NFPA 12-1973, "Carbon Dioxide Extinguishing Systems." Based on this commitment, the staff concludes that the carbon dioxide suppression systems will comply with the guidelines of BTP CMEB 9.5-1, Item C.6.e, and is, therefore, acceptable.

Portable Extinguishers

Portable fire extinguishers are provided to conform with the guidelines of NFPA Std 10-1978, "Portable Fire Extinguishers." The staff finds this acceptable. Based on its review, the staff concludes that these extinguishers meet the guidelines of BTP CMEB 9.5-1, Item C.6.f, and are, therefore, acceptable.

9.5.1.8 Fire Protection for Specific Station Areas

Containment

Containment fire protection features include manual hose stations; automatic fire detectors; a fixed, automatic sprinkler system for the pipe corridor; and a fixed, manual preaction sprinkler system for the lower containment filters.

The reactor coolant pump motors are manufactured with an enclosure around the upper and lower oil pots to contain any oil spill and direct it to piping that goes to a drain tank. The oil collection system for the reactor coolant pumps is designed to withstand the design-basis seismic event. Heat sensing cable detectors are installed around both the pumps and motors.

Based on its evaluation, the staff concludes that the fire protection for containment meets the guidelines of BTP CMEB 9.5-1, Item C.7.a, and is, therefore, acceptable.

Reactor Building

The reactor building is separated from adjacent buildings by three-hour-rated barriers. A fixed automatic sprinkler system protects the annulus. Additional fire protection includes automatic fire detectors, manual hose stations, and portable fire extinguishers.

Based on its evaluation, the staff concludes that the fire protection for this area meets the guidelines of BTP CMEB 9.5-1, Item C.7.a, and is, therefore, acceptable.

Control Room

The control room is separated from all other areas of the plant by three-hour-fire-rated assemblies. All ventilation ducts penetrating these barriers have three-hour-fire-rated dampers. Mechanical and electrical penetrations in rated fire barriers are sealed with an approved three-hour-fire-rated barrier. Access to the control room is through UL-approved, three-hour-rated fire doors and frames. Ionization smoke detectors and rate-of-rise/fixed-temperature heat detectors are installed on the ceiling and inside the main control board consoles. All detectors are alarmed and annunciated in the control room.

The control room ventilation intakes are equipped with smoke detectors that alarm in the control room and automatically close the intake in the event of radioactive contamination. Smoke is prevented from entering the control room from other areas because the room is maintained under a positive pressure. If it is necessary to exhaust smoke from the room, a purge fan is provided to

purge smoke to the auxiliary building exhaust system for discharge through the station vent.

All cables that enter the control room terminate in the control room. Only power and control cables essential for operation of lighting and HVAC ducts are located in the concealed ceiling space. The cable is of an interlocked armor design as described in Section 9.5.1.5 of this report. Protection is achieved by physical separation of the cable, supplemented by automatic fire detectors, manual hose stations, and portable fire extinguishers. The standby system (discussed in Section 9.5.1.5) is available to achieve safe shutdown in the event of a fire in the control room.

Based on its evaluation, the staff concludes that the fire protection for this area meets the guidelines of BTP CMEB 9.5-1, Item C.7.b, and is, therefore, acceptable.

Cable Spreading Rooms

There are two cable spreading rooms (one for each unit). Each cable spreading room contains cables from redundant divisions. The rooms are separated from the remainder of the plant and each other by three-hour-fire-rated walls and floor/ceiling assemblies. All penetrations through fire-rated barriers are fitted with three-hour-fire-rated fire dampers and/or penetration seals.

The cables are of an interlocked armor, galvanized steel design as described in Section 9.5.1.5.

The cable spreading rooms are not protected by a fixed fire suppression system as required. Fire protection consists of automatic fire detectors, supplemented by manual hose stations and portable fire extinguisher. In the event of a fire in the cable spreading rooms, the dedicated standby shutdown system (discussed in Section 9.5.1.5) is available to achieve safe shutdown. This protection provides an acceptable level of safety and is an acceptable deviation from the guidelines of BTP CMEB 9.5-1, Item C.7.c.

Switchgear Rooms

There is one switchgear room for each division with complete divisional separation. Switchgear rooms are separated from each other and the remainder of the plant by three-hour-fire-rated walls and floor/ceiling assemblies. Automatic smoke detectors that alarm in the control room are provided. Portable fire extinguishers and manual hose stations are provided in and adjacent to each switchgear room.

Based on its evaluation, the staff concludes that the fire protection for the switchgear rooms meets the guidelines of BTP CMEB 9.5-1, Item C.7.e, and is, therefore, acceptable.

Remote Safety-Related Panels

Separate rooms are provided for the auxiliary shutdown panels for each division to achieve complete divisional separation. The rooms are separated from the remainder of the plant and each other by ceiling/floor assemblies, walls and

doors with fire resistance ratings of three-hours. Each room is provided with automatic smoke detectors that alarm in the control room. Based on its evaluation of the information submitted, the staff finds the fire protection for this area to be in accordance with BTP CMEB 9.5-1, Item C.7.e, and is, therefore, acceptable.

Safety-Related Battery Rooms

The station battery rooms are separated from each other and the remainder of the fire area by three-hour-rated fire barriers. Each battery room is equipped with redundant exhaust ventilation to prevent the buildup of hydrogen. Ionization smoke detectors are provided in each room. There are air flow monitors that alarm in the control room to monitor loss of ventilation in each battery room.

Redundant DC switchgear and inverters are located outside of the 3-hour-fire-rated battery enclosures in Fire Areas 9 and 10. The staff is concerned that a fire could damage these redundant systems before being detected and suppressed by the fire brigade. The staff will require an automatic fire suppression system be installed in Fire Areas 9 and 10 in accordance with the guidelines in Item C.5.b(2) of BTP CMEB 9.5-1. The staff will report on this issue in a supplement to this SER.

Diesel Generator Areas

Each diesel generator is located in a different fire area separated by three-hour-fire-rated walls and floor/ceiling assemblies. All cable and piping penetration through the fire-rated barriers are fitted with three-hour-fire-rated penetration seals.

The diesel fuel oil day tank is located within the emergency diesel generator room, which is separated from other plant areas by three-hour-fire-rated barriers. Each 600-gal diesel fuel oil day tank is contained by a dike around the tank. The walls extend above piping to the tank to block oil spray from the diesel generator room. Each diesel fuel oil day tank is protected by a total flooding CO₂ extinguishing system. The diesel fuel oil storage tanks are buried. The day tank can be isolated from the main fuel oil tanks by means of a valve located outside the diesel generator room.

Each diesel generator room is protected by an automatic total flooding CO₂ extinguishing system. Heat detectors actuate the carbon dioxide system. When the carbon dioxide fire suppression system is actuated the diesel building ventilation system is automatically deenergized and the outside air and exhaust dampers are closed.

Based on its evaluation, the staff concludes that the fire protection for the diesel generator rooms meets the guidelines of BTP CMEB 9.5-1, Item C.7.i, and is, therefore, acceptable.

Other Plant Areas

The applicant's Fire Hazards Analyses addressed other station areas not specifically discussed in this report. The staff finds that the fire protection for

these areas is in accordance with the guidelines of BTP 9.5-1, Item C.7, and is, therefore, acceptable.

9.5.1.9 Conclusion

The technical requirements of Appendix R to 10 CFR 50 and Appendix A to BTP ASB 9.5-1 have been included in BTP CMEB 9.5-1.

The following deviations from the guidelines of BTP CMEB 9.5-1 have been approved:

- (1) unlabeled fire doors (Section 9.5.1.5)
- (2) deletion of fire detectors in safety-related areas (Section 9.5.1.7)
- (3) unlabeled water supply valves (Section 9.5.1.7)
- (4) automatic sprinklers for safe shutdown areas (Section 9.5.1.7)
- (5) seismic design of standpipe systems (Section 9.5.1.7)

The following items remain open:

- (1) safe shutdown analyses (Section 9.5.1.5)
- (2) description of standby shutdown system (Section 9.5.1.5)
- (3) design of bulk gas system (Section 9.5.1.5)
- (4) divisional separation in battery rooms (Section 9.5.1.7)

The applicant has been informed of the necessity of the resolution of all open items so that all fire protection features can be implemented before fuel loading. The staff will report its review of these unresolved items in a supplement to this SER.

9.5.2 Communication Systems

The communication system is designed to provide reliable intraplant and interplant (or plant-to-offsite) communications under both normal station operation and accident conditions.

9.5.2.1 Intraplant Systems

The intraplant communication systems provide sufficient equipment of various types so that Catawba station has adequate communications to start up, continue safe operation, or safely shut down. The intraplant systems include:

(1) Public Address System

The public address system is designed to provide effective communication between station personnel in all vital areas during the full spectrum of accident or incident conditions up to a maximum potential noise level of 90-95 dBA (A-weighted sound level). The public address (PA) system provides two independent channels of communication, page and party line, throughout the critical areas of the station.

The page channel of the PA system provides intraplant communication over loud speakers with integral amplifiers. Page channel speaker-amplifiers are ring wired to preclude loss of system function in the event of a single

APPENDIX F

Correspondence

Correspondence

1. July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR).
2. September 14, 1982. H. B. Tucker's letter to Harold R. Denton (NRR).
3. December 15, 1982. H. B. Tucker's letter to Harold R. Denton (NRR).
4. April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR).
5. July 7, 1983. H. B. Tucker's letter to Harold R. Denton (NRR).

APPENDIX F

CORRESPONDENCE

DUKE POWER COMPANY

POWER BUILDING

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

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

July 29, 1982

TELEPHONE AREA 704
272-4183

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

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

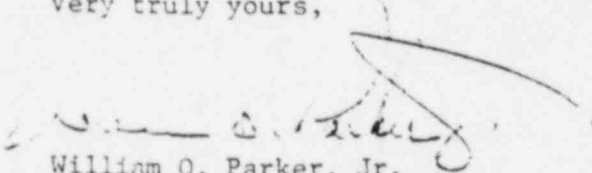
Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Dear Mr. Denton:

Mr. R. L. Tedesco's letter of May 12, 1982 transmitted the Fire Protection preliminary draft SER. Included in this document were a number of requests for additional information and requests for commitments.

Attached is Duke Power's response. Also attached are comments and clarifications on the preliminary draft SER and BTP CMEB 9.5-1.

Very truly yours,



William O. Parker, Jr.

ROS/php
Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Mr. P. K. Van Doorn
NRC Resident Inspector
Catawba Nuclear Station

Mr. Robert Guild, Esq.
Attorney-at-Law
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Mr. Harold R. Denton, Director
July 29, 1982
Page 2

cc: Palmetto Alliance
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Columbia, South Carolina 29205

Mr. Jesse L Riley
Carolina Environmental Study Group
854 Henley Place
Charlotte, North Carolina 28207

Mr. Henry A Presler, Chairman
Charlotte-Mecklenburg Environmental Coalition
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Mr. Jim Behn
Gage Babcock & Associates
135 Addison Avenue
Elmhurst, Illinois 60126

bcc: D. B. Blackmon
J. R. Hendricks
J. W. Hampton
N. A. Rutherford
Section File: CN-801.01

Duke Power Company
Catawba Nuclear Station
Response to Fire Protection Preliminary Draft SER

ITEM II.A

1. Statement "We will require that the applicant commit to comply with guidelines in BTP CMEB 9.5-1 Item C.1.a in development of Station Fire Plan."

Response The fire protection policy and program will comply with BTP CMEB 9.5-1 Item C.1.a.

ITEM II.B

2. Statement "The fire protection program for both units should be operational before initial fuel loading."

Response The station fire protection program consisting of administrative controls and station directives will be in place inside the interim barrier prior to initial fuel loading. The program organization and documentation will tentatively be available for review in August 1983.

ITEM III

3. Statement "We will require that the applicant commit to follow the guidelines in BTP CMEB 9.5-1, Item C.2 regarding administrative control in the formulation of the fire protection station directives."

Response Administrative controls will comply with guidelines in BTP CMEB 9.5-1 Item C.2.

ITEM IV

4. Statement "We will require that the applicant commit to follow the guidelines in BTP CMEB 9.5-1, Item C.3 in the establishment and training of the fire brigade."

Response Establishment and training of the fire brigade will follow guidelines of BTP CMEB 9.5-1, Item C.3.

ITEM V

5. Statement "We will require that these stairways (unprotected spiral stairways in the Auxiliary Building) be enclosed by three hour rated fire walls to comply with guidelines of BTP CMEB 9.5-1, Item C.5, a. (1)."

Response There are three sets of spiral stairs (total of 6) between fire areas as shown in the August, 1981 revision of the fire hazard analysis.

1. Stairs between elevation 543+0 and 522+0. These stairs are enclosed by three hour rated construction at the top, i.e., 543+0 elevation.

2. Spiral stairs between 577+0 (fire area 18) and 594+0 (fire area 22) are open between floors. This is reasonable since there are no in situ combustibles or inherent fire hazards on either elevation which would contribute to fire propagating across the boundary. The Standby Shutdown System assures that the units can be brought to Hot Standby Condition without utilizing function of equipment in either fire area. The areas could be combined for the purpose of fire hazard analysis. However, since each elevation covers a relatively large area they are discussed individually for the sake of clarity.
3. Spiral stairs between Elevation 631+6 (fire area 47 and 38 - refer to drawing CFP-6) and elevation 611+0 (fire area 22) are open. Fire areas 47 and 38 contain carbon filter units for the spent fuel pool air handling system which are located approximately 50 feet from the stairs. These units have heat detection systems and fixed water spray systems. There are no other combustibles in the area. On elevation 594+0 the stairs are located in corridors and isolated from in situ combustibles. Lack of continuity of combustibles reduces the possibility of a fire propagating between these areas. The Standby Shutdown System would be functional if equipment in these fire areas were not available so the area could conceivably be combined. However, as above, for clarify, the areas have been divided for discussion purposes.

ITEM V.A

6. Statement "To assure that the penetration seals are equivalent to the fire resistance of the original barrier, we will require that the seals meet the three hour fire test requirement of ASTM E-119, in accordance with BTP CMEB 9.5-1, Item C.5.a(3)."

Response Fire barrier penetration seals have been tested and approved in accordance with IEEE 634-1978 and ASTM E119-1976.

ITEM V.A

7. Statement "We will require that these doors (in fire rated barriers) are three hour rated, UL listed doors."

Response Interior fire boundary doors are either hollow metal or composite (pressure) doors.

Pressure doors have not been tested in accordance with ASTM E-152 "Standard for Fire Tests of Door Assemblies," however, manufacturers have certified that construction is in accordance with UL methods and requirements. Certificates are available for each fire boundary door. Pressure door material is more substantial than tested components.

Hollow metal doors in operator's room and interface office (fire area 35) are not rated. This area, adjacent to the control room, is normally attended. Combustible loading is light on each side of the wall. Detectors are provided in each room as well as the control room. Although walls are three hour fire rated the rooms are separated (fire areas) in the Fire Hazards Analysis from the control room for discussion purposes. Therefore, non fire rated doors are acceptable.

Three hollow metal doors have louvered grills for radiological purposes. These doors AX100, AX312 and AX391 are installed in concrete walls with a concrete shield wall in a labyrinth arrangement for shielding. These arrangements are acceptable since there is a lack of continuity of combustibles in each adjoining area. Other hollow metal doors are three hour fire rated with either labels attached or manufacturer's certification.

ITEM V.B

8. Statement "We will require the applicant to provide a safe shutdown analysis in accordance with the guidelines of BTP CMEB 9.5-1, Item C.5.b."

Response This information will be provided at a later date. This response is also applicable to Item V.C Alternate Shutdown Capability.

ITEM V.D

9. Statement "We will require that the applicant comply with NFPA 30."

Response Flammable and combustible liquid systems will comply with NFPA 30-1977 "Flammable and combustible liquids."

ITEM V.G

10. Statement "We will require that fixed emergency lighting units with individual eight hour battery power supplies be provided in all areas that must be manned for safe shutdown and for access and egress routes to all fire areas in accordance with BTP CMEB 9.5-1, Item C.5.g.(1)."

Response Fixed emergency lighting will be provided in accordance with BTP CMEB 9.5-1, Item C.5.g.(1).

ITEM V.G

11. Statement "We will require that a portable radio communications system, independent of normal plant communications system be provided for use by the fire brigade and other operations personnel required to achieve safe plant shutdown in accordance with BTP CMEB 9.5-1, Item C.5.g.(4)."

Response A multifrequency radio system will be provided with a dedicated frequency for fire brigade use.

ITEM VI.C

12. Statement "We will require the applicant to comply with NFPA 13 in accordance with BTP CMEB 9.5-1, Item C.6.c(1)."

Response Fixed sprinkler systems will comply with NFPA 13-1980 "Installation of Sprinkler Systems." An exception is to requirement on section 3.14.1 "All valves....shall be listed indicating valves....".

Several isolation, vent, check, or drain RF (Interior Fire Protection System) valves located within nuclear safety related areas particularly within the Reactor Buildings, are not UL listed or FM approved. Of the 38 RF valves located within each Reactor Building, 14 valves are not UL listed. These unlisted valves are constructed of stainless steel or carbon steel bodies and were chosen in place of UL listed carbon steel valves because of the superior strength of the stainless steel or carbon steel components. While the RF system is not seismically qualified except at pressure boundaries (such as Reactor Building RF penetrations), these valves aid in reducing the number of pipe supports needed to prevent pipe interaction during or following a seismic event.

The sprinkler isolation valve and hose connection supply piping for each unit's Auxiliary Feedwater Pump Room are also unlisted. These valves are seismically qualified and were utilized such that piping within these areas could be seismically designed and a pressure boundary maintained. Suitable UL listed valves were not available.

The 4 RF valves (3 motor operated, 1 vent) located within the Auxiliary Building for the three RF supply pipes to the Reactor Building are also unlisted. These valves required seismic qualification to maintain the Reactor pressure boundary. Suitable seismically qualified UL listed valves were not available.

The two Auxiliary Building RY (Exterior Fire Protection) supply lines from the underground loop are each provided with an electric motor operated valve. These valves are seismically designed and therefore unlisted.

All valves mentioned are designed to specifications outlined in ANSI/ASTM B31.1 and are considered equivalent or superior to UL listed valves.

RF butterfly valves located within the Auxiliary Building have been modified to accept chain operators. This modification involves removal of the hand crank on each valve and substituting a wheel and chain assembly. This modification is necessary for accessibility.

ITEM V.D

13. Statement "We will require that the applicant comply with the guidelines of NFPA 12 in accordance with BTP CMEB 9.5-1 Item c.6.c."

Response Carbon dioxide fire suppression systems will comply with NFPA 12-1980 "Carbon Dioxide Extinguishing Systems."

ITEM VII.G

14. Statement "The applicant has not provided the necessary information on divisional separation within each battery room."

Response Battery rooms are located as shown on drawing CFP3. Power supply trains are separated by enclosures constructed of three hour fire rated masonry block walls, concrete roof and fire rated doors. A typical wall elevation is included (Figure 1). DC switchgear and inverters are

located outside battery enclosures. Redundant trains are shielded from each other by battery room enclosures. For example, on Unit 1, one set of DC switchgear and inverters is located north of room 351 and east of room 352. The redundant train is located south of room 354 and west of room 353.

15. Additional information is provided as requested in the draft SER.
 - a. A list of rooms with room description and type of fire detector provided is included (Table 1). Tables in the Fire Hazards Analysis will be updated with the next revision, to reflect this information.
 - b. Critical radiant heat flux information for control room carpet is included. (Figure 2).
 - c. The cable installation at Catawba within the Auxiliary Building, Reactor Buildings, and the Diesel Generator Buildings consists primarily of interlocked armor cables installed in cable tray. These cables have an over-all armor (No jacket) such that no combustible materials are exposed. The criteria applied on Catawba requires that any cables, such as prefabricated cables supplied by vendors, with an over-all jacket be routed through totally enclosed raceways. Small diameter sealtite conduit, which has a PVC jacket, is used in very short lengths (usually 3 to 6 feet long) between terminal boxes and individual devices where a moisture seal is required and a seal cannot otherwise be made at the device. These applications are limited such that there is no concentrated use of PVC.
 - d. Location and arrangement of the three full capacity fire pumps is as shown on attached drawing (Figure 3).
 - e. Based on current scope of work 90% of electrical cables were in place as of June 11, 1982.
 - f. Outside of containment, at least one of the three trains available for hot shutdown is separated from others by a (physical) fire barrier. A study is being conducted of cable routing and equipment location inside containment. Tentative schedule for submittal is April 1983. A firm schedule will be provided by January 1, 1983.

CLARIFICATION

The following items are provided for clarification.

SER

1. On page 7, section V(C), a completely independent "Standby Shutdown System" is referenced. It should be noted that "completely independent" was not an entirely accurate phrase since the auxiliary feedwater pump and various components in the containment are utilized in the shutdown scheme.
2. On page 13, section VI(B), the greatest water demand is 2670 gpm with 750 gpm equals 3420 gpm or a total water demand of approximately 3600 gpm.
3. On page 15, section VI(C), hose stations are provided with up to 100 feet of 1½ inch hose. Some stations have 100 feet and some have 75 feet.
4. On page 16, section VI(D), carbon dioxide detectors are described as cross-zoned. The CO₂ detectors are not cross-zoned.

NUREG 800, Branch Technical Position CMEB 9.5-1

5. P.21 item J; Fire watches will be established per Technical Specification requirement.
6. P.29 item 3.b; As stated in the "Fire Qualification Test on Silicone Foam Floor Penetration Seals" (Attachement 3), Page 46, 6.1.2 maximum temperature is 700°F.
7. P.29-30 item 5; Fire doors are to be inspected on 18 month frequency as are barrier penetration seals - Fire doors will be normally closed. Doors which separate safety related equipment and components are locked or alarmed. Doors, in locations such as stairwells have closures and are normally closed but are not locked or alarmed.
8. P.34-35 item e.2. Continuous line-type heat detectors are not provided over all cable trays. Detection is provided as appropriate based on the fire hazard analysis. Automatic water suppression is not provided over cable trays.
9. P.39 item 11; the water supply is capable of supplying the largest water demand with the shortest portion of the yard loop out of service.
10. P.41 item d; Halcon cylinder content will be checked semi annually by means of an agent level detector.
11. P.45 item c.5., same as No. 8.
12. P.46 item c.5 (top of page) - Floor drains are not provided in Cable Spreading Rooms since fixed water extinguishing systems are not required.
13. P.46 item e - Re.: floor drains - same as No. 12.

Table 1

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
ELEVATION 522		
100	Refueling Water Recirculating Pump;	I - R/R
	Component Cooling Drain Sump & Sump Pumps	
101	Corridor	I - R/R
102	Containment Spray Pump 1A	I - R/R
103	Containment Spray Pump 1B	I - R/R
104	Residual Heat Removal Pump 1B	I - R/R
105	Residual Heat Removal Pump 1A	I - R/R
106	Corridor	I - R/R
107	Containment Spray Pump 2A	I - R/R
108	Containment Spray Pump 2B	I - R/R
109	Residual Heat Removal Pump 2B	I - R/R
110	Residual Heat Removal Pump 2A	I - R/R
111	Corridor	I - R/R
112	Corridor	I - R/R
113	Pipe Chase	-
ELEVATION 543		
200	Area Between Column Lines 56 & 58	I - R/R
200A	Stairwell North of East Elevator	-
200B	Area in Front of East Elevator	-
200C	Groundwater Drainage Sump & Pumps	-
200D	Stairwell Adjacent to Room 248	-
201	Area South of Valve Gallery 202	-
202	Valve Gallery	-
203	Waste Gas Decay Tanks	-
204	Hydrogen Recombiner Control Panel Area (Corridor)	-
204A	Exhaust Fan Concrete Pad	-
204B	Waste Gas Analysis Rack "A"	-
205	Waste Gas Hydrogen Recombiner "A"	-
205A	Gas Analysis Rack	-
206A	Waste Gas Hydrogen Recombiner "B"	-
206B	Waste Gas Compressor Package "B"	-
207	Waste Gas Compressor Package "A"	-
208	Corridor	I - R/R
209	Corridor	I - R/R
209A	Stairwell	-
210	Corridor Adjacent to Recycle Evap. Feed Pump	-
210A	Recycle Evap. Feed Pump "A" & "B"	-
210B	Valve Gallery	-
211	Recycle Evap. Package	-
212	Corridor	I - R/R
212A	Stairwell	-
212B	Exhaust Fan Concrete Pad	-

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
212	Gas Decay Tank Drain Pump	-
214	Chemical Drain Tank, Floor Drain Sump, Waste Evap. Feed Sump	-
215	Access Corridor	-
215A	Waste Drain Tank Pumps	-
215B	Waste Evap. Feed Tank Pumps	-
215C	Waste Drain Tank	-
215D	Waste Evap. Feed Tank	-
216	Waste Evaporator Package	-
217	Mechanical Penetration Area - Unit 1	I - R/R
220	Mixing & Settling Tank Pumps	-
221	Mixing & Settling Tank	-
222	Spent Resin Valve Body Room	-
222A	Spent Resin Storage Tank B	-
222B	Spent Resin Storage Tank A	-
223	Spent Resin Sluicing Pump & Valve Body Area	-
224	Laundry & Hot Shower Tank Pump	-
225	Laundry & Hot Shower Tank/Floor Drain Tank	-
226	Floor Drain Tank Pump	-
227	Mechanical Penetration Area - Unit 2	I - R/R
230	Centrifugal Charging Pump 1A	I - R/R
231	Centrifugal Charging Pump 1B	I - R/R
232	Corridor	I - R/R
233	Reciprocal Charging Pump - Unit 1	I - R/R
234	Safety Injection Pump 1B	I - R/R
235	Safety Injection Pump 1A	I - R/R
236	Hatch Area	I - R/R
237	Restricted Instrument Shop	I - R/R
238	Sample Panel Area - Unit 1	I - R/R
239	Cable Shaft Access Area	I - R/R
240	Centrifugal Charging Pump 2A	I - R/R
241	Centrifugal Charging Pump 2B	I - R/R
242	Corridor	I - R/R
243	Reciprocal Charging Pump - Unit 2	I - R/R
244	Safety Injection Pump 2B	I - R/R
245	Safety Injection Pump 2A	I - R/R
246	Hatch Area	I - R/R
247	Restricted Instrument Shop	I - R/R
248	Sample Room - Unit 2	I - R/R
250	Vent Condensate Drain Tank - Unit 1	I - R/R
250A	Stairwell	-
251	Aux. Feedwater Pump Turbine Panel	I - R/R
252	Train A Shutdown Panel	I - R/R
253	Train B Shutdown Panel	I - R/R
254	Turbine Driven Aux. Feedwater Pump - 1A	Photoelectric
255	Motor Driven Aux. Feedwater Pump - 1B	I - R/R
256	Motor Driven Aux. Feedwater Pump - 1A	I - R/R
260	Vent Condensate Drain Tank - Unit 2	I - R/R
260A	Stairwell	-
261	Aux. Feedwater Pump Turbine Panel	I - R/R
262	Train A Shutdown Panel	I - R/R

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
263	Train B Shutdown Panel	I - R/R
264	Turbine Driven Aux. Feedwater Pump - 2A	Photoelectric
265	Motor Driven Aux. Feedwater Pump - 2B	I - R/R
266	Motor Driven Aux. Feedwater Pump - 2A	I - R/R

ELEVATION 560

300	Equipment Area	I - R/R
300A	Stairs	-
300B	Elevator Lobby	-
300C	Duct Shaft	-
300D	Duct Shaft	-
301	Boric Acid Transfer Pumps - Unit 2	-
302	Boric Acid Transfer Pumps - Unit 1	-
303	Corridor (Boric Acid Batching Tank)	I - R/R
303A	Stairs	-
303B	Duct Shaft	-
304	Valve Gallery	I - R/R
305	Boric Acid Tank "A"	-
306	Valve Gallery	I - R/R
307	Boric Acid Tank "B"	-
308	Corridor	I - R/R
308A	Boron Injection Tank & Pumps - Unit 2	I - R/R
309	Volume Control Tank - Unit 2	-
310	Corridor	I - R/R
310A	Stairs	-
310B	Duct Shaft	-
311	Pipe Trench & Hall	-
312	Pipe Trench & Hall	-
313	Valve Gallery	I - R/R
314	Recycle Holdup Tank "A"	-
315	Valve Gallery	I - R/R
316	Recycle Holdup Tank "B"	-
317	Valve Gallery	-
318	Corridor	I - R/R
318A	Boron Injection Tank & Pumps - Unit 1	I - R/R
319	Volume Control Tank - Unit 1	-
320	Motor Control Center	- R/R
321	Seal Water Heat Exchanger - Unit 2	-
322	Cable Tray Access - Unit 2	I - R/R
322A	Stairs	-
323	Pipe Chase	I - R/R
323A	Pipe Chase	-
323B	Pipe Chase	I - R/R
324	Boronometer - Unit 2	-
330	Motor Control Center	I - R/R
331	Seal Water Heat Exchanger - Unit 1	-
332	Boronometer - Unit 1	-
333	Pipe Chase	I - R/R
333A	Pipe Chase	-
333B	Pipe Chase	I - R/R

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
334	Cable Tray Access - Unit 1	I - R/R
340	Battery Room - Unit 2	-
340A	Cable Shaft	-
340B	Cable Shaft	-
341	Vital Battery 2EBA	I - R/R
342	Vital Battery 2EBB	I - R/R
342A	Battery Charger 2ECB	-
343	Vital Battery 2EBC	I - R/R
344	Vital Battery 2EBD	I - R/R
345	Aux. Cont. Pwr. Batt. 2CBB	I - R/R
346	Aux. Cont. Pwr. Batt. 2CBA	I - R/R
350	Battery Room - Unit 1	-
350A	Cable Shaft	-
350B	Duct Shaft	-
351	Vital Battery 1EBA	I - R/R
352	Vital Battery 1EBB	I - R/R
352A	Battery Charger 1ECB	-
353	Vital Battery 1EBC	I - R/R
354	Vital Battery 1EBD	I - R/R
355	Aux. Cont. Pwr. Batt. 1CBB	I - R/R
356	Aux. Cont. Pwr. Batt. 1CBA	I - R/R
360	Electrical Penetration Room - Unit 2	-
360A	Stairs	-
362	Switchgear Room	-
363	Switchgear HVAC Equipment Room	-
370	Electrical Penetration Room - Unit 1	-
370A	Stairs	-
372	Switchgear Room	-
373	Switchgear HVAC Equipment Room	-

ELEVATION 577

400	Equipment Area	I - R/R
400A	Stairs	-
400B	Stairs	-
400C	Duct Shaft	-
400D	Duct Shaft	-
400E	Stairs	-
400F	Duct Shaft	-
400G	Duct Shaft	-
401	Glycol Mixing & Storage Tank; Elevator Lobby	I - R/R
401A	Stairs	-
402	Corridor	I - R/R
403	Container & Drum Storage	I - R/R
404	Access to Rooms	-
404A	Dewatering Pump	I - R/R
404B	Radwaste Feed Skid	I - R/R
404C	Evaporator Concentrate Holdup Tank	I - R/R
405	Filter Bunkers	I - R/R
407	Corridor	I - R/R

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
408	Fuel Pool Cooling Demineralizer	I - R/R
409	Fuel Pool Cooling; Skimmer Pumps; Heat Exchangers	I - R/R
410	Recycle Evaporator Feed Demin (Hatch)	-
411	Recycle Evaporator Condensate Demin. (Hatch)	-
412	Recycle Evaporator Condensate Filter (Double Hatch)	-
413	Boric Acid Filters (2 Adjacent Hatches)	-
414	Recycle Evaporator Feed Demin (Hatch)	-
415	Recycle Evaporator Concentrate Filter (Hatch)	-
416A	Recycle Evaporator Feed Filter (Double Hatch)	-
416B	Recycle Evaporator Feed Filter (Double Hatch)	-
417	Fuel Pool Cooling Demineralizer	I - R/R
418	Fuel Pool Cooling Pumps & Heat Exchanger	I - R/R
419	Mechanical Penetration Room	I - R/R
420	Fuel Pool Cooling Post Filters and Pre-Filters and Fuel Pool Skimmer Filter (6 Hatches)	-
421	Thermal Regenerative Demineralizer 2B (Hatch)	-
422	Thermal Regenerative Demineralizer 2C (Hatch)	-
423	Cation Bed Demineralizer 2A (Hatch)	-
424	Waste Monitor Tank Demineralizer (Hatch)	-
425	Containment Spray & Residual Heat Removal Heat Exchangers - 2A	I - R/R
426	Containment Spray & Residual Heat Removal Heat Exchangers - 2B	I - R/R
427	Mechanical Penetration Room	I - R/R
428	Laundry/Hot Shower Carbon Filter	-
430	Fuel Pool Skimmer Filter & Waste Evaporator Condensate Filter (3 Hatches)	-
431	Thermal Regenerative Demineralizer - 1E (Hatch)	-
432	Thermal Regenerative Demineralizer - 1C (Hatch)	-
433	Cation Bed Demineralizer 1A (Hatch)	-
434	Containment Spray & Residual Heat Removal Heat Exchangers - 1A	I - R/R
435	Containment Spray & Residual Heat Removal Heat Exchangers - 1B	I - R/R
441	Floor Drain Tank Filter	-
442	Laundry & Hot Shower Filter (Primary and Secondary)	-
443	Thermal Regenerative Demineralizer - 2A (Hatch)	-
444	Thermal Regenerative Demineralizer - 2D	-
445	Mixed Bed Demineralizer (Hatch)	-

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
446	Reactor Coolant Filter - 2B (Hatch)	-
447	Seal Water Return Filter (Hatch)	-
448	Thermal Regenerative Demineralizer - 2E (Hatch)	-
449	Mixed Bed Demineralizer - 2A (Hatch)	-
450	Fuel Pool Cooling Filters - Unit 1 (5 Hatches)	-
451	Seal Water Return Filter - Unit 1 (2 Hatches)	-
452	Thermal Regenerative Demineralizer - 1D (Hatch)	-
453	Thermal Regenerative Demineralizer - 1B (Hatch)	-
454	Mixed Bed Demineralizer - 1B (Hatch)	-
455	Reactor Coolant Filter - 1B (2 Hatches)	-
456	Reactor Coolant Filter - 1A (2 Hatches)	-
457	Waste Evaporator Condensate Demineralizer (1 Hatch)	-
458	Thermal Regenerative Demineralizer 1A (1 Hatch)	-
459	Mixed Bed Demineralizer 1A	-
460	Reactor Coolant Filter 2A	-
461	Waste Monitor Tank Filter	-
462	Seal Water Injection Filter 2B	-
463	Seal Water Injection Filter 2A	-
464	Spent Resin Sluice Filter	-
465	Letdown Reheat Heat Exchanger - Unit 2	I - R/R
466	Letdown Chiller Heat Exchanger - Unit 2	I - R/R
467	Letdown Heat Exchanger - Unit 2	I - R/R
468	Moderating Heat Exchanger - Unit 2	I - R/R
469	Motor Control Center	I - R/R
470	Seal Water Injection Filter 1A	-
471	Seal Water Injection Filter 1B	-
472	Waste Evaporator Feed Filter B	-
473	Waste Evaporator Feed Filter A	-
474	Letdown Heat Exchanger - Unit 1	I - R/R
475	Chiller Heat Exchanger - Unit 1	I - R/R
476	Letdown Heat Exchanger - Unit 1	I - R/R
477	Moderating Heat Exchanger - Unit 1	I - R/R
478	Motor Control Center	I - R/R
480	Corridor (East of #2 Cable Room 481)	I - R/R
480A	Cable Shaft Room	I - R/R
481	Cable Room	I - R/R
481A	Electrical Boards	I - R/R
482	Duct Shaft (East of #2 Corridor & Cable Room)	-
483	Corridor	-
484	Electrical Penetration Room - Unit 2	-
484A	Stairs - Entry to Electrical Penetration Room	-
485	Switchgear Equipment Room	-
486	Load Center - Unit 2	-

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
490	Corridor	I - R/R
490A	Cable Shaft	I - R/R
491	Cable Room - Unit 1	I - R/R
491A	Electrical Boards Room - Unit 1	I - R/R
492	Duct Shaft (Adjacent to #1 Corridor)	-
493	Corridor Unit 1	-
494	Electrical Penetration Room - Unit 1	-
494A	Stairs & Access to Electrical Penetration Room	-
495	Switchgear Equipment Room - Unit 1	-
496	Load Center - Unit 1	-

ELEVATION 594

500	Central Area - Auxiliary Building	I - R/R
500A	NE Stairwell	-
500B	NW Stairwell	-
500C	SE Stairwell	-
500D	SW Stairwell	-
510	Counting Room	-
511	Environmental Room	I - R/R
512	H. P. Respiratory	I - R/R
530	New Fuel Storage Area, Unit 1	UV
531	New Fuel Receiving Area, Unit 1	UV
540	New Fuel Storage, Unit 2	UV
541	New Fuel Receiving, Unit 2	UV
550	Manway to Spent Resin Batching Tank	I - R/R
551	Instrument Calibration	-
551A	Corridor	-
560	Equipment Area (Vent.)	-
561	Corridor/Hatch Area	-
561A	Stairwell	-
561B	Stairwell	-
562	Unit 2 Penetration Area (Steam Doghouse)	-
563	Electrical Penetration, Unit 2	-
564	RMC Room	-
570	Equipment Area (Vent.)	-
571	Corridor	-
571A	Stairwell	-
572	Unit 1 Steam Penetration (Doghouse)	-
573	Control Room	-
574	Operators Room	-
575	Interface Office	-
576	Electrical Penetration Room, Unit 1	-
580	N ₂ Accum. Tank Blowoff, Unit 2	-
580A	Stairwell	-
581	Steam Penetration, Unit 2 (Outside Doghouse)	-
590	N ₂ Accum. Tank Blowoff, Unit 1	-
590A	Stairwell	-
591	Steam Penetration, Unit 1 (Outside Doghouse)	-

Room NumberDescriptionDetection

ELEVATION 609

600	Fuel Pool Operating Floor, Unit 1	I - R/R
600A	Duct Room	-
601	Reactor Personnel Lock Area	-
601A	Reactor Personnel Area	I - R/R
602	Decontamination Storage, Unit 1	I - R/R
614	Fuel Pool Operating Floor - Unit 2	I - R/R
614A	Duct Room	-
615	Reactor Personnel Lock Area #2	-
615A	Reactor Personnel Area	I - R/R
616	Decontamination Storage, Unit 2	I - R/R

ELEVATION 611

750	Purge Supply Room - Unit 1	-
751	Purge Supply Room - Unit 2	-

ELEVATION 623 + 10

801	Fuel Pool Purge Unit (Unit 1)	-
802	Fuel Pool Purge Unit (Unit 2)	-

Room NumberDescriptionDetection

DIESEL GENERATOR BUILDING

302	Diesel Generator 1A	I - R/R
302C	Diesel Generator 1A Sequencer Panels	I - R/R
304	Diesel Generator 1B	I - R/R
304C	Diesel Generator 1B Sequencer Panels	I - R/R
306	Diesel Generator 2A	I - R/R
306C	Diesel Generator 2A Sequencer Panels	I - R/R
308	Diesel Generator 2B	I - R/R
308C	Diesel Generator 2B Sequencer Panels	I - R/R

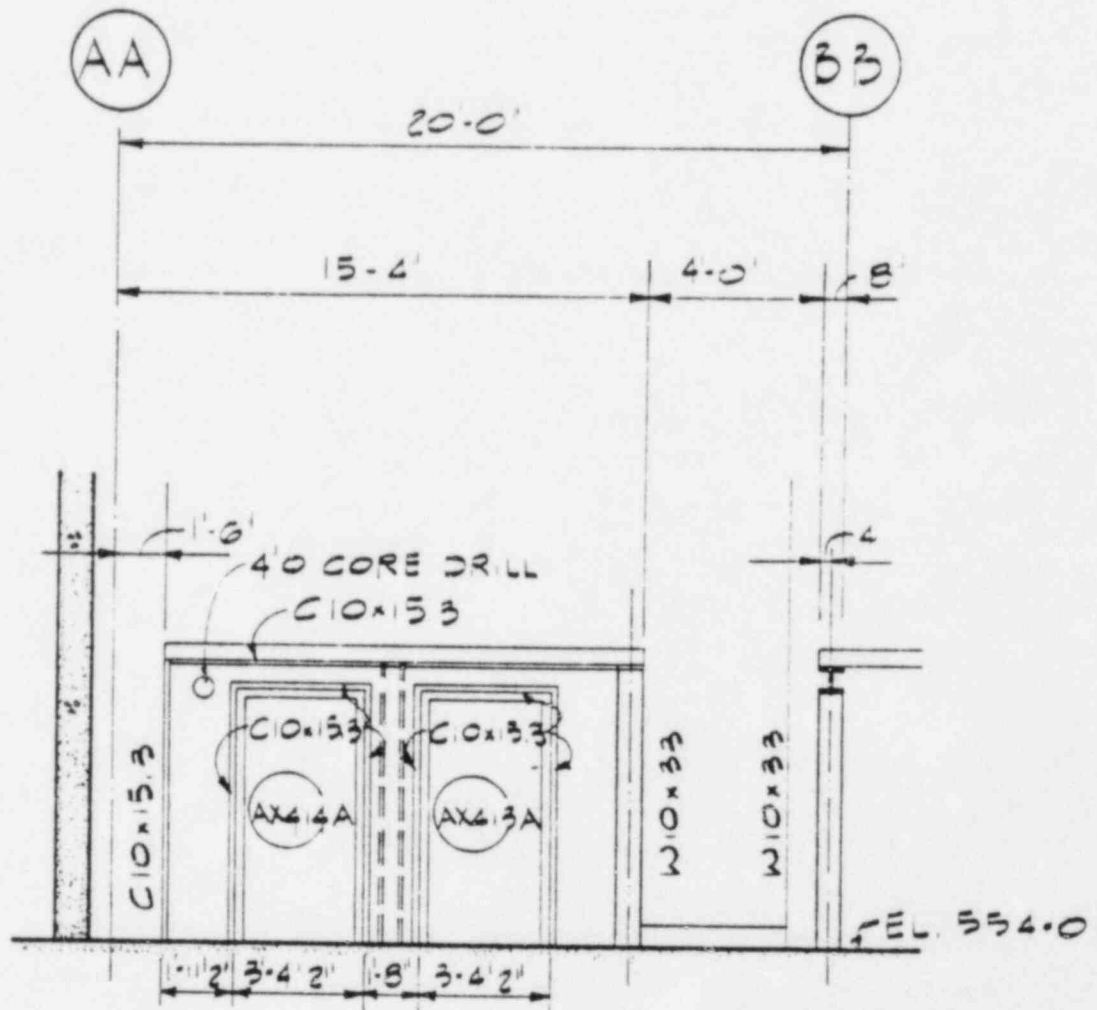
NUCLEAR SERVICE WATER PUMP STRUCTURE

662	NSWP 1A & 2A	I - R/R
663	NSWP 1B & 2B	I - R/R

REACTOR BUILDING

Annulus - Unit 1	I - R/R
Annulus - Unit 2	I - R/R
Pipe Corridor - Unit 1	I - R/R
Pipe Corridor - Unit 2	I - R/R
Safety Related Cable Trays - Unit 1	I - R/R
Safety Related Cable Trays - Unit 2	I - R/R
RCP 1A, 1B, 1C, 1D	Heat Sensitive Cab.
RCP 2A, 2B, 2C, 2D	Heat Sensitive Cab.
Lower Containment Filters 1A, 1B	I - R/R
Lower Containment Filters 2A, 2B	I - R/R

FIGURE 1



				DUKE POWER CO.			
				TYPICAL ELEVATION OF BATTERY ROOM MASONRY WALL			
				DRN.		CHKD.	
				INSP.		APPR.	
NO.	REVISION	CHKD	APPR	DATE	SCALE 3/8" = 1'-0"	NO.	

FIGURE 2

INDEPENDENT TEXTILE TESTING SERVICE, INC.

P. O. Box 1948 1499 Murray Ave.

Phone 404-273-3011

Dalton, Georgia 30720

TEST NUMBER

3703

— REPORT —

CUSTOMER: Carpets International

August 16, 1977

SUBJECT: Specimens of the submitted samples were prepared and tested in accordance with the procedures proposed by the National Bureau of Standards dated June 1975.

FLOORING RADIANT PANEL TEST (NBS)

Sample Description

Style: Debron 4000 P/2400

Color: Burnt Orange

Roll No:

Fibers:

Pile:

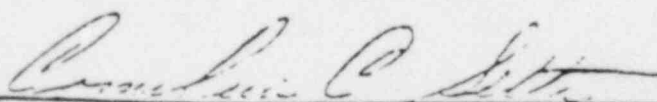
Test Assembly

Mounted on Transite

<u>Test Results</u>	<u>Specimen No. 1</u>		<u>Specimen No. 2</u>		<u>Specimen No. 3</u>	
Critical Radiant Flux:	.50	watts/cm ²	.45	watts/cm ²	.55	watts/cm ²
Total Burn Length:	39.6	cm.	42.8	cm.	37.4	cm.
Flame Front Out:	74.0	minutes	73.0	minutes	52.0	minutes

Average Critical Radiant Flux: .50 watts/cm²

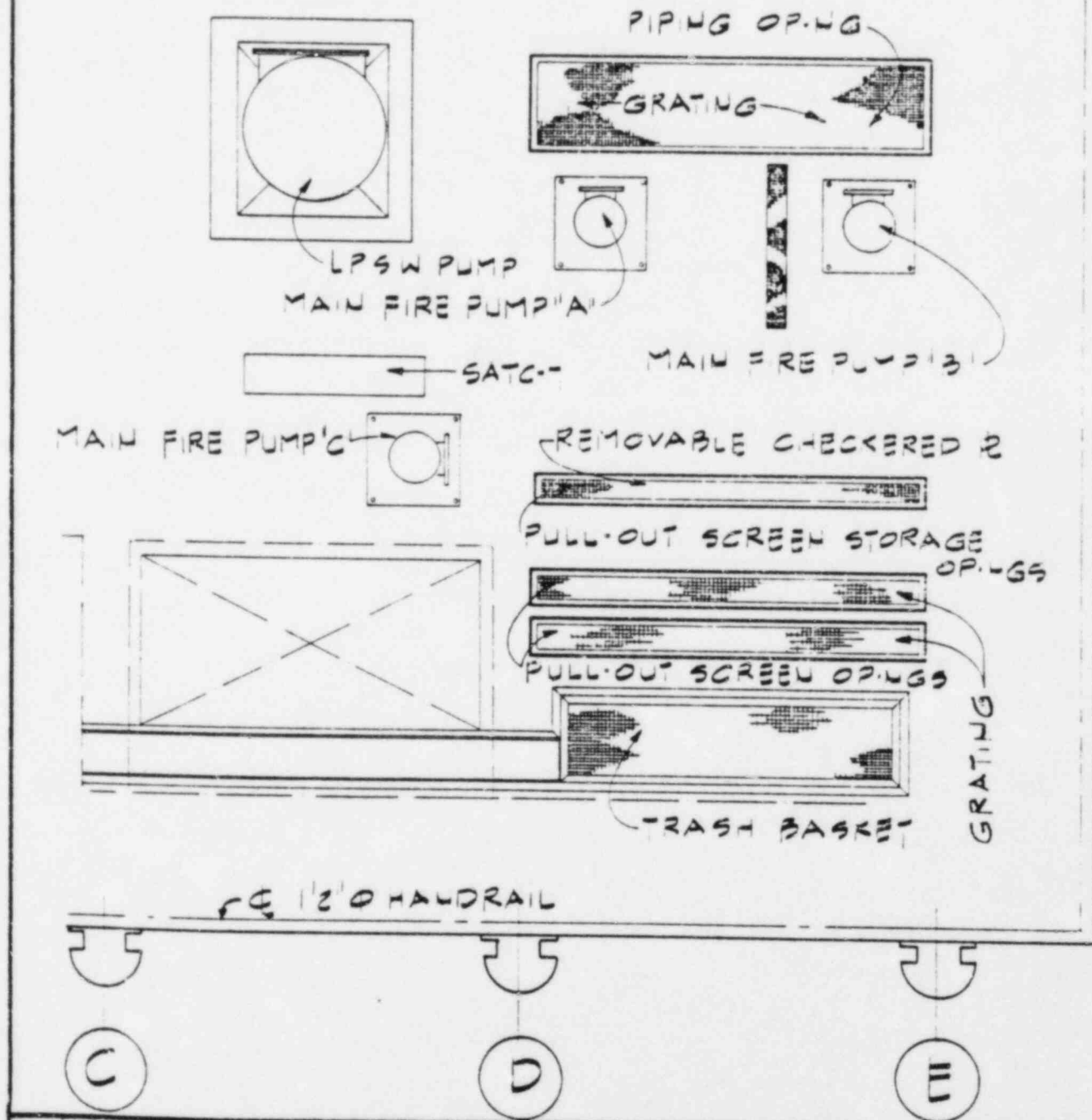
Estimated Standard Deviation: .05



Independent Textile Testing Service

Our letters and reports are for the exclusive use of the customer to whom they are addressed, and their communication to any others or the use of the same of Independent Textile Testing Service, Inc., must receive our prior written approval. Our letters and reports apply only to the sample tested and are not necessarily indicative of the qualities of apparently identical or similar products. The reports and letters and the name of the Independent Textile Testing Service, Inc., are not to be used under any circumstances in advertising to the general public.

FIGURE 3



				DUKE POWER CO.			
				FIRE PUMP LOCATION			
				DRN.		CHKD.	
				INSP.		APPR.	
NO.	REVISION	CHKD	APPR	DATE	SCALE 3/8" = 1'-0"		NO.

DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

September 14, 1982

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

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Dear Mr. Denton:

On July 29, 1982, Duke Power Company transmitted comments on the Fire Protection preliminary draft SER. Included as Table 1 was a list of rooms and the type of fire detector provided. A number of errors were noted in this table. Attached is a corrected copy.

Very truly yours,

H.B. Tucker

Hal B. Tucker

ROS/php
Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Mr. P. K. Van Doorn
NRC Resident Inspector
Catawba Nuclear Station

Mr. Robert Guild, Esq.
Attorney-at-Law
314 Pall Mall
Columbia, South Carolina 29201

Mr. Harold R. Denton, Director
September 14, 1982
Page 2

cc: Palmetto Alliance
2135½ Devine Street
Columbia, South Carolina 29205

Mr. Jesse L. Riley
Carolina Environmental Study Group
854 Henley Place
Charlotte, North Carolina 28207

Mr. Henry A. Presler, Chairman
Charlotte-Mecklenburg Environmental Coalition
943 Henley Place
Charlotte, North Carolina 28207

bcc: C. C. Rolfe
J. R. Hendricks
J. W. Hampton
N. A. Rutherford
Section File: CN-801.01

Table 1

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
ELEVATION 522		
100	Refueling Water Recirculating Pump;	I - R/R
	Component Cooling Drain Sump & Sump Pumps	
101	Corridor	I - R/R
102	Containment Spray Pump 1A	I - R/R
103	Containment Spray Pump 1B	I - R/R
104	Residual Heat Removal Pump 1B	I - R/R
105	Residual Heat Removal Pump 1A	I - R/R
106	Corridor	I - R/R
107	Containment Spray Pump 2A	I - R/R
108	Containment Spray Pump 2B	I - R/R
109	Residual Heat Removal Pump 2B	I - R/R
110	Residual Heat Removal Pump 2A	I - R/R
111	Corridor	I - R/R
112	Corridor	I - R/R
113	Pipe Chase	-
ELEVATION 543		
200	Area Between Column Lines 56 & 58	I - R/R
200A	Stairwell North of East Elevator	-
200B	Area in Front of East Elevator	-
200C	Groundwater Drainage Sump & Pumps	-
200D	Stairwell Adjacent to Room 248	-
201	Area South of Valve Gallery 202	-
202	Valve Gallery	-
203	Waste Gas Decay Tanks	-
204	Hydrogen Recombiner Control Panel Area (Corridor)	-
204A	Exhaust Fan Concrete Pad	-
204B	Waste Gas Analysis Rack "A"	-
205	Waste Gas Hydrogen Recombiner "A"	-
205A	Gas Analysis Rack	-
206A	Waste Gas Hydrogen Recombiner "B"	-
206B	Waste Gas Compressor Package "B"	-
207	Waste Gas Compressor Package "A"	-
208	Corridor	I - R/R
209	Corridor	I - R/R
209A	Stairwell	-
210	Corridor Adjacent to Recycle Evap. Feed Pump	-
210A	Recycle Evap. Feed Pump "A" & "B"	-
210B	Valve Gallery	-
211	Recycle Evap. Package	-
212	Corridor	I - R/R
212A	Stairwell	-
212B	Exhaust Fan Concrete Pad	-

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
213	Gas Decay Tank Drain Pump	-
214	Chemical Drain Tank, Floor Drain Sump, Waste Evap. Feed Sump	-
215	Access Corridor	-
215A	Waste Drain Tank Pumps	-
215B	Waste Evap. Feed Tank Pumps	-
215C	Waste Drain Tank	-
215D	Waste Evap. Feed Tank	-
216	Waste Evaporator Package	-
217	Mechanical Penetration Area - Unit 1	I - R/R
220	Mixing & Settling Tank Pumps	-
221	Mixing & Settling Tank	-
222	Spent Resin Valve Body Room	-
222A	Spent Resin Storage Tank B	-
222B	Spent Resin Storage Tank A	-
223	Spent Resin Sluicing Pump & Valve Body Area	-
224	Laundry & Hot Shower Tank Pump	-
225	Laundry & Hot Shower Tank/Floor Drain Tank	-
226	Floor Drain Tank Pump	-
227	Mechanical Penetration Area - Unit 2	I - R/R
230	Centrifugal Charging Pump 1A	I - R/R
231	Centrifugal Charging Pump 1B	I - R/R
232	Corridor	I - R/R
233	Reciprocal Charging Pump - Unit 1	I - R/R
234	Safety Injection Pump 1B	I - R/R
235	Safety Injection Pump 1A	I - R/R
236	Hatch Area	I - R/R
237	Restricted Instrument Shop	I - R/R
238	Sample Panel Area - Unit 1	I - R/R
239	Cable Shaft Access Area	I - R/R
240	Centrifugal Charging Pump 2A	I - R/R
241	Centrifugal Charging Pump 2B	I - R/R
242	Corridor	I - R/R
243	Reciprocal Charging Pump - Unit 2	I - R/R
244	Safety Injection Pump 2B	I - R/R
245	Safety Injection Pump 2A	I - R/R
246	Hatch Area	I - R/R
247	Restricted Instrument Shop	I - R/R
248	Sample Room - Unit 2	I - R/R
250	Vent Condensate Drain Tank - Unit 1	I - R/R
250A	Stairwell	-
251	Aux. Feedwater Pump Turbine Panel	I - R/R
252	Train A Shutdown Panel	I - R/R
253	Train B Shutdown Panel	I - R/R
254	Turbine Driven Aux. Feedwater Pump - 1A	Photoelectric
255	Motor Driven Aux. Feedwater Pump - 1B	I - R/R
256	Motor Driven Aux. Feedwater Pump - 1A	I - R/R
260	Vent Condensate Drain Tank - Unit 2	I - R/R
260A	Stairwell	-
261	Aux. Feedwater Pump Turbine Panel	I - R/R
262	Train A Shutdown Panel	I - R/R

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
263	Train B Shutdown Panel	I - R/R
264	Turbine Driven Aux. Feedwater Pump - 2A	Photoelectric
265	Motor Driven Aux. Feedwater Pump - 2B	I - R/R
266	Motor Driven Aux. Feedwater Pump - 2A	I - R/R

ELEVATION 560

300	Equipment Area	I - R/R
300A	Stairs	-
300B	Elevator Lobby	-
300C	Duct Shaft	-
300D	Duct Shaft	-
301	Boric Acid Transfer Pumps - Unit 2	-
302	Boric Acid Transfer Pumps - Unit 1	-
303	Corridor (Boric Acid Batching Tank)	I - R/R
303A	Stairs	-
303B	Duct Shaft	-
304	Valve Gallery	I - R/R
305	Boric Acid Tank "A"	-
306	Valve Gallery	I - R/R
307	Boric Acid Tank "B"	-
308	Corridor	I - R/R
308A	Boron Injection Tank & Pumps - Unit 2	I - R/R
309	Volume Control Tank - Unit 2	-
310	Corridor	I - R/R
310A	Stairs	-
310B	Duct Shaft	-
311	Pipe Trench & Hall	-
312	Pipe Trench & Hall	-
313	Valve Gallery	I - R/R
314	Recycle Holdup Tank "A"	-
315	Valve Gallery	I - R/R
316	Recycle Holdup Tank "B"	-
317	Valve Gallery	-
318	Corridor	I - R/R
318A	Boron Injection Tank & Pumps - Unit 1	I - F/R
319	Volume Control Tank - Unit 1	-
320	Motor Control Center	I - R/R
321	Seal Water Heat Exchanger - Unit 2	-
322	Cable Tray Access - Unit 2	I - R/R
322A	Stairs	-
323	Pipe Chase	I - R/R
323A	Pipe Chase	-
323B	Pipe Chase	I - R/R
324	Boronometer - Unit 2	-
330	Motor Control Center	I - R/R
331	Seal Water Heat Exchanger - Unit 1	-
332	Boronometer - Unit 1	-
333	Pipe Chase	I - R/R
333A	Pipe Chase	-
333B	Pipe Chase	I - R/R

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
334	Cable Tray Access - Unit 1	I - R/R
340	Battery Room - Unit 2	I -
340A	Cable Shaft	-
340B	Cable Shaft	-
341	Vital Battery 2EBA	I - R/R
342	Vital Battery 2EBB	I - R/R
342A	Battery Charger 2ECB	I -
343	Vital Battery 2EBC	I - R/R
344	Vital Battery 2EBD	I - R/R
345	Aux. Cont. Pwr. Batt. 2CBB	I - R/R
346	Aux. Cont. Pwr. Batt. 2CBA	I - R/R
350	Battery Room - Unit 1	I -
350A	Cable Shaft	-
350B	Duct Shaft	-
351	Vital Battery 1EBA	I - R/R
352	Vital Battery 1EBB	I - R/R
352A	Battery Charger 1ECB	I -
353	Vital Battery 1EBC	I - R/R
354	Vital Battery 1EBD	I - R/R
355	Aux. Cont. Pwr. Batt. 1CBB	I - R/R
356	Aux. Cont. Pwr. Batt. 1CBA	I - R/R
360	Electrical Penetration Room - Unit 2	I -
360A	Stairs	-
362	Switchgear Room	I -
363	Switchgear HVAC Equipment Room	I -
370	Electrical Penetration Room - Unit 1	I -
370A	Stairs	-
372	Switchgear Room	I -
373	Switchgear HVAC Equipment Room	I -

ELEVATION 577

400	Equipment Area	I - R/R
400A	Stairs	-
400B	Stairs	-
400C	Duct Shaft	-
400D	Duct Shaft	-
400E	Stairs	-
400F	Duct Shaft	-
400G	Duct Shaft	-
401	Glycol Mixing & Storage Tank; Elevator Lobby	I - R/R
401A	Stairs	-
402	Corridor	I - R/R
403	Container & Drum Storage	I - R/R
404	Access to Rooms	-
404A	Dewatering Pump	I - R/R
404B	Radwaste Feed Skid	I - R/R
404C	Evaporator Concentrate Holdup Tank	I - R/R
405	Filter Bunkers	I - R/R
407	Corridor	I - R/R

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
408	Fuel Pool Cooling Demineralizer	I - R/R
409	Fuel Pool Cooling; Skimmer Pumps; Heat Exchangers	I - R/R
410	Recycle Evaporator Feed Demin (Hatch)	-
411	Recycle Evaporator Condensate Demin. (Hatch)	-
412	Recycle Evaporator Condensate Filter (Double Hatch)	-
413	Boric Acid Filters (2 Adjacent Hatches)	-
414	Recycle Evaporator Feed Demin (Hatch)	-
415	Recycle Evaporator Concentrate Filter (Hatch)	-
416A	Recycle Evaporator Feed Filter (Double Hatch)	-
416B	Recycle Evaporator Feed Filter (Double Hatch)	-
417	Fuel Pool Cooling Demineralizer	I - R/R
418	Fuel Pool Cooling Pumps & Heat Exchanger	I - R/R
419	Mechanical Penetration Room	I - R/R
420	Fuel Pool Cooling Post Filters and Pre-Filters and Fuel Pool Skimmer Filter (6 Hatches)	-
421	Thermal Regenerative Demineralizer 2B (Hatch)	-
422	Thermal Regenerative Demineralizer 2C (Hatch)	-
423	Cation Bed Demineralizer 2A (Hatch)	-
424	Waste Monitor Tank Demineralizer (Hatch)	-
425	Containment Spray & Residual Heat Removal Heat Exchangers - 2A	I - R/R
426	Containment Spray & Residual Heat Removal Heat Exchangers - 2B	I - R/R
427	Mechanical Penetration Room	I - R/R
428	Laundry/Hot Shower Carbon Filter	-
430	Fuel Pool Skimmer Filter & Waste Evaporator Condensate Filter (3 Hatches)	-
431	Thermal Regenerative Demineralizer - 1E (Hatch)	-
432	Thermal Regenerative Demineralizer - 1C (Hatch)	-
433	Cation Bed Demineralizer 1A (Hatch)	-
434	Containment Spray & Residual Heat Removal Heat Exchangers - 1A	I - R/R
435	Containment Spray & Residual Heat Removal Heat Exchangers - 1B	I - R/R
441	Floor Drain Tank Filter	-
442	Laundry & Hot Shower Filter (Primary and Secondary)	-
443	Thermal Regenerative Demineralizer - 2A (Hatch)	-
444	Thermal Regenerative Demineralizer - 2D	-
445	Mixed Bed Demineralizer (Hatch)	-

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
446	Reactor Coolant Filter - 2B (Hatch)	-
447	Seal Water Return Filter (Hatch)	-
448	Thermal Regenerative Demineralizer - 2E (Hatch)	-
449	Mixed Bed Demineralizer - 2A (Hatch)	-
450	Fuel Pool Cooling Filters - Unit 1 (5 Hatches)	-
451	Seal Water Return Filter - Unit 1 (2 Hatches)	-
452	Thermal Regenerative Demineralizer - 1D (Hatch)	-
453	Thermal Regenerative Demineralizer - 1B (Hatch)	-
454	Mixed Bed Demineralizer - 1B (Hatch)	-
455	Reactor Coolant Filter - 1B (2 Hatches)	-
456	Reactor Coolant Filter - 1A (2 Hatches)	-
457	Waste Evaporator Condensate Demineralizer (1 Hatch)	-
458	Thermal Regenerative Demineralizer 1A (1 Hatch)	-
459	Mixed Bed Demineralizer 1A	-
460	Reactor Coolant Filter 2A	-
461	Waste Monitor Tank Filter	-
462	Seal Water Injection Filter 2B	-
463	Seal Water Injection Filter 2A	-
464	Spent Resin Sluice Filter	-
465	Letdown Reheat Heat Exchanger - Unit 2	I - R/R
466	Letdown Chiller Heat Exchanger - Unit 2	I - R/R
467	Letdown Heat Exchanger - Unit 2	I - R/R
468	Moderating Heat Exchanger - Unit 2	I - R/R
469	Motor Control Center	I - R/R
470	Seal Water Injection Filter 1A	-
471	Seal Water Injection Filter 1B	-
472	Waste Evaporator Feed Filter B	-
473	Waste Evaporator Feed Filter A	-
474	Letdown Heat Exchanger - Unit 1	I - R/R
475	Chiller Heat Exchanger - Unit 1	I - R/R
476	Letdown Heat Exchanger - Unit 1	I - R/R
477	Moderating Heat Exchanger - Unit 1	I - R/R
478	Motor Control Center	I - R/R
480	Corridor (East of #2 Cable Room 481)	I - R/R
480A	Cable Shaft Room	I - R/R
481	Cable Room	I - R/R
481A	Electrical Boards	I - R/R
482	Duct Shaft (East of #2 Corridor & Cable Room)	-
483	Corridor	-
484	Electrical Penetration Room - Unit 2	I -
484A	Stairs - Entry to Electrical Penetration Room	-
485	Switchgear Equipment Room	I -
486	Load Center - Unit 2	I -

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
490	Corridor	I - R/R
490A	Cable Shaft	I - R/R
491	Cable Room - Unit 1	I - R/R
491A	Electrical Boards Room - Unit 1	I - R/R
492	Duct Shaft (Adjacent to #1 Corridor)	-
493	Corridor Unit 1	-
494	Electrical Penetration Room - Unit 1	I -
494A	Stairs & Access to Electrical Penetration Room	-
495	Switchgear Equipment Room - Unit 1	I -
496	Load Center - Unit 1	I -

ELEVATION 594

500	Central Area - Auxiliary Building	I - R/R
500A	NE Stairwell	-
500B	NW Stairwell	-
500C	SE Stairwell	-
500D	SW Stairwell	-
510	Counting Room	-
511	Environmental Room	I - R/R
512	H. P. Respiratory	I - R/R
530	New Fuel Storage Area, Unit 1	UV
531	New Fuel Receiving Area, Unit 1	UV
540	New Fuel Storage, Unit 2	UV
541	New Fuel Receiving, Unit 2	UV
550	Manway to Spent Resin Batching Tank	I - R/R
551	Instrument Calibration	-
551A	Corridor	-
560	Equipment Area (Vent.)	I -
561	Corridor/Hatch Area	-
561A	Stairwell	-
561B	Stairwell	-
562	Unit 2 Penetration Area (Steam Doghouse)	-
563	Electrical Penetration, Unit 2	I -
564	RMC Room	I -
570	Equipment Area (Vent.)	I -
571	Corridor	-
571A	Stairwell	-
572	Unit 1 Steam Penetration (Doghouse)	-
573	Control Room	I - R/R
574	Operators Room	I -
575	Interface Office	I -
576	Electrical Penetration Room, Unit 1	I -
580	N ₂ Accum. Tank Blowoff, Unit 2	-
580A	Stairwell	-
581	Steam Penetration, Unit 2 (Outside Doghouse)	-
590	N ₂ Accum. Tank Blowoff, Unit 1	-
590A	Stairwell	-
591	Steam Penetration, Unit 1 (Outside Doghouse)	-

<u>Room Number</u>	<u>Description</u>	<u>Detection</u>
ELEVATION 609		
600	Fuel Pool Operating Floor, Unit 1	I - R/R
600A	Duct Room	-
601	Reactor Personnel Lock Area	-
601A	Reactor Personnel Area	I - R/R
602	Decontamination Storage, Unit 1	I - R/R
614	Fuel Pool Operating Floor - Unit 2	I - R/R
614A	Duct Room	-
615	Reactor Personnel Lock Area #2	-
615A	Reactor Personnel Area	I - R/R
616	Decontamination Storage, Unit 2	I - R/R
ELEVATION 611		
750	Purge Supply Room - Unit 1	-
751	Purge Supply Room - Unit 2	-
ELEVATION 623 + 10		
801	Fuel Pool Purge Unit (Unit 1)	-
802	Fuel Pool Purge Unit (Unit 2)	-

Room NumberDescriptionDetection

DIESEL GENERATOR BUILDING

302	Diesel Generator 1A	- R/R
302C	Diesel Generator 1A Sequencer Panels	I - R/R
304	Diesel Generator 1B	- R/R
304C	Diesel Generator 1B Sequencer Panels	I - R/R
306	Diesel Generator 2A	- R/R
306C	Diesel Generator 2A Sequencer Panels	I - R/R
308	Diesel Generator 2B	- R/R
308C	Diesel Generator 2B Sequencer Panels	I - R/R

NUCLEAR SERVICE WATER PUMP STRUCTURE

662	NSWP 1A & 2A	I - R/R
663	NSWP 1B & 2B	I - R/R

REACTOR BUILDING

Annulus - Unit 1	I -
Annulus - Unit 2	I -
Pipe Corridor - Unit 1	I -
Pipe Corridor - Unit 2	I -
Safety Related Cable Trays - Unit 1	I -
Safety Related Cable Trays - Unit 2	I -
RCP 1A, 1B, 1C, 1D	Heat Sensitive Cab.
RCP 2A, 2B, 2C, 2D	Heat Sensitive Cab.
Lower Containment Filters 1A, 1B	I - R/R
Lower Containment Filters 2A, 2B	I - R/R

DUKE POWER COMPANY

P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

December 15, 1982

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

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

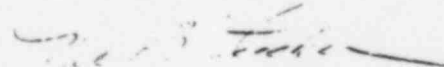
Dear Mr. Denton:

In order to facilitate the completion of the review of the Catawba FSAR, Duke Power Company is transmitting herewith responses or revised responses to open items of the following technical review branches.

- Attachment 1 - Geotechnical Engineering
- Attachment 2 - Auxiliary Systems
- Attachment 3 - Instrumentation and Control Systems
- Attachment 4 - Meteorology
- Attachment 5 - Licensee Qualification Branch
- Attachment 6 - Fire Protection

These responses will be included in FSAR Revision 7.

Very truly yours,



Hal B. Tucker

ROS/dyh

Attachments

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Mr. P. K. Van Dorn
NRC Resident Inspector
Catawba Nuclear Station

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Mr. Jesse L. Riley
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Mr. Henry A. Presler, Chairman
Charlotte-Mecklenburg Environmental Coalition
943 Henley Place
Charlotte, North Carolina 28207

bcc: C. C. Rolfe
J. W. Cox
NAR w/o Attachment
CN801.01

Attachment 6

Fire Protection

Re: Catawba Nuclear Station
Fire Protection SER

Item IIB requires clarification.

Statement of Proposed Draft Safety Evaluation Report

"The fire protection program for both units should be operational before initial fuel loading."

Response

An interim security boundary will be installed between Unit 1 and Unit 2 prior to initial fuel loading. Inside the interim barrier, the fire protection program including active systems (i.e. fixed manual and automatic systems), passive features (i.e. barriers, doors, dampers and penetration seals, administrative controls and station directives) will be in place and operating prior to initial fuel loading.

Re: Catawba Nuclear Station
Fire Protection - SER
Section V.A

Unlabeled composite steel doors and hollow metal doors equipped with grills which are located in committed fire boundary walls are indicated in the following summaries.

The four hollow metal committed fire boundary doors equipped with grills for radiological purposes are shown on the drawings listed below.

<u>Drawing No.</u>	<u>Door No.</u>	<u>Elevation</u>	<u>Location</u>
CN-1200-1.1	AX100	522+0	FF-56
CN-1200-8.2	AX312	560+0	MM-51
CN-1200-8.3	AX391	560+0	MM-63
CN-1200-9.1	AX526B	577+0	PP-58

The drawings listed below show locations of composite steel low yield pressure doors, pressure doors, bullet resistant doors, and missile resistant doors located in committed fire boundary walls. There are a total of 29 composite steel committed fire boundary doors.

<u>Drawing No.</u>	<u>Door No.</u>	<u>Elevation</u>	<u>Location</u>	<u>Manufacturers/Document No.</u>
CN-1200-5.1	AX248	543+0	QQ-57	Overly/CNM 1182.04-10
CN-1200-8.1	AX417	560+0	QQ-57	Overly/CNM 1182.04-10
CN-1200-8.4	S102A	554+0	AA-54	R V Harty/CNM 1182.00-5
CN-1200-8.5	AX415	560+0	DD-45	Overly/CNM 1182.04-4
	AX416	560+0	DD-69	Overly/CNM 1182.04-4
CN-1200-9.1	AX525	577+0	QQ-55	Overly/CNM 1182.04-16
	AX525B	577+0	QQ-56	Overly/CNM 1182.04-10
	AX526D	577+0	QQ-58	Overly/CNM 1182.04-13
CN-1200-9.2	AX525	577+0	QQ-55	Overly/CNM 1182.04-16
CN-1200-9.3	AX526D	577+0	QQ-58	Overly/CNM 1182.04-13
CN-1200-9.4	S303A	574+0	AA-54	R V Harty/CNM 1182.00-5
	S304A	574+0	AA-60	Mosier/CNM 1182.00-49
CN-1200-10.1	AX630	594+0	QQ-58	Overly/CNM 1182.04-10
	AX632	594+0	QQ-57	Overly/CNM 1182.04-29
CN-1200-10.2	AX635E	594+0	QQ-53	Overly/CNM 1182.04-29
	AX635F	594+0	QQ-54	Overly/CNM 1182.00-81
CN-1200-10.3	AX630	594+0	QQ-58	Overly/CNM 1182.04-10
	AX635	594+0	QQ-61	Overly/CNM 1182.04-29
CN-1200-10.4	S 400	594+0	AA-55	Overly/CNM 1182.04-7
	S 406	594+0	AA-59	Overly/CNM 1182.04-7
	AX657F	594+0	DD-60	Overly/CNM 1182.00-97
	AX657G	594+0	DD-57	Overly/CNM 1182.00-97
	AX657H	594+0	DD-54	Overly/CNM 1182.00-97
	AX657J	594+0	CC-53	Overly/CNM 1182.00-97

<u>Drawing No.</u>	<u>Door No.</u>	<u>Elevation</u>	<u>Location</u>	<u>Manufacturers/Document No.</u>
CN-1200-10.5	AX655	594+0	DD-62	Overly/CNM 1132.04-1
	AX658B	594+0	DD-52	Overly/CNM 1132.04-1
CN-1200-11.2	AX700B	605+10	KK-50	Mosler/CNM 1132.00-44
	AX720	605+10	JJ-51	Overly/CNM 1132.04-4
CN-1200-11.3	AX602	594+0	UU-52	R V Harty/CNM 1132.00-5
CN-1200-12.1	AX635	594+0	QQ-61	Overly/CNM 1132.04-29
CN-1200-12.2	AX714B	605+10	KK-64	Mosler/CNM 1132.00-43
	AX721	605+10	JJ-63	Overly/CNM 1132.04-4
CN-1200-12.3	AX627	594+0	UU-62	R V Harty/CNM 1132.00-5
CN-1200-13.1	AX630	594+0	QQ-58	Overly/CNM 1132.04-10
	AX632	594+0	QQ-57	Overly/CNM 1132.04-29
	AX635E	594+0	QQ-53	Overly/CNM 1132.04-29
	AX635F	594+0	QQ-54	Overly/CNM 1132.00-81
CN-1200-13.4	AX602	594+0	UU-52	R V Harty/CNM 1132.00-5

Also attached are eight vendor letters certifying door construction. These are typical letters covering composite steel doors or hollow metal doors.

OVERLY

MANUFACTURING CO.

GREENSBURG, PENNSYLVANIA 15601 USA (412) 834-7300 TWX 510-468-0539

May 1, 1980

Letter No. 833

Duke Power Company
P. O. Box 2178
422 South Church Street
Charlotte, NC 28242

ATTENTION: Mr. L. C. Dail - Chief Engineer
Civil-Environmental Division

SUBJECT: Catawba Nuclear Station
MPS Order No. E92751-41
Specification CMS-1182.00-00-0004, Rev. 9
Certification - Fire Resistant Construction
Door MK Nos. AX415, AX416, AX720, AX721

File CN-1182-00

We hereby certify that door Mark Nos. AX415, AX416, AX720 and AX721 for Catawba Nuclear Station have been fabricated in strict accordance with Underwriters' Laboratories approved procedures for Class "A" 3-hour fire doors. The doors will not bear the physical label because the gasketing required to satisfy the leakage rates is not covered by U. L. procedures for labeled fire doors.

OVERLY MANUFACTURING COMPANY

Donald C. Sheltzer
DONALD C. SHELTER
VICE PRESIDENT, ENGINEERING
DCS:ljf

CENTRAL RECORDS DIVISION USE

SUBSCRIBED AND SWORN TO BEFORE ME THIS *1st*

DAY OF *May* 1980

Vincent N. Lepidi

VINCENT N. LEPIDI, NOTARY PUBLIC
GREENSBURG, WESTMORELAND COUNTY
MY COMMISSION EXPIRES JULY 19, 1981
Member, Pennsylvania Association of Notaries

OVERLY
MANUFACTURING CO.

GREENSBURG, PENNSYLVANIA 15601 USA (412) 834-7300 TWX 510-468-0539

April 18, 1980

Letter No. 828

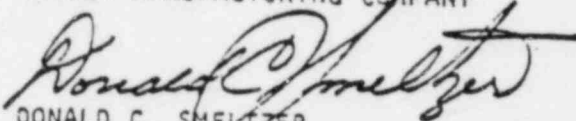
Duke Power Company
P. O. Box 2178
422 South Church Street
Charlotte, NC 28242

ATTENTION: Mr. L. C. Dail - Chief Engineer
Civil-Environment Division

SUBJECT: Catawba Nuclear Station
MPS Order No. E92751-41
Specification CMS-1182.00-00-0004, Rev. 9
Certification - Fire Resistant Construction
Door MK. Nos. AX630, AX525B, AX248 & AX417

We hereby certify that door MK. Nos. AX630, AX525B, AX248 and AX417 for Catawba Nuclear Station have been fabricated in accordance with Underwriters Laboratories approved procedures for Class "A" 3-hour fire doors. The doors will not bear the physical label because the material thicknesses required to satisfy the pressure loadings exceed those permitted by U.L. procedures.

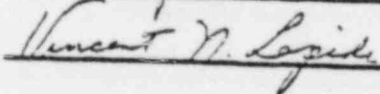
OVERLY MANUFACTURING COMPANY



DONALD C. SMELTZER
VICE PRESIDENT, ENGINEERING
DCS:LJG:115

SUBSCRIBED AND SWORN TO BEFORE ME THIS 21st

DAY OF April 1980



VINCENT N. LEPORE, NOTARY PUBLIC
GREENSBURG, WESTMORELAND COUNTY
MY COMMISSION EXPIRES JULY 19, 1981
Member, Pennsylvania Association of Notaries

Hamilton, Ohio 45012
Telephone (513) 867-4000

(513) 867-4300

Date: October 29, 1979

Mosler

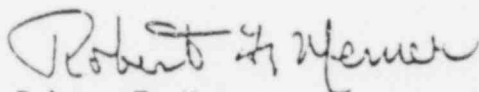
An American-Standard Company

Quality Assurance Manager Engineering & Services
Quality Assurance Department
Duke Power Company
P.O. Box 33189
Charlotte, N.C. 28242

Subject: U.L. Certification

This is to certify that door and frame No. AX-700B have
been designed and manufactured to meet the requirements of
U.L. 10-B - Three-Hr. Label Construction.

Sincerely,



Robert F. Meiner
Quality Assurance Manager
Mosler Safe Company
1561 Grand Blvd.
Hamilton, Ohio 45012

NUCLEAR SAFETY RELATED
PROTECTION LEVEL: C
CATAWBA NUCLEAR STATION
DES. ENG. FILE NO. 8337-1182.00-00-0004-01
MPS. CO. ORDER NO. E-57270-41

FR. M. H. HARTY COMPANY, INC.

NUCLEAR ACCESS DOORS & TRANSFER DEVICES
FOR PERSONNEL & EQUIPMENT

UL "A" LABEL CONSTRUCTION CERTIFICATION

R.V. Harty Company hereby certifies that door number AN627
has been constructed in accordance with the practices and
specifications typical for UL "A" Label doors.

R.V. HARTY COMPANY INC.

[Signature]

P. E. Hoke

Ex. V. P.

July 24, 1980

Letter #897

ENVIRONMENTAL
SECTION
SLP 3, 1981
CENTRAL RECORDS DIVISION USE
NO ATTACHMENT TO FILE
FILE NO. CN-1182.041

Duke Power Company
P. O. Box 2178
422 South Church St.
Charlotte, NC 28242

Attention: Mr. L. C. Dail, Chief Engineer
Civil - Environmental Division

Subject: Catawba Nuclear Station
MPS Order ES2751-41
Specification CNS-1182.00-00-0004, Rev. 8
Certification, Bullet Resisting & Fire Resisting
Doors Mark No's. AX632, AX635, AX635E, AX660, AX661
Overly Job No. Q0632

We hereby certify that door Mark No's. AX632, AX635, AX635E, AX660, and AX661 are designed to meet or exceed the requirements of U. L. 752 Class IV (High Power Rifle) bullet resisting rating.

We further certify that the doors are fabricated of fire resistant materials but cannot bear an Underwriters' label because of certain features of construction which are not incorporated in U. L. procedures for "A" 3-hour fire doors.

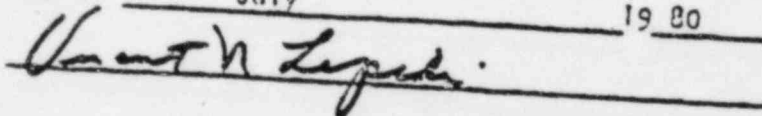
OVERLY MANUFACTURING COMPANY



DONALD C. SMETZER
VICE PRESIDENT, ENGINEERING
DCS:aak

SUBSCRIBED AND SWORN TO BEFORE ME THIS 24th

DAY OF July 1980



VINCENT N. LEPIDI, NOTARY PUBLIC
GREENSBURG, WESTMORELAND COUNTY
MY COMMISSION EXPIRES JULY 19, 1981
Member, Pennsylvania Association of Notaries

Williamsburg

TELEX #12-5495

PAIDGE AVENUE

BROOKLYN, N.Y. 11222

(212) 383-2000

June 15, 1981

J. Mac Rabb Co.

Re: Our Job 6W250K
Catawba Nuclear Sta.

Gentlemen:

This is to certify that the doors we furnished for the above job, under the following tags, have been fabricated in accordance with the requirements of the Underwriters Laboratories for "A" labeled doors.

All component parts used in the manufacture of these doors meet Underwriters specifications.

The tag numbers are:

S101C	- AX393B	- AX517	- AX355A
S101F	- AX394	- AX518	
S101G	- AX394B	- AX533C	
S301B	- AX394C	- AX535	
S301C	- AX395	- AX536	
S407	- AX396	- AX657F	
AX352C	- AX515	- AX657G	
- AX353	AX516A	- AX657H	
- AX353B	- AX516K	AX657J	
- AX355B	- AX516M	- AX353C	

Very truly yours,

WILLIAMSBURG STEEL PRODUCTS CO. INC.

S. J. Roemer
S. J. Roemer Chief Engineer

SJR: GP



HOLLOW STEEL DOORS AND BUCKS - UNDERWRITER AND N.Y. CITY LABELLED DOORS AND FRAMES -
BRONZE STAINLESS STEEL AND ALUMINUM DOORS - ELEVATOR CABS - ELEVATOR FRONTS

Dec. 1, 1980

J. Mac Rabb Co.

Attention: Mr. J. Mac Rabb, Jr.

Re: Our Job 6W259
Catawba Nuclear Sta.

Gentlemen:

This is to certify that the two doors we have furnished for the above job, tags X665B and X800C have been fabricated in accordance with the requirements for Underwriter "A" labelled doors.


All component parts used in the manufacture of these doors meet Underwriters specifications for "A" labels.

Our records disclose that these doors bore the "A" label when they left our plant.

The above certification may probably be acceptable to the owners, in lieu of returning the doors to our plant for factory inspection and re-labeling.

Very truly yours,

WILLIAMSBURG STEEL PRODUCTS CO. INC.


S. J. Rosner, Chief Engineer

SJR: GP



HOLLOW STEEL DOORS AND BUCKS - UNDERWRITER AND N.Y. CITY LABELLED DOORS AND FRAMES -
BRONZE STAINLESS STEEL AND ALUMINUM DOORS - ELEVATOR CABS - ELEVATOR FRONTS

BUILDING SPECIALTIES



PHONE 232-1503

P. O. BOX 144

GREENVILLE, S. C.
29602

GRH / QRT / A7A

RECEIVED

JUN 22 1981

NO ATTACHMENT TO FILE

FILE NO. CN-1182.00

Subject: Catawba Nuclear Station
Hollow Metal Doors
File No. CN-1182.00

This is to certify that the following numbered doors for above subject were constructed in accord with Underwriter's Laboratories procedure:

S101F
- AX352C
- AX394
- AX515
- AX518
- AX657G

S101G
- AX353
- AX394B
AX516A
- AX533C
- AX657H

- S301B
- AX353B
- AX394C
- AX516K
- AX535
- AX657J

- S301C
- AX355B
- AX395
- AX516M
- AX536
- AX353C

J. MAC. RABB COMPANY, INC.

J. Mac Rabb
J. Mac. Rabb

Date: 1/1/61

Notary Public

DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

April 14, 1983

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

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Dear Mr. Denton:

On February 22, 1983 the NRC issued the Safety Evaluation Report (SER) for Catawba Nuclear Station. Section 9.5.1 discussed the Fire Protection Program. Attached are comments and additional information related to this portion of the SER.

Very truly yours,

H.B. Tucker / NW

Hal B. Tucker

WOS/php
Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Mr. P. K. Van Doorn
NRC Resident Inspector
Catawba Nuclear Station

Mr. Robert Guild, Esq.
Attorney-at-Law
P. O. Box 12097
Charleston, South Carolina 29412

Palmetto Alliance
2135½ Devine Street
Columbia, South Carolina 29205

Mr. Harold R. Denton, Director
April 14, 1983
Page 2

cc: Mr. Jesse L. Riley
Carolina Environmental Study Group
854 Henley Place
Charlotte, North Carolina 28207

Mr. Henry A. Presler, Chairman
Charlotte-Mecklenburg Environmental Coalition
943 Henley Place
Charlotte, North Carolina 28207

bcc: J. W. Cox
M. S. Tully
N. A. Rutherford
R. D. Stevens
Section File: CN-801.01

Duke Power Company
Catawba Nuclear Station
Comments on SER Section 9.5.1
Fire Protection

9.5.1.5 Control of Combustibles

Bulk gas (hydrogen) storage is located in the plant yard. Cylinders are arranged with the long axis parallel to building walls. Piping inside the Auxiliary Building is Duke Class F which is designed to maintain pressure boundaries during the Design Basis Seismic Event. In each Reactor Building there are two 150 lb. hydrogen cylinders and associated piping which provides a gas "blanket" for Reactor Coolant Pump drain tanks. Piping is Class F as described above. Cylinders are seismically restrained. Drawings showing hydrogen and oxygen pipe routing in the Auxiliary and Reactor Buildings are attached (Attachment 1).

9.5.1.6 Safe Shutdown for Fires (Appendix R)

A safe shutdown analysis will be provided by July 1983 and will include drawings marked to show cable routing inside containment, Standby Shutdown System cable routing in the Auxiliary Building and a discussion of associated circuits.

9.5.1.7 Fire Detection

Ultraviolet and photoelectric detectors are used in addition to fixed temperature, rate-of-rise and ionization detectors. A corrected list of rooms where fire detection is not provided is attached (Attachment 2). A sketch detailing normal and backup power supplies for the fire detection system (EFA) is also included (Attachment 3).

9.5.1.7 Fire Protection Water Supply

The full water demand for the largest sprinkler system and hose demand (3645 GPM as presently designed) can be met with a single fire pump (i.e., with two pumps out of service). Copies of acceptance test performance curves for "A" and "B" fire pumps are included (Attachment 4). Pump "C" data will be provided when available.

9.5.1.7 Sprinkler and Standpipe Systems

Reactor Coolant Pump and pipe corridor sprinkler systems are manually actuated. Sprinklers will be provided in the annulus between redundant cable trains if separation is determined to be less than Appendix R requirements.

9.5.1.8 Reactor Building

Electrical penetrations and mechanical pipe penetrations are sealed to provide three hour fire rated barriers. U.L. listed fire dampers are not provided in HVAC ducts which penetrate the Reactor Building wall.

The Containment Purge System (described in FSAR Section 9.4.5) has four penetrations per unit, located in the vicinity of column HH-52 (Unit 2 at HH-62) on Elevation 594+0 (penetrations are located at elevations 600'+0" - 606'+0"). Two penetrations are 28 inches by 68 inches. Ducts are $\frac{1}{2}$ inch steel plate designed to allow thermal and seismic movement. These penetrations are flashed with $\frac{3}{8}$ inch stainless steel angles similar to fire damper sleeve arrangement. A "zero leakage" damper is provided in each duct constructed of $\frac{1}{2}$ inch carbon steel plate housings and $\frac{1}{2}$ inch carbon steel blades as compared with 18 gauge galvanized steel housing and 22 gauge blades of typical fire dampers. The other two penetrations of the containment purge system consist of 10 inch diameter, schedule 40 stainless steel pipe also designed for thermal and seismic movement. A motor operated valve serves as a damper in each of these penetrations. All "zero leakage" dampers and motor operated valves are normally closed and fail closed.

The Annulus Ventilation System (described in FSAR Section 9.4.9) has four penetrations per unit in the Reactor Building walls in the general vicinity of the Containment Purge System penetrations. Penetrations are 30 inches by 28 inches constructed of $\frac{1}{2}$ inch stainless steel plate designed to allow thermal and seismic movement. The Annulus Ventilation System is an engineered safety feature system. This system functions to effect a negative pressure with respect to the containment and the atmosphere within 60 seconds following a LOCA. If fire dampers were to be included in the design of this system, the potential for inadvertent closure of a damper would decrease the reliability of this system. In addition, the duct is sealed to maintain integrity of the secondary containment so that dampers could not be reopened in the event of inadvertent closure.

The area around these eight penetrations is generally void of combustibles with fire detectors on each side of the wall. There are no power or control cables important to safe shutdown in the vicinity of these penetrations. Therefore, it is concluded that not providing fire dampers in the Containment Purge and Annulus Ventilation Systems is an acceptable deviation from the recommendations of the Standard Review Plan (NUREG-0800), Section 9.5.1 and is consistent with the NRC's previous approval of similarly designed systems at other facilities.

9.5.1.8 Control Room

Control room doors are constructed in accordance with U.L. methods for fire resistance but are not "approved" because of pressure resistance and other modifications.

9.5.1.8 Safety Related Batteries

As stated in the Catawba Fire Hazard Analysis, page C-29, the Standby Shutdown System is available following loss of all functions in fire areas 9 and 10. This will be confirmed by the electrical cable separation submittal. When this is confirmed by the Staff, requirement for sprinklers in these fire areas will be relieved.

Attachment 1

Drawing Nos.

CFP-1G
CFP-2G
CFP-3G
CFP-4G

Attachment 2

Room NumberDescription

ELEVATION 522

113

Pipe Chase

ELEVATION 543

200A	Stairwell North of East Elevator
200B	Area in Front of East Elevator
200C	Groundwater Drainage Sump & Pumps
200D	Stairwell Adjacent to Room 248
201	Area South of Valve Gallery 202
202	Valve Gallery
203	Waste Gas Decay Tanks
204	Hydrogen Recombiner Control Panel Area (Corridor)
204A	Exhaust Fan Concrete Pad
204B	Waste Gas Analysis Rack "A"
205	Waste Gas Hydrogen Recombiner "A"
205A	Gas Analysis Rack
206A	Waste Gas Hydrogen Recombiner "B"
206B	Waste Gas Compressor Package "B"
207	Waste Gas Compressor Package "A"
209A	Stairwell
210	Corridor Adjacent to Recycle Evap. Feed Pump
210A	Recycle Evap. Feed Pump "A" & "B"
210B	Valve Gallery
211	Recycle Evap. Package
212A	Stairwell
212B	Exhaust Fan Concrete Pad
213	Gas Decay Tank Drain Pump
214	Chemical Drain Tank, Floor Drain Sump, Waste Evap. Feed Sump
215	Access Corridor
215A	Waste Drain Tank Pumps
215B	Waste Evap. Feed Tank Pumps
215C	Waste Drain Tank
215D	Waste Evap. Feed Tank
216	Waste Evaporator Package
220	Mixing & Settling Tank Pumps
221	Mixing & Settling Tank
222	Spent Resin Valve Body Room
222A	Spent Resin Storage Tank B
222B	Spent Resin Storage Tank A
223	Spent Resin Sluicing Pump & Valve Body Area

Room NumberDescription

224	Laundry & Hot Shower Tank Pump
225	Laundry & Hot Shower Tank/Floor
	Drain Tank
226	Floor Drain Tank Pump
250A	Stairwell
260A	Stairwell
ELEVATION 560	
300A	Stairs
300B	Elevator Lobby
300C	Duct Shaft
300D	Duct Shaft
301	Boric Acid Transfer Pumps - Unit 2
302	Boric Acid Transfer Pumps - Unit 1
303A	Stairs
303B	Duct Shaft
305	Boric Acid Tank "A"
307	Boric Acid Tank "B"
309	Volume Control Tank - Unit 2
310A	Stairs
310B	Duct Shaft
311	Pipe Trench & Hall
312	Pipe Trench & Hall
314	Recycle Holdup Tank "A"
316	Recycle Holdup Tank "B"
317	Valve Gallery
319	Volume Control Tank - Unit 1
321	Seal Water Heat Exchanger - Unit 2
322A	Stairs
323A	Pipe Chase
324	Boronometer - Unit 2
331	Seal Water Heat Exchanger - Unit 1
332	Boronometer - Unit 1
333A	Pipe Chase
340A	Cable Shaft
340B	Cable Shaft
342A	Battery Charger 2ECB
350A	Cable Shaft
350B	Duct Shaft
352A	Battery Charger 1ECB
360A	Stairs
370A	Stairs

ELEVATION 577

400A	Stairs
400B	Stairs
400C	Duct Shaft
400D	Duct Shaft
400E	Stairs
400F	Duct Shaft
400G	Duct Shaft

Room NumberDescription

401A	Stairs
404	Access to Rooms
410	Recycle Evaporator Feed Demin. (Hatch)
411	Recycle Evaporator Condensate Demin. (Hatch)
412	Recycle Evaporator Condensate Filter (Double Hatch)
413	Boric Acid Filters (2 Adjacent Hatches)
414	Recycle Evaporator Feed Demin. (Hatches)
415	Recycle Evaporator Condensate Filter (Hatch)
416A	Recycle Evaporator Feed Filter (Double Hatch)
416B	Recycle Evaporator Feed Filter (Double Hatch)
420	Fuel Pool Cooling Post Filters and Pre-Filters and Fuel Pool Skimmer Filter (6 Hatches)
421	Thermal Regenerative Demineralizer 2B (Hatch)
422	Thermal Regenerative Demineralizer 2C (Hatch)
423	Cation Bed Demineralizer 2A (Hatch)
424	Waste Monitor Tank Demineralizer (Hatch)
428	Laundry/Hot Shower Carbon Filter
430	Fuel Pool Skimmer Filert & Waste Evaporator Condensate Filter (3 Hatches)
431	Thermal Regenerative Demineralizer 1E (Hatch)
432	Thermal Regenerative Demineralizer 1C (Hatch)
433	Cation Bed Demineralizer 1A (Hatch)
441	Floor Drain Tank Filter
442	Laundry & Hot Shower Filter (Primary and Secondary)
443	Thermal Regenerative Demineralizer 2A (Hatch)
444	Thermal Regenerative Demineralizer 2D
445	Mixed Bed Demineralizer (Hatch)
446	Reactor Coolant Filter 2B (Hatch)
447	Seal Water Return Filter (Hatch)
448	Thermal Regenerative Demineralizer 2E (Hatch)
449	Mixed Bed Demineralizer 2A (Hatch)
450	Fuel Pool Cooling Filters - Unit 1 (5 Hatches)
451	Seal Water Return Filter - Unit 1 (2 Hatches)
452	Thermal Regenerative Demineralizer 1D (Hatch)
453	Thermal Regenerative Demineralizer 1B (Hatch)
454	Mixed Bed Demineralizer 1B (Hatch)

Room NumberDescription

455	Reactor Coolant Filter 1B (2 Hatches)
456	Reactor Coolant Filter 1A (2 Hatches)
457	Waste Evaporator Condensate Demineralizer (1 Hatch)
458	Thermal Regenerative Demineralizer 1A (1 Hatch)
459	Mixed Bed Demineralizer 1A
460	Reactor Coolant Filter 2A
461	Waste Monitor Tank Filter
462	Seal Water Injection Filter 2B
463	Seal Water Injection Filter 2A
464	Spent Resin Sluice Filter
470	Seal Water Injection Filter 1A
471	Seal Water Injection Filter 1B
472	Waste Evaporator Feed Filter B
473	Waste Evaporator Feed Filter A
482	Duct Shaft (East of #2 Corridor & Cable Room)
483	Corridor
484A	Stairs - Entry to Electrical Penetration Room
492	Duct Shaft (Adjacent to #1 Corridor)
493	Corridor Unit 1
494A	Stairs & Access to Electrical Penetration Room
500A	NE Stairwell
500B	NW Stairwell
500C	SE Stairwell
500D	SW Stairwell
510	Counting Room
551	Instrument Calibration
551A	Corridor
561	Corridor/Hatch Area
561A	Stairwell
561B	Stairwell
562	Unit 2 Penetration Area (Steam Doghouse)
571	Corridor
571A	Stairwell
572	Unit 1 Steam Penetration (Doghouse)
580	N ₂ Accum. Tank Blowoff, Unit 2
580A	Stairwell
581	Steam Penetration, Unit 2 (Outside Doghouse)
590	N ₂ Accum. Tank Blowoff, Unit 1
590A	Stairwell
591	Steam Penetration, Unit 1 (Outside Doghouse)
600A	Duct Room
601	Reactor Personnel Lock Area
614A	Duct Room
615	Reactor Personnel Lock Area #2

Room Number

Description

ELEVATION 611

750
751

Purge Supply Room - Unit 1
Purge Supply Room - Unit 2

ELEVATION 623 + 10

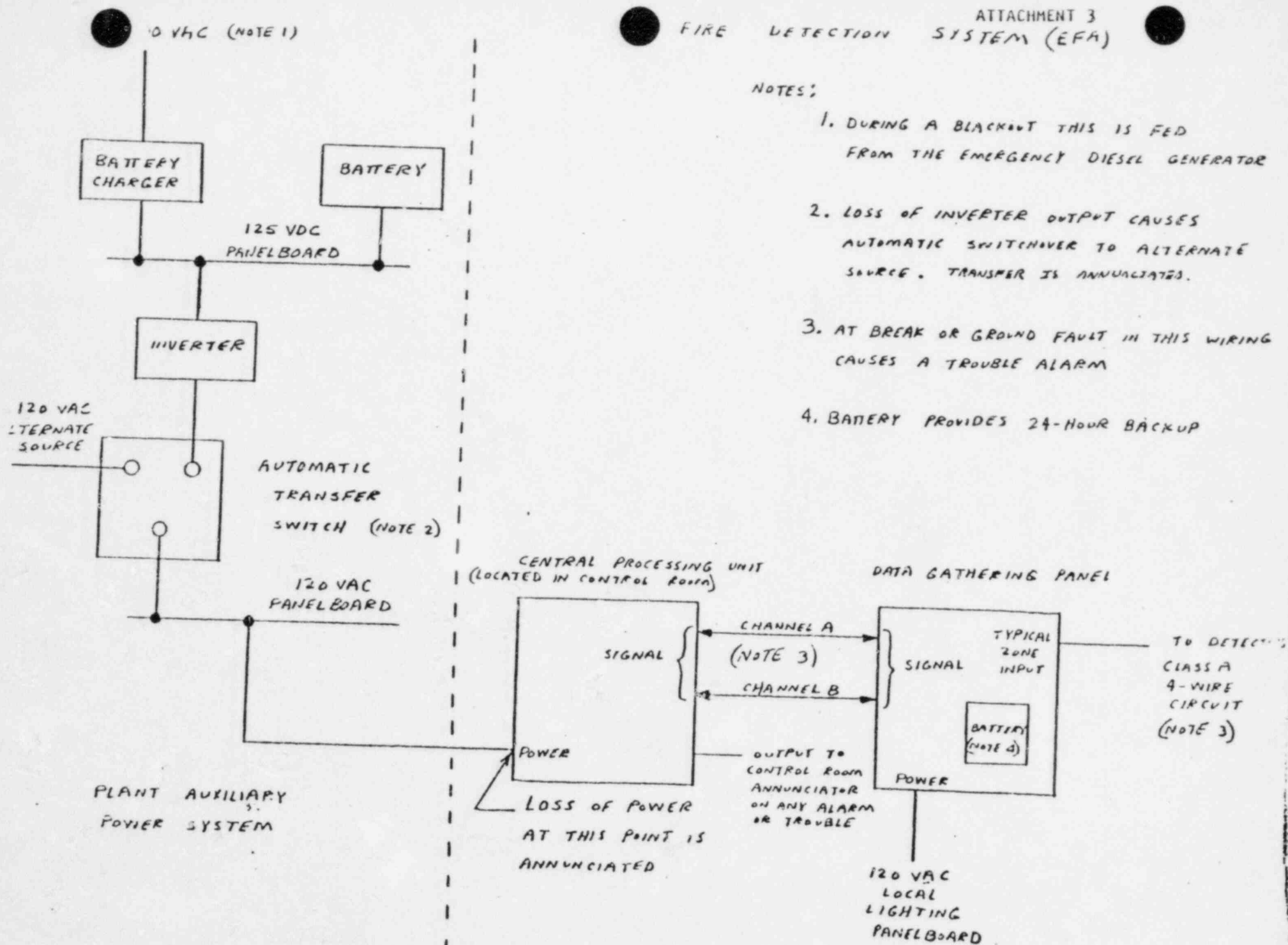
801
802

Fuel Pool Purge Unit (Unit 1)
Fuel Pool Purge Unit (Unit 2)

ATTACHMENT 3 FIRE DETECTION SYSTEM (EFA)

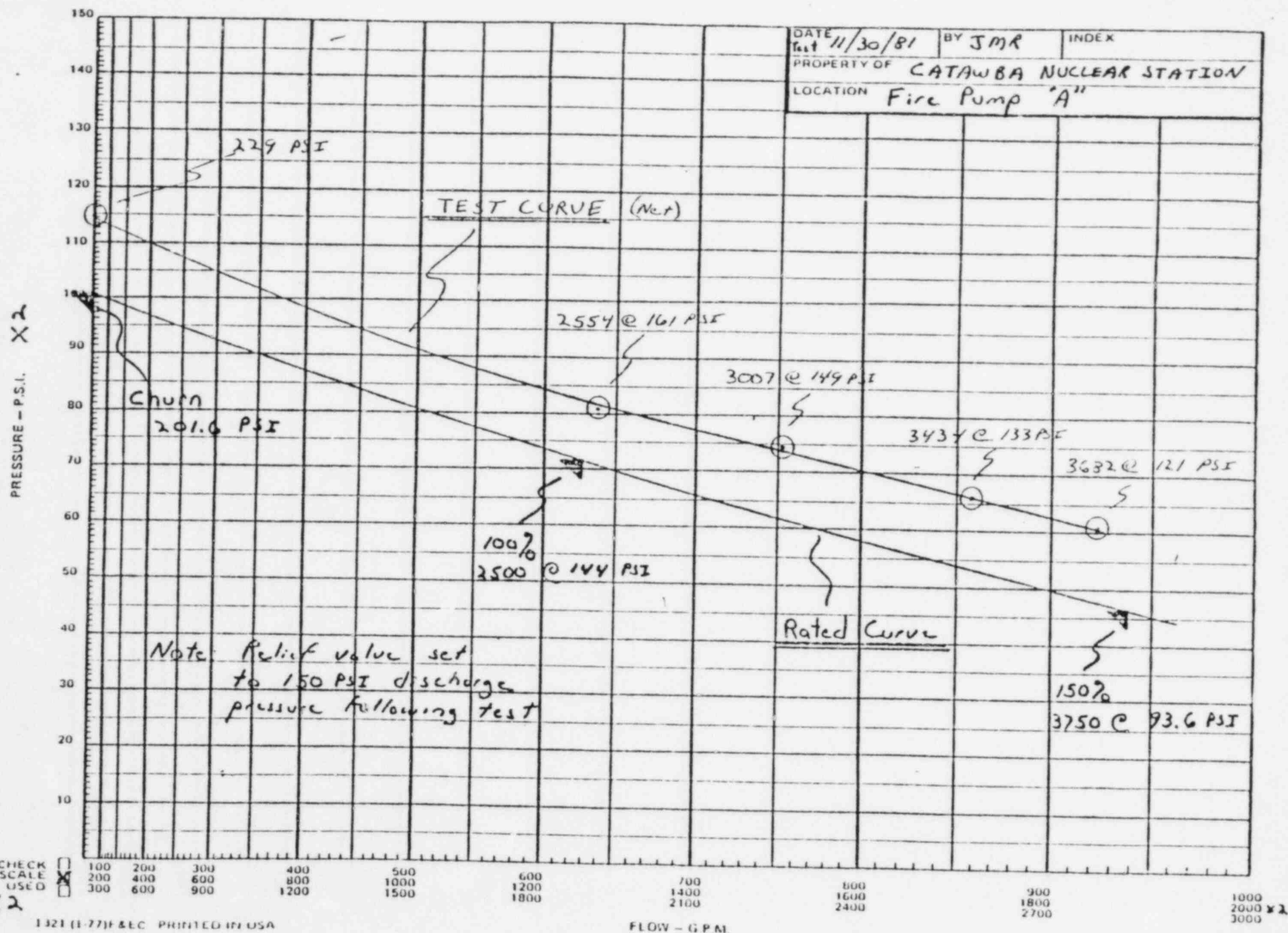
NOTES:

1. DURING A BLACKOUT THIS IS FED FROM THE EMERGENCY DIESEL GENERATOR
2. LOSS OF INVERTER OUTPUT CAUSES AUTOMATIC SWITCHOVER TO ALTERNATE SOURCE. TRANSFER IS ANNUNCIATED.
3. AT BREAK OR GROUND FAULT IN THIS WIRING CAUSES A TROUBLE ALARM
4. BATTERY PROVIDES 24-HOUR BACKUP



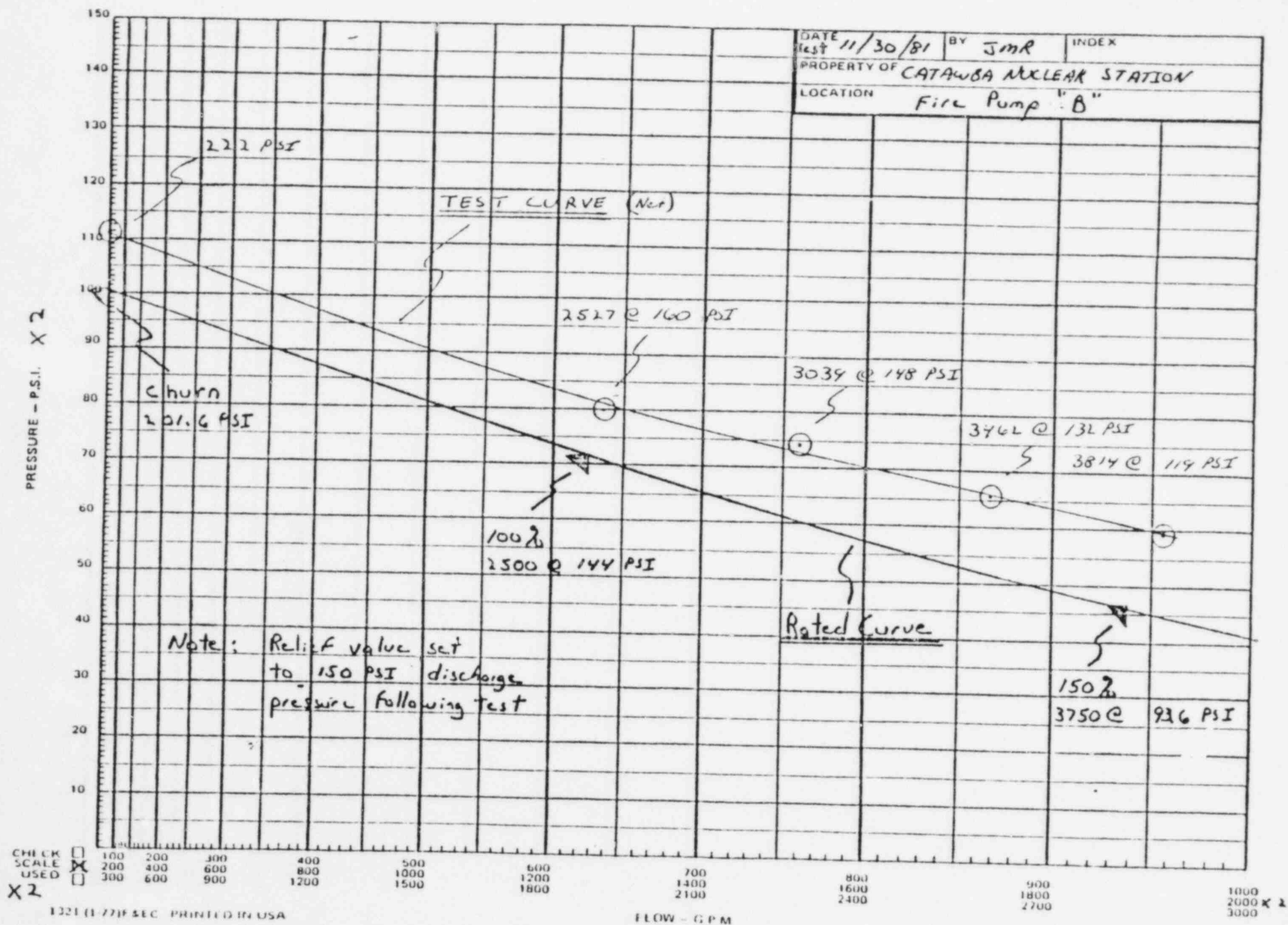
WATER SUPPLY GRAPH · NO. 1

ATTACHMENT



WATER SUPPLY GRAPH · NO. N¹

ATTACHMENT 4



DUKE POWER COMPANY

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July 5, 1983

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

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Dear Mr. Denton:

Section 9.5.1 of the Catawba Safety Evaluation Report identifies the Safe Shutdown Analysis, Description of Standby Shutdown System, Design of Bulk Gas System and Divisional Separation in Battery Rooms as Open Item 10. The Bulk Gas System was addressed in my letter of April 14, 1983. The remaining three issues are discussed in the following attachments:

Attachment 1 - Review of Cable Separation in Catawba Unit 1
Reactor Building

Attachment 2 - Discussion of Associated Circuits

Attachment 3 - Information in Support of the Catawba Standby Shutdown
System

Attachments 1 and 2 pertain to the Safe Shutdown Analysis; Attachment 3 pertains to the Standby Shutdown System.

Information in this submittal confirms that the safety related batteries in the station control complex are not required for hot standby condition. Therefore, the current arrangement complies with BTP CMEB 9.5.1, Item C.5.b(2) and installation of sprinklers in Fire Areas 9 and 10 is not required.

Very truly yours,

H.B. Tucker / *HTS*
Hal B. Tucker

ROS/php

Attachments (3)

Mr. Harold R. Denton, Director
July 5, 1983
Page 2

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ATTACHMENT 1

I. PURPOSE

This attachment is to document the assumptions, procedures and results of a detailed evaluation for Unit 1 Catawba Appendix R study.

II. CRITERIA

The criteria for this study is as stated in Appendix R.

Fire protection features shall be provided for structures, systems and components important to safe shutdown. These features shall be capable of limiting fire damage so that:

One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage; and systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired and cold shutdown reached and maintained within 72 hours.

1. Inside containment, one of the following fire protection means shall be provided.
 - A. Separation of cables and equipment and associated non-safety circuits of redundant trains by a distance of more than 20 feet with no intervening combustibles or fire hazards; or
 - B. Installation of fire detectors and an automatic fire suppression system in the fire area; or
 - C. Separation of cables and equipment and associated non-safety circuits of redundant trains by a noncombustible radiant energy shield.
2. Outside containment, one of the following means shall be provided.
 - A. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a three hour rating; or

- B. Separation of cables and equipment and associated non-safety circuits of redundant trains by a distance of more than 20 feet with no intervening combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or
- C. Enclosure of cable and equipment and associated non-safety circuits of one redundant train with a fire barrier having a 1 hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

III. ASSUMPTIONS

- 1. Only the equipment required for a hot shutdown need to be considered, since at this state the containment can be entered and necessary measures taken with damaged controls to bring the plant to a cold shutdown.
- 2. The equipment associated with the Standby Shutdown Facility, SSF, will be sufficient to bring the plant to a hot shutdown condition.
- 3. Armored cable without a PVC jacket is a non fire propagating material and armored cable with a PVC jacket is a fire propagating material.
- 4. Because of the limited amount of combustibles inside containment, the postulated fires would be from transient combustibles and expected not to spread beyond the area of origin. This means credit can be taken:
 - a) for devices/cables inside containment which are not in the area of the postulated fire and,
 - b) for devices/cables outside containment.
- 5. The annulus is considered part of containment.
- 6. Inner Containment is considered the area inside the Containment Vessel.
- 7. Shorts within control cables were considered for possible spurious valve operation.

IV. PROCEDURES (Inner Containment)

The following procedures were followed to determine to what degree Appendix R was met within Inner Containment.

1. Locations of areas where fires might occur were identified. These included grates, platforms and floor areas where combustibles might be placed.
(However, due to the existing separation between the SSF and alternate devices/cables, the presence of the grates did not have any affect on the meeting of Appendix R requirements).
2. Identified and located SSF related devices and cables.
3. Where SSF related devices and cables were within a postulated fire area it was determined if an alternate device existed that would provide the same function and
 - a) not have cables in the same area as the postulated fire, or
 - b) be located outside containment.
4. Cable separation was determined by a computer cable routing drawing study.
5. When direct alternatives did not exist, other means of providing the SSF function were identified. This procedure was accomplished by the following:
 - a) A study was conducted to determine the impact of the SSF function being inoperable during an Appendix R event.
 - b) If the impact would be negligible, then it was documented.
 - c) If the loss of a particular SSF function would be severe, and a direct alternate did not exist, a different approach of achieving the same function was identified. For example, reference section V.3.

V. RESULTS (Inner Containment)

1. The following section contains SSF devices which have alternates outside containment.
 - a) The Nuclear Sampling System Isolation valves 1NM3A and 1NM6A have as their alternate 1NM7B. Also Nuclear Sampling System Isolation valves 1NM22A and NM25A have as their alternate 1NM26B.

- b) The steam generator secondary side isolation valves and their alternates are listed below. Please reference figure 1 for a typical flow path.

<u>SSF Valve</u>	<u>Alternates</u>
1BB8A	1BB10B and 1BB147B
1BB19A	1BB21B and 1BB150B
1BB56A	1BB57B and 1BB148B
1BB60A	1BB61B and 1BB149B

- c) The Reactor Coolant Pump Seal Water Return Isolation valve INV89A has as its alternate INV91B.

2. This section consists of solenoid controlled valves that are de-energized to provide the SSF function. This de-energization is accomplished by disconnecting the power to the solenoids and limit switches via disengaging connectors (mounted in two separate enclosures) in the train "A" 4KV Essential Switchgear Room, and installing shorting pins in the connectors. This measure eliminates the possibility of spurious valve operation.

- a) Pressurizer Power Operated Relief Valves (Isolation) 1NC32B, 1NC34A, and 1NC36B.
- b) Reactor Coolant/CVCS Train A Isolation valve INV1A.
- c) Reactor Coolant/CVCS Train B Isolation valve INV122B.
- d) Reactor Coolant/Pressurizer Spray Isolation valves 1NC27 and 1NC29.

3. The following valves are associated with the Standby Makeup Pump and are not required, since a fire inside containment will not affect equipment outside containment, where other means of charging are available. (Besides the normal flow path for make-up, charging can be accomplished by aligning a centrifugal or the reciprocating charging pump through the boron injection flow path to the reactor coolant cold legs). These valves isolate to compensate for the low flow capability of the Standby Makeup Pump.
 - a) Standby Makeup Pump/Reactor Coolant Pump Seal Water Isolation valve, INV877.
 - b) Standby Makeup Pump Drain Isolation valve, INV876.
 - c) Reactor Coolant System (Head Vent) valves, INC250A and INC253A.
4. The Residual Heat Removal System (ND) Isolation valves IND2A and INC37A, have as their alternates IND1B and IND36B respectively. These valves are normally closed and must remain closed to protect the lower pressure ND piping from the higher pressures in the primary loop. The isolation valves and their alternates are both located inside containment, however, Appendix R separation exist. (Cable 1*ND599, associated with IND37A, provides a permissive interlock for valves INI136B, INI184B, and INS38B. Therefore an internal short, due to a postulated fire, would not result in spurious operation of IND37A. Thus the routing of 1*ND599 within the 20 foot separation of the train B alternate valve and associated cables is insignificant. There will be administrative procedures implemented for cable 1*ND599, to prevent the violation of Appendix R in the future.) Reference Table 1 for separation distances.
5. The SSF power cable to the Pressurizer Heater is 1LE607. If the SSF Pressurizer Heater or cable 1LE607 is damaged, due to a fire, the plant could be taken to hot shutdown and maintained in that condition until a cold shutdown could be achieved.

Westinghouse has performed calculations demonstrating that heat losses from the pressurizer are low enough to maintain RCS pressurization for natural circulation for at least four hours. (They assumed a loss of offsite power). During this time cooldown towards ND initiation could be in progress or virtually complete. (Cooling the RCS below hot standby conditions extends the time between loss of heaters and loss of sub-cooling).

6. The cables associated with the incore thermocouples, for temperature monitoring, will be separated. To comply with Appendix R criteria.

Table 2 consists of a complete list of SSF cables and equipment inside Inner Containment.

4. The cables serving valves IND2A and IND37A are routed within seven (7) feet vertically of the train B cables serving their alternate valves, IND1B and IND36B, respectively, for a distance of thirty-five (35) feet. Reference Table 1 for associated cables.
5. The Pressurizer Heater cable routed in the Annulus does not present a concern as explained in section V.5.
6. The separation of the Incore Thermocouples (reference section V.6.) will be implemented and will comply with Appendix R.
7. The SSF transmitter sensors, along with the normal operating transmitters, for the Steam Generator Level, the Pressurizer Level and the Reactor Coolant System Pressure are located in the Annulus. The separation distances between the SSF transmitter sensors and the normal transmitters are provided in Table 3.

The equipment listed in section VII.3. and in Table 3 include all of the SSF equipment located in the Annulus.

VIII. PROCEDURES (Doghouse)

1. The SSF related valves and their locations were identified.
2. It was determined if an alternate device existed that would provide the same function and
 - a) not have cables in the area as the postulated fire, or
 - b) be located outside the Doghouse.
3. When direct alternates did not exist, other means of providing the SSF functions were identified. Reference Section IV.5.

IX. RESULTS (Doghouse)

1. The Steam Generator 1C Outlet Header Blowdown Control valve 1SM75A, could spuriously open due to a postulated fire inside the doghouse, however a flow orifice, 1SMFE5770, will restrict the amount of flow. This loss would be negligible and would not hinder the capability to achieve and maintain hot standby.
2. The Main Steam Isolation valve 1SM3 and the Steam Generator 1C Power Operated Relief valve 1SV7, are solenoid controlled valves that are de-energized to provide the SSF related function. This de-energization is accomplished in the same manner as described in section V.2.

VI. PROCEDURES (Annulus)

The following procedures were used to determine to what extent Appendix R was met inside the Annulus.

1. The cables associated with the Residual Heat Removal Isolation valves and their alternates were identified (reference section V.4.).
2. Transmitters used for monitoring, during normal operation, that are located inside the annulus, were identified.
3. SSF equipment and cables located inside the annulus were identified.
4. Cable separation distances were determined by a site evaluation and a computer cable routing drawing study.

VII. RESULTS (Annulus)

1. For the functions which have alternates outside inner containment, (reference section V.1.) these alternates are also outside the annulus and therefore do not have any cables routed through the annulus.
2. The functions provided by the de-energized solenoids (reference section V.2.) have their disconnect plugs and shorting pins located outside the annulus. Thus, the associated cables that transverse the annulus could not become energized.
3. The following SSF equipment and associated cables (cable # in parenthesis) are located in the annulus and provides means for makeup.
 - a) Standby Makeup Pump (1NV758)
 - b) Fuel Transfer Tube Isolation valve 1NV865A (1*NV742 and 1*NV767)
 - c) Standby Makeup Pump discharge isolation valve 1NV872A (1*NV743 and 1*NV768).
 - d) Standby Makeup Pump discharge flow transmitter 1NVFT6150 (1NV848).

The devices above are not required to function for a postulated fire in the Annulus due to the availability of the equipment outside the Reactor Building where a much larger flow is accessible.

3. The Turbine Driven Auxiliary Feedwater Pump/Steam Line isolation valve ISA5, can be operated via ISASV0052 which has controls on the SSF Control Board. This valve is also susceptible to spurious operation, however, a postulated fire inside the Doghouse would not affect equipment outside where the normal means of feedwater is available.

X. AUXILIARY BUILDING AND STANDBY SHUTDOWN FACILITY

1. The Residual Heat Removal Isolation Valves IND1B and IND37A have an alternate source of power and control from A and B train motor control centers, respectively. These alternate sources will be used only when a fire has disabled the normal power and control cabling. Open/Close pushbuttons are mounted on the respective motor control center compartments and cabling from these compartments to their respective electrical penetrations will be provided, but will be disconnected on the penetration end.
2. The remainder of the SSF cables are restricted to the Electrical Penetration Room, the 4KV Essential Switchgear Room, the Auxiliary Feedwater Pump Room, Standby Shutdown Facility, and the associated tray and trenches which form the route from the SSF to the Auxiliary Building. Therefore, the equipment and associated cables will not be addressed.

XI. SUMMARY

A. Unit 1

The following items comply with Appendix R as stated.

- a. Cables 1*ND524, 525, 526, and 595 are protected from 0° to 65° (approximately 65 feet), in the Annulus, with a sprinkler system and fire detection system. This will protect cables for Valves IND2A and IND37A from the cables associated with their alternates, IND1B and IND36B.
- b. Cable 1*NC704 is protected with a sprinkler system and fire detection system in the Annulus from 105° to 180° (approximately 75 feet). This will protect the SSF Related NC System Pressure Transmitter Sensor, 1NCPT5121, and Cable 1NC810 from transmitter 1NCPT5140.
- c. Steam Generator B Level transmitter 1CFLT5540 and Cable 1*CF501 in the Annulus are protected with a sprinkler system and a fire detection system. The cable in the Annulus which is approximately six feet in length will be protected from the SSF dedicated Transmitter Sensor 1CFLT5622 and Cable 1CF675.
- d. In Core Thermocouples have been rerouted and separated to meet Regulatory Guide 1.97 and Appendix R.

B. Unit 2

In the Auxiliary Building, at least one train of equipment required for hot standby will be protected from redundant trains by three hour rated fire barriers. In the Reactor Building, redundant trains of cable and equipment needed for hot standby will be separated by more than 20 feet.

TABLE 1:

SSF/Alternate Function Separation
Within Inner Containment

SSF VALVE	ALTERNATE VALVE	SEPARATION		FUNCTION
		HORIZ.	VERT.	
1ND2A	1ND1B	20	NA	ND Isolation/RCS Loop 2
1ND37A	1ND36B	22	NA	ND Isolation/RCS Loop 3

Notes:

1. Valve 1ND37A has cable 1*ND599 routed within six (6) feet vertically of the cables associated with 1ND36B. Reference Section V.4. for the analysis.
2. Valve 1ND1B has cables 1*ND503 and 1*ND596 associated with it inside Inner Containment and cables 1*ND524, 1*ND525, and 1*ND595 associated with it in the Annulus.
3. Valve 1ND36B is associated with cable 1*ND518 within Inner Containment and it's respective cable in the Annulus is 1*ND526.

TABLE 2:

SSF Control Cables/Equipment
Within Inner Containment

CABLE # WITHIN INNER CONTAINMENT	CABLE # IN ANNULUS	DEVICE	SSF FUNCTION	ALTERNATE	ALTERNATE OUTSIDE INNER CONTAINMENT
1LE607	1LE606	Pressurizer Heater		None Note 1	
1*NV527 1*NV539	1*NV526 1*NV538	1NV89A 1NV89A	Normal RCP Seal Water Return Isol. Vlv.	1NV91B	Yes
1NV760 1NV755	1NV759 1NV754	1NV876 1NV876	Standby Makeup Pmp Drain Isol. Vlv.	None Note 2	
1NV757 1NV761	1NV756 1NV759	1NV877 1NV877	Standby Makeup Pmp/RCP Seal Water Isol. Vlv.	None Note 2	
1*ND504	1*ND527	1ND2A	ND/RCS Train A Isol. Vlv.	1ND1B	No
1*ND511 1*ND599	1*ND523 1*ND528	1ND37A 1ND37A	ND/RCS Train B Isol. Vlv.	1ND36B	No
1*88545 1*88518 1*88508	1*88571 1*88570 1*88507	18860A 18860A 18860A	S.G. Secondary Side Isol.	18861B 188149B	Yes Yes
1*88510 1*88523 1*88542	1*88509 1*88570 1*88571	1888A 1888A 1888A		188147B 18810B	Yes Yes
1*88543 1*88519 1*88506	1*88571 1*88570 1*88505	18819A 18819A 18819A		18821B 188150B	Yes Yes
1*88544 1*88524 1*88512	1*88571 1*88570 1*88511	18856A 18856A 18856A		18857B 188148B	Yes Yes

CABLE # WITHIN INNER CONTAINMENT	CABLE # IN ANNULUS	DEVICE	SSF FUNCTION	ALTERNATE	ALTERNATE OUTSIDE INNER CONTAINMENT
L*NM578 1*NM540 1*NM515	1*NM611 1*NM610 1*NM514	1NM3A 1NM3A 1NM3A	Nuclear Sampling System Isol. Vlvs.	1NM7B	Yes
1*NM579 1*NM541 1*NM517	1*NM611 1*NM610 1*NM516	1NM6A 1NM6A 1NM6A	↓	1NM7B	Yes
1*NM580 1*NM542 1*NM511	1*NM611 1*NM610 1*NM510	1NM22A 1NM22A 1NM22A	↓	1NM26B	Yes
1*NM581 1*NM543 1*NM509	1*NM611 1*NM610 1*NM508	1NM25A 1NM25A 1NM25A	↓	1NM26B	Yes
1ENA524 1ENA525 1ENA526 1ENA527 1ENA712	1ENA533 1ENA534 1ENA535 1ENA536; 1NC809 1ENA713	Incore T/C Reference RTD	Temp. Monitoring	Hot & Cold Leg RTDs (Note 3)	No
1*NC838 1*NC861	1*NC837 1*NC860	1NC250A 1NC250A	RCS Isolation (Head Vent)	None Note 4	
1*NC840 1*NC863	1*NC839 1*NC862	1NC253A 1NC253A	↓	None Note 4	
1*NC596 1*NC823	1*NC830 1*NC830	1NC32B	PORV (Isolation)	1NC31B Note 5	No
1*NC599 1*NC825	1*NC828 1*NC824	1NC34A	↓	1NC33A Note 5	No
1*NC596 1*NC823	1*NC830 1*NC830	1NC36B 1NC36B	↓	1NC35B Note 5	No
1*NV547	1*NV835	1NV1A	RCS/CVCS Isol. Vlv.	1NV2A Note 5	No
1*NV581	1*NV836	1NV122B	RCS/CVCS Isol. Vlv.	1NV123 or 1NV124B Note 5	No

TABLE 2 NOTES

SSF CABLES WITHIN INNER CONTAINMENT

1. It has been determined that the Pressurizer Heater is not required to perform the necessary SSF functions.
2. These cables are associated with valves, used in the alignment of the Standby Makeup Pump, which are not required to operate due to a postulated fire inside containment, and would not affect the normal means of charging which is located outside the Reactor Building.
3. An alternate for the Incore Thermocouples is a pair of Wide Range RTDs located in the hot and cold legs of one loop. However, the RTD cables may be routed with the Incore Thermocouple cables, making them unreliable.

Due to Licensing commitments to meet Reg. Guide 1.97, the Incore Thermocouples will be separated and at that time, Appendix R will be taken into account and satisfied.

4. These SSF Isolation functions are initiated because of the low flow capability of the Standby Makeup Pump. However, the reasoning of Note 2 above applies here as well.
5. These cables are de-energized by disengaging connectors and installing shorting pins. Therefore the solenoid operated valves, which they control, fail to their respective SSF position and are not susceptible to spurious operation.

TABLE 3:

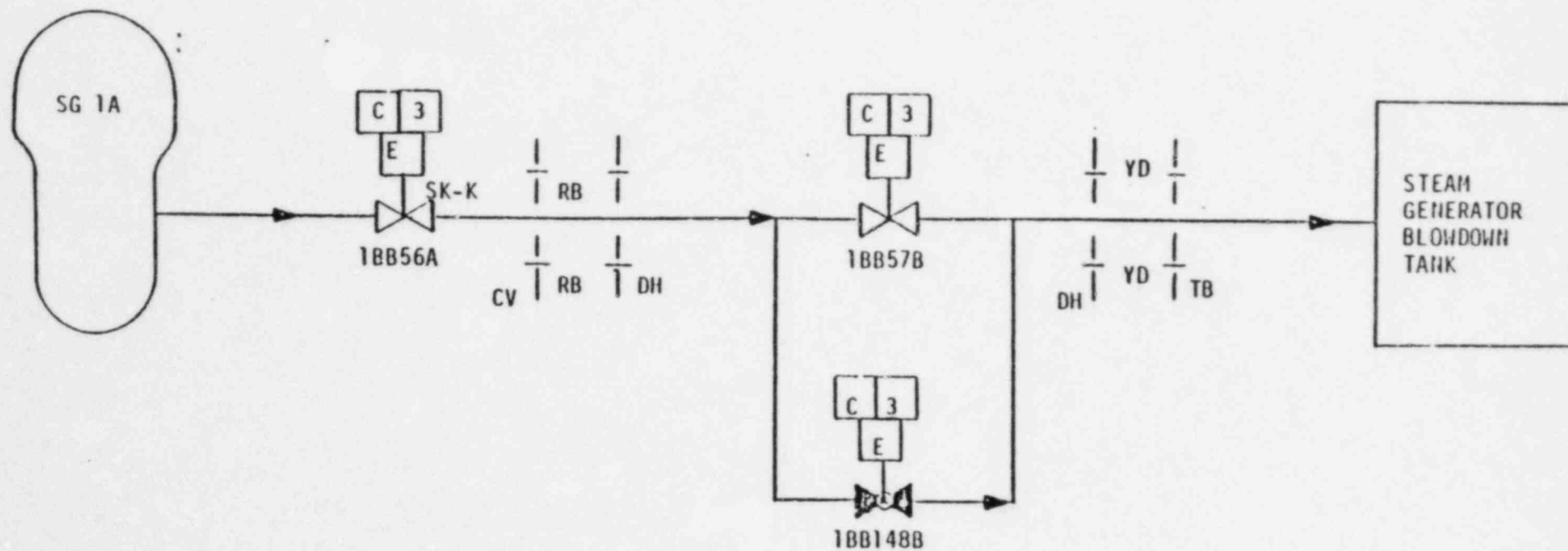
SSF/Normal Function Transmitter Separation

SSF DEDICATED TRANSMITTER SENSOR (NOTE 1)		NORMAL PLANT TRANSMITTER (NOTE 1)		SEPARATION(FT) (NOTE 2)			FUNCTION
DEVICE #	CABLE # (NOTE 3)	DEVICE #	CABLE # (NOTE 3)	CHNL.	HORZ.	VERT.	
1NCLT5151	1NC811	1NCLT5160	1*NC608	1	NA	5	Pressurizer Level
		1NCLT5150	1*NC615	2	19	NA	
		1NCLT5170	1*NC622	3	64	NA	
1NCPT5121	1NC810	1NCPT5120	1*NC703	Train A	10	15	NC System Pressure
		1NCPT5140	1*NC704	Train B	2	NA	
1CFLT5612	1CF674	1CFLT5501	1*CF663	1	NA	1	Steam Generator A Level
		1CFLT5510	1*CF505	2	1	NA	
		1CFLT5500	1*CF509	3	7	NA	
		1CFLT5490	1*CF513	4	NA	20	
1CFLT5622	1CF675	1CFLT5540	1*CF501	1	11	17	Steam Generator B Level
		1CFLT5521	1*CF665	2	1	NA	
		1CFLT5530	1*CF510	3	NA	1	
		1CFLT5520	1*CF514	4	NA	5	
1CFLT5632	1CF676	1CFLT5570	1*CF503	1	13	12	Steam Generator C Level
		1CFLT5551	1*CF666	2	3	3	
		1CFLT5560	1*CF511	3	NA	1	
		1CFLT5550	1*CF515	4	24	NA	
1CFLT5642	1CF677	1CFLT5591	1*CF664	1	NA	5	Steam Generator D Level
		1CFLT5600	1*CF506	2	20	53	
		1CFLT5590	1*CF512	3	8	NA	
		1CFLT5580	1*CF539	4	5	5	

TABLE 3 NOTES

1. The SSF related transmitter sensors and the normal operating transmitters are located in the Annulus except for the normal operating pressurizer level transmitter, which is located within Inner Containment. The SSF related transmitter amplifiers are located in the Auxiliary Building col. AA-47, elev. 580 ft.
2. This is the minimum distance of separation.
3. Cables that are located in the Annulus.

FIGURE 1 STEAM GENERATOR 1A SECONDARY SIDE FLOW PATH



ATTACHMENT 2

The safe shutdown capability outside the Reactor Building is assured by the separation of the shutdown related cables/equipment from alternate cables/equipment by three hour fire barriers. Associated circuits, if present, which may be associated with the redundant shutdown cables/equipment, do not have the same three hour fire barrier requirements.

Associated cables can be divided into two categories as follows:

- 1) The cables considered associated by being electrically connected to a shutdown power distribution system.
- 2) The cables considered associated by proximity, by sharing raceway, etc.

The first category does not exist at Catawba due to the use of optical isolators which isolate the Non QA Condition cables from the QA Condition power sources. The second category does not exist at Catawba either, due to design requirement for cable separation which is as follows:

Neither redundant Class IE circuits nor a combination of Class IE and Non Class IE circuits may be routed through the same raceway.

Therefore, Catawba meets Appendix R in regard to associated cables, since none of the cables at Catawba fall into the category of associated cables.

ATTACHMENT 3

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION

INFORMATION IN SUPPORT OF
STANDBY SHUTDOWN FACILITY

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1.0 INTRODUCTION

In a May 1, 1978 submittal, Duke Power Company provided a conceptual description of the Standby Shutdown Facility (SSF) for McGuire Nuclear Station. This concept was reviewed and approval provided by the NRC staff in March, 1979.

A similar facility, with individual power supply, instrumentation and controls to bring the units to Hot Standby Condition, is provided at Catawba. This facility fulfills requirements of BTP CMEB 9.5-1 Item C.5.C, and Appendix R, Section III G.2 as described herein. This submittal includes mechanical, electrical, structural, and support system descriptions.

The Standby Shutdown System (SSS) is designed to mitigate the consequences of postulated fire incidents to one or both units at Catawba. The SSF contains independent sources of AC and DC electrical power and associated electrical distribution systems and support systems. The SSS supplements the current shutdown capability described in the Catawba FSAR. It would be operated only in the event installed normal and emergency systems are inoperable. Manual operator action is required to actuate the system.

2.0 STRUCTURAL

2.1 Facility Description

The Standby Shutdown Facility is a steel frame, masonry, structure consisting of a diesel generator room, electrical equipment room, battery room, control room and on the second elevation a shared equipment room. The diesel generator room occupies the north side of the structure. This room is the equivalent of two stories in height although there is no intermediate floor level. The remainder of the rooms occupy the east side and south end of the structure. The control room, battery room, and shared equipment rooms make up the two levels south of the diesel generator room. A single level electrical equipment room occupies the east end of the structure. The diesel generator floor is six inches above grade. The shared equipment room is one level above the battery and control rooms. Access is provided by one equipment door and one personnel door at grade level. These are three hour fire rated door units. Openings for HVAC air intake and discharge are provided. The intake is a protected opening flush with the second level of the north end of the diesel generator room. The discharge, a walled labyrinth area, is at the north end of the diesel generator room. The general arrangement of major equipment and structures is in Figure 2.1-1.

2.2 Design Bases

The Standby Shutdown Facility is not designed to withstand design basis seismic loadings nor is it nuclear safety related. The facility is designed in accordance with requirements for Category III structures as defined in the Catawba FSAR Table 3.2.1-1.

3.0 STANDBY SHUTDOWN SYSTEM

3.1 SYSTEM PURPOSE

The Standby Shutdown System provides an alternate and independent means to achieve and maintain a hot standby condition for one or both units. This system supplements the current shutdown capability described in the Catawba FSAR. The system has the capability to maintain hot standby in both units for 3-1/2 days (12 hours more than the Appendix R requirement) without credit for use of equipment made available through damage control measures.

Since the Standby Shutdown System is provided as an alternate means to achieve and maintain a hot standby condition following postulated fire events, the system (except where it interfaces with existing safety related systems) is designed in accordance with accepted fire protection requirements and thus is neither designed to withstand design basis seismic loadings nor is it nuclear safety related.

3.2 DESIGN BASIS

3.2.1 CRITERIA FOR FIRE PROTECTION

The SSF design for fire protection concerns is based on the following criteria:

- A) A fire is not postulated concurrent with non-fire-related failures in safety systems, other plant accidents, or the most severe natural phenomena.
- B) Destruction of all equipment and cabling within a single fire zone shall not preclude the capability to achieve and maintain hot standby. No credit for use of equipment made available through damage control measures is allowed for a period of 3-1/2 days.
- C) No credit is allowed for fire protection devices.

The design basis is to maintain hot standby conditions for 72 hours (without offsite power) while necessary damage control measures are taken. After 72 hours, it is assumed offsite power is restored and the plant is taken to cold shutdown conditions. The method of achieving cold shutdown will be determined based on what equipment is available which in turns depends on the location and extent of damage caused by the fire and any damage control measures taken to restore operability.

The Catawba SSS has been designed to meet the intent of Appendix R by providing separation in order to maintain hot standby conditions. Once damage control measures have been taken, cold shutdown is achieved through use of the same equipment normally used to establish this condition.

3.3 DESIGN DESCRIPTION

3.3.1 SYSTEM DESCRIPTION

3.3.1.1 General Description

The Standby Shutdown System consists mainly of one diesel generator set and supporting equipment, one standby makeup pump per unit with filter, valves and associated piping, and one turbine driven auxiliary feedwater pump per unit with supporting equipment. Utilizing this equipment, hot standby capability is achieved as follows.

3.3.1.2 Primary Side Volume Control

A standby makeup pump is located in the annulus of each unit to supply makeup to the Reactor Coolant System should the normal system be unavailable. The pump provides makeup to the Reactor Coolant System to recover normal system leakage and reactor coolant pump seal leakage. The pump draws borated water from the spent fuel pool through a three inch pipe connected to the fuel transfer tube in the annulus. This line contains one normally closed electric motor operated valve which is controlled from the SSF control room. This single, normally closed valve, is adequate isolation between the Class B fuel transfer tube and the Class E pump suction piping. There is sufficient borated water available from the spent fuel pool to allow 3-1/2 days of standby makeup pump operation without adverse effect on the spent fuel pool (assuming the spent fuel pool cooling system is not available and maximum spent fuel heat load). A filter in the pump discharge piping removes debris which might be harmful to the reactor coolant pump seals. This portion of the Standby Shutdown System is shown in FSAR Figures 9.3.4-6 and 9.3.4-9 (Duke Flow Diagrams CN-1554-1.5 and CN-1554-1.8).

The standby makeup pump is a positive displacement design and therefore adds a constant quantity of borated water to the Reactor Coolant System. If it becomes necessary to remove some water to maintain acceptable pressurizer liquid level, electric motor operated valves, powered by the standby shutdown diesel, can be opened to letdown RCS water to the pressurizer relief tank. These valves are operated from the SSF control room. Refer to FSAR Figures 5.1-1 and 5.1-2 or Duke Flow Diagrams CN-1553-1.0 and CN-1553-1.1.

3.3.1.3 Secondary Side Volume Control

The existing turbine driven auxiliary feedwater pump is utilized to maintain adequate secondary side volume. The water in the embedded condenser circulating water pipe will be utilized to maintain hot standby for at least 3-1/2 days.

The Nuclear Service Water System (FSAR Figures 9.2.1-6 and 9.2.1-10 or CN-1574-2.1 and CN-1574-2.5) provides the flow path from embedded pipe to the Auxiliary Feedwater System. Two direct current (DC) power operated valves are required to provide an assured source of water to the turbine driven auxiliary feedwater pump (Refer to FSAR Figure 10.4.9-1 or Duke Flow Diagram CN-1592-1.0). These valves will open automatically on low pump suction pressure. Steam operator low level logic has been added to insure the automatic start of the turbine driven auxiliary feedwater pump. The pump discharge valves are normally open, this injection to the steam generators is assured (Refer to FSAR Figure 10.4.9-2 or Duke Flow Diagram CN-1592-1.1).

3.3.1.4 Primary Side Natural Circulation

Decay heat is removed from the core by utilizing primary side natural circulation. With the Auxiliary Feedwater System operating, the Reactor Coolant System is capable of providing adequate natural circulation flow for core heat removal in the event of a loss of normal station power.

3.3.5 Main Steam Safety Valves

The main steam safety valves lift and dump steam to the atmosphere. These valves maintain a constant pressure in the secondary side which in turn maintains the Reactor Coolant System at the correct temperature and pressure to maintain hot standby.

3.3.1.6 Instrumentation and Controls

Sufficient instrumentation and controls are provided to allow operator initiation and control of the orderly progression of each unit to hot standby conditions. These instruments and controls are located in the Standby Shutdown Facility.

3.3.1.7 Supporting Services

The Standby Shutdown Facility (SSF) is provided to house some of the equipment described herein. This equipment includes the diesel generator, battery, power distribution equipment, HVAC for the structure, shutdown panels and miscellaneous support equipment.

3.3.1.8 Electric Power Supply

An independent power system is supplied to support the above equipment and instrumentation. See Section 4.0 for further information.

3.3 DESCRIPTION OF INDIVIDUAL COMPONENTS

3.3.2.1 Standby Makeup Pump

The standby makeup pump delivers water from the spent fuel pool to the Reactor Coolant System at the rate of 26 GPM. Approximately 18 GPM is required for seal leakage and 8 GPM for Reactor Coolant System makeup and boration. Makeup is through the reactor coolant pump seals. The standby makeup pump is a positive displacement pump driven by an induction motor, powered by the standby shutdown power supply. The pump is located sufficiently below the fuel pool to assure that adequate net positive suction head is available.

3.3.2.2 Standby Makeup Filter

The standby makeup filter removes particulate matter larger than five microns which could be harmful to the seal faces. The filter is sized to accept three times the flow output of the standby makeup pump with a negligible pressure drop. Fouling of this filter is not considered to be a problem since the fuel pool is normally filtered to three microns and since this filter has been conservatively sized.

3.3.2.3 Turbine Driven Auxiliary Feedwater Pump

Refer to the Auxiliary Feedwater System description in the Catawba FSAR Section 10.4.9.1 for the sizing criteria for this pump.

3.3.2.4 Pressurizer Heaters

One subbank of pressurizer heaters (approximately 70 KW) are powered from the standby shutdown diesel. These heaters may be necessary within approximately 15 hours following the initiating event to insure that the steam bubble remains in the pressurizer.

3.3.3 INSTRUMENTATION AND CONTROL (Per Unit)

3.3.3.1 Temperature

3.3.3.1.1 Reactor Coolant System Temperature

This instrument displays the Reactor Coolant System temperature in the SSF using existing incore instrument thermocouples. Manual means are provided in the SSF of switching the power supply and output signal from the normal path to the Standby Shutdown Facility.

3.3.3.2 Pressure

3.3.3.2.1 Reactor Coolant System Pressure

This instrument displays the Reactor Coolant System pressure in the SSF. The transmitter is separate from the normal Reactor Coolant System pressure transmitters and the receiver gauge is located on the SSF control panel.

3.3.3.2.2 Standby Makeup Filter Differential Pressure

A local pressure gauge in the annulus indicates the differential pressure across the Standby Makeup Filter.

3.3.3.2.3 Turbine Driven Auxiliary Feedwater Pump Suction Pressure

Pressure switches are located at the suction of the Turbine Driven Auxiliary Feedwater Pump and powered from the SSF. These switches automatically align the pump suction to the embedded condenser circulating water pipe on low pressure. This assures a source of water for the Auxiliary Feedwater Pump.

3.3.3.3 Level

3.3.3.3.1 Pressurizer Level

This instrumentation displays the pressurizer liquid level on the SSF control panel. The operator utilizes this readout to control letdown. The transmitter is powered from the SSF power supply.

3.3.3.3.2 Steam Generator Level

Separate and dedicated steam generator level transmitters are supplied to indicate the liquid level in each Steam Generator on the SSF control panel. The transmitters are powered by the SSF power supply and the receiver gauges are located on the SSF control panel. An electrical logic scheme is provided such that a two out of four low level signal will automatically open the steam supply which starts the Turbine Driven Auxiliary Feedwater Pump.

3.3.3.4 Flow

3.3.3.4.1 Standby Makeup Pump Discharge Flow

This instrumentation indicates the Standby Makeup Pump discharge flow rate at the SSF control panel. This instrument is mainly utilized for periodic testing of the Standby Makeup Pump.

3.3.5 PERIODIC TESTING

A complete inplace periodic test of the Standby Shutdown System cannot be done without upsetting the water chemistry in both the primary and secondary side systems. However, periodic testing is performed for individual system components.

4.0 ELECTRICAL POWER SYSTEMS

4.1 DESIGN BASES

The Standby Shutdown Facility (SSF) Power System is designed to provide a reliable source of AC and DC power to those loads required to achieve and maintain hot standby conditions in either or both of the two Catawba units for the following events:

1. Lose of all non-SSF onsite (safety and non-safety) and offsite power.
2. Loss of control capability for the normal shutdown systems.

The SSF Power System is designed to function independent of all other onsite and offsite power systems. For achieving and maintaining hot standby conditions, this system serves as a backup to existing redundant plant power systems. The SSF Power System design is such that any one failure in the system will not prevent the existing plant power systems from performing their intended function. Conversely, any one failure in the existing plant power systems will not prevent the SSF Power System from performing its intended function.

The SSF Power System is not designed to withstand design basis seismic loadings, nor is its nuclear safety related, except for interfaces to existing safety related systems.

4.2 DESIGN DESCRIPTION

The SSF Power System includes onsite 600 VAC, 208 VAC, 120 VAC, 250 VDC, and 125 VDC power. The SSF Power System including its associated loads is shown on Figures 4.2-1, 4.2-2, 4.2-3, 4.2-4, and Tables 4.2-1, 4.2-2, and 4.2-3.

4.2.1 AC POWER SYSTEM

4.2.1.1 600/208/120 VAC SSF Power System

The 600/208/120 VAC SSF Power System consists of one 600 VAC shared load center, one 600 VAC non-safety shared motor control center, two 600 VAC safety related motor control centers, two inverter supplied 120 VAC systems, and a 208/120 VAC power panelboard.

600 V Load Center 1SLXG is located in the SSF and is shared by the two Catawba units. This load center is normally energized from the Unit 1 6900 V Power System and is available to power the SSF 125 VDC battery chargers, and 600 V Motor Control Center SMXG. Standby power is also available to the 600 VAC SSF Power System by means of the SSF diesel generator. The SSF standby power source is described in Section 4.2.3.

In the event that the normal power source to the 600 VAC SSF load center is lost, the incoming feeder breaker is manually tripped to separate it from the normal source, and the SSF diesel generator is manually started and connected to the load center. The 600 VAC SSF loads are manually sequenced as necessary to achieve and maintain hot standby.

600 VAC shared Motor Control Center SMXG, located in the SSF, is the alternate power supply to two 600 VAC safety-related motor control centers (1EMXS and 2EMXS), and is the normal power supply to non-safety loads required for hot standby of either or both units from the SSF.

Motor Control Center SMXG also supplies those loads directly associated with the SSF (e.g., diesel generator auxiliaries, SSF sump pumps and SSF lighting system).

The two 600 VAC safety-related motor control centers located in the station are normally energized from their associated Class 1E auxiliary power systems. Upon loss of the Class 1E auxiliary power system, the motor control centers will be manually transferred to 600 VAC SSF Motor Control Center SMXG where they can be powered from the SSF diesel generator. A kirk key interlock scheme is provided between the normal and alternate motor control center feeder breakers to prevent paralleling of the SSF Power System and the Class 1E auxiliary power system.

The 600 VAC SSF Power System is shown on Figure 4.2-1 and Tables 4.2-1, 4.2-2, and 4.2-3.

The 208/120 VAC portion of the 600/208/120 VAC Power System distributes power to all SSF 208 VAC and interruptible 120 VAC loads (such as fans and space heating equipment). The 600 VAC motor control center supplies power to 208 VAC Power Panelboard SKPG via a 600/208 VAC transformer. This portion of the power system is shown on Figure 4.2-3.

The uninterruptible 120 VAC portion of the 600/208/120 VAC SSF Power System normally receives its power from the 250/125 VDC SSF Power System via Static Inverter 2KSI. Inverter 2 KSI has two outputs with one output supplying power to the security system and one output supplying the SSF instrumentation and controls (Panelboard SKXP). This inverter system has an alternate source of power from 600 VAC Motor Control Center 2MXX via a 600/120 VAC transformer. 120 VAC Panelboard SKXP is shown on Figure 4.2-4.

Upon loss of a static inverter(s) or the 125 VDC SSF Power System, the inverter system(s) is automatically transferred to its alternate source.

4.2.2 DC POWER SYSTEM

4.2.2.1 250/125 VDC SSF Power System

The 250/125 VDC SSF Power System consists of three 125 VDC batteries and associated chargers, one DC distribution center, and two power panelboards.

This system is designed to provide an uninterruptible source of power for the Catawba security system and to supply the SSF equipment controls and instrumentation.

Normally, two 125 VDC batteries and associated chargers are connected to the 250/125 VDC distribution center to supply the 250 VDC and 125 VDC SSF loads. In this alignment, each battery is floated on the distribution center and is available to assume load without interruption upon loss of its associated battery charger or the charger's AC power source. The other 125 VDC battery and associated charger is in a standby mode and can be manually connected to the 250/125 VDC distribution center to replace one of the normal 125 VDC batteries and/or the normal charger.

All of the battery chargers are fed from the shared 600 VAC load center and are designed to prevent their associated battery from discharging back into any internal charger circuits in the event of an AC power failure or a charger malfunction.

Any two of the three 125 VDC batteries connected in a 250/125 VDC combination are sized to supply the required SSF and security loads for a minimum of one hour without its associated charger and without decreasing the battery voltage below an acceptable level.

The 250/125 VDC SSF Power System is shown on Figures 4.2-2 and 4.2-4.

4.2.3 SSF DIESEL GENERATOR AND AUXILIARIES

The SSF Power System is provided with standby power from a dedicated diesel generator. This SSF diesel generator is rated for continuous operation at 700 KW, 0.8 pf, and 600 VAC. The SSF design load does not exceed the continuous rating of the diesel generator. The auxiliaries required to assure proper operation of the SSF diesel generator are supplied entirely from the SSF Power System.

4.2.3.1 Starting Circuit

The SSF diesel generator starting system must be manually initiated from the SSF.

4.2.3.2 Starting System

The diesel engine has dual 24 VDC positive engagement starting motors. A 24 VDC battery and charger combination supplies power to the starting motors. This starting system is capable of providing ten successive starts.

4.2.3.3 Intake and Exhaust

The combustion air for the diesel is taken from the diesel room area and passes through a replaceable filter. The diesel exhaust travels through silencers and then is discharged outside the building via an outlet plenum.

4.2.3.4 Diesel Generator Protection

The diesel generator protection system initiates automatic and immediate protective action to prevent or limit damage to the SSF diesel generator. The following protective trips are provided to protect the diesel generator at all times and are not bypassed when the diesel generator is in the emergency mode:

1. Engine Overspeed
2. Generator Differential Protection

Overspeed protection is provided by a centrifugal overspeed trip device, the setpoint of which is above the engine speed of a full-load rejection. Generator differential protection is provided through relaying in the 600 volt load center.

The following additional trips and associated alarms are provided to protect the diesel generator during test periods:

1. Low Pressure Lube Oil
2. High Temperature Jacket Water
3. Generator Overcurrent Protection
4. Generator Reverse Power Protection
5. Generator Ground Protection

These electrical trips are bypassed when the diesel generator is in the emergency mode. However, the associated alarms remain functional to alert the operator to any abnormal conditions.

4.2.3.5 Fuel Oil

The fuel oil storage and supply system for the standby diesel is entirely separate from those which supply the IE emergency diesels. The system consists of an underground fuel oil storage tank, a recirculation loop containing a pump and a filter to maintain the fuel oil in the storage tank within acceptable limits, a fuel oil day tank and pump to maintain day tank level, and the duplex filter unit and fuel oil pump which are a part of the shutdown diesel package.

The underground storage tank contains sufficient fuel to supply the shutdown diesel for over 3-1/2 days of continuous operation. The day tank contains sufficient fuel to start the engine and permit orderly shutdown of the diesel on loss of fuel from the storage tank. The equipment and piping associated with the recirculation loop and day tank which is located inside the SSF building are located within a retaining wall which would control spreading of fuel oil due to spills or leaks.

4.2.3.6 Lube Oil

The lube oil system is an entirely self-contained part of the diesel engine skid. Draining the lube oil system completely, refilling, or adding lube oil when necessary is a manual operation.

4.2.3.7 Jacket Cooling

The engine cooling water system is supplied as a portion of the diesel package. It is a closed loop which rejects heat through a radiator to air which is subsequently discharged from the building.

5.0 SSF SUPPORT SYSTEMS

5.1 DESIGN BASES

The SSF support systems are designed to provide lighting, fire protection, fire detection, service water, HVAC, sump drainage, and potable water for the Standby Shutdown Facility. The lighting, the fire protection system, the fire detection system, the HVAC system, the sump drainage system, and the potable water system are not seismically designed or safety related. The fire protection systems and the fire detection system are designed and constructed to meet National Fire Codes as appropriate. Fire protection and detection equipment is Underwriter's Laboratories listed or Factory Mutual approved.

5.2 DESIGN DESCRIPTION

5.2.1 SSF LIGHTING SYSTEMS

5.2.1.1 Normal Lighting System

Normal lighting for the SSF is provided by fluorescent and high pressure sodium lighting units. These lighting units are located to provide adequate levels of light with good distribution throughout the structure.

The normal lighting system is powered from the 600 VAC SSF Motor Control Center SMXG via a 600/208/120 VAC dry-type transformer. In the event that the normal source of power to MCC SMXG is lost and the SSF is being powered by the diesel generator, the normal lighting system will be reconnected via MCC SMXG.

5.2.1.2 Emergency DC Lighting System

Emergency DC lighting for the SSF is provided by self-contained 12 VDC battery pack lighting units. These units are located to provide adequate levels of lighting for control panel operation and for entering and leaving the structure.

These battery pack lights are energized automatically upon a loss of voltage in the normal lighting system power supply.

5.2.2 FIRE PROTECTION AND DETECTION

5.2.2.1 Protection

The Catawba Fire Protection System supplies the following primary and secondary protection systems for the Standby Shutdown Facility.

Area	Primary Protection	Secondary Protection
Diesel Engine Room	Automatic Sprinkler System	Hose Racks
Battery Room	Hose Racks	CO ₂ Portable Extinguishers
Control Room	Hose Racks	CO ₂ Portable Extinguishers
Electrical Equipment Area	Hose Racks	CO ₂ Portable Extinguishers
HVAC Equipment Area	Hose Racks	CO ₂ Portable Extinguishers

5.2.2.1.1 Sprinkler System

The SSF diesel generator and diesel generator room are protected by a closed head sprinkler system. Each sprinkler head fuses and discharges water when it is heated to its rated temperature. An alarm check valve is installed in the sprinkler header which alarms to the Unit 1 and 2 control room when activated.

5.2.2.1.2 Hose Racks

Hose racks are installed throughout the SSF. From these locations, the hose lengths are such that the entire SSF can be served.

5.2.2.2.2 Detection

Detection devices are located throughout the Standby Shutdown Facility. These devices alarm locally and annunciate in the Unit 1 and 2 control room in the event of a fire.

5.2.3 HVAC

The purpose of this system is to satisfy the heating, ventilating and air conditioning requirements of the Standby Shutdown Facility. The system consists of an air conditioning subsystem for the battery and control rooms, and a ventilating subsystem for the remaining areas of the SSF. Components necessary for SSF operation are powered from the SSF diesel generator. All HVAC components are controlled from a central panel in the HVAC equipment room.

5.2.3.1 Ventilation System

The electrical equipment room and HVAC equipment room are each provided with a wall mounted supply fan, intake and relief dampers, and electric room thermostat for fan control. Fan capacities are selected to maintain maximum area temperatures below 105°F. Electric unit heaters are provided to maintain minimum area temperatures of 60°F during periods of insufficient heat load.

The diesel generator room is provided with a wall mounted supply fan, intake and relief dampers, and room thermostat for fan control. Fan capacity is selected to maintain maximum area temperature below 105°F during periods when the diesel generator is not operating. Electric unit heaters are provided to maintain a minimum area temperature of 60°F during periods when the diesel generator is not operating. Room ventilation during diesel generator operation

is provided by the engine mounted radiator cooling fan, and room conditions will vary according to outdoor air temperature. Sidewall intake and relief dampers provide a flow path for engine radiator cooling air.

5.2.3.2 Air Conditioning System

The battery and control rooms are served by a packaged, air-cooled air conditioning unit located in the HVAC equipment room. Duct mounted electric heating coils and electric room thermostats are provided to maintain desired conditions in each room. Equipment capacities are selected to maintain the battery room at $77 \pm 2^\circ\text{F}$ and the control room at $75 \pm 5^\circ\text{F}$. A centrifugal roof exhauster serves the battery room to limit hydrogen gas accumulation.

5.2.4 SSF SUMP SYSTEM

The SSF sump system provides a collection and discharge function for normal equipment drainage within the Standby Shutdown Facility. The main components of the system are the sump and a sump pump which handles the flow routed to the sump via the floor drain system located throughout the SSF. The pump receives power from the SSF Power System.

6.0 DESIGN EVALUATION

6.1 DESIGN BASES

The Standby Shutdown Facility (SSF) is designed as a standby system for use under extreme emergency conditions. The system provides additional "defense-in-depth" protection for the health and safety of the public by serving as a backup to existing safety systems. The SSF is provided as an alternate means to achieve and maintain hot standby conditions following postulated fire or sabotage events, and is designed in accordance with criteria associated with these events. Loss of all other station power is assumed for each event. In that the SSF is a backup to existing safety systems, the single failure criterion is not required. However, failures in the SSF systems will not cause failures or inadvertent operations in existing plant systems.

The SSF requires manual activation and would only be activated under adverse fire conditions when existing redundant emergency systems are not available. The SSF utilizes equipment in vital areas (e.g., containment, SSF) to achieve and maintain hot standby conditions.

The SSF has been designed to:

1. Maintain a minimum water level above the reactor core.
2. Achieve and maintain cold shutdown reactivity conditions.
3. Maintain the primary coolant system filled to a sufficient level in the pressurizer to assure natural circulation and core cooling and maintain sufficient secondary side cooling water.
4. Transfer decay heat from the fuel to an ultimate heat sink.
5. Provide direct readings of the process variables necessary to perform and control the above functions.
6. Provide process cooling, lubrication, etc., for equipment required for safe shutdown.

In some locations (such as the cable spreading room), it is not feasible to protect redundant safe shutdown systems against adverse effects of fire or fire suppression activities. Only through the use of fire protection features can these safe shutdown systems be protected. Because for given fire areas, the redundant safe shutdown systems are too close to each other. Therefore, an alternative shutdown capability has been provided from the SSF which is independent from the areas mentioned above.

This dedicated safe shutdown capability assures that fire protection features are provided for structures, systems, and components important to safe shutdown, which will be capable of limiting fire damage so that:

- A. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage; and
- B. Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours.

In the Auxiliary Building, at least one train of equipment needed for hot shutdown is separated from other trains by three hour rated barriers. In Unit 1 Reactor Building, automatic sprinklers and fire detection are being installed and in Unit 2 Reactor Building, cable separation of more than 20 feet will be maintained, to assure that one train of equipment would be unaffected by a postulated fire.

Upon transfer to the SSF, isolation is provided between the normal operating circuiting and the SSF circuiting. This is true for both the controls and power sources. Since the instrumentation and some equipment is dedicated to the SSF, the need for isolation does not exist.

With the design of Catawba's dedicated Standby Shutdown Facility, which meets Appendix R criteria, through fire protection features and the non existence of associated circuits, an assured shutdown capability exist for an all consuming fire in a given fire area.

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
ELECTRICAL ONE-LINE LIST
CNLT-1752-03.17
SMXG

Table 4.2-1

NORMAL POWER SOURCE
BUS 15LXG
COMPT NONE

MOTOR CONTROL CENTER
SSF BLDG ELEV 594+00 COORD LOC A-2

ALTERNATE POWER SOURCE
BUS NONE
COMPT NONE

MOTOR CTL CTR ONE-LINE DWG NO. 1
MOTOR CTL CTR DUKE BILL OF MAT'L
MOTOR CTL CTR WIRE TAB DWG NO. CNWT-1752-03.17

REV	BUS	COMPT	SYS	S-CL	TRN	BLDG ELEV COORD SF	HP/FLA LRA/KW KVA	TYPE UNIT OL HTR Y-PHASE	NEMA SIZE X	-----BREAKER----- TYPE TRIP CATALOG # FRAME MAG- TRIP UNIT CONT POS POLE ELEM	AUX- CONTS STR BKR FUSE SIZE	---CABLE--- SIZE/CLASS	ONE-LINE DWG NO. VEND WIRING DIAG DUKE WIRING DIAG REMARKS	
08 06 01	SMXG	F02E	AD	NE		SSF 594+00	0.50 0.88 4.60	CFVNR 2418	1 1.0	MCP 150 15 3	50 50 IM	MCP03150	X8 1-3/C #10 C	ALJ-374-NS1A CNM 1314.02-0005 R2
		SSF DIESEL FUEL OIL RECIRCULATION PUMP MOTOR				1.25								
08 06 01	SMXG	R03F	AD	NE		SSF 594+00	1.50 2.64 21.00	CFVNR 2429	1 1.0	MCP 150 15 3	50 50 IM	MCP03150	X8 1-3/C #10 C	ALJ-374-NS1A CNM 1314.02-0005 R2
		SSF DIESEL ROOM SUMP PUMP MOTOR				1.00								
08 06 01	SMXG	R04A	AD	NE		SSF 594+00		FDBKR	0.5	HFB 150 20 3		HFB3020	1-3/C #10 C	ALJ-374-NFCA CNM 1314.02-0016 R1
		SSF DIESEL ENGINE JACKET WATER AND LUBE OIL HEATERS					11.20				TM			
08 06 04	SMXG	R05A	CA	NE		TB 568+00 1E-32 1.00	0.13 0.44 2.10	CFVR 2411	1 1.5	MCP 150 7 3	18 18 IM	MCP0358	X7/X7 1-3/C #10 C	ALJ-374-NR1A-A CNM 1314.02-0274 R1
		TURBINE BUILDING FLOOD ISOLATION VALVE 1CA178												
08 06 00	SMXG	R01F	CA	NE		TB 568	0.13 0.44 2.10	CFVR 2411	1 1.5	MCP 150 7 3	18 18 IM	MCP0358	X7/X7 1-3/C #10 C	ALJ-374-NR1A-A CNM 1314.02-0274 R1
		TURBINE BUILDING FLOOD ISOLATION VALVE 2CA178				1.00								
08 06 00	SMXG	F04D	ELN	NE		SSF 594+00		FDBKR	0.5	HFB 150 50 3		HFB3050	1-3/C #6 P	ALJ-374-NFCA CNM 1314.02-0016 R1
		LIGHTING TRANSFORMER SFL					45.00				TM			
08 06 02	SMXG	F02C	EPE	NE		AB 577+00		FDBKR	0.5	HFB 150 60 3		HFB3060	1-3/C #2 P	ALJ-374-NFCA CNM 1314.02-0016 R1
		MOTOR CONTROL CENTER 1EMXS ALTERNATE SUPPLY									TM			
08 06 00	SMXG	R03D	EPE	NE		AB 577+00		FDBKR	0.5	HFB 150 60 3		HFB3060	1-3/C #2 P	ALJ-374-NFCA CNM 1314.02-0016 R1
		MOTOR CONTROL CENTER 2FMXS ALTERNATE SUPPLY									TM			

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
ELECTRICAL ONE-LINE LIST
CNLT-1752-03.17
SMXG

Table 4.2-1

[illegible]

Table 4.2-1

[illegible]

NORMAL POWER SOURCE
BUS 1EMXA
COMPT F05B

MOTOR CONTROL CENTER
AB BLDG ELEV 577+00 COORD LOC BB-49

ALTERNATE POWER SOURCE
BUS SMXG
COMPT FO2C

MOTOR CTL CTR ONE-LINE DWG NO. 1
MOTOR CTL CTR ONE-LINE DWG NO. 2 CN -1703-01.17
MOTOR CTL CTR DUKE BILL OF MAT'L CNBM-1752-01.15
MOTOR CTL CTR WIRE TAB DWG NO. 3 CNWT-1752-01.15

REV	BUS	COMPT	SYS	S-CL	TRN	BLDG ELEV COORD SF	HP/FLA LRA/KW KVA	TYPE UNIT OL HTR Y-PHASE	NEMA SIZE X	TYPE FRAME CONT POLE	TRIP MAG- POS ELEM	CATALOG # TRIP UNIT	AUX- CONTS STR BKR FUSE SIZE	-----CABLE----- SIZE/CLASS	ONE-LINE DWG NO. VEND WIRING DIAG DUKE WIRING DIAG REMARKS
0-1 00	11MXS F01A	EPE	1E	A				1BKRN	1.0	HFB 150 60 3		HFB3060	2A&2B	1-3/C #6 P	CN -1703-01.17 ALJ-372-NKCA CNM 1314.01-0053 RO
	NORMAL INCOMING P.L.C. FID FROM MOTOR CTRL CENTER 11MXA														
04 03 00	1EMXS F01B	NV	1E	A	CV 559+03 56/167 1.00	0.38 1.40 5.10	CFVR 2422	1 2.0	HFB 150 20 3		TM	HFB3020	X7/X7 20	1-3/C #10 P	CN -1703-01.17 ALJ-372-PR1A-A CNM 1314.01-0134 D1
	NC PUMPS SEAL RTN INSIDE CONT ISOL VALVE INV89A														
04 01 00	1EMXS F01C	NV	1E	A	ANN 1.00 1.00	0.24 1.00 3.70	CFVR 2418	1 1.5	HFB 150 20 3		TM	HFB3020	X7/X7	1-3/C #10 C	CN -1703-01.17 ALJ-372-NR1A-A CNM 1314.01-0133 RO
	FUEL TRANSFER TUBE ISOLATION VALVE INV865A														
04 00	1EMXS F01D	NV	1E	A	ANN 1.00	0.67 1.84 9.52	CFVR 2418	1 1.5	HFB 150 20 3		TM	HFB3020	X7/X7	1-3/C #10 C	CN -1703-01.17 ALJ-372-NR1A-A CNM 1314.01-0133 RO
	STANDBY MAKEUP PUMP DISCHARGE PEN ISOL VALVE INV872A														
04 00	1EMXS F02A	ND	1E	A	CV 571+03 52/184 1.00	7.20 12.00 70.00	CFVR 2445	1 2.0	HFB 150 20 3		TM	HFB3020	X7/X7 20	1-3/C #12 C	CN -1703-01.17 ALJ-372-PR1A-A CNM 1314.01-0134 D1
	ND PUMP 1B SUCTION FROM NC LOOP C VALVE IND37A														
05 04 02	1EMXS F02B	NC	1E	A	CV 0.76* 4.00*	0.33* 0.76* 4.00*	CFVR 2415	1 2.0	HFB 150 20 3		TM	HFB3020	X7/X7 20	1-3/C #10 C	CN -1703-01.17 ALJ-372-PR1A-A CNM 1314.01-0134 D1
	REACTOR VESSEL HEAD VENT VALVE INC250A														
04 02 01	1EMXS F02C	WL	1E	A	AB 543+00 BB-52 1.00	7.50 8.40 47.00	CFVNR 2445 FH39	1 1.0	HFB 150 20 3		TM	HFB3020	X8	1-3/C #10 C	CN -1703-01.17 ALJ-372-NS1A CNM 1314.01-0005 R2
	CA PUMP TURBINE 1 SUMP PUMP MOTOR A														
04 00	1EMXS F02D	ZZZ	1E	A			FDBKR	0.5	HFB 150 30 3		TM	HFB3030			CN -1703-01.17 ALJ-372-NFCA CNM 1314.01-0017 R1
	SPARE 30 AMP FIDDER BREAKER														

Table 4.2-2

LIST NUMBER 2B		REVISION 05		DUKE POWER COMPANY CATAMBA NUCLEAR STATION ELECTRICAL ONE-LINE LIST CNLT-1752-01.15 1EHXS				QA CONDITION 1		PAGE 2 1/19/83			
REV	BUS	COMPT	SYS	S-CL	TRN	BLDG ELEV COORD SF	HP/FLA LRA/KW KVA	TYPE UNIT OL HTR Y-PHASE	NEMA SIZE X	-----BREAKER----- TYPE TRIP FRAME MAG- CONT POS POLE ELEM	AUX- CONTS STR BKR FUSE SIZE	-----CABLE----- SIZE/CLASS	ONE-LINE DWG NO. VEND WIRING DIAG DUKE WIRING DIAG REMARKS
04 00	1EHXS F02E	EPE	1E	A	A			CFPT	0.5				CN -1703-01.17 ALJ-372-NXOF CNH 1314.01-0038 R3
04 02 00	1EHXS F03A	EPE	1E	A	A			IBKRA	1.0	HFB 150 60 3	2A&2B	1-3/C #2 P	CN -1703-01.17 ALJ-372-NKCA CNH 1314.01-0053 R0
04 00	1EHXS F03B	ZZZ	1E	A	A			FDBKR	1.0	HFB 150 30 3	30		CN -1703-01.17 ALJ-372-PFCA CNH 1314.01-0032 R1
04 00	1EHXS F03C	ND	1E	A	A	CV 571+3 52/176 1.00	7.20 12.00 70.00	CFVR 2445	2.0	HFB 150 20 3	X7/X7	1-3/C #10 P	CN -1703-01.17 ALJ-372-PRIA-A CNH 1314.01-0134 D1
05 04 02	1EHXS F03D	NC	1E	A	A	CV	0.33* 0.76* 4.00*	CFVR 2415	1 2.0	HFB 150 20 3	X7/X7	1-3/C #10 C	CN -1703-01.17 ALJ-372-PRIA-A CNH 1314.01-0134 D1
04 02 00	1EHXS F04A	SH	1E	A	A	DH 583+03 99-53 1.00	1.10 2.10 10.00	CFVR 2425	1 1.5	HFB 150 20 3	X7/X7	1-3/C #10 C	ALJ-372-NRIA-A CNH 1314.01-0133 R0
04 02 00	1EHXS F04B	ZZZ	1E	A	A			FDBKR	0.5	HFB 150 30 3			ALJ-372-NFCA CNH 1314.01-0017 R1
04 02 00	1EHXS F04C	DB	1E	A	A	CV 576+00 38/358 1.00	1.80 3.60 17.00	CFVR 2432	1 2.0	HFB 150 20 3	X7/X7	1-3/C #10 C	ALJ-372-PRIA-A CNH 1314.01-0134 D1
04 02 00	1EHXS F04D	BB	1E	A	A	CV 576+00 35/175 1.00	1.80 3.60 17.00	CFVR 2432	1 2.0	HFB 150 20 3	X7/X7	1-3/C #10 C	ALJ-372-PRIA-A CNH 1314.01-0134 D1
04 02 00	1EHXS F05A	BB	1E	A	A	CV 576+00 38/003 1.00	1.80 3.60 17.00	CFVR 2432	1 2.0	HFB 150 20 3	X7/X7	1-3/C #10 C	ALJ-372-PRIA-A CNH 1314.01-0134 D1

1ST NUMBER 2B

REVISION 05

DUKE POWER COMPANY
 CATAWBA NUCLEAR STATION
 ELECTRICAL ONE-LINE LIST
 CNLT-1752-01.15
 1EMXS

Table 4.2-2

OA CONDITION 1

 PAGE 3
 1/19/83

EV	BUS	COIPT	SYS	S-CL	TRN	BLDG ELEV COORD OF	HP/FLA LRA/KW KVA	TYPE UNIT OL HTR Y-PHASE	NEMA SIZE X	-----BREAKER----- TYPE TRIP CATALOG # FRAME MAG- POS CONT ELEH TRIP UNIT	AUX- CONTS STR BKR FUSE SIZE	----CABLE---- SIZE/CLASS	ONE-LINE DWG NO. VEND WIRING DIAG DUKE WIRING DIAG REMARKS
1 2 0	1EMXS F05B	DB	1E	A	CV	576+00 35/103 1.00	1.80 3.60 17.00	CFVR 2432	1 2.0	HFB 150 20 3	HFB3020	X7/X7 1-3/C #10 C 20	ALJ-372-PR1A-A CNM 1314.01-0134 D1
1 3 2	1EMXS F05C	NM	1E	A	CV	583+00 46/139 1.00	0.33 0.76 4.00	CFVR 2415	1 2.0	HFB 150 20 3	HFB3020	X7/X7 1-3/C #10 P 20	ALJ-372-PR1A-A CNM 1314.01-0134 D1
4 3 2	1EMXS F06A	NM	1E	A	CV	581+00 45/139 1.00	0.33 0.76 4.00	CFVR 2415	1 2.0	HFB 150 20 3	HFB3020	X7/X7 1-3/C #10 P 20	ALJ-372-PR1A-A CNM 1314.01-0134 D1
4 3 2	1EMXS F06B	NM	1E	A	CV	576+00 22/085 1.00	0.33 0.76 4.00	CFVR 2415	1 2.0	HFB 150 20 3	HFB3020	X7/X7 1-3/C #10 P 20	ALJ-372-PR1A-A CNM 1314.01-0134 D1
1 3 2	1EMXS F06C	NM	1E	A	CV	576+00 27/193 1.00	0.33 0.76 4.00	CFVR 2415	1 2.0	HFB 150 20 3	HFB3020	X7/X7 1-3/C #10 P 20	ALJ-372-PR1A-A CNM 1314.01-0134 D1

NORMAL POWER SOURCE
BUS 2EMXA
COMPT F05B

MOTOR CONTROL CENTER
AB BLDG ELEV 577+00 COORD LOC BB-65

ALTERNATE POWER SOURCE
BUS SMX0
COMPT R030

MOTOR CTL CTR ONE-LINE DWG NO. 1 CN -2703-01.17
MOTOR CTL CTR DUKE BILL OF MAT'L CNBM-2752-01.15
MOTOR CTL CTR WIRE TAB DWG NO. CNWT-2752-01.15

REV	BUS	COMPT	SYS	S-CL	TRN	BLDG ELEV COORD SF	HP/FLA LRA/KW KVA	TYPE UNIT OL HTR Y-PHASE	NEMA SIZE X	TYPE FRAME CONT POLE	TRIP MAG- POS ELEM	CATALOG # TRIP UNIT	AUX- CONTS STR BKR FUSE SIZE	-----CABLE----- SIZE/CLASS	ONE-LINE DWG NO. VEND WIRING DIAG DUKE WIRING DIAO REMARKS
04 00	2EMXS F01A	EPE	1E	A				1BKRN	1.0	HFB 150 60 3		HFB3060	2A&2B	1-3/C #6 P	CN -2703-01.17 ALJ-372-NKCA CNM 1314.01-0053 RO
	NORMAL INCOMING BKR FED FROM MOTOR CTRL CENTER 2EMXA														
01 00	2EMXS F01B	NV	1E	A	CV 559+09 55/16 1.00	0.38 1.40 5.10	CFVR 2422	1 2.0	HFB 150 20 3		TM	HFB3020	X7/X7 20	1-3/C #10 P	CN -2703-01.17 ALJ-372-PR1A-A CNM 1314.01-0134 DI
	NC PUMPS SEAL RTN INSIDE CONT ISOL VALVE 2NV89A														
04 01 00	2EMXS F01C	NV	1E	A	ANN 1.00 1.00	0.24 1.00 3.70	CFVR 2418	1 1.5	HFB 150 20 3		TM	HFB3020	X7/X7	1-3/C #10 C	CN -2703-01.17 ALJ-372-NR1A-A CNM 1314.01-0133 RO
	FUEL TRANSFER TUBE ISOLATION VALVE 2NV865A														
04 01 00	2EMXS F01D	NV	1E	A	ANN 1.00 1.00	0.67 1.84 9.52	CFVR 2418	1 1.5	HFB 150 20 3		TM	HFB3020	X7/X7	1-3/C #10 C	CN -2703-01.17 ALJ-372-NR1A-A CNM 1314.01-0133 RO
	STANDBY MAKEUP PUMP DISCHARGE PEN ISOL VALVE 2NV872A														
04 01 00	2EMXS F02A	ND	1E	A	CV 1.00 1.00	7.20 12.00 70.00	CFVR 2445	1 2.0	HFB 150 20 3		TM	HFB3020	X7/X7 20	1-3/C #12 C	CN -2703-01.17 ALJ-372-PR1A-A CNM 1314.01-0134 DI
	ND PUMP 2B SUCTION FROM NC LOOP C VALVE 2ND37A														
35 34 32	2EMXS F02B	NC	1E	A	CV 4.00* 4.00*	0.33* 0.76* 4.00*	CFVR 2415	1 2.0	HFB 150 20 3		TM	HFB3020	X7/X7 20	1-3/C #10 C	CN -2703-01.17 ALJ-372-PR1A-A CNM 1314.01-0134 DI
	REACTOR VESSEL HEAD VENT VALVE 2HC250A														
34 32 31	2EMXS F02C	WL	1E	A	AB 543+00 88-62 1.00	7.50 8.40 47.00	CFVNR 2445 FH39	1 1.0	HFB 150 20 3		TM	HFB3020	X8	1-3/C #10 C	CN -2703-01.17 ALJ-372-NS1A CNM 1314.01-0005 R2
	CA PUMP TURBINE 2 SUMP PUMP MOTOR A														
34 30	2EMXS F02D	ZZZ	1E	A			FDBKR	0.5	HFB 150 30 3		TM	HFB3030			CN -2703-01.17 ALJ-372-NFCA CNM 1314.01-0017 R1
	SPARE 30 AMP FEEDER BREAKER														

DUKE POWER COMPANY
CATAMBA NUCLEAR STATION
ELECTRICAL ONE-LINE LIST
CNLT-2752-01.15
2EMXS

QA CONDITION 1

Table 4.2-3

REV	BUS	COMPT	SYS	S-CL	TRN	BLDG ELEV COORD SF	HP/FLA LRA/KW K/A	TYPE UNIT OL HTR Y-PHASE	NEMA SIZE X	-----BREAKER----- TYPE TRIP FRAME MAG- CONT POS POLE ELEM	AUX- CONTS STR BKR FUSE SIZE	-----CABLE----- SIZE/CLASS	ONE-LINE DWG NO. VEND WIRING DIAG DUKE WIRING DIAG REMARKS
04	00	2EMXS F02E	EPE	1E	A			CFPT	0.5				CN -2703-01.17 ALJ-372-NXOF CNM 1314.01-0038 R3
04	00	CONTROL POWER TRANSFORMER											
04	00	2EMXS F03A	EPE	1E	A			IBKRA	1.0	HFB 150 60 3	2A&2B	1-3/C #2 P	CN -2703-01.17 ALJ-372-NKCA CNM 1314.01-0053 R0
04	00	ALTERNATE INCOMING BKR FED FROM MOTOR CTRL CENTER SHXG								TM			
04	00	2EMXS F03B	ZZZ	1E	A			FDBKR	1.0	HFB 150 30 3			CN -2703-01.17 ALJ-372-FFCA CNM 1314.01-0032 R1
04	00	SPARE 30 AMP FEEDER BREAKER								TM	30		
04	01	2EMXS F03C	ND	1E	A	CV	7.20 12.00 70.00	CFVR 2445	2.0	HFB 150 20 3	X7/X7	1-3/C #10 P	CN -2703-01.17 ALJ-372-PRIA-A CNM 1314.01-0134 D1
04	00	ND PUMP 2A SUCTION FROM NC LOOP B VALVE 2ND2A				1.00				TM	20		
05	04	2EMXS F03D	NC	1E	A	CV	0.33 0.76 4.00	CFVR 2415	2.0	HFB 150 20 3	X7/X7	1-3/C #10 C	CN -2703-01.17 ALJ-372-PRIA-A CNM 1314.01-0134 D1
05	02	REACTOR VESSEL HEAD VENT VALVE 2NC253A								TM	20		
04	02	2EMXS F04A	SM	1E	A	DH 583.03 GG-61 1.00	1.10 2.10 10.00	CFVR 2425	1.5	HFB 150 20 3	X7/X7	1-3/C #10 C	ALJ-372-NRIA-A CNM 1314.01-0133 R0
04	00	S/G 2C OUTLET HDR BLOWDOWN CONTROL VALVE 2SM75A								TM			
04	00	2EMXS F04B	ZZZ	1E	A			FDBKR	0.5	HFB 150 30 3			ALJ-372-NFCA CNM 1314.01-0017 R1
04	00	SPARE 30 AMP FEEDER BREAKER								TM			
04	02	2EMXS F04C	BB	1E	A	CV	1.80 3.60 17.00	CFVR 2432	2.0	HFB 150 20 3	X7/X7	1-3/C #10 C	ALJ-372-PRIA-A CNM 1314.01-0134 D1
04	00	S/G 2D BLOWDOWN INSIDE CONT ISOL VALVE 2BB06A				1.00				TM	20		
04	02	2EMXS F04D	BB	1E	A	CV	1.80 3.60 17.00	CFVR 2432	2.0	HFB 150 20 3	X7/X7	1-3/C #10 C	ALJ-372-PRIA-A CNM 1314.01-0134 D1
04	00	S/G 2B BLOWDOWN INSIDE CONT ISOL VALVE 2BB19A				1.00				TM	20		
04	02	2EMXS F05A	BB	1E	A	CV	1.80 3.60 17.00	CFVR 2432	2.0	HFB 150 20 3	X7/X7	1-3/C #10 C	ALJ-372-PRIA-A CNM 1314.01-0134 D1
04	00	S/G 2A BLOWDOWN INSIDE CONT ISOL VALVE 2BB06A				1.00				TM	20		

LIST NUMBER 28

REVISION 03

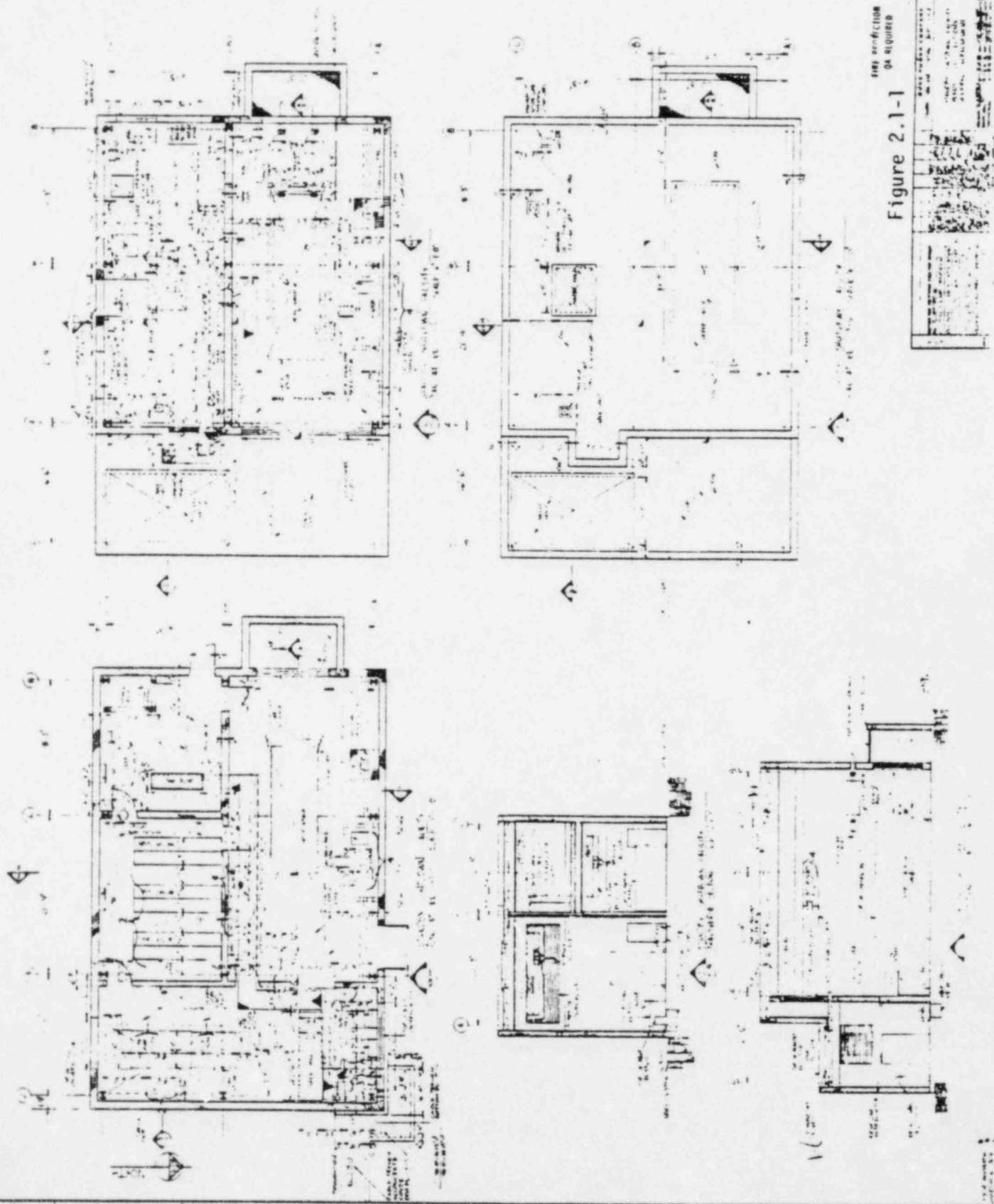
DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
ELECTRICAL ONE-LINE LIST
CNLT-2752-01.15
2EMXS

QA CONDITION 1

PAGE 3
1/19/83

Table 4.2-3

REV	DIS	COMPT	SYS	S-CL	TRN	BDG ELEV COORD	HF/FLA LVA/KW KVA	TYPE UNIT OL ITR Y-TIASE	NEMA SIZE X	-----BREAKER----- TYPE TRIP FRAME MAG- CONT POS POLE FIEM	----- CATALOG # TRIP UNIT	AUX- CONTS STR BKR FUSE SIZE	----CABLE--- SIZE/CLASS	ONE-LINE DWG. NO. VEND WIRING DIAG DUKE WIRING DIAG REMARKS
04 03 02	2EMXS F05B	DIS	1E	A		CV	1.80 3.60 17.00	CFVR 2432	1 2.0	HFB 150 20 3	HFB3020	X7/X7 20	1-3/C #10 C	ALJ-372-PRIA-A CNH 1314.01-0134 D1
04 03 02	2EMXS F05C	NH	1E	A		CV	0.33 0.76 4.00	CFVR 2415	1 2.0	HFB 150 20 3	HFB3020	X7/X7 20	1-3/C #10 P	ALJ-372-PRIA-A CNH 1314.01-0134 D1
04 03 02	2EMXS F06A	NH	1E	A		CV	0.33 0.76 4.00	CFVR 2415	1 2.0	HFB 150 20 3	HFB3020	X7/X7 20	1-3/C #10 P	ALJ-372-PRIA-A CNH 1314.01-0134 D1
04 03 02	2EMXS F06B	NH	1E	A		CV	0.33 0.76 4.00	CFVR 2415	1 2.0	HFB 150 20 3	HFB3020	X7/X7 20	1-3/C #10 P	ALJ-372-PRIA-A CNH 1314.01-0134 D1
04 03 02	2EMXS F06C	NH	1E	A		CV	0.33 0.76 4.00	CFVR 2415	1 2.0	HFB 150 20 3	HFB3020	X7/X7 20	1-3/C #10 P	ALJ-372-PRIA-A CNH 1314.01-0134 D1
04 03 02	2EMXS F06D	NH	1E	A		CV	0.33 0.76 4.00	CFVR 2415	1 2.0	HFB 150 20 3	HFB3020	X7/X7 20	1-3/C #10 P	ALJ-372-PRIA-A CNH 1314.01-0134 D1



4007 LONE CENTER RD. 19136

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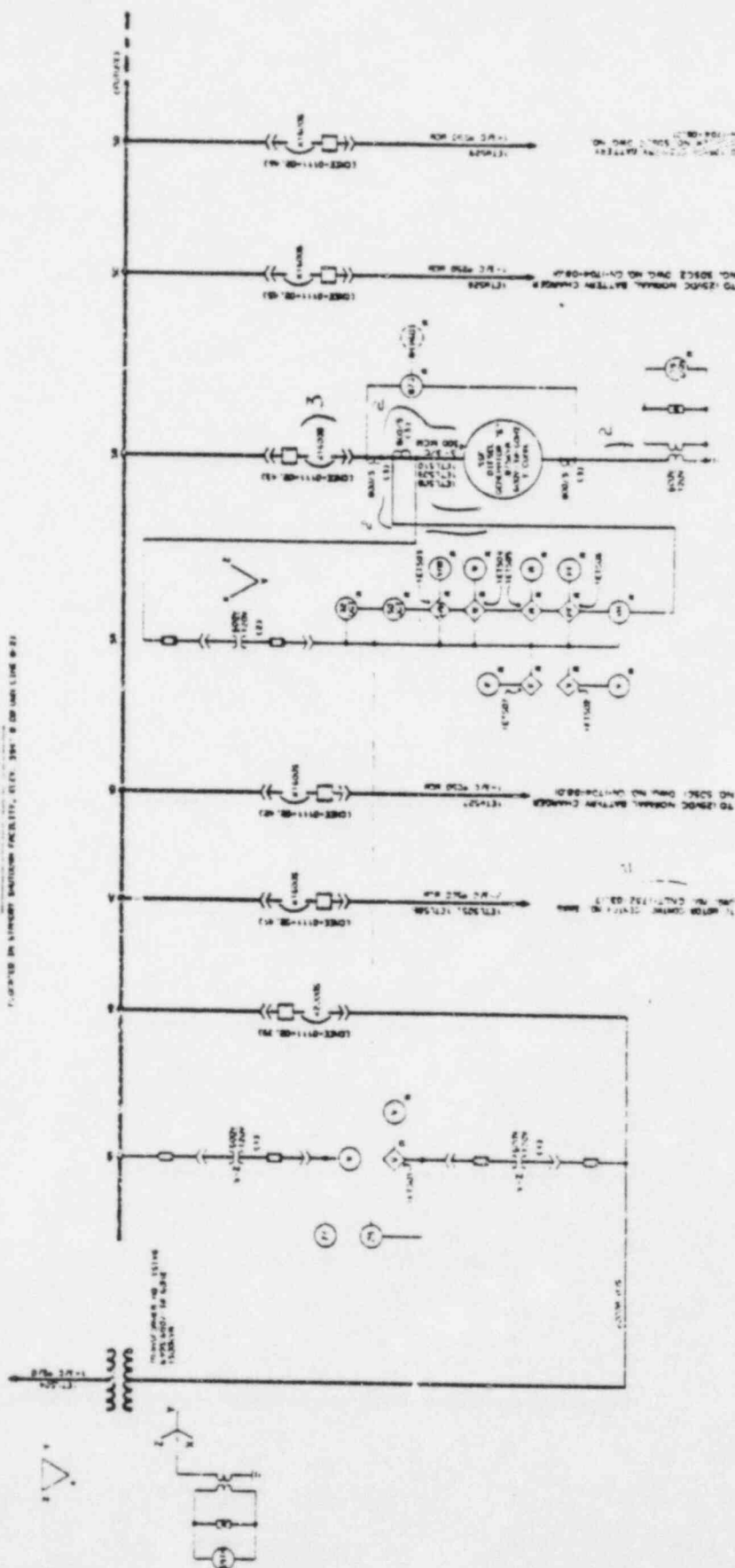
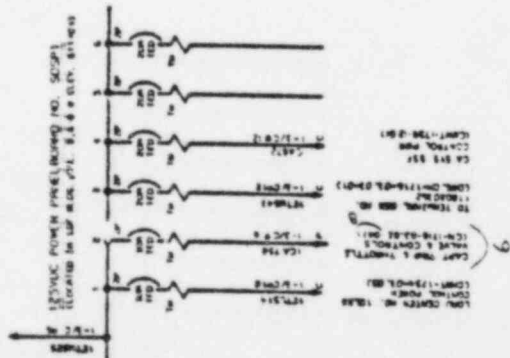


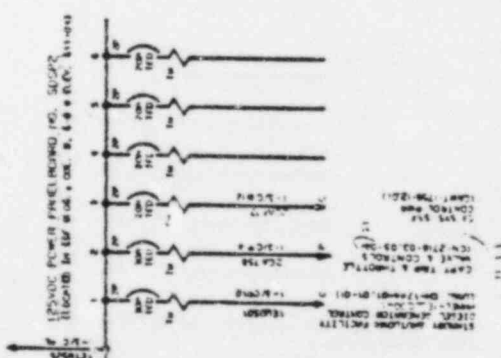
Figure 4.2-1

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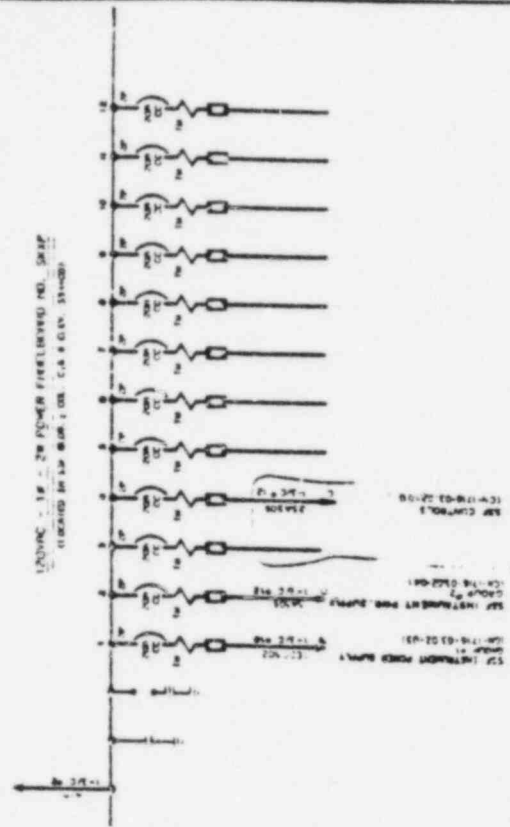
100% POWER DERIVATION CENTER
NO. 302, CH-1, 7734 UN 102



100% POWER DERIVATION CENTER
NO. 302, CH-1, 7734 UN 102



100% POWER DERIVATION CENTER
NO. 302, CH-1, 7734 UN 102



100% POWER DERIVATION CENTER
NO. 302, CH-1, 7734 UN 102

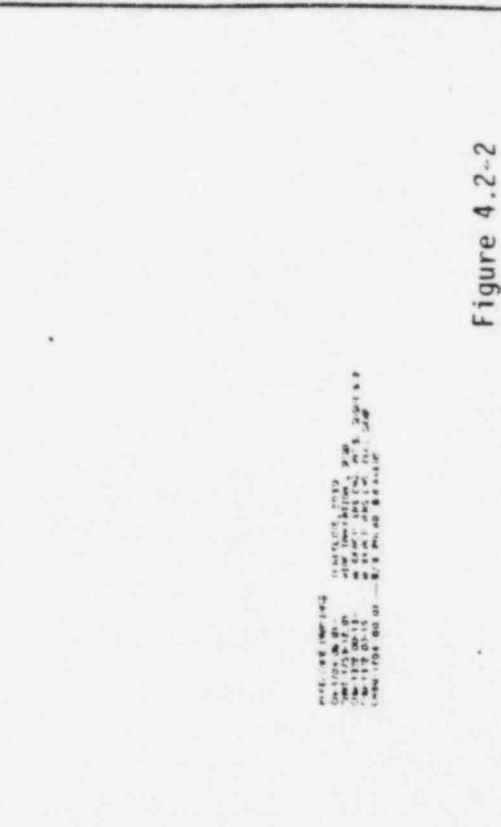
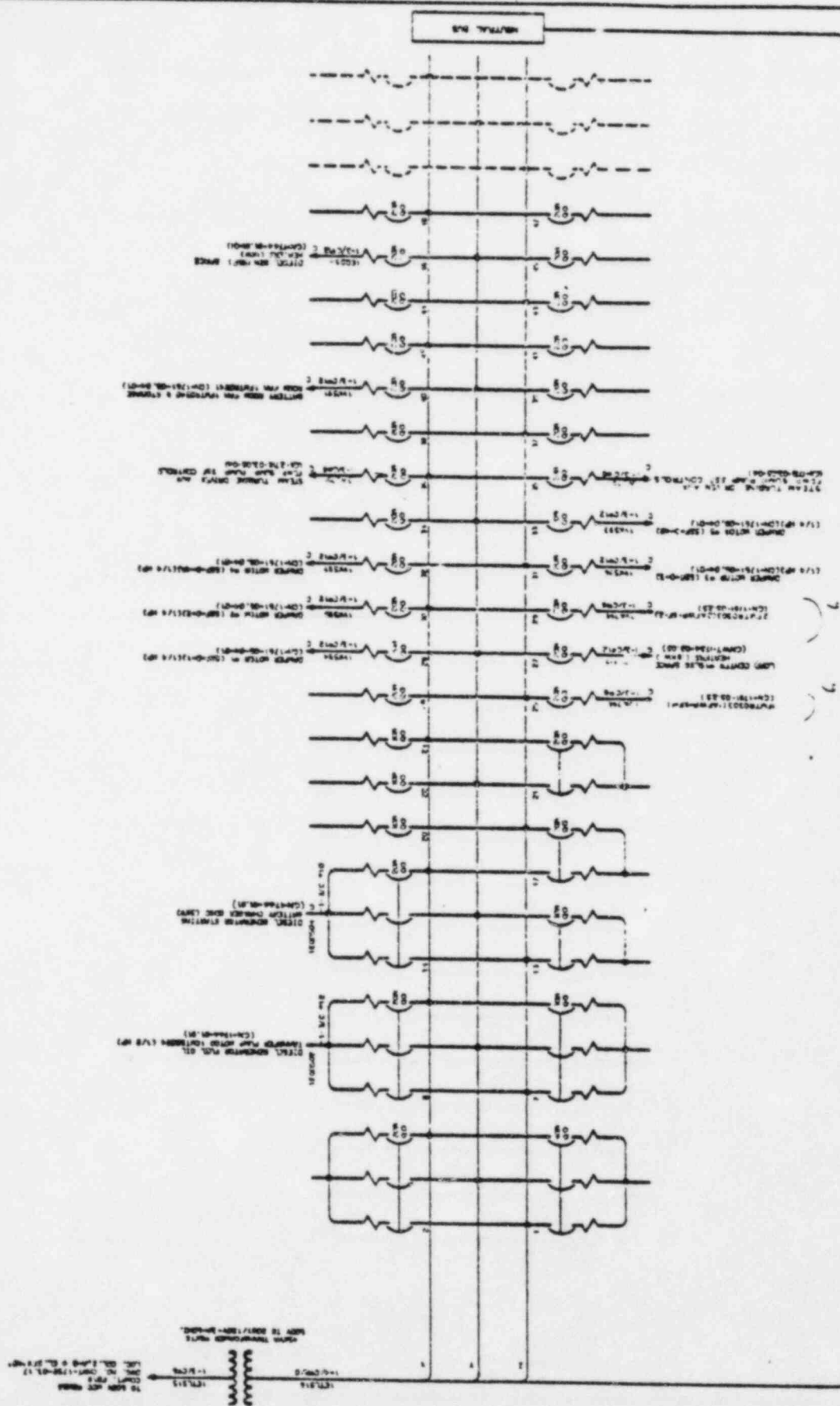


Figure 4.2-2

Channel	Waveform	Label
1	100% POWER FIRE (BURST) NO. 302	LOCATED IN 100% DER. 7734 UN 102
2	100% POWER FIRE (BURST) NO. 302	LOCATED IN 100% DER. 7734 UN 102
3	100% POWER FIRE (BURST) NO. 302	LOCATED IN 100% DER. 7734 UN 102
4	100% POWER FIRE (BURST) NO. 302	LOCATED IN 100% DER. 7734 UN 102
5	100% POWER FIRE (BURST) NO. 302	LOCATED IN 100% DER. 7734 UN 102
6	100% POWER FIRE (BURST) NO. 302	LOCATED IN 100% DER. 7734 UN 102
7	100% POWER FIRE (BURST) NO. 302	LOCATED IN 100% DER. 7734 UN 102
8	100% POWER FIRE (BURST) NO. 302	LOCATED IN 100% DER. 7734 UN 102
9	100% POWER FIRE (BURST) NO. 302	LOCATED IN 100% DER. 7734 UN 102
10	100% POWER FIRE (BURST) NO. 302	LOCATED IN 100% DER. 7734 UN 102

Figure 4.2-3

[illegible][illegible]

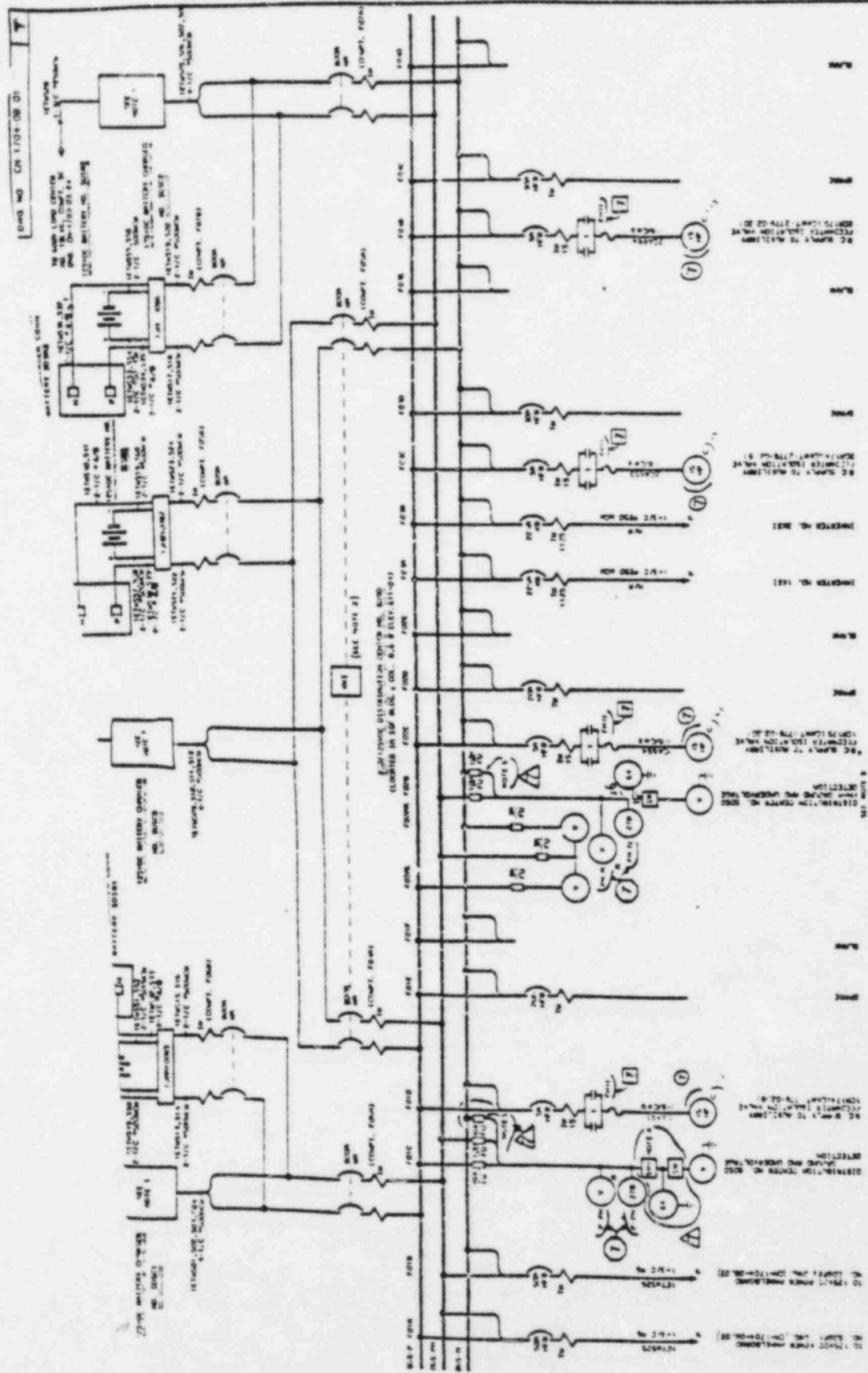


Figure 4.2-4

1. 120V AC GENERATOR
2. 24V DC BATTERY
3. 120V AC MOTOR
4. 24V DC MOTOR
5. 120V AC LIGHT
6. 24V DC LIGHT
7. 120V AC FAN
8. 24V DC FAN
9. 120V AC PUMP
10. 24V DC PUMP
11. 120V AC HEATER
12. 24V DC HEATER
13. 120V AC COOLER
14. 24V DC COOLER
15. 120V AC WARMER
16. 24V DC WARMER
17. 120V AC DRYER
18. 24V DC DRYER
19. 120V AC WASHER
20. 24V DC WASHER
21. 120V AC IRON
22. 24V DC IRON
23. 120V AC熨斗
24. 24V DC熨斗
25. 120V AC熨斗
26. 24V DC熨斗

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