

August 23, 1991

Docket No. 50-416

Mr. William T. Cottle
Vice President, Operations GGNS
Entergy Operations, Inc.
Post Office Box 756
Port Gibson, Mississippi 39150

Dear Mr. Cottle:

SUBJECT: ISSUANCE OF AMENDMENT NO. 82 TO FACILITY OPERATING LICENSE
NO. NPF-29 - GRAND GULF NUCLEAR STATION, UNIT 1, REGARDING
THE FIRE PROTECTION PROGRAM (TAC NO. 77505)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 82 to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1. This amendment consists of changes to the Technical Specifications (TS) in response to your application dated May 19, 1987, as revised August 22, 1990.

The amendment replaces Operating License Condition (OLC) 2.C.(23) "Fire Protection Program" with OLC 2.C.(41) and relocates Technical Specifications (TS) 3/4.3.7.9 "Fire Detection Instrumentation", 3/4.7.6 "Fire Suppression Systems", 3/4.7.7 "Fire Rated Assemblies", and 6.2.2.e "Site Fire Brigade" from the TS to the Updated Final Safety Analysis Report (UFSAR) in accordance with NRC Generic Letter 88-12. OLC 2.C.(41) references the NRC approved fire protection program in the UFSAR and allows changes to this program provided the changes would not adversely affect fire protection effectiveness. A new requirement is added to TS 6.0 "Administrative Controls" requiring the Plant Safety Review Committee (PSRC) to review changes to the approved fire protection program.

A copy of our related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

Lester L. Kintner, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III, IV, and V
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 82 to NPF-29
- 2. Safety Evaluation

DISTRIBUTION:

- PD4-1 Reading
- GPA/PA(MS2G5)
- PD4-1 Plant File
- D. Hagan(MS3206)
- Wanda Jones(MS7103)
- ACRS(10)(MSP315)
- Docket File
- P. Noonan
- T. Quay
- OGC(MS15B18)
- G. Hill(4)
- C. Grimes(MS11E22)
- ARM/LFMB(MS4503)

- NRC/Local PDR
- M. Virgilio
- L. Kintner(2)
- D. Notley
- D. Verrelli
- W. LeFave

cc w/enclosures:
See next page

9109060068 910823
PDR ADOCK 05000416
P PDR

OFC	: PD4-1/LA	: PD4-1/PM	: SPLB/B6	: OGC	: PD4-1/D	:	:
NAME	: PNoonan	: LKintner	: CMcCracken	:	: TQuay	:	:
DATE	: 7/17/91	: 7/29/91	: 7/30/91	: 8/10/91	: 8/23/91	:	:

OFFICIAL RECORD COPY
Document Name: GG AMEND/77505

650047

NRC FILE CENTER COPY

Handwritten signatures and initials, including "FOI" and "11".



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

August 23, 1991

Docket No. 50-416

Mr. William T. Cottle
Vice President, Operations GGNS
Entergy Operations, Inc.
Post Office Box 756
Port Gibson, Mississippi 39150

Dear Mr. Cottle:

SUBJECT: ISSUANCE OF AMENDMENT NO. 82 TO FACILITY OPERATING LICENSE
NO. NPF-29 - GRAND GULF NUCLEAR STATION, UNIT 1, REGARDING
THE FIRE PROTECTION PROGRAM (TAC NO. 77505)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 82 to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1. This amendment consists of changes to the Technical Specifications (TS) in response to your application dated May 19, 1987, as revised August 22, 1990.

The amendment replaces Operating License Condition (OLC) 2.C.(23) "Fire Protection Program" with OLC 2.C.(41) and relocates Technical Specifications (TS) 3/4.3.7.9 "Fire Detection Instrumentation", 3/4.7.6 "Fire Suppression Systems", 3/4.7.7 "Fire Rated Assemblies", and 6.2.2.e "Site Fire Brigade" from the TS to the Updated Final Safety Analysis Report (UFSAR) in accordance with NRC Generic Letter 88-12. OLC 2.C.(41) references the NRC approved fire protection program in the UFSAR and allows changes to this program provided the changes would not adversely affect fire protection effectiveness. A new requirement is added to TS 6.0 "Administrative Controls" requiring the Plant Safety Review Committee (PSRC) to review changes to the approved fire protection program.

A copy of our related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

A handwritten signature in cursive script that reads "Lester L. Kintner".

Lester L. Kintner, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III, IV, and V
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 82 to NPF-29
2. Safety Evaluation

cc w/enclosures:
See next page

Mr. W. T. Cottle
Entergy Operations, Inc.

Grand Gulf Nuclear Station

cc:

Mr. Fred W. Titus
Vice President, Engineering
Entergy Operations Inc.
P. O. Box 31995
Jackson, Mississippi 39286-1995

Mr. C. R. Hutchinson
GGNS General Manager
Entergy Operations, Inc.
P. O. Box 756
Port Gibson, Mississippi 39150

Robert B. McGehee, Esquire
Wise, Carter, Child & Caraway
P. O. Box 651
Jackson, Mississippi 39205

The Honorable William J. Guste, Jr.
Attorney General
Department of Justice
State of Louisiana
P. O. Box 94005
Baton Rouge, Louisiana 70804-9005

Nicholas S. Reynolds, Esquire
Winston & Strawn
1400 L Street, N.W. - 12th Floor
Washington, D.C. 20005-3502

Alton B. Cobb, M.D.
State Health Officer
State Board of Health
P. O. Box 1700
Jackson, Mississippi 39205

Mr. Jim T. LeGros
Manager of Quality Assurance
Entergy Operations, Inc.
P. O. Box 31995
Jackson, Mississippi 39286-1995

Office of the Governor
State of Mississippi
Jackson, Mississippi 39201

Mr. Jack McMillan, Director
Division of Solid Waste Management
Mississippi Department of Natural
Resources
P. O. Box 10385
Jackson, Mississippi 39209

President,
Claiborne County Board of Supervisors
Port Gibson, Mississippi 39150

Mr. Michael J. Meisner
Director, Nuclear Licensing
Entergy Operations, Inc.
P. O. Box 756
Port Gibson, Mississippi 39150

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta St., Suite 2900
Atlanta, Georgia 30323

Mr. C. B. Hogg, Project Manager
Bechtel Power Corporation
P. O. Box 2166
Houston, Texas 77252-2166

Mike Morre, Attorney General
Frank Spencer, Asst. Attorney General
State of Mississippi
Post Office Box 227
Jackson, Mississippi 39225

Mr. Johnny Mathis
Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Route 2, Box 399
Port Gibson, Mississippi 39150

Mr. Gerald W. Muench
Vice President, Operations Support
Entergy Operations, Inc.
P. O. Box 31995
Jackson, Mississippi 39286-1995

Mr. Donald C. Hintz, Executive Vice
President & Chief Operating Officer
Entergy Operations, Inc.
P. O. Box 31995
Jackson, Mississippi 39286-1995



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENERGY OPERATIONS, INC.

SYSTEM ENERGY RESOURCES, INC.

SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION

MISSISSIPPI POWER AND LIGHT COMPANY

DOCKET NO. 50-416

GRAND GULF NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 82
License No. NPF-29

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Entergy Operations, Inc. (the licensee) dated May 19, 1987, as revised August 22, 1990, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

9109060083 910823
PDR ADOCK 05000416
P PDR

2. Accordingly, delete Operating License Condition (OLC) 2.C.(23) of Facility Operating License No. NPF-29 and replace it with OLC 2.C.(41) to read as follows:

(41) Fire Protection Program

Entergy Operations, Inc. shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in Revision 5 to the Updated Final Safety Analysis Report, and as approved in the Safety Evaluation dated August 23, 1991, subject to the following provisions:

The licensee may make changes to the approved Fire Protection Program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

3. Also, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Facility Operating License No. NPF-29 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 82, are hereby incorporated into this license. Entergy Operations, Inc. shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

4. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

f., 
Theodore R. Quay, Director
Project Directorate IV-1
Division of Reactor Projects III, IV, and V
Office of Nuclear Reactor Regulation

Attachments:

1. Pages 9 and 16 of the license
2. Changes to the Technical Specifications

Date of Issuance: August 23, 1991

ATTACHMENT TO LICENSE AMENDMENT NO. 82

FACILITY OPERATING LICENSE NO. NPF-29

DOCKET NO. 50-416

Replace the following pages of the Facility Operating License and Appendix A Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change. The corresponding overleaf pages are also provided to maintain document completeness.

REMOVE PAGES

License page 9
License page 16
v
viii
ix
xiii
xv
3/4 3-80 through 3/4 3-89
3/4 7-17 through 3/4 7-31
B 3/4 3-5
B 3/4 7-4
6-2
6-8

INSERT PAGES

License page 9
License page 16
v
viii
ix
xiii
xv
3/4 3-80
3/4 7-17
B 3/4 3-5
B 3/4 7-4
6-2
6-8

(19) IE Information Notice 79-22, Qualification of Control System
(Section 7.8.C, SER, SSER #2)

Prior to startup following the first refueling outage, MP&L shall complete any design changes found necessary as a result of this review.

(20) Standby Service Water System (Section 9.2.1 SER, SSER #2)

(Deleted)

(21) Spent Fuel Pool Ventilation System (Section 9.4.2 SER, SSER #2)

If spent irradiated fuel is placed in the spent fuel pool prior to installation and operability of the safety related backup fuel pool cooling pump room coolers, the plant shall be placed in shutdown condition and remain shut down with the RHR system dedicated to the fuel pool cooling mode.

(22) Remote Shutdown Panel (Section 9.5.4.1, SER, SSER #2)

Prior to startup following the first refueling outage, MP&L shall install electrical isolation switches between the control room and the Division 1 remote shutdown panel.

(23) Fire Protection Program (Section 9.5.9, SER)

Replaced by Paragraph 2.C.(41).

(41) Fire Protection Program

Entergy Operations, Inc. shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in Revision 5 to the Updated Final Safety Analysis Report, and as approved in the Safety Evaluation dated August 23, 1991, subject to the following provisions:

The licensee may make changes to the approved Fire Protection Program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

- D. The facility required exemptions from certain requirements of Appendices A and J to 10 CFR Part 50 and from certain requirements of 10 CFR Part 100. These include: (a) exemption from General Design Criterion 17 of Appendix A until startup following the first refueling outage, for (1) the emergency override of the test mode for the Division 3 diesel engine, (2) the second level undervoltage protection for the Division 3 diesel engine, and (3) the generator ground over current trip function for the Division 1 and 2 diesel generators (Section 8.3.1 of SSER #7) and (b) exemption from the requirements of Paragraph III.D.2(b)(ii) of Appendix J for the containment airlock testing following normal door opening when containment integrity is not required (Section 6.2.6 of SSER #7). These exemptions are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest. In addition, by exemption dated December 20, 1986, the Commission exempted licensees from 10 CFR 100.11(a)(1), insofar as it incorporates the definition of exclusion area in 10 CFR 100.3(a), until April 30, 1987 regarding demonstration of authority to control all activities within the exclusion area (safety evaluation accompanying Amendment No. 27 to License (NPF-29). This exemption is authorized by law, and will not present an undue risk to the public health and safety, and is consistent with the common defense and security. In addition, special circumstances have been found justifying the exemption. Therefore, these exemptions are hereby granted pursuant to 10 CFR 50.12. With the granting of these exemptions, the facility will operate, to the extent authorized herein, in conformity with the application, as amended, the provisions of the Act and the rules and regulations of the Commission.
- E. The licensee shall fully implement and maintain in effect all provision of the Commission-approved physical security, guard training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The plans, which contain Safeguards Information protected under 10 CFR 73.21, are entitled: "Grand Gulf Nuclear Station Physical Security Plan," with revisions submitted through September 1, 1987; "Grand Gulf Nuclear Station Guard Training and Qualification Plan," with revisions submitted through March 10, 1987; and "Grand Gulf Nuclear Station Safeguards Contingency Plan," with revisions submitted through August 25, 1987. Changes made in accordance with 10 CFR 73.55 shall be implemented in accordance with the schedule set forth therein.

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

<u>SECTION</u>	<u>PAGE</u>
<u>3/4.3 INSTRUMENTATION</u>	
3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION.....	3/4 3-1
3/4.3.2 ISOLATION ACTUATION INSTRUMENTATION.....	3/4 3-9
3/4.3.3 EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION.....	3/4 3-27
3/4.3.4 RECIRCULATION PUMP TRIP ACTUATION INSTRUMENTATION	
ATWS Recirculation Pump Trip System Instrumentation.....	3/4 3-37
End-of-Cycle Recirculation Pump Trip System Instrumentation.....	3/4 3-41
3/4.3.5 REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION.....	3/4 3-47
3/4.3.6 CONTROL ROD BLOCK INSTRUMENTATION.....	3/4 3-52
3/4.3.7 MONITORING INSTRUMENTATION	
Radiation Monitoring Instrumentation.....	3/4 3-58
Seismic Monitoring Instrumentation.....	3/4 3-63
Meteorological Monitoring Instrumentation.....	3/4 3-66
Remote Shutdown System Instrumentation and Controls.....	3/4 3-69
Accident Monitoring Instrumentation.....	3/4 3-73
Source Range Monitors.....	3/4 3-77
Traversing In-Core Probe System.....	3/4 3-78
Chlorine Detection System.....	3/4 3-79
Fire Detection Instrumentation (DELETED).....	3/4 3-80
Loose-Part Detection System.....	3/4 3-90
Radioactive Liquid Effluent Monitoring Instrumentation.....	3/4 3-91
Radioactive Gaseous Effluent Monitoring Instrumentation.....	3/4 3-96
3/4.3.8 PLANT SYSTEMS ACTUATION INSTRUMENTATION.....	3/4 3-105
3/4.3.9 TURBINE OVERSPEED PROTECTION SYSTEM.....	3/4 3-110

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

<u>SECTION</u>	<u>PAGE</u>
<u>3/4.4 REACTOR COOLANT SYSTEM</u>	
3/4.4.1 RECIRCULATION SYSTEM	
Recirculation Loops.....	3/4 4-1
Jet Pumps.....	3/4 4-2
Recirculation Loop Flow.....	3/4 4-3
Idle Recirculation Loop Startup.....	3/4 4-4
3/4.4.2 SAFETY VALVES	
Safety/Relief Valves.....	3/4 4-5
Safety/Relief Valves Low-Low Set Function.....	3/4 4-7
3/4 4.3 REACTOR COOLANT SYSTEM LEAKAGE	
Leakage Detection Systems.....	3/4 4-8
Operational Leakage.....	3/4 4-9
3/4.4.4 CHEMISTRY.....	3/4 4-13
3/4.4.5 SPECIFIC ACTIVITY.....	3/4 4-16
3/4.4.6 PRESSURE/TEMPERATURE LIMITS	
Reactor Coolant System.....	3/4 4-19
Reactor Steam Dome.....	3/4 4-23
3/4.4.7 MAIN STEAM LINE ISOLATION VALVES.....	3/4 4-24
3/4.4.8 STRUCTURAL INTEGRITY.....	3/4 4-25
3/4.4.9 RESIDUAL HEAT REMOVAL	
Hot Shutdown.....	3/4 4-26
Cold Shutdown.....	3/4 4-27
<u>3/4.5 EMERGENCY CORE COOLING SYSTEMS</u>	
3/4.5.1 ECCS - OPERATING.....	3/4 5-1
3/4.5.2 ECCS - SHUTDOWN.....	3/4 5-6
3/4.5.3 SUPPRESSION POOL.....	3/4 5-8

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

<u>SECTION</u>	<u>PAGE</u>
<u>3/4.6 CONTAINMENT SYSTEMS</u>	
3/4.6.1 PRIMARY CONTAINMENT	
Primary Containment Integrity.....	3/4 6-1
Containment Leakage.....	3/4 6-2
Containment Air Locks.....	3/4 6-5
MSIV Leakage Control System.....	3/4 6-7
Feedwater Leakage Control System.....	3/4 6-8
Containment Structural Integrity.....	3/4 6-9
Containment Internal Pressure.....	3/4 6-10
Containment Average Air Temperature.....	3/4 6-11
Containment Purge System.....	3/4 6-12
3/4.6.2 DRYWELL	
Drywell Integrity.....	3/4 6-13
Drywell Bypass Leakage.....	3/4 6-14
Drywell Air Locks.....	3/4 6-15
Drywell Structural Integrity.....	3/4 6-17
Drywell Internal Pressure.....	3/4 6-18
Drywell Average Air Temperature.....	3/4 6-19
Drywell Vent and Purge.....	3/4 6-20
3/4.6.3 DEPRESSURIZATION SYSTEMS	
Suppression Pool.....	3/4 6-21
Containment Spray.....	3/4 6-25
Suppression Pool Cooling.....	3/4 6-26
Suppression Pool Makeup System.....	3/4 6-27
3/4.6.4 CONTAINMENT AND DRYWELL ISOLATION VALVES.....	3/4 6-28

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

<u>SECTION</u>	<u>PAGE</u>
<u>CONTAINMENT SYSTEMS (Continued)</u>	
3/4.6.5 DRYWELL VACUUM RELIEF.....	3/4 6-46
3/4.6.6 SECONDARY CONTAINMENT	
Secondary Containment Integrity.....	3/4 6-48
Secondary Containment Automatic Isolation Dampers/ Valves.....	3/4 6-49
Standby Gas Treatment System.....	3/4 6-55
3/4.6.7 ATMOSPHERE CONTROL	
Containment Hydrogen Recombiner Systems.....	3/4 6-58
Containment and Drywell Hydrogen Ignition System.....	3/4 6-59
Combustible Gas Control Purge System.....	3/4 6-66
<u>3/4.7 PLANT SYSTEMS</u>	
3/4.7.1 SERVICE WATER SYSTEMS	
Standby Service Water System.....	3/4 7-1
High Pressure Core Spray Service Water System.....	3/4 7-3
Ultimate Heat Sink.....	3/4 7-4
3/4.7.2 CONTROL ROOM EMERGENCY FILTRATION SYSTEM.....	3/4 7-5
3/4.7.3 REACTOR CORE ISOLATION COOLING SYSTEM.....	3/4 7-7
3/4.7.4 SNUBBERS.....	3/4 7-9
3/4.7.5 SEALED SOURCE CONTAMINATION.....	3/4 7-15
3/4.7.6 FIRE SUPPRESSION SYSTEMS (DELETED).....	3/4 7-17

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

<u>SECTION</u>	<u>PAGE</u>
<u>PLANT SYSTEMS (Continued)</u>	
3/4.7.7 FIRE RATED ASSEMBLIES (DELETED).....	-
3/4.7.8 AREA TEMPERATURE MONITORING.....	3/4 7-32
3/4.7.9 SPENT FUEL STORAGE POOL TEMPERATURE.....	3/4 7-34
3/4.7.10 FLOOD PROTECTION.....	3/4 7-35
<u>3/4.8 ELECTRICAL POWER SYSTEMS</u>	
3/4.8.1 A.C. SOURCES	
A.C. Sources-Operating.....	3/4 8-1
A.C. Sources-Shutdown.....	3/4 8-9
3/4.8.2 D.C. SOURCES	
D.C. Sources - Operating.....	3/4 8-10
D.C. Sources - Shutdown.....	3/4 8-14
3/4.8.3 ONSITE POWER DISTRIBUTION SYSTEMS	
Distribution - Operating.....	3/4 8-15
Distribution - Shutdown.....	3/4 8-17
3/4.8.4 ELECTRICAL EQUIPMENT PROTECTIVE DEVICES	
Primary Containment Penetration Conductor Overcurrent Protective Devices.....	3/4 8-19
Motor Operated Valve Thermal Overload Protection.....	3/4 8-46
Reactor Protection System Electric Power Monitoring.....	3/4 8-54
<u>3/4.9 REFUELING OPERATIONS</u>	
3/4.9.1 REACTOR MODE SWITCH.....	3/4 9-1
3/4.9.2 INSTRUMENTATION.....	3/4 9-3
3/4.9.3 CONTROL ROD POSITION.....	3/4 9-5

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

<u>SECTION</u>	<u>PAGE</u>
<u>REFUELING OPERATIONS (Continued)</u>	
3/4.9.4 DECAY TIME.....	3/4 9-6
3/4.9.5 COMMUNICATIONS.....	3/4 9-7
3/4.9.6 REFUELING EQUIPMENT.....	3/4 9-8
Refueling Platform.....	3/4 9-8
Auxiliary Platform.....	3/4 9-9
Fuel Handling Platform.....	3/4 9-10
3/4.9.7 CRANE TRAVEL - SPENT FUEL AND UPPER CONTAINMENT FUEL STORAGE POOLS.....	3/4 9-11
3/4.9.8 WATER LEVEL - REACTOR VESSEL.....	3/4 9-12
3/4.9.9 WATER LEVEL - SPENT FUEL AND UPPER CONTAINMENT FUEL STORAGE POOLS.....	3/4 9-13
3/4.9.10 CONTROL ROD REMOVAL	
Single Control Rod Removal.....	3/4 9-14
Multiple Control Rod Removal.....	3/4 9-16
3/4.9.11 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION	
High Water Level.....	3/4 9-18
Low Water Level.....	3/4 9-19
3/4.9.12 HORIZONTAL FUEL TRANSFER SYSTEM.....	3/4 9-20
<u>3/4.10 SPECIAL TEST EXCEPTIONS</u>	
3/4.10.1 PRIMARY CONTAINMENT INTEGRITY/DRYWELL INTEGRITY.....	3/4 10-1
3/4.10.2 ROD PATTERN CONTROL SYSTEM.....	3/4 10-2
3/4.10.3 SHUTDOWN MARGIN DEMONSTRATIONS.....	3/4 10-3
3/4.10.4 RECIRCULATION LOOPS.....	3/4 10-4
3/4.10.5 TRAINING STARTUPS.....	3/4 10-5

INDEX

BASES

<u>SECTION</u>	<u>PAGE</u>
<u>INSTRUMENTATION (Continued)</u>	
3/4.3.7 MONITORING INSTRUMENTATION	
Radiation Monitoring Instrumentation.....	B 3/4 3-4
Seismic Monitoring Instrumentation.....	B 3/4 3-4
Meteorological Monitoring Instrumentation.....	B 3/4 3-4
Remote Shutdown System Instrumentation and Controls.....	B 3/4 3-4
Accident Monitoring Instrumentation.....	B 3/4 3-4
Source Range Monitors.....	B 3/4 3-5
Traversing In-Core Probe System.....	B 3/4 3-5
Chlorine Detection System.....	B 3/4 3-5
Fire Detection Instrumentation (DELETED).....	B 3/4 3-5
Loose-Part Detection System.....	B 3/4 3-6
Radioactive Liquid Effluent Monitoring Instrumentation.....	B 3/4 3-6
Radioactive Gaseous Effluent Monitoring Instrumentation.....	B 3/4 3-6
3/4.3.8 PLANT SYSTEMS ACTUATION INSTRUMENTATION.....	B 3/4 3-6
3/4.3.9 TURBINE OVERSPEED PROTECTION.....	B 3/4 3-7
3/4.3.10 NEUTRON FLUX MONITORING INSTRUMENTATION.....	B 3/4 3-7
<u>3/4.4 REACTOR COOLANT SYSTEM</u>	
3/4.4.1 RECIRCULATION SYSTEM.....	B 3/4 4-1
3/4.4.2 SAFETY/RELIEF VALVES.....	B 3/4 4-2
3/4.4.3 REACTOR COOLANT SYSTEM LEAKAGE	
Leakage Detection Systems.....	B 3/4 4-2
Operational Leakage.....	B 3/4 4-2
3/4.4.4 CHEMISTRY.....	B 3/4 4-3
3/4.4.5 SPECIFIC ACTIVITY.....	B 3/4 4-3
3/4.4.6 PRESSURE/TEMPERATURE LIMITS.....	B 3/4 4-4
3/4.4.7 MAIN STEAM LINE ISOLATION VALVES.....	B 3/4 4-5
3/4.4.8 STRUCTURAL INTEGRITY.....	B 3/4 4-5
3/4.4.9 RESIDUAL HEAT REMOVAL.....	B 3/4 4-5

INDEX

BASES

<u>SECTION</u>	<u>PAGE</u>
<u>3/4.5 EMERGENCY CORE COOLING SYSTEM</u>	
3/4.5.1/2 ECCS - OPERATING and SHUTDOWN.....	B 3/4 5-1
3/4.5.3 SUPPRESSION POOL.....	B 3/4 5-2
<u>3/4.6 CONTAINMENT SYSTEMS</u>	
3/4.6.1 PRIMARY CONTAINMENT	
Primary Containment Integrity.....	B 3/4 6-1
Containment Leakage.....	B 3/4 6-1
Containment Air Locks.....	B 3/4 6-1
MSIV Leakage Control System.....	B 3/4 6-1
Feedwater Leakage Control System.....	B 3/4 6-2
Containment Structural Integrity.....	B 3/4 6-2
Containment Internal Pressure.....	B 3/4 6-2
Containment Average Air Temperature.....	B 3/4 6-2
Containment Purge System.....	B 3/4 6-2
3/4.6.2 DRYWELL	
Drywell Integrity.....	B 3/4 6-3
Drywell Bypass Leakage.....	B 3/4 6-3
Drywell Air Locks.....	B 3/4 6-3
Drywell Structural Integrity.....	B 3/4 6-4
Drywell Internal Pressure.....	B 3/4 6-4
Drywell Average Air Temperature.....	B 3/4 6-4
Drywell Vent and Purge.....	B 3/4 6-4
3/4.6.3 DEPRESSURIZATION SYSTEMS.....	B 3/4 6-4
3/4.6.4 CONTAINMENT AND DRYWELL ISOLATION VALVES.....	B 3/4 6-7
3/4.6.5 DRYWELL VACUUM RELIEF.....	B 3/4 6-7
3/4.6.6 SECONDARY CONTAINMENT.....	B 3/4 6-8
3/4.6.7 ATMOSPHERE CONTROL.....	B 3/4 6-9

INDEX

BASES

<u>SECTION</u>	<u>PAGE</u>
<u>3/4.7 PLANT SYSTEMS</u>	
3/4.7.1 SERVICE WATER SYSTEMS.....	B 3/4 7-1
3/4.7.2 CONTROL ROOM EMERGENCY FILTRATION SYSTEM.....	B 3/4 7-1
3/4.7.3 REACTOR CORE ISOLATION COOLING SYSTEM.....	B 3/4 7-1
3/4.7.4 SNUBBERS.....	B 3/4 7-2
3/4.7.5 SEALED SOURCE CONTAMINATION.....	B 3/4 7-3
3/4.7.6 FIRE SUPPRESSION SYSTEMS (DELETED).....	B 3/4 7-4
3/4.7.7 FIRE RATED ASSEMBLIES (DELETED).....	B 3/4 7-4
3/4.7.8 AREA TEMPERATURE MONITORING.....	B 3/4 7-4
3/4.7.9 SPENT FUEL STORAGE POOL TEMPERATURE.....	B 3/4 7-5
3/4.7.10 FLOOD PROTECTION.....	B 3/4 7-5
<u>3/4.8 ELECTRICAL POWER SYSTEMS</u>	
3/4.8.1, 3/4.8.2, A.C. SOURCES, D.C. SOURCES and ONSITE POWER and 3/4.8.3 DISTRIBUTION SYSTEMS.....	B 3/4 8-1
3/4.8.4 ELECTRICAL EQUIPMENT PROTECTIVE DEVICES.....	B 3/4 8-3
<u>3/4.9 REFUELING OPERATIONS</u>	
3/4.9.1 REACTOR MODE SWITCH.....	B 3/4 9-1
3/4.9.2 INSTRUMENTATION.....	B 3/4 9-1
3/4.9.3 CONTROL ROD POSITION.....	B 3/4 9-1
3/4.9.4 DECAY TIME.....	B 3/4 9-1
3/4.9.5 COMMUNICATIONS.....	B 3/4 9-1
3/4.9.6 REFUELING EQUIPMENT.....	B 3/4 9-1
3/4.9.7 CRANE TRAVEL - SPENT FUEL AND UPPER CONTAINMENT FUEL STORAGE POOLS.....	B 3/4 9-2

INDEX

BASES

<u>SECTION</u>	<u>PAGE</u>
<u>REFUELING OPERATIONS (Continued)</u>	
3/4.9.8 and 3/4.9.9 WATER LEVEL - REACTOR VESSEL and WATER LEVEL - SPENT FUEL AND UPPER CONTAINMENT FUEL STORAGE POOLS.....	B 3/4 9-2
3/4.9.10 CONTROL ROD REMOVAL.....	B 3/4 9-2
3/4.9.11 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION.....	B 3/4 9-2
3/4.9.12 HORIZONTAL FUEL TRANSFER SYSTEM.....	B 3/4 9-2
<u>3/4.10 SPECIAL TEST EXCEPTIONS</u>	
3/4.10.1 PRIMARY CONTAINMENT INTEGRITY/DRYWELL INTEGRITY....	B 3/4 10-1
3/4.10.2 ROD PATTERN CONTROL SYSTEM.....	B 3/4 10-1
3/4.10.3 SHUTDOWN MARGIN DEMONSTRATIONS.....	B 3/4 10-1
3/4.10.4 RECIRCULATION LOOPS.....	B 3/4 10-1
3/4.10.5 TRAINING STARTUPS.....	B 3/4 10-1
<u>3/4.11 RADIOACTIVE EFFLUENTS</u>	
3/4.11.1 LIQUID EFFLUENTS.....	B 3/4 11-1
Concentration.....	B 3/4 11-1
Dose.....	B 3/4 11-1
Liquid Waste Treatment.....	B 3/4 11-2
Liquid Holdup Tanks.....	B 3/4 11-2
3/4.11.2 GASEOUS EFFLUENTS.....	B 3/4 11-3
Dose Rate.....	B 3/4 11-3
Dose - Noble Gases.....	B 3/4 11-3
Dose - Iodine-131, Iodine-133, Tritium and Radionuclides in Particulate Form.....	B 3/4 11-4
Gaseous Radwaste Treatment and Ventilation Exhaust System.....	B 3/4 11-5

INSTRUMENTATION

CHLORINE DETECTION SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.7.8 DELETED

SURVEILLANCE REQUIREMENTS

4.3.7.8 DELETED

INSTRUMENTATION

FIRE DETECTION INSTRUMENTATION

(Deleted)

Pages 3/4 3-80 through 3/4 3-89 have been deleted.

PLANT SYSTEMS

3/4.7.6 FIRE SUPPRESSION SYSTEMS

(Deleted)

3/4.7.7 FIRE RATED ASSEMBLIES

(Deleted)

Pages 3/4 7-17 through 3/4 7-31 have been deleted

PLANT SYSTEMS

3/4.7.8 AREA TEMPERATURE MONITORING

LIMITING CONDITION FOR OPERATION

3.7.8 The temperature of each area shown in Table 3.7.8-1 shall be maintained within the limits indicated in Table 3.7.8-1.

APPLICABILITY: Whenever the equipment in an affected area is required to be OPERABLE.

ACTION:

With one or more areas exceeding the temperature limit(s) shown in Table 3.7.8-1:

- a. For more than eight hours, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within the next 30 days providing a record of the amount by which and the cumulative time the temperature in the affected area exceeded its limit and an analysis to demonstrate the continued OPERABILITY of the affected equipment.
- b. By more than 30°F, in addition to the Special Report required above, within 4 hours either restore the area to within its temperature limit or declare the equipment in the affected area inoperable.

SURVEILLANCE REQUIREMENTS

4.7.8 The temperature in each of the areas shown in Table 3.7.8-1 shall be determined to be within its limit at least once per 12 hours.

INSTRUMENTATION

BASES

3/4.3.7.6 SOURCE RANGE MONITORS

The source range monitors provide the operator with information of the status of the neutron level in the core at very low power levels during startup and shutdown. At these power levels, reactivity additions should not be made without this flux level information available to the operator. When the intermediate range monitors are on scale adequate information is available without the SRMs and they can be retracted.

The SRMs are required OPERABLE in OPERATIONAL CONDITION 2 to provide for rod block capability, and are required OPERABLE in OPERATIONAL CONDITIONS 3 and 4 to provide monitoring capability which provides diversity of protection to the mode switch interlocks.

3/4.3.7.7 TRAVERSING IN-CORE PROBE SYSTEM

The OPERABILITY of the traversing in-core probe system with the specified minimum complement of equipment ensures that the measurements obtained from use of this equipment accurately represent the spatial neutron flux distribution of the reactor core.

The TIP system OPERABILITY is demonstrated by normalizing all probes (i.e., detectors) prior to performing an LPRM calibration function. Monitoring core thermal limits may involve utilizing individual detectors to monitor selected areas of the reactor core, thus all detectors may not be required to be OPERABLE. The OPERABILITY of individual detectors to be used for monitoring is demonstrated by comparing the detector(s) output with data obtained during the previous LPRM calibrations.

3/4.3.7.8 CHLORINE DETECTION SYSTEM

DELETED

3/4.3.7.9 FIRE DETECTION INSTRUMENTATION

DELETED

INSTRUMENTATION

BASES

3/4.3.7.10 LOOSE-PART DETECTION SYSTEM

The OPERABILITY of the loose-part detection system ensures that sufficient capability is available to detect loose metallic parts in the primary system and avoid or mitigate damage to primary system components. The system consists of 16 sensors, of which only 8 are selected and need to be OPERABLE at a time, to provide the inputs to the 8 monitoring channels. The remaining 8 sensors may be used as replacement sensor inputs for failed sensors or to provide a change in location of the area being monitored. The allowable out-of-service times and surveillance requirements are consistent with the recommendations of Regulatory Guide 1.133, "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors," May 1981.

3/4.3.7.11 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

The radioactive liquid effluent monitoring instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63 and 64 of Appendix A to 10 CFR 50.

3/4.3.7.12 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

The radioactive gaseous effluent monitoring instrumentation is provided to monitor and control, as applicable, gaseous effluents during actual or potential releases. Those instruments that monitor the activity of gaseous effluents being released to the environment shall have their alarm/trip setpoints calculated in accordance with the methods in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. Other instruments that monitor offgas processing, (i.e., the Explosive Gas Monitor, Offgas Pre-Treatment Monitor, and Offgas Post-Treatment Monitor) are calibrated according to plant procedures. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63 and 64 of Appendix A to 10 CFR Part 50.

3/4.3.8 PLANT SYSTEMS ACTUATION INSTRUMENTATION

The plant systems actuation instrumentation is provided to initiate action to mitigate the consequences of accidents that are beyond the ability of the operator to control. The LPCI mode of the RHR system is automatically initiated on a high drywell pressure signal and/or a low reactor water level, level 1, signal. The containment spray system will then actuate automatically following high drywell and high containment pressure signals. Negative barometric pressure fluctuations are accounted for in the trip setpoints and allowable values specified for drywell and containment pressure-high. A 10-minute minimum, 13-minute maximum time delay exists between initiation of LPCI and containment spray actuation. A high reactor water level, level 8, signal will actuate the feedwater system/main turbine trip system. The suppression pool makeup system is automatically initiated on a low low suppression pool water level signal with a concurrent LOCA signal or following a specified time delay after receipt of a LOCA signal. The low low suppression pool water level Trip Setpoint and Allowable Value are relative to the surface floor of the suppression pool (93'0 $\frac{1}{2}$ " above mean sea level).

PLANT SYSTEMS

BASES

3/4.7.4 SNUBBERS (Continued)

The acceptance criteria are to be used in the visual inspection to determine OPERABILITY of the snubbers. For example, if a fluid port of a hydraulic snubber is found to be uncovered, the snubber shall be declared inoperable and shall not be determined OPERABLE via functional testing.

To provide assurance of snubber functional reliability one of two functional testing methods is used with the stated acceptance criteria:

1. Functionally test 10% of a type of snubber with an additional 5% tested for each functional testing failure, or
2. Functionally test a sample size and determine sample acceptance using Figure 4.7.4-1.

Figure 4.7.4-1 was developed using "Wald's Sequential Probability Ratio Plan" described in "Quality Control and Industrial Statistics" by Acheson J. Duncan and the Revision 2 draft (9/86) of the ANSI/ASME OM4 document (Examination and Performance Testing of Nuclear Power Plant Dynamic Restraints (Snubbers)).

Permanent or other exemptions from the surveillance program for individual snubbers may be granted by the Commission if a justifiable basis for exemption is presented and, if applicable, snubber life destructive testing was performed to qualify the snubbers for the applicable design conditions at either the completion of their fabrication or at a subsequent date. Snubbers so exempted shall be listed in the list of individual snubbers indicating the extent of the exemptions.

The service life of a snubber is established via manufacturer input and information through consideration of the snubber service conditions and associated installation and maintenance records (newly installed snubber, seal replaced, spring replaced, in high radiation area, in high temperature area, etc.). The requirement to monitor the snubber service life is included to ensure that the snubbers periodically undergo a performance evaluation in view of their age and operating conditions. These records will provide statistical bases for future consideration of snubber service life.

3/4.7.5 SEALED SOURCE CONTAMINATION

The limitation on removable contamination for sources requiring leak testing, including alpha emitters, is based on 10 CFR 70.39(c) limits for plutonium. This limitation will ensure that leakage from byproduct, source, and special nuclear material sources will not exceed allowable intake values. Sealed sources are classified into three groups according to their use, with surveillance requirements commensurate with the probability of damage to a source in that group. Those sources which are frequently handled are required to be tested more often than those which are not. Sealed sources which are continuously enclosed within a shielded mechanism, i.e., sealed sources within radiation monitoring or boron measuring devices, are considered to be stored and need not be tested unless they are removed from the shielded mechanism.

PLANT SYSTEMS

BASES

3/4.7.6 FIRE SUPPRESSION SYSTEMS

DELETED

3/4.7.7 FIRE RATED ASSEMBLIES

DELETED

3/4.7.8 AREA TEMPERATURE MONITORING

The area temperature limitations ensure that safety-related equipment will not be subjected to temperatures in excess of their environmental qualification temperatures. Exposure to excessive temperatures may degrade equipment and can cause loss of its OPERABILITY. The temperature limits include allowance for instrument error.

ADMINISTRATIVE CONTROLS

UNIT STAFF (Continued)

- c. A health physics technician* shall be onsite when fuel is in the reactor.
- d. All CORE ALTERATIONS shall be observed and directly supervised by either a licensed Senior Reactor Operator or Senior Reactor Operator Limited to Fuel Handling who has no other concurrent responsibilities during this operation.
- e. (DELETED)
- f. Administrative procedures shall be developed and implemented to limit the working hours of unit staff who perform safety-related functions; e.g., senior reactor operators, reactor operators, health physicists, auxiliary operators, and key maintenance personnel.

Adequate shift coverage shall be maintained without routine heavy use of overtime. However, in the event that unforeseen problems require substantial amounts of overtime to be used, the following guidelines shall be followed:

- 1. An individual should not be permitted to work more than 16 hours straight, excluding shift turnover time.
- 2. An individual should not be permitted to work more than 16 hours in any 24-hour period, nor more than 24 hours in any 48-hour period, nor more than 72 hours in any seven-day period, all excluding shift turnover time.
- 3. A break of at least eight hours should be allowed between work periods, including shift turnover time.
- 4. Except during extended shutdown periods, the use of overtime should be considered on an individual basis and not for the entire staff on a shift.

Any deviation from the above guidelines shall be authorized by the General Manager, Plant Operations or his designee, or higher levels of management, in accordance with established procedures and with documentation of the basis for granting the deviation. Controls shall be included in the procedures such that individual overtime shall be

*The number of health physics technicians may be less than the minimum requirements for a period of time not to exceed 2 hours in order to accommodate unexpected absence provided immediate action is taken to fill the required positions.

ADMINISTRATIVE CONTROLS

RESPONSIBILITIES (Continued)

- f. Reports of violations of codes, regulations, orders, Technical Specifications, or Operating License requirements having nuclear safety significance or reports of abnormal degradation of systems designed to contain radioactive material.
- g. Reports of significant operating abnormalities or deviations from normal and expected performance of plant equipment that affect nuclear safety.
- h. Review of all REPORTABLE EVENTS.
- i. All recognized indications of an unanticipated deficiency in some aspect of design or operation of safety related structures, systems, or components.
- j. The plant Security Plan and changes thereto.
- k. The Emergency Plan and changes thereto.
- l. Items which may constitute a potential nuclear safety hazard as identified during review of facility operations.
- m. Investigations or analyses of special subjects as requested by the Chairman of the Safety Review Committee.
- n. Changes to the PROCESS CONTROL PROGRAM, OFFSITE DOSE CALCULATION MANUAL, and radwaste systems.
- o. Fire Protection Program and changes thereto.

AUTHORITY

6.5.1.7 The PSRC shall:

- a. Recommend in writing to the General Manager, Plant Operations approval or disapproval of items considered under 6.5.1.6.a, c, d, e, j, and k, above.
- b. Render determinations in writing to the General Manager, Plant Operations with regard to whether or not each item considered under 6.5.1.6.a, c and d, above, constitutes an unreviewed safety question.
- c. Provide written notification within 24 hours to the SRC of disagreement between the PSRC and the General Manager, Plant Operations; however, the General Manager, Plant Operations shall have responsibility for resolution of such disagreements pursuant to 6.1.1 above.

RECORDS

6.5.1.8 The PSRC shall maintain written minutes of each PSRC meeting that, at a minimum, document the results of all PSRC activities performed under the responsibility and authority provisions of these Technical Specifications. Copies shall be provided to the SRC.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 82 TO FACILITY OPERATING LICENSE NO. NPF-29
ENERGY OPERATIONS, INC., ET AL.
GRAND GULF NUCLEAR STATION, UNIT 1
DOCKET NO. 50-416

1.0 INTRODUCTION

By letter dated May 19, 1987, as revised August 22, 1990, the licensee (System Energy Resources, Inc., before June 6, 1990, and Entergy Operations, Inc., on or after June 6, 1990), submitted a request for changes to the Grand Gulf Nuclear Station (GGNS) Unit 1, Technical Specifications (TS). The requested changes would replace Operating License Condition (OLC) 2.C.(23) "Fire Protection Program" with proposed OLC 2.C.(41) and relocate Technical Specifications (TS) 3/4.3.7.9 "Fire Detection Instrumentation", 3/4.7.6 "Fire Suppression Systems", 3/4.7.7 "Fire Rated Assemblies", and 6.2.2.e "Site Fire Brigade" from the TS to the Updated Final Safety Analysis Report (UFSAR). Proposed OLC 2.C.(41) would reference the NRC approved fire protection program in the UFSAR and allow changes to this program provided the changes would not adversely affect fire protection effectiveness. A new requirement would be added to TS 6.0 "Administrative Controls" requiring the Plant Safety Review Committee (PSRC) to review changes to the approved fire protection program.

By submittal dated December 1, 1990, the licensee provided Revision 5 to the UFSAR which, among other things, placed the fire protection TS in the UFSAR as committed to in the proposed amendment. By agreement with the licensee, a change was made in the proposed license condition to reference Revision 5 to the UFSAR in lieu of Revision 4. This editorial change did not change the initial proposed no significant hazards considerations.

In 1984, the licensee implemented a program to identify and analyze exceptions to the requirements of Appendix R to 10 CFR Part 50. Although the provisions of Appendix R do not apply to GGNS, the licensee committed to comply with the requirements of certain sections of Appendix R with exceptions to be justified on a case-by-case basis. While those exceptions are not the subject of this amendment they are incorporated in the UFSAR and referenced in the proposed OLC. Accordingly these exceptions are reviewed and approved in this Safety Evaluation.

9109060092 910823
PDR ADOCK 05000416
P PDR

2.0 EVALUATION

The proposed changes to the fire protection Operating License Condition (OLC) and Technical Specifications (TS) are consistent with the guidance in NRC Generic Letter 86-10 "Implementation of Fire Protection Requirements" and NRC Generic Letter 88-12 "Removal of Fire Protection Requirements from Technical Specifications". These generic letters recommended that the facility fire protection program and major commitments, including the fire hazards analysis, be incorporated into the final safety analysis report for the facility. They also recommended that the specific revision of the final safety analysis report which incorporated the fire protection program and the staff's specific safety evaluation report which approved the fire protection program be referenced in a new OLC. Generic Letter 88-12 recommended that fire protection TS be relocated to the final safety analysis report and that they be considered an integral part of the fire protection program, subject to the new OLC.

The present fire protection OLC 2.C.(23) states:

"EOI [Entergy Operations, Inc.] shall maintain in effect and fully implement all provisions of the approved Fire Protection Plan. In addition, EOI shall maintain the fire protection program to meet the intent of Appendix R to 10 CFR Part 50, except that an oil collection system for the reactor coolant pump is not required."

The proposed fire protection OLC 2.C.(41) states:

"Entergy Operations, Inc. shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in Revision 5 to the Updated Final Safety Analysis Report and as approved in the Safety Evaluation dated August 23, 1991, subject to the following provisions:

The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire."

As stated in Generic Letter 86-10, changes to the approved fire protection program without prior approval by the Commission must meet two conditions in addition to the one specified in the license condition: (a) under 10 CFR 50.59 such changes must not otherwise involve a change in a license condition or the TS or result in an unreviewed safety question as defined in that regulation and (b) such changes must not result in failure to complete prior commitments concerning the fire protection program which have been approved by the Commission. The licensee will use its 10 CFR 50.59 review process on such changes in addition to reviews made to demonstrate the fire protection of the facility is not adversely affected. The licensee has administrative procedures to provide guidance for the review of changes to assure that fire protection and safe shutdown requirements are met and for the revision and

maintenance of the Grand Gulf Nuclear Station (GGNS) Fire Hazards Analysis and the Combustible Heat Load Calculation. If a change impacts fire protection or safe shutdown as determined by the responsible engineer, a fire protection reviewer or a safe shutdown reviewer and, if deemed necessary by the reviewer, a qualified fire protection engineer will review the change. Revisions to the Fire Hazards Analysis and the Combustible Heat Load Calculation are reviewed and approved by a qualified fire protection engineer. The provisions for reviewing and documenting changes to the fire protection program provide assurance that no changes adversely affecting the ability to achieve and maintain safe shutdown in the event of a fire will be made without prior Commission approval and therefore are acceptable.

OLC 2.C.(23) will be deleted and new OLC 2.C.(41) will be added so that the fire protection license condition will not be included in those OLCs which are referred to in OLC 2.F. License Condition 2.F requires that "violations of the requirements contained in Section 2, Items C.(1), C.(4) through C.(38)" be reported within 24 hours in accordance with the provisions of 10 CFR 50.72 and written followup in accordance with 10 CFR 50.73. Fire protection deficiencies which meet the reportability criteria of 10 CFR 50.72 or 10 CFR 50.73 must be reported pursuant to the applicable rule. Other conditions which represent deficiencies of the fire protection program or systems but which are not encompassed by these reportability criteria should be evaluated by the licensee and appropriate corrective actions should be taken. Excluding the new fire protection license condition from the requirements of OLC 2.F will avoid an apparent reporting requirement for deficiencies in addition to those in 10 CFR 50.72 and 10 CFR 50.73 by precluding the interpretation that "deficiencies" are equivalent to "violations" of the new fire protection license condition. The exclusion of the fire protection program from the requirements of OLC 2.F is consistent with the exclusion of the emergency plan and the physical security plan from the requirements of OLC 2.F and is acceptable to the staff.

The licensee has incorporated the GGNS Fire Protection Program (FPP), including Technical Specifications, into the UFSAR Revision 5 by letter dated December 1, 1990. The specific locations in the UFSAR where elements of the FPP are described or referenced are:

Section 7.4.1.5	Alternate Shutdown System
Section 9.5.1	Fire Protection System
Appendix 9A	Fire Hazards Analysis Report
Appendix 9B	Fire Protection Program
Appendix 9C	Analysis of Safe Shutdown
Table 9.5-11	Comparison with NRC Branch Technical Position APCS 9.5-1, Appendix A
Table 9.5-12	Comparison with Appendix R to 10 CFR 50
Figures 9.5-1 through 9.5-8e	Fire Protection System P&ID Drawings (Figure 9.5-3 is deleted)
Appendix 16A	Fire Protection System Technical Specifications

The fire protection system TS in Sections 3/4.3.7.9, 3/4.7.6 and 3/4.7.7 which would be deleted by this amendment have been transferred verbatim to Appendix 16A in the UFSAR. This transfer includes the limiting conditions for operation, applicability, actions and surveillance requirements. TS Section 1.0 "Definitions", Section 3/4.0 "Applicability" and other sections of the TS which are referenced in the relocated fire protection TS are applicable to the relocated TS. The administrative TS Section 6.2.2.e regarding the fire brigade composition has been transferred with only a minor editorial change to UFSAR Section 9.B.7.1. An additional administrative requirement (TS 6.5.1.6.o) would be added for the Plant Safety Review Committee (PSRC) to review the Fire Protection Program and changes thereto. The present TS Sections 6.1.5.6.a and 6.1.5.6.b require the PSRC to review implementing procedures for the fire protection program and evaluations of proposed changes to the fire protection program. The present TS Section 6.5.1.8 requires evaluations of changes to the Fire Protection Program to be provided to the Safety Review Committee. The proposed changes to the fire protection TS are necessary to transfer the fire protection program to the FSAR as recommended in Generic Letter 86-10 and Generic Letter 88-12 and are therefore, acceptable.

In 1984, the licensee developed and implemented a reanalysis program to determine and analyze specific exceptions to the requirements of Appendix R to 10 CFR Part 50. Although this rule does not apply to plants such as GGNS which were licensed to operate after January 1, 1979, the licensee committed to comply with the requirements of Sections III.G, III.J, and III.O of Appendix R, with exceptions to be justified on a case-by-case basis. By letter dated May 7, 1985, the licensee submitted an updated GGNS Unit 1 Fire Hazards Analysis (FHA) and a 10 CFR Part 50 Appendix R Fire Protection Review Summary Report. The Summary Report identified and justified exceptions to Appendix R, including Section L because requirements in Section L for alternate shutdown are closely related to requirements in Section G for safe shutdown. Additional information regarding exceptions to Appendix R were provided by licensee's letters dated May 18, 1985, June 14, 1985, June 25, 1986, July 24, 1986, July 31, 1986, and May 6, 1987. Annual revisions to the Fire Hazards Report were submitted on May 7, 1986, April 7, 1987, May 11, 1988, May 5, 1989, May 9, 1990, and May 7, 1991. Additional information regarding safe shutdown and alternate shutdown was submitted by letters dated May 30, 1985, May 6, 1985, and July 19, 1985. Information regarding an exception to scheduling fire brigade drills as specified in Appendix III.I to 10 CFR Part 50 was submitted on December 23, 1986. After the licensee had completed its reanalysis of the comparison of the GGNS Fire Protection Program to 10 CFR Part 50 Appendix R requirements and identified exceptions in its May 7, 1985, Summary Report, the NRC staff conducted an inspection of the facility to determine whether the fire protection features provided for structures, systems and components important to safe shutdown complied with the requirements of Appendix R to 10 CFR Part 50 (Inspection Report No. 50-416/85-16, dated August 29, 1985). The exceptions identified in the licensee's May 7, 1985, Summary Report together with other items requiring further information and NRC staff review were noted as unresolved items in the inspection report. The licensee's Summary Report and

supplemental submittals regarding exceptions to Appendix R were reviewed by the staff and found to be acceptable. The staff's evaluation of these exceptions is given in Sections 2.1, 2.2, and 2.3 of this Safety Evaluation.

The specific locations in the NRC staff's Safety Evaluation Report (SER) related to the operation of Grand Gulf Nuclear Station, Units 1 and 2 (NUREG-0831), Supplements to the SER (SSER), Letter Safety Evaluation (SE) and this Safety Evaluation where elements of the GGNS Fire Protection Program are approved are as follows:

SER	Fire Protection Systems
Section 9.5	
SSER No. 1	Alternate Shutdown
Section 9.5.6	
SSER No. 2	Remote Shutdown Panel
Section 9.5.4.1	
SSER No. 3	Sprinkler and Standpipe Systems
Section 9.5.1.2	
Letter SE dated February 15, 1985	Remote Shutdown Panel Isolation
This SE	
Section 2.1	Exceptions to Section III.G of Appendix R to 10 CFR Part 50, "Fire Protection of Safe Shutdown Capability"
Section 2.2	Exception to Section III.L of Appendix R to 10 CFR Part 50, "Alternative and Dedicated Shutdown Capability"
Section 2.3	Exception to Section III.I of Appendix R to 10 CFR Part 50, "Fire Brigade Training"

The SER and SSER Nos. 1, 2, and 3 evaluated the GGNS Fire Protection Program as submitted prior to issuance of the initial operating license on June 16, 1982. As reflected in the present license condition, the licensee indicated it met "the intent" of Appendix R, but had not identified specific exceptions to the rule. One open issue regarding electrical isolation of the remote shutdown panel was included in the license as a condition and was resolved and evaluated in the staff's February 15, 1985, letter.

2.1 Exceptions to Section III.G of Appendix R to 10 CFR Part 50

Section III.G.1 of Appendix R requires fire protection features to be provided for structures, systems, and components important to safe shutdown and 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.

Section III.G.2 of Appendix R requires that one train of cables and equipment necessary to achieve and maintain safe shutdown be maintained free of fire damage by one of the following means:

- 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 combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.
- 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.

If the above conditions are not met, Section III.G.3 requires that there be an alternative shutdown capability independent of the area, room, or zone of concern. These alternative requirements are not deemed to be equivalent; however, they provide an acceptable level of fire protection for those configurations in which they are approved by the staff.

Because it is not possible to predict the specific conditions under which fires may occur and propagate the design basis protective features rather than the design basis fire are specified in the rule. Plant specific features may require protection different from the measures specified in Section III.G. In such a case, the licensee must demonstrate by means of a detailed fire hazards analysis that existing protection or existing protection in conjunction with proposed modifications will provide a level of safety equivalent to the technical requirements of Section III.G of Appendix R.

In summary, Section III.G is related to fire protection features to ensure that systems and associated circuits used to achieve and maintain safe shutdown are free of fire damage. Fire protection configurations must meet the specific requirements of Section III.G or an alternative fire protection configuration must be justified by a fire hazards analysis. Generally, the staff will accept an alternative fire protection configuration if:

The alternative ensures that one train of equipment necessary to achieve hot shutdown from either the control room or emergency control systems is free of fire damage.

The alternative ensures that fire damage to at least one train of equipment necessary to achieve cold shutdown is limited so that it can be repaired within a reasonable time (minor repairs using components stored on the site).

Fire-retardant coatings are not used as fire barriers.

Modifications required to meet Section III.G would not enhance fire protection safety levels above those provided by either existing or proposed alternatives.

Modifications required to meet Section III.G would be detrimental to overall facility safety.

By letter dated May 7, 1985, the licensee submitted an updated fire hazards analysis and a 10 CFR Part 50 Appendix R Fire Protection Review Summary Report. These documents were submitted as a result of an updated comparison of the licensee's fire protection program based on recent NRC regional workshops and new Appendix R clarifications contained in the Generic Letters. On June 17 and 18, 1986, a site visit was conducted for the purpose of seeking clarification of the licensee's submittals and to gather plant-specific information. A total of nine deviations from Appendix R were identified in the May 7, 1985, summary report and an additional deviation was presented during the site meeting. By letters dated July 24 and July 31, 1986, the licensee supplemented their earlier submittals and docketed the tenth deviation. The information presented in the licensee's submittal, the supplements, and the information collected during the site visit are the bases for the deviation request evaluations in this report.

2.1.1 Auxiliary Building Perimeter Passageways, Fire Area 1 (Fire Zones 1A101, 1A114, 1A117 and 1A120)

Deviation Requested

A deviation was requested from Section III.G.2.b of Appendix R to the extent that it requires an area-wide fire suppression system and no intervening combustibles within the separation space that is greater than 20 feet between redundant safe shutdown system components.

Discussion

Fire Area 1 is within the auxiliary building and consists of Fire Zones 1A101, 1A107, 1A108 1A111, 1A114, 1A117 1A120, 1A127, 1A130, and 1A131. However, only Fire Zones 1A101, 1A114, and 1A117 contain safe shutdown components. These three fire zones and Fire Zone 1A120 are completely open to each other and form a perimeter passageway around the auxiliary building. The ceiling and all interior walls are complete 3-hour fire rated barriers, except for the interfaces with stairs and elevators, which are 2-hour fire rated. The floor and exterior walls are nonrated barriers. These fire zones encompass elevations 93 and 103 feet. The average fire load in Fire Area 1 is less than a 15 minute

fire severity with a maximum of a 45 minute fire severity for any fire zone. Fire detection is provided in the fire zones which contain safety-related components and partial automatic sprinkler system coverage exists in zones containing Division I and Division II safe shutdown cables. Fire hose stations and fire extinguishers are available throughout the area.

Fire Zone 1A101 forms part of a perimeter corridor within the auxiliary building. One end of this fire zone is open into adjacent Fire Zone 1A114, whereas, the other end is open into adjacent Fire Zone 1A117. For Fire Zone 1A101, a minimum separation distance of 35 feet exists between unwrapped redundant divisions. The intervening combustibles consist of one ventilated cable tray containing nonsafety-related IEEE Std 383 qualified cables. Division I safe shutdown components, located north of column line 11.0, are protected with a 1-hour fire rated barrier (cable wrap). A partial area sprinkler system exists in Fire Zone 1A101, north of column line 10.5 where the redundant cables are located. The fire load in Fire Zone 1A101 is low with a fire severity less than 30 minutes.

Fire Zone 1A117 is a continuation of open space from Fire Zone 1A101. Division I and II safe shutdown cables are located herein. The combustible fire load in this fire zone is equivalent to a fire severity of less than 30 minutes. Fire detection is provided throughout the zone and partial area sprinkler protection is provided east of Column Line J5.

Fire Zone 1A120 separates Fire Zones 1A117 and 1A114. Fire Zone 1A120 contains no safe shutdown cables and provides more than 90 feet separation space between redundant cables located in Fire Zones 1A117 and 1A114. The average fire load is low (less than 30 minute fire severity) and consists primarily of electrical cables. Fire detection is provided.

Fire Zone 1A114 is adjacent to Fire Zone 1A120 and is a continuation of the corridor perimeter. It contains Division I safe shutdown cables and fire detection is provided. The fire load is equivalent to a 45 minute fire severity. The separation distance to the redundant division in Fire Zone 1A117 is more than 90 feet, which includes the space in Fire Zone 1A120. Fire Detection is provided.

valuation

The fire protection in Fire Area 1 does not comply with the technical requirements of Section III.G.2.b of Appendix R because 20 feet of spatial separation free of intervening combustibles and an area-wide automatic fire suppression system have not been provided between redundant safe shutdown system components.

The concern regarding the level of fire protection in Fire Area 1 was that because of the lack of an area-wide fire suppression system and 20 foot spatial separations between redundant safe shutdown system components free of intervening combustibles, a fire of significant magnitude could develop and spread through the separation spaces (fire zones) between the redundant divisions.

However, the fire load is low and consists primarily of IEEE Std 383 qualified cable insulation with the possibility of a transient exposure fire. Should a fire occur, it is expected to be small and develop slowly. The presence of the partial sprinkler fire suppression system in Fire Zone 1A101 and 1A117 would prevent the fire from reaching significant proportions and spreading through the 35 foot separation distance. Also, the actuation of the fire detection system in the fire zones which contain safety-related equipment would alarm and summon the fire brigade. Until the fire is extinguished, the low fire load, the spatial separation equal to or greater than 35 feet for Fire Zone 1A101 and 90 feet for Fire Zones 1A114 and 1A117, the high ceilings, and the partial sprinkler system coverage and 1-hour fire rated barrier (wrap) in Fire Zone 1A101 would provide reasonable assurance that a fire would not simultaneously threaten redundant safe shutdown system components. It is expected that the fire would remain small and would be easily extinguished by the fire brigade.

Conclusion

Based on the above evaluation, the staff concludes that the existing fire protection features in and around the three fire zones having redundant safe shutdown system components separated by a space from 35 to 90 feet with a minimal amount of intervening combustibles provide a level of fire protection equivalent to the technical requirements of Section III.G.2.b of Appendix R. Therefore, this deviation is acceptable.

2.1.2 Auxiliary and Enclosure Buildings, Fire Area 2

Deviation Requested

A deviation was requested for Fire Area 2 from Section III.G.2.a of Appendix R to the extent that it requires complete 3-hour fire rated barriers separating redundant divisions of safe shutdown system components.

Discussion

Fire Area 2 is in the auxiliary building, includes the roof, and contains 30 fire zones that are located at each elevation of the auxiliary and enclosure buildings (roof area). The floor at elevation 93 feet of the auxiliary building is reinforced concrete slab on grade. Fire Area 2 is separated from other fire areas by 3-hour fire rated barriers; however, the roof is unrated. The enclosure building is on the auxiliary building roof and its walls and roof are unrated. Exterior building walls for Fire Area 2 on elevations 185 and 228 feet are unrated while the containment wall is 3-hour fire rated.

Fifteen of the 30 fire zones in Fire Area 2 contain safe shutdown equipment or cables. Fire Area 2 can be simplified by dividing it into four groups of fire zones (A, B, C, and D). Three groups are in the auxiliary building and one is in the enclosure building (roof area). The three groups of fire zones in the auxiliary building are separated from each other by complete 3-hour fire

rated walls. The only exception is the pressure relief (blowout) panels that open into blowout shafts. These panels are 1-3/4-inch thick steel and are kept in a closed position.

Division II safe shutdown system components are located in group A, and Division I in group B and group C. Group D contains fire zones that have no safe shutdown system components.

The highest fire severity in Fire Area 2 is less than 60 minutes as represented by the ASTM E-119 fire test curve. However, this is skewed on the high side because of the area geometry (a small floor area). Since Fire Area 2 is separated from all other fire areas by 3-hour fire rated barriers, a fire will not spread into other fire areas.

Fire protection in Fire Area 2 includes fire hose stations and fire extinguishers strategically located throughout the area. Fire Zones 1A439, 1A440, 1A441, 1A442, 1A506, and 1A508 are not provided with hose stations or fire extinguishers because of their close proximity to other zones having such equipment. Smoke detection systems are provided in all fire zones containing safe shutdown equipment cables.

Evaluation

The fire protection in Fire Area 2 does not comply with the technical requirements of Section III.G.2.a of Appendix R because a complete 3-hour fire rated barrier has not been provided between redundant divisions of safe shutdown system components.

The staff's principal concern with the level of fire protection in Fire Area 2 was that because of the the lack of complete 3-hour fire rated barriers between redundant trains of safe shutdown system components, a fire of significant magnitude could develop and damage redundant divisions of safe shutdown system components. However, there are no large fire hazards located in the fire zones of concern and the available fire load/severity is significantly less than the barrier(s) fire rating of 3 hours. Three of the four groups of fire zones in Fire Area 2 are located in the Auxiliary Building and are separated from each other by 3-hour fire rated barriers, except for the steel blowout panels. These steel panels are 1-3/4-inch-thick and are kept closed. Hence, a substantial noncombustible physical barrier exists between these three groups of fire zones. The fourth group of fire zones in Fire Area 2, consisting of those fire zones located within the Enclosure Building, is separated from each of the other three groups by the nonrated reinforced concrete barriers of the blowout shafts.

The fire zones within group A are separated by nonrated barriers. Since the fire zones in group A contain only Division II safe shutdown components, a postulated fire originating in any fire zone within this group will not affect more than one train of safe shutdown systems.

The fire zones within group B and group C are also separated by nonrated barriers. Since the fire zones in group B and group C contain only Division I safe shutdown components, a postulated fire originating in any fire zone within these groups will not affect more than one train of safe shutdown systems.

The fire zones within group D are not separated by barriers. Since the fire zones in group D do not contain any safe shutdown components, a postulated fire originating in any fire zone within this group will not affect either train of safe shutdown systems.

Division II in group A and Division I in group C are not separated by complete 3-hour fire barriers. The nonrated steel pressure relief panels located in the north and south walls and the floor of Fire Zone 1A124 (blowout shaft) are the only means of communication between group A and C fire zones. The closest Division I and II safe shutdown components are located in Zones 1A204 and 1A105. These components are separated horizontally by more than 20 feet for any of the communication paths between Fire Zones 1A105 and 1A204. Also, the communication path would have to involve two separated blowout pressure relief panels in an open position. The blowout panels are kept in a closed position. There are no intervening combustibles located within the horizontal separation distance.

If a fire were to occur in any of the four groups of fire zones, the staff anticipates that it would develop slowly with initial low heat release and slow rise in area temperature. The floors, walls, ceilings, and penetrations between the four groups of fire zones are essentially complete 3-hour fire rated barriers. The incompleteness of the fire barriers is due to the 1-3/4-inch steel blowout panels and the blowout shaft walls above elevation 185 feet, which are unrated, but offer substantial passive resistance to the spread of fire. Because of the presence of fire detection systems in the fire zones containing safe shutdown system components, the fire would be detected in a timely manner and the fire brigade would be summoned. Until the fire was extinguished, the 3-hour fire rated barriers with their steel blowout panels would provide reasonable passive protection to ensure that one division would remain free of fire damage.

The staff finds that the provision of 3-hour fire rated blowout panels to form complete 3-hour fire rated barriers would not significantly increase the level of fire protection in this fire area.

Conclusion

Based on the above evaluation, the staff concludes that the existing fire protection measures, separation distances, steel blowout panels, and 3-hour fire rated barriers provide a level of fire protection equivalent to the technical requirements of Section III.G.2.a of Appendix R. Therefore, the deviation for Fire Area 2 is acceptable.

2.1.3 Auxiliary Building, Fire Area 6 (Fire Zones 1A201, 1A211, 1A215, and 1A222)

Deviation Requested

A deviation was requested from Section III.G.2.b of Appendix R to the extent that it requires an automatic fire suppression system throughout the area and a separation distance of more than 20 feet with no intervening combustibles.

Discussion

Fire Area 6 is within the auxiliary building on elevation 119 feet and consists of four fire zones: 1A201, 1A211, 1A215, and 1A222. The four zones in this fire area are open to each other and form the perimeter corridor in the auxiliary building. The floor, ceiling, and walls are 3-hour fire rated barriers, except for the below grade areas and the nonrated exterior barriers. However, these barriers are of reinforced concrete and would qualify as 3-hour fire rated barriers. Barriers separating stairs and elevators are 2-hour fire rated.

All four zones contain safe shutdown system components. Fire Zone 1A211 contains Division I and II cables, which are protected by a 1-hour fire rated barrier (wrap) within the 26 foot separation space between 4 ft. and 30 ft. west of Column Line G.4. The unprotected portions are separated by 26 feet of space with intervening combustibles in the form of IEEE Std 383 cables. Fire Zone 1A201 contains only Division I safe shutdown system components and is adjacent to Fire Zone 1A211. There is a separation distance of at least 26 feet between the Division I components and the unprotected Division II components in Fire Zone 1A211. Fire Zone 1A215 contains only Division I components and is located over 90 feet away from Fire Zone 1A211 and is separated from Fire Zone 1A211 by Fire Zone 1A201. Fire Zone 1A222 contains both Division I and II safe shutdown system components. Divisions I and II within Fire Zone 1A222 are separated from each other by 26 feet of space free of intervening combustibles. Fire Zone 1A222 separates Division I components located in Fire Zone 1A215, from the Division II components located in Fire Zone 1A211.

The average fire load for Fire Area 6 is less than 60 minutes fire severity and, in one Fire Zone (1A201), it is less than 75 minutes as represented by the ASTM E-119 fire test curve. (For purposes of determining combustible fuel loading in a Fire Zone, enclosed cable trays - i.e. trays with solid bottom and solid covers - are treated the same as conduits or totally enclosed raceways.) Fire protection for this fire area includes an area-wide fire detection system. Partial area sprinkler system coverage is also provided for both fire zones that contain redundant divisions of shutdown components and for Fire Zone 1A201. Fire extinguishers, fire hose station coverage and automatic fire detection capability are also available throughout the area.

Evaluation

The fire protection in Fire Area 6 does not comply with the technical requirements of Section III.G.2.b of Appendix R because 20 feet of spatial separation free of intervening combustibles and an area-wide automatic fire suppression system have not been provided between redundant safe shutdown system components.

The principal concern with the level of fire protection in Fire Area 6 was that a fire of significant magnitude could develop and, by spreading through the separation spaces between redundant safe shutdown components, could damage redundant divisions. Adding to this concern was the lack of complete area-wide fire suppression system and the presence of intervening combustibles within the 26-foot separation space in Fire Zone 1A211. These intervening combustibles consist of IEEE Standard 383 qualified cables. There are no other fire hazards or fuel loading within the 26-foot separation space in Fire Zone 1A211.

Should a fire occur, it is expected to be small and develop slowly. The presence of a complete area-wide fire detection system would detect and summon the fire brigade in a timely manner. The partial sprinkler systems, being in the areas of primary concern, would keep the fire small or extinguish it. Until the fire was extinguished, the low fire load in the fire zones, the 1-hour fire barrier wraps on both divisions within Fire Zone 1A211, separation distances of more than 26 feet, and the IEEE Standard 383 qualified cable insulation provide reasonable assurance that the fire would not threaten redundant safe shutdown system components simultaneously. It is expected that the fire would remain small and be easily extinguished by the fire brigade if necessary.

Conclusion

Based on the above evaluation, the staff concludes that the existing fire protection features in the fire zones having redundant safe shutdown components separated by a space of more than 26 feet with a minimal amount of intervening combustibles in the form of IEEE 383 qualified cables provide a level of fire protection equivalent to the technical requirements of Section III.G.2.b of Appendix R. Therefore, this deviation is acceptable.

2.1.4 Auxiliary Building, Fire Area 11

Deviation Requested

A deviation was requested from Section III.G.2.b of Appendix R to the extent that it requires an automatic fire suppression system throughout the area and a separation distance of more than 20 feet with no intervening combustibles.

Discussion

Fire Area 11 consists of nine fire zones. Fire Zones 1A301, 1A302, 1A314, 1A316, 1A321 and 1A322 are the only fire zones in Fire Area 11 that contain safe shutdown system components, and they comprise an open, U-shaped passage around the perimeter of the auxiliary building on elevation 139 feet. Fire Zone 1A301 is separated from Fire Zone 1A302 by the main steam tunnel. Fire Zones 1A323, 1A324, and 1A326 communicate with Fire Zones 1A316, 1A321, 1A322, and with each other through open areas and nonrated barriers. The floors, ceiling, and walls of Fire Area 11 are 3-hour fire rated barriers, except for sections of the south and west walls, which are nonrated exterior walls. However, these wall sections are of reinforced concrete and would qualify as being 3-hour fire rated. A section of the north wall, the stairwells, and Elevator No. 3 enclosures are 2-hour rated.

Fire Zone 1A316 contains Division I and II safe shutdown system components and both are provided with a 1-hour fire rated wrap within the 25-foot separation space. A minimum separation distance of 25 feet between unprotected Division I and II components exists with intervening combustibles in the form of five cable trays loaded with IEEE Std 383 qualified cables. An automatic fire suppression system is installed within this zone to cover this space. Therefore, this deviation from Section III.G.2.b can be approved in Fire Zone 1A316.

Fire Zone 1A301 contains only Division I components and is separated from Fire Zone 1A316 Division II components by a 25-foot separation distance. Fire Zone 1A321 contains only Division II components and is also separated by a 25-foot distance from Fire Zone 1A316 Division I components. Partial automatic sprinkler protection is provided for safe shutdown components in both Fire Zones 1A301 and 1A321 but not throughout the entire zones.

Fire Zone 1A322 contains both Division I and II components and these redundant divisions are separated by 23 feet. The only combustibles in this separation space is lube oil contained within three plant-chilled water system chillers and two enclosed cable trays. Automatic sprinklers are provided for this zone.

Fire Zones 1A314 and 1A302 are located east of Fire Zone 1A322 and contain Division I components. No fire suppression system coverage is provided for these two fire zones.

Fire Area 11 is provided with an area-wide detection system. Also, fire extinguishers and hose stations are available on an area-wide basis. Fire rated barriers in all fire zones exceed the zone fire severity based on existing fire loads. There is only a minimal fire load on the floors.

Evaluation

The fire protection in Fire Area 11 does not comply with the technical requirements of Section III.G.2.b of Appendix R because 20 feet of spatial separation free of intervening combustibles and an area-wide automatic fire suppression system have not been provided between redundant safe shutdown system components.

The principal concern with the level of fire protection in Fire Area 11 was that because of the lack of an area-wide fire suppression system and spatial separations between redundant safe shutdown system components that are not free of intervening combustibles, a fire of significant magnitude could develop and spread through the spatial separations and, thus, jeopardize the safe shutdown capability. The primary fire load in Fire Zone 1A316 is composed of IEEE Std 383 qualified cables. The primary fire load in Fire Zone 1A322 is the 25 gallons of lube oil in the chillers which is contained within metal casings. The only intervening combustibles within the 25 foot separation distance described for Fire Zone 1A316 are IEEE-qualified cables. The only intervening combustibles within the 23 foot separation distance described for Fire Zone 1A322 is the lube oil contained in the chillers. There is essentially no fire loading on the floor and no fire hazardous equipment located within the subject fire area. Should a fire occur, it is expected to be small and develop slowly. The presence of the area-wide fire detection system would detect the fire in a timely manner and summon the fire brigade. In Fire Zones 1A316 which contains redundant divisions, 1-hour fire rated barriers (wraps) are provided on both Division I and II cables. In Fire Zone 1A322, no wraps are provided for redundant divisions of safe shutdown components. The wraps in Fire Zone 1A316 and no exposed combustibles in Fire Zone 1A322 and the sprinkler system coverage provide assurance that one division of safe shutdown system components will remain free of fire damage.

Until a fire is extinguished within any of the fire zones in Fire Area 11, the partial 1-hour fire rated barrier wraps, the partial area sprinkler systems, the high ceilings and open areas, the IEEE 383 qualified cable insulation, and the spatial separations of at least 23 feet between redundant components provide reasonable assurance that a fire would not threaten redundant safe shutdown system components simultaneously. It is expected that the fire would remain small, be easily extinguished, and not damage redundant divisions of safe shutdown components.

Conclusion

Based on the above evaluation, the staff concludes that the existing fire protection in the six fire zones in Fire Zone 11 having redundant divisions of safe shutdown components separated by a spatial distance of at least 23 feet with a minimal amount of combustibles, and protected by area wide fire detection capability and/or 1-hour fire rated barrier wraps and partial area coverage sprinkler systems, provides a level of fire protection equivalent to the technical requirements of Section III.G.2.b of Appendix R. Therefore, this deviation is acceptable.

2.1.5 Auxiliary Building, Fire Area 19

Deviation Requested

A deviation was requested from Section III.G.2.b of Appendix R to the extent that it requires redundant safe shutdown components to be separated by either a 20-foot space with no intervening combustibles or a 1-hour fire rated barrier. In addition, both alternatives must have fire detection and automatic suppression systems installed throughout the area.

Discussion

Fire Area 19 consists of 35 fire zones located in the Auxiliary Building and the Enclosure Building. Twenty-nine of the 35 fire zones do not contain safe shutdown system components. In the remaining six fire zones, only two contain both redundant safe shutdown components. Fire Area 19 is bounded by 3-hour fire rated barriers and nonrated exterior barriers. The exterior barriers of the Auxiliary Building are of reinforced concrete and would qualify as 3-hour fire rated barriers. The exterior barriers of the Enclosure Building are metal and would not qualify as 3-hour rated barriers. For the interior barriers, the only exceptions to the 3-hour rating are the stairwells and Elevator No. 3 enclosures, which are 2-hour fire rated.

For ease of discussion, the fire zones in Fire Area 19 can be classified into three separate groups (A, B, and C). Group A consists of Fire Zones 1A401, 1A403, and 1A420, which contain only Division I safe shutdown components; Fire Zone 1A424, which contains only Division II safe shutdown components; and Fire Zones 1A417 and 1A428, which contain both Division I and II safe shutdown components. Group B consists of Fire Zones 1A427, 1A429, 1A430, 1A432, 1A433, 1A434, and 1A436. Group C consists of Fire Zones 1A431, 1A437, 1A438, 1A444, 1A519, 1A523, 1A524, 1A525, 1A527, 1A528, 1A529, 1A530, 1A531, 1A532, 1A533, 1A534, 1A536, 1A537, 1A602, 1A603, 1A604, and 1A606. None of the group B or group C fire zones contain any safe shutdown components.

Group A includes those fire zones that form a passageway around the perimeter of the auxiliary building on elevation 166 feet. Group B consists of the remaining zones on elevation 166 feet. Group C includes the fire zones on elevation 185 feet or those that are separated from groups A and B by 3-hour rated barriers. Group A communicates with group B through nonrated barriers and open boundaries and with group C through nonrated hatchways between the floors.

Fire Zone 1A417 contains both divisions of safe shutdown components. Between column line G.4 and 23 feet west of G.4, both divisions are protected with a 1-hour fire rated wrap. Unprotected portions have a 23-foot separation free of intervening combustibles. In addition, an automatic sprinkler system provides a partial area coverage for this fire zone.

Fire Zone 1A428 contains both Division I and II safe shutdown components. All Division I safe shutdown components are located south of column line 6.2 and east of column line N. All Division II safe shutdown components are located more than 21 feet north of column line 11.0. Therefore, Division I and II safe shutdown components in Fire Zone 1A428 are separated by more than 110 feet. The intervening combustibles within this separation space are low and consist of IEEE Std 383 qualified cables in ventilated trays.

The remaining fire zones that contain safe shutdown system components have only one division per zone. These zones are adjacent to each other and to Fire Zones 1A417 and 1A428. Based on the arrangements of these zones, Division I and II components are separated by at least 21 feet and the space enclosed by any one particular fire zone.

Fire Zones 1A523, 1A519, and 1A525 are located on elevation 185 feet and do not contain any safe shutdown components. These fire zones are separated from the fire zones located on elevation 166 feet by 3-hour rated fire barriers, except for two nonrated hatches in the floor at elevation 185 feet. These hatches interface with Fire Zone 1A428, which contains safe shutdown components. The hatches are separated by a horizontal distance of more than 115 feet. The intervening combustibles between these hatches consist primarily of IEEE Std 383 qualified cables. The hatches are constructed of steel or concrete and steel and offer substantial physical barriers against the spread of fire and heat.

All fire zones that contain safe shutdown components have fire detection systems. Twelve of the remaining 29 zones also contain fire detection systems. In addition, fire hose stations and portable fire extinguishers are located in all Fire zones except 1A525 and 1A537. Fire Zone 1A525 has neither hose stations nor fire extinguishers located in it and Fire Zone 1A537 has no hose station in it. However, these two zones are close enough to the other zones to assure that hoses and portable fire extinguishers are available throughout the area. In all fire zones, the fire severity is considerably less than the fire rating of the existing barriers and, in no case, is the fire severity more than 75 minutes as represented by the ASTM E-119 fire test curve.

Evaluation

The fire protection in Fire Area 19 does not comply with the technical requirements of Section III.G.2.b of Appendix R because redundant divisions have not been separated by 20 feet of space with no intervening combustibles or provided with a complete 1-hour fire rated barrier. Also fire detection and automatic fire suppression systems have not been provided on an area-wide basis.

The staff's principal concern with the level of fire protection in Fire Area 19 is that a fire of significant magnitude could develop and, by spreading through separation distances, damage redundant divisions of safe shutdown system components. This concern was heightened by the lack of complete area-wide fire detection and fire suppression systems and spatial separations containing

intervening combustibles. However, there are no fire hazardous equipment or heavy fire loads on the floors of the fire zones. The primary fire loading is in the form of IEEE Std 383 qualified cables. Should a fire occur, it is expected to develop slowly and remain small. The fire detection systems within the various fire zones would detect the fire and summon the fire brigade in a timely manner. The presence of partial sprinkler systems in the fire zones that have both redundant divisions of cables would be expected to control any postulated fire so that it can be extinguished by the fire brigade.

Until the fire is extinguished, the spatial separations and high ceilings, the 2- and 3-hour fire rated barriers and 1-hour fire rated barrier wraps, the IEEE Standard 383 qualified cable insulation, the partial area sprinkler systems, and the absence of other significant insitu fire loading provide reasonable assurance that a fire would not threaten redundant safe shutdown system components simultaneously. It is expected that any fire would remain small and would be easily extinguished by the fire brigade.

Conclusion

Based on the above evaluation, the staff concludes that the existing fire detection and sprinkler systems in fire zones having redundant safe shutdown system components separated by a distance of 21 to 115 feet (with minimal intervening combustibles) provide a level of fire protection equivalent to the technical requirements of Appendix R, Section III.G.2.b. Therefore, this deviation is acceptable.

2.1.6 Containment and Drywell, Fire Area 25

Deviation Requested

A deviation was requested for Fire Area 25 from Section III.G.2. (d, e, or f) of Appendix R to the extent that it requires one of the following: separation of redundant safe shutdown components by a horizontal distance of more than 20 feet with no intervening combustibles; or the installation of fire detectors and an automatic fire suppression system; or separation of redundant components by a noncombustible radiant energy heat shield.

Discussion

Fire Area 25 consists of 34 fire zones of which two are in the drywell and 32 are in the containment proper. The floors in the containment are made of steel grating with concrete pads to support specific pieces of equipment. There are no rated fire walls inside the containment. Therefore, a fire originating in any fire zone can spread to any other fire zone in the containment. The same is true for the two fire zones in the drywell. However, a fire originating in either the drywell or the containment cannot spread to the other because the drywell is separated from the containment by a 5-foot-thick concrete wall with a vault type door.

A separation analysis of Fire Area 25 was performed to determine compliance with Section III.G.2 of Appendix R. This analysis, which is contained in licensee's letter dated May 7, 1986, and supplemented by letter dated July 24, 1986, revealed that there are redundant trains that are separated by less than 20 feet with no suppression systems or radiant energy shields. The circuits and components of the redundant safe shutdown trains include:

- o safe shutdown nuclear boiler system pressure switches/circuits,
- o suppression pool temperature monitoring circuits (system M71), and
- o safety relief valves.

The deviation related to lack of a 20-foot separation distance for each of these combinations of safe shutdown train components and the corrections provided by the licensee, as described below.

1. Radiant energy shields in accordance with Section II.G.2.f were provided for safe shutdown nuclear boiler system (B21) pressure switches and raceways containing these circuits in Fire Zone 1A110D3, and raceway 1CARNP14 from Fire Zone 1A220D3 to azimuth 19° in Fire Zone 1A411.
2. Radiant energy shields in accordance with Section III.G.2.f were provided for all Division 2 safe shutdown suppression pool temperature monitoring circuits (system M71) in Fire Area 25 (Fire Zones 1A110C1, 1A313, 1A110C2, 1A311, and 1A110C3). These circuits are only redundant to the Division I M71 system circuitry. Therefore, at least one train of safe shutdown suppression pool temperature monitoring circuits are protected from the effects of a design basis fire in Fire Area 25.
3. With respect to the safety relief valves, the licensee had originally selected six specific safety relief valves and associated cabling as being required for safe shutdown during a fire at the Grand Gulf plant. These six valves were in accordance with the licensee's post-fire safe shutdown model approach. Each of these valves, by necessity, has redundant power cables terminating at it, and some were in close proximity to each other. A total of 20 safety relief valves (SRVs) are available, and any six SRVs can be used for safe shutdown given a fire in Fire Area 25. These design features assure that at least six of the 20 SRVs will be available during or following any fire in Fire Area 25, thus preventing a fire from disabling the ability to depressurize the reactor vessel via ADS/safety relief valves. By letter dated July 24, 1986, the licensee stated that each safety relief valve can be opened with power from Division I or Division II so that loss of one division does not compromise depressurization capability for that valve.

The fire severity based on the fire loading in Fire Area 25 ranges from 15 minutes to less than 90 minutes as represented by the ASTM E-119 fire test curve. Fire detection capability is in the form of smoke detectors within

sections of the HVAC ductwork and redundant ambient air temperature monitors. In the drywell area, three dual thermocouples are provided to monitor ambient air and alarm if the temperatures exceed 145°F. Additional fire protection is in the form of fire extinguishers and fire hose stations.

Evaluation

The fire protection in Fire Area 25 did not comply with the technical requirements of Section III.G.2 of Appendix R because 20 feet of separation without intervening combustibles does not exist, fire detection and automatic fire suppression systems are not installed, and the provision of a radiant energy heat shield(s) had not been provided between redundant safe shutdown system components.

Within the containment and drywell areas, the main concern was that a fire could develop and damage redundant safe shutdown system components because of their close proximity and/or lack of radiant energy heat shields. However, for the three specific locations of concern identified by the licensee, two were resolved by the licensee's modifications. The third location of concern involved six SRVs and their associated cables.

The licensee's installation of radiant energy heat shields for the safe shutdown nuclear boiler system pressure switches and raceways and for all of Division II safe shutdown suppression pool temperature monitoring circuits complies with the technical provisions of Section III.G.2.f of Appendix R.

The availability of 20 SRVs, of which only six are required, mitigates the concern for fire damage to redundant SRVs because of the arrangement and spacing of all of the SRVs.

Conclusion

Based on the above evaluation, the staff concludes that the existing fire protection and the licensee's modifications provide a level of fire protection equivalent to the technical requirements of Section III.G.2 of Appendix R. Therefore, this deviation is acceptable.

1.7 Control Building, Fire Area 42

Deviation Requested

A deviation was requested from Section III.G.2.a of Appendix R to the extent that it requires complete 3-hour fire rated barriers separating redundant divisions of safe shutdown system components in Fire Area 42.

Discussion

Fire Area 42 contains 21 fire zones located on Control Building elevations 133 feet through 177 feet. The floor, ceiling, and walls of Fire Area 42 are either 3- or 2-hour fire rated barriers, except for the nonrated exterior doors of Fire Zone OC309.

Fourteen of the 21 fire zones in Fire Area 42 do not contain any safe shutdown components. Four fire zones (OC302, OC303, OC308, and OC402) contain both Division I and II safe shutdown system components. The three remaining fire zones (OC406A, OC518A, and OC613A) contain only safe shutdown ductwork.

Fire Zones OC302, OC303, and OC308 are situated in the control building as a group, each containing both Division I and II safe shutdown equipment, cable, and raceway. All three fire zones are separated from each other by 2-hour rated fire barriers. Fire Zone OC302 contains both Division I standby service water system (P41) and Division II residual heat removal (12) safe shutdown cable and raceway. Division I P41 cable and raceway are provided with 3-hour rated fire barriers.

Fire Zones OC302 and OC303 contain Divisions I and II safeguard switchgear and battery room ventilation (Z77) safe shutdown components.

A section of both Division I and II safe shutdown (Z77) cable and raceway in Fire Zone OC302 are provided with 3-hour rated fire barriers. The Z77 system, which consists of Units 1 and 2 (dedicated for Unit 1 Operation) equipment, is designed to operate with two supply air handling units (AHUs), two exhaust fans (EFs) and the corresponding ductwork, dampers, etc. Four AHU/EF trains exist. A minimum of two trains are required for proper ventilation. There are two complete sets of equipment in Fire Zone OC302 and two complete sets in Fire Zone OC303. The Z77 ductwork does not cross Fire Zones OC302/OC303 room boundary.

A fire in Fire Zone OC302 could disable the Z77 equipment located there. However, the power supplies in Fire Zone OC302 and the Z77 equipment in Fire Zone OC303 would not be affected and would still be operational. Similarly, a fire in Fire Zone OC303 could disable the Z77 equipment located there, however the power supplies in Fire Zone OC303 and the Z77 equipment in Fire Zone OC302 would not be affected and would be available. As previously indicated, a minimum of two trains of AHUs/EFs are required to provide proper ventilation for the safeguard switchgear and battery rooms. The logic associated with the Z77 system permits manually initiated operation using the undamaged equipment, cable, and raceway located in the other fire zone.

Fire Zone OC308 contains both Division I and II safe shutdown cable and raceway. All of the Division I safe shutdown cable and raceway are provided with 3-hour fire barriers. Fire Zone OC308 is separated from Fire Zones OC302 and OC303 by 2-hour fire barriers. Fire Zones OC302 and OC303 each has a postulated combustible loading equal to less than a 15-minute fire severity and Fire Zone OC308 has a combustible loading equal to less than a 30-minute fire severity.

Fire Zone OC402 contains Division I and Division II safe shutdown equipment. One hour fire rated barriers are provided for the Division I safe shutdown cables and raceways in addition to fire detection capability, automatic total flooding CO₂ and automatic water sprinkler suppression systems throughout the zone. This² assures that at least one train of safe shutdown equipment will be protected from effects of a fire within Fire Zone OC402. From the above descriptions it is also clear that safe shutdown equipment in Fire Zone OC402 is separated from redundant equipment located in Fire Zones OC302, OC303 and OC308 by more than 50 feet of horizontal distance and 2-hour rated fire barriers.

Smoke detection systems are provided in all zones having safe shutdown system components except the three fire zones which have only safe shutdown ductwork (OC406A, OC518A, and OC613A). Fire extinguishers and hose stations are also available throughout the area except in Fire Zones OC412A, OC507C, OC518A, OC603B and OC613A (heating, ventilating and air conditioning chases). The fire severity, based on zone fire loadings, ranges from 0 to less than 120 minutes as represented by the ASTM E-119 fire test curve. However, for Fire Zones OC302 and OC303, the fire severity is less than 15 minutes and for Fire Zone OC308 it is less than 30 minutes. In Fire Zone OC402, the fire severity is less than 75 minutes, but this zone has two automatic fire suppression systems on an area-wide basis.

Evaluation

The fire protection in Fire Area 42 does not comply with the technical requirements of Section III.G.2. of Appendix R because a complete 3-hour fire rated barrier has not been provided between divisions of safe shutdown system components.

The main concern with the level of fire protection in Fire Area 42 was that because of the lack of complete 3-hour fire rated barriers between redundant divisions, a fire of significant magnitude could develop and damage redundant divisions of safe shutdown system components. However, in the fire zones containing safe shutdown divisions, the fire load is low. Coverage of two fire suppression systems is available in Fire Zone OC402. Within this fire area, the fire severity is less than 120 minutes and, hence, less than the fire rating of the area/zone barriers throughout Fire Area 42.

In the fire zones containing redundant divisions, one division has either 3-hour fire rated wraps or 1-hour fire rated wraps coupled with fire detection and suppression systems, bringing it in compliance with Appendix R. The remaining issue, then, is the 2-hour fire rating of the walls separating redundant divisions.

If a fire were to occur anywhere in Fire Area 42 the staff expects that it would develop slowly and remain small with low heat release and slow rise in area temperature. The fire loads are such that the expected fire severity would not exceed the 2- or 3-hour fire rating of the walls. The smoke detection systems would actuate and summon the fire brigade. Until the fire was

extinguished by either the fire brigade or existing fire suppression systems, there is reasonable assurance that the 1- and 3-hour fire rated wraps would adequately protect the redundant division components in the area or zone of concern. Likewise, the 2-hour fire rating of the walls is sufficient to protect adjoining zones that have safe shutdown components. The staff finds that the upgrading of the 2-hour fire rated barriers to a 3-hour fire rating would not significantly increase the level of fire protection.

Conclusion

Based on the above evaluation, the staff concludes that the existing fire protection measures including the 1- and 3-hour fire rated wraps and the 2-hour fire rated walls provide a level of fire protection equivalent to the technical requirements of Section III.G.2.a of Appendix R. Therefore, the deviation for Fire Area 42 is acceptable.

2.1.8 Control Building, Fire Area 50

Deviation Requested

A deviation was requested from Section III.G.3 of Appendix R to the extent that it requires installation of a fixed fire suppression system in a fire area for which an alternative shutdown capability is provided.

Discussion

Fire Area 50 is separated from other plant areas by 3-hour fire rated barriers, except for interfaces with stairwells and an elevator, which are 2-hour fire rated. The only fire zones in Fire Area 50 that contain safe shutdown system components are Fire Zones OC503, OC504 and OC617. Fire Zones OC503 and OC504 are essentially the control room for Unit 1. Fire Zone OC503 is the control room proper, whereas, Fire Zone OC504 is the space above the control room that is enclosed by a suspended ceiling. Fire Zone OC504 contains redundant divisions of power cables; however, since an alternative safe shutdown system is provided outside the control room, fire barriers are not provided for redundant power cables in Fire Zone OC504. Fire Zone OC617 contains only Division I safe shutdown cable and raceway and is separated from other fire zones by 2-hour walls and 3-hour ceiling and floor. No fires are postulated within or adjacent to Fire Zone OC617 which exceed the fire rating of the floor, ceiling or walls.

The fire load in the room is low. Fire protection features in the control room include fire detectors, Halon fire suppression for the under floor sections of the PGCC panels, portable extinguishers, and constant manning of the area. Also, fire hose stations are available to this area.

Since the control room area contains safe shutdown system components for almost all plant systems, the most severe postulated fire would affect all divisions. The licensee has provided an alternative safe shutdown system including

isolation transfer switches for compliance with Sections III.G.3 and III.L of Appendix R. The alternative safe shutdown room is independent of the control room area.

Evaluation

The fire protection in Fire Area 50 (main control room) does not comply with the technical requirements of Section III.G.3 of Appendix R because a fixed fire suppression system is not installed in a fire area for which alternative shutdown capability is provided.

The primary concern for this fire area was that a fire in the main control room could cause the loss of normal shutdown capability. However, should a fire occur within the main control room, it is expected that it would be promptly detected by the automatic fire detection system or by station personnel. Should fire damage be extensive, necessitating evacuation of the control room, the alternative safe shutdown system can be used to shut down the plant safely. Because the control building has 3- and 2-hour fire rated barriers (see Section 2.1.7), it is expected that a fire would not spread to adjacent fire areas/zones. The staff finds that the installation of a fixed suppression system in the main control room would not significantly increase the level of fire protection.

Conclusion

Based on the above evaluation, the staff concludes that the existing fire protection features, including the alternative shutdown capability in Fire Area 50 provide a level of protection equivalent to the technical requirements of Section III.G.3 of Appendix R. Therefore, the deviation from fixed fire suppression in the main control room is acceptable.

2.1.9 Manholes, Fire Area 59

Deviation Requested

A deviation was requested from Section III.G.2.a of Appendix R to the extent that it requires complete 3-hour fire rated barriers separating redundant divisions of safe shutdown system components.

Discussion

Fire Area 59 is the yard which includes all components outside the power block, including those underground. Fire Area 59 contains manhole MH01, which has four compartments. This manhole is located underground and contains Division I and II safe shutdown cable and raceway. The raceway consists of reinforced concrete duct banks and manholes to facilitate cable pulling. All manholes are sealed with pressure-type water-, gas-, and steam-tight bolted lids. Rubber gaskets are proved to prevent the entry of liquids. Manhole MH01 is located about 275 feet west of the control building.

Two compartments of MH01 contain Division I cables and the other two contain Division II cables. Each compartment is separated from each other by a 12-inch-thick reinforced concrete wall. However, at the bottom of each manhole compartment, a 4-inch drain pipe allows drainage from one compartment to another. A sump pump is provided at the end of the drainage path. Since this area and structure are below grade and are isolated, there can be no exposure fire consideration on the manhole walls. The Unit 1 diesel oil storage tank is located about 35 feet away and 10 feet below grade.

The fire load within Manhole MH01 is low, consisting of IEEE Std 383 qualified cables. A fire hydrant is about 50 feet away from manhole MH01.

Evaluation

The fire protection in Fire Area 59 does not comply with the technical requirements of Section III.G.2.a of Appendix R because a complete 3-hour fire rated barrier has not been provided between redundant divisions of safe shutdown system components.

The principal concern with the level of fire protection in Fire Area 59 was that because of the lack of complete 3-hour fire rated barriers between redundant trains of safe shutdown system components, a fire of significant magnitude could develop and damage redundant divisions of safe shutdown system components. However, fire hazards inside and outside of MH01 are low. This area is continuously sealed off and unmanned. The concrete barriers between each manhole compartment would qualify as a 3-hour fire rated barrier, except for the 4-inch-open drain line in the bottom of each manhole. If a fire were to develop in any of the manhole compartments, it is expected to be small because of the low fire load, small volume of space in the manhole, and the sealed covers, which prevent the entry of combustion air. The 4-inch-open drain pipe is at the bottom of the manhole and, therefore, not in a position to allow heat or flame to spread. Also, there are no combustibles located at the bottom of the manholes and no flammable liquids contained therein.

The staff finds that the provision of complete 3-hour fire rated barriers, which would necessitate the sealing of the open 4-inch drains, between each of the MH01 compartments would not significantly increase the level of fire protection in this fire area.

Conclusion

Based on the above evaluation, the staff concludes that the existing physical arrangement, low fire load, sealed environment, locations of the drain at the bottom, and the 12-inch reinforced concrete walls provide a level of fire protection equivalent to the technical requirements of Section III.G.2.a of Appendix R. Therefore, the deviation for Fire Area 59 is acceptable.

2.1.10 Unprotected Cable Trays/Conduits Steel Supports

Deviation Requested

A deviation was requested from Section III.G.2.a and III.G.2.c of Appendix R to the extent that it requires fire resistant materials for covering all structural supports for cable trays and conduits provided with a fire rated barrier or wrap in accordance with Appendix R.

Discussion

The issue of unprotected cable tray supports is applicable throughout the station, wherever a 1-hour fire rated barrier has been provided for either cable trays or conduits. In all cases these locations are provided with fire suppression systems. The sprinkler systems are designed to deliver 0.3 gpm per square foot, which is a conservative discharge density for cable tray fire hazards and other significant fire hazards. In addition, fire detection systems are provided in these areas. Finally, fire extinguishers and hose stations are available.

The licensee has performed a detailed evaluation of unprotected steel supports using a computer program based on a fire mode. The computer program, identified as FIREMPROG, evaluates the thermal response of structural steel to bulk fires. The assumptions and bulk fire analysis are similar to those used for the Limerick plant, which has been previously accepted by the NRC.

Evaluation

The fire protection for the 1-hour fire rated cable tray and conduit wraps does not comply with the technical requirements of Sections III.G.2.a and III.G.2.c of Appendix R because of the lack of a complete fire rated barrier to include the unprotected steel supports.

Because of the low fire loads and the fire detection and suppression systems in the areas that have 1- or 3-hour fire rated barrier wraps, cable trays or conduits, there is reasonable assurance that after a fire in one of the subject areas, one train of safe shutdown systems will be free of fire damage (exclusive of the unprotected steel cable tray/conduit supports)

With respect to the specific issue of unprotected steel supports for cable trays and conduits, the following evaluation is offered.

1. The supports are designed for a seismic load and, hence, have a conservative strength factor. Because of this, the licensee has concluded that the complete loss of a support's strength will not impair the integrity of an adjacent support.
2. The calculated deflection caused by the loss of a support is minimal and the overlapping of wraps by 4 inches allows for this deflection without impairing barrier.

3. The fire analysis was performed with a conservative computer program similar to that accepted at the Limerick plant.
4. All affected areas have automatic fire suppression systems that would contain a fire so that the heat release would not fail structural steel.
5. The steel supports terminate into concrete building components. These connections allow heat to dissipate into concrete, which serves as a heat reservoir. This phenomenon is documented in the American Iron and Steel Institute (AISI) publication, Fire Protection Through Modern Building Codes, Fifth Edition.
6. A fire would not be expected to concentrate only on the steel supports but, rather, would dissipate much of its energy throughout the area of involvement. The result would be that the steel supports would experience a lower heat flux exposure.
7. It is especially important to note that fire test information generally provided by the utilities have no indication of damage or failure of steel supports for cable trays or conduits subjected to the ASTM E-119 fire tests. Further, the staff has neither observed nor received information to the effect that steel cable tray or conduit supports have failed during the numerous ASTM E-119 1, 2, or 3-hour fire tests conducted over the years.

Conclusion

Based on the above evaluation, the staff concludes that the installation of complete fire wraps, barriers, or fire resistive materials on bare steel supports for fire protected steel conduits and cable trays would not significantly increase the level of fire protection in the affected areas. Therefore, the omission of complete fire resistive wraps, barriers, or materials on steel supports for fire protected conduits and cable trays is an acceptable deviation from Sections III.G.2.a and III.G.2.c of Appendix R for these areas and is acceptable.

2.1.11 Summary

Based on the above evaluations, the staff finds that the level of fire safety in the areas listed below is equivalent to that achieved by compliance with the technical requirements of Section III.G of Appendix R and, therefore, the licensee's requests for deviations in the following areas are acceptable. -

1. Auxiliary Building (Fire Area 1) to the extent that there is no fire suppression system or separation space free of intervening combustibles provided pursuant to Section III.G.2.b. See Section 2.1.1 for more details.
2. Auxiliary Building (Fire Area 2) to the extent that complete 3-hour fire rated barriers are not provided pursuant to Section III.G.2.a. See Section 2.1.2 for more details.

3. Auxiliary Building (Fire Area 6) to the extent that there is no fire suppression system or separation space free of intervening combustibles provided pursuant to Section III.G.2.b. See Section 2.1.3 for more details.
4. Auxiliary Building (Fire Area 11) to the extent that there is no fire suppression system or separation space free of intervening combustible provided pursuant to Section III.G.2.b. See Section 2.1.4 for more details.
5. Auxiliary Building (Fire Area 19) to the extent that there is no 1-hour fire rated barrier, or 20-foot separation space free of intervening combustibles, and fire detection and suppression systems provided pursuant to Section III.G.2.b. See Section 2.1.5 for more details.
6. Containment and Drywell (Fire Area 25) to the extent that: (a) pursuant to Section III.G.2.d there is no 20-foot separation space free of intervening combustibles, (b) pursuant to Section III.G.2.e there are no fire detectors or an automatic fire suppression system, and (c) pursuant to Section III.G.2.f there is no separation of redundant components by a noncombustible radiant energy heat shield. See Section 2.1.6 for more information.
7. Control Building (Fire Area 42) to the extent that pursuant to Section III.G.2.a there is not a complete 3-hour fire rated barrier provided between divisions of redundant safe shutdown system components. See Section 2.1.7 for more details.
8. Control Building (Fire Area 50) to the extent that pursuant to Section III.G.3 there is no fixed fire suppression system provided in an area for which an alternative safe shutdown system has been provided. See Section 2.1.8 for more details.
9. Manholes (Fire Area 59) to the extent that a complete 3-hour fire rated barrier is not provided between redundant divisions of safe shutdown system components pursuant to Section III.G.2.a. See Section 2.1.9 for more information.
10. Unprotected Cable Trays/Conduits Steel Supports to the extent that fire rated barriers are not provided for unprotected steel supports of cable trays/conduits pursuant to Sections III.G.2.a and III.G.2.c. See Section 2.1.10 for more information.

2.2 Exceptions to Section III.L of Appendix R to 10 CFR Part 50

In Section 9.5.6 of Supplement No. 1 to the Grand Gulf Nuclear Station (GGNS) Units 1 and 2, Safety Evaluation Report (SSER No. 1, NUREG-0831) dated December 1981, the staff provided its evaluation of the station's compliance with Appendix R to 10 CFR Part 50, Sections III.G and III.L with respect to safe and alternate shutdown capability in the event of a fire.

In SSER No. 1, the staff concluded that for hot shutdown, at least one of the following shutdown systems would be available: (1) the reactor core isolation cooling (RCIC) system, (2) the high pressure core spray (HPCS) system, (3) a combination of the pressure relief system - automatic depressurization system (ADS), the low pressure core spray (LPCS) system, and residual heat removal (RHR) system. For cold shutdown, an appropriate portion of the RHR system would be available. The safe shutdown analysis in SSER No. 1 considered components, cabling and support equipment for the above safe shutdown systems. Also in SSER No. 1, the staff stated that for a control room fire, the RCIC system, safety/relief valves and one division of the RHR system would be controlled from the remote shutdown panel (alternate shutdown capability). This alternate shutdown capability was to include isolation switches at the remote shutdown panel for RCIC, ADS valves and one division of RHR.

By letters dated May 18, May 30, and June 18, 1985, the licensee proposed to protect different safe shutdown systems in the event of a fire than those identified by the staff in SSER No. 1. The revised safe shutdown systems do not include the RCIC system or the HPCS system. In the staff's original evaluation it was assumed that for a fire disabling RCIC, the HPCS would be available. However, the availability of HPCS was not verified by the licensee. In lieu of showing the availability of either the RCIC or HPCS systems, the new safe shutdown method proposed by the licensee relies on the ADS valves for depressurization and the RHR system for makeup operating in the LPCI mode. The licensee's revised safe shutdown systems identified in the above referenced letters included the use of three (3) ADS valves for depressurization and requested an exception to the requirements of Section III.L of Appendix R because the shutdown method resulted in a temporary uncovering of the core with no core damage. Although the licensee's analysis showed no core damage due to the core uncovering during depressurization, the staff requested the licensee to consider verifying the availability of six ADS valves for any fire in order to minimize the amount and time of fuel uncovering. The licensee indicated that their current plans already called for isolation capability for six ADS valves at the remote shutdown panel in the event of a control room fire. By letter dated July 19, 1985, the licensee also provided the results of a cable separation analysis that showed six ADS valves would be available in the event of a fire in any plant area. The July 19, 1985, submittal also included the results of a plant unique analysis of reactor water level assuming six ADS valves available for depressurization with makeup from one RHR pump in the LPCI mode. The results of the analysis showed only the upper portion of the core would be uncovered for a short period of time. This short term uncovering of the upper portion of the core in a BWR is an acceptable deviation from the Appendix R, Section III.L.2 requirement that reactor water level be maintained above the top of the core since even with the core uncovering, fuel cladding integrity is maintained. This same exemption has been granted for other BWR plants that rely on the ADS/LPCI method of shutdown in the event of a fire.

The safe shutdown systems now proposed by the licensee to be available for GGNS include the following:

1. ADS valves - a minimum of six valves will be available either in the control room or at the remote shutdown panel;
2. RHR system trains A and B - Suppression pool cooling, alternate shutdown cooling and LPCI modes;
3. Standby service water system trains A and B;
4. Standby diesel generators A and B;
5. Emergency core cooling system (ECCS) rooms ventilation (HVAC);
6. Standby service water pump hose HVAC;
7. Diesel generator rooms HVAC;
8. Remote and alternate shutdown panels;
9. Electrical distribution systems for the above equipment plus portions of some distribution panels;
10. ESF switchgear room HVAC; and
11. Safeguard switchgear and battery room HVAC.

For a control room fire, train A (Division I) components of the above listed systems will be used for alternate shutdown and will be appropriately isolated from the control room.

In SSER No. 1, the staff also identified certain instrumentation that would be available at the remote shutdown panel following a control room fire. This instrumentation included suppression pool water level and RCIC pump turbine speed. Because the RCIC is no longer relied on for alternate shutdown, the RCIC pump turbine speed instrument is not required to be operable following a control room fire. Additionally, by letter dated June 18, 1985, the licensee proposed to delete the suppression pool water level instrument from the instrumentation required for post-alternate safe shutdown. Justification for not providing suppression pool level instrumentation is based on the licensee's associated circuits analysis which eliminates any leakage pathways from the suppression pool and the new alternate shutdown cooling method using the ADS valves and RHR in the LPCI mode. When the plant is aligned for alternate shutdown cooling which relies on ADS for depressurization and RHR-LPCI to flood the vessel, a closed loop is established through the safety relief valves to the suppression pool. The licensee has performed analyses to show that the resulting decrease in suppression pool water level is less than two feet. We have reviewed the above justification, and conclude that the elimination of

suppression pool water level instrumentation is an acceptable deviation from the staff position on required instrumentation for compliance with Section III.L of Appendix R.

Based on its review of the safe and alternate shutdown systems and supporting analyses for GGNS, the staff concludes that the systems are in conformance with Sections III.G and III.L of Appendix R with the acceptable deviations regarding short-term uncovering of the upper portion of the core and absence of a suppression pool water level instrument for alternate shutdown. The staff, therefore, concludes that the proposed safe and alternate shutdown systems using six ADS valves and LPCI are acceptable in the event of a fire in any plant area.

2.3 Exception to Section III.I of Appendix R to 10 CFR Part 50

Section III.I of 10 CFR Part 50, Appendix R entitled Fire Brigade Training, specifies among other things that fire brigade drills must be performed at regular intervals not to exceed three months for each shift fire brigade.

On June 17, 1983, the Grand Gulf Nuclear Station Final Safety Analysis Report (FSAR) was amended to discuss compliance with Appendix R, Section III.I. In that amendment the licensee incorporated the guidelines for fire brigade drills and practices along with the requirement that fire brigade drills be conducted at least once per quarter. The licensee established the quarterly concept as a method of compliance with the Appendix R, Section III.I requirement that drills be performed at intervals not to exceed three months.

However, the NRC staff identified a concern regarding the potential for time periods up to 6 months between fire brigade drills which is permitted under the quarterly concept. The NRC staff indicated that the intent of Appendix R, Section III.I is to require four fire brigade drills per year at relatively evenly spaced intervals.

By letter dated December 23, 1986, the licensee committed to change their FSAR and procedures governing drills for the plant fire brigade members. They stated that following completion of the fourth quarter, 1986 fire brigade drills, subsequent drills would be performed for each shift at intervals of ninety-two (92) days with:

- a. a maximum allowable extension not to exceed 25% of the ninety-two (92) day time interval, but
- b. the combined time interval for any three (3) consecutive drill intervals shall not exceed 3.25 times the specified ninety-two (92) day time interval.

Based on its review of this commitment the staff concludes, that the proposed allowable extension of the quarterly intervals for five brigade drills is an acceptable deviation from the requirements of Section III.I of Appendix R to 10 CFR Part 50 and an acceptable alternative to the related sections of the Standard Review Plan (NUREG-0800) Section 9.5.1., Item C.3.(7)(b).

The licensee amended its UFSAR by Revision 2, dated December 1987, to incorporate this commitment, among other things, in the annual update required by 10 CFR 50.71(e).

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Mississippi State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (56 FR 22465). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). This amendment also involves changes in recordkeeping, reporting or administrative procedures or requirements. Accordingly, with respect to these items, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(c)(10). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: J. Stang
D. Notley
W. LeFave

Date: August 23, 1991