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April 8, 1983
5211-83-095

Office of Nuclear Reactor Regulations
Attn: John F. Stolz, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Fire Protection, App. R Technical Exemptions

This letter transmits the additional information requested by the staff in our Technical Exemption Request appeal meeting of March 15, 1983. The three areas where the NRC proposed (letter dated January 14, 1983) to deny our Technical Exemption Requests were; AB-FZ-1, AB-FZ-5, CB-FA-3B.

For AB-FZ-1 (Heat Exchanger Vault), we commit to install tray mounted ionization detection on the cable trays in non-compliance with Appendix R. NRC approval of our existing exemption request to not require installation of an automatic suppression system or 1 hour fire barriers in this zone (per 10 CFR 50 Appendix R Section III.G.2.c) is still requested.

For AB-FZ-5 (Aux. Bldg. El. 281'), we commit to install fire detection capability for the localized area of concern (20 feet on either side, and above the safe shutdown circuits). NRC approval of our existing exemption request to not require installation of an automatic suppression system in this area (per 10 CFR 50 Appendix R Section III.G.2.c) is still requested.

For CB-FA-3B (4160 volt switch gear room), we commit to provide 3 hour rated barriers for the safe shutdown circuits in this area. This will bring this area into compliance with Appendix R and, therefore, the NRC staff need not approve our existing exemption request for this area. (This approach varies from what was discussed with the staff on March 15, 1983.)

Additionally, our submittal of July 1, 1982 (Section 1.2.2f) proposed a modification to the existing deluge water spray system located in fire zone AB-FZ-4 (Penetration Area, El. 281'). We proposed the installation of a thermal detection system to actuate the spray system in place of the current ionization detection system.

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In lieu of installing a thermal detection system, GPUN now proposes that the NRC allow this system to be manually actuated. Ionization detection will remain in the area to alarm in the Control Room in the event of a fire. By converting the system to the manual mode, the concern for inadverent activation of this system due to false alarms by the ionization detectors is eliminated.

The attached changed pages to our "Fire Hazards Analysis" and "Appendix R Safe Shutdown Evaluation" reflect the above commitments and administrative changes since October 1, 1983.

This information is being provided for inclusion in your final safety evaluation report for TMI-1 Fire Protection. Should that not be possible, due to NRC Staff schedular difficulties, we request that this information form the basis of an exemption request under the provisions of 10 CFR 50.12.

Sincerely,

H. D. Hukill
Director, TMI-1

HDH:CJS:vjf
Enclosure
cc: R. Conte
J. Van Vliet

E N C L O S U R E 1

Letter No. 5211-83-095

Insert these pages in the TMI-1 "Fire Hazards Analysis" and "Appendix R Safe Shutdown Evaluation" as appropriate. Previous revisions of these pages can be discarded.

Rev. No.	Page/Dwg.	Section	Revision	Date
4	1.2-3	1.2.2.c	Added detection system in areas where circuits for safe shutdown valves are not in compliance with Appendix R.	4/6/83
4	1.2-4	1.2.2.f	Proposed conversion of deluge water spray system to manual operation.	4/6/83
4	1.2-4	1.2.2.g	Added detection system 20 feet south and west of circuit fire barriers and in hallway which provides entrance to fire zone AB-FZ-1.	4/6/83
4	1.2-5/1.2-6	1.2.2.j	Deleted requirement to install partial barrier between pumps DC-P-1A and 1B.	4/6/83
4	1.2-7/ 1.2-8	1.2.4	Added circuits LP-1A, 1B & 1C to list of circuits requiring one hour fire barriers.	4/6/83
4	1.2-9	1.2.4i	Revised one hour barrier for conduit MD-65 to three hour barrier.	4/6/83
4	1.2-10	1.2.4m	Added structural steel repairs for beams and Q-deck.	4/6/83
		1.2.6a	Corrected typo on tray 736.	
4	2-1	2.1	Indicate that reactor is brought to hot shutdown and cold shutdown within 72 hours.	4/6/83
4	3.2-1	3.2.3.1	Added detection system in areas where circuits for safe shutdown valves are not in compliance with Appendix R.	4/6/83
4	3.2-2/ 3.2-3	3.2.3.4a & Conclusion	Proposed conversion of deluge water spray system to manual operation.	4/6/83
4	3.2-3/ 3.2-4	3.2.3.5 a & b and conclusion	Added detection system 20 feet south and west of circuit fire barriers and in hallway which provides entrance to fire zone AB-FZ-1.	4/6/83
4	3.2-5/ 3.2-6	3.2.3.7b	Deleted requirement to install partial barrier between pumps DC-P-1A and 1B.	4/6/83
4	3.4-2	3.4.1f	Changed 480V AC ESCC1A to 480V AC ESVCC1A.	4/6/83
4	3.4-3/ 3.4-4	3.4.1o	Added circuits LP-1A, 1B & 1C, Trays 536, 537 and 538 for protection of 480V AC ES CC-1A.	4/6/83

Rev. No.	Page/Dwg.	Section	Revision	Date
4	3.4-5	3.4.10	Revised one hour barrier for conduit MD-65 to three hour barrier. Revised conclusion - three hour barrier eliminates Appendix R non-compliance.	4/6/83
4	3.11-2	3.11	Added routings for 480V ES-CC-1A & 1B	4/6/83
4	3.11-16	3.11	Added routings for 480V ES-CC-1A & 1B	4/6/83
4	4.2-8	4.2.3.1.2/ 4.2.3.1.3	Added detection system in areas where circuits for safe shutdown valves are not in compliance with Appendix R.	4/6/83
4	4.2-14	4.2.3.4.2	Added proposed conversion of deluge water spray system to manual operation.	4/6/83
4	4.2-17/ 4.2-18	4.2.3.5.2/ 4.2.3.5.3	Added detection system 20 feet south and west of circuit fire barriers and in hallway which provides entrance to fire zone AB-FZ-1.	4/6/83
4	4.4-4	4.4.1.1	Added one hour fire barrier protection for circuits serving 480V AC ES CC-1A.	4/6/83
4	4.4-13	4.4.5.1	Revised one hour barrier for NS-P-1A and DC-P-1A to three hour barrier.	4/6/83
4	4.4-23	4.4.10.1	Revised one hour barrier for MU-P-1A to three hour barrier.	4/6/83
Issue 2	1-FHA-015 1-FHA-022	---	Indicate three hour barrier rating over alligator pit.	4/6/83
Issue 2	1-FHA-025	---	Added ionization detection in AB-FZ-1.	4/6/83
Issue 2	1-FHA-026	---	Added ionization detection in north end of AB-FZ-5.	4/6/83
Issue 2	1-FHA-036	---	Deleted designation of CB-FA-4b in CB-FA-4a.	4/6/33
Issue 3	1-FHA-034	---	Added requirement to protected circuits LP-1A, 1B, and 1C in fire area CB-FA-1.	4/6/83

g. Fire Zone RB-FZ-1e

Radiant Energy Heat Shields

Radiant Energy Heat Shields will be provided for conduits RG-61A, RE-177A, RE-178A and RE-182A.

Instrument RC-4B-TE2 will be protected from the consequences of a fire such that a single fire cannot damage both RC-4B-TE2 and RC-4B-TE3.

Instrument RC-5B-TE2 will be protected from the consequences of a fire such that a single fire cannot damage RC-5B-TE2 and RC-5B-TE4.

Appendix R non-compliances will be eliminated. No exemption request is required.

1.2.2 Auxiliary Building

a. Fire Area AB-FA-1

No Appendix R Section IIIG non-compliances. No exemption request is required.

b. Fire Area AB-FA-2

No Appendix R Section IIIG non-compliances. No exemption request is required.

c. Fire Zone AB-FZ-1

Fire Detection System

An automatic fire detection system will be installed in the areas where circuits for safe shutdown valves are not in compliance with Appendix R. R4

Safe shutdown valves are located in this zone. Circuit protection is not proposed for these valves since time is available for manual operation.

An exemption from a requirement to install one hour fire barriers on safe shutdown valves and valve circuits, and an automatic fire suppression system is requested. R4

d. Fire Zones AB-FZ-2a, 2b and 2c

Each makeup pump is located in separate zones separated from each other by three hour fire barriers. No modifications are required.

No exemption request is required.

e. Fire Zone AB-FZ-3

Fire Barriers

One hour fire barriers will be provided for trays 176, 587 and 755.

An exemption from a requirement to install an automatic fire suppression system is requested.

f. Fire Zone AB-FZ-4

Fire Barriers

One hour fire barriers will be provided for trays 726, 750, 554, 555 and 556.

Safe shutdown valves are located in this zone. Circuit protection is not proposed for these valves since time is available for manual operation. The zone is presently provided with ionization detection and a deluge water spray system. GPUN proposes to operate the existing deluge water spray system manually in the event of a fire.

An exemption from a requirement to install one hour fire barriers on safe shutdown valves and valve circuits as well as an automatic fire suppression system is requested. Note that the area is currently provided with a fixed deluge water spray system. The exemption request here is to permit manual actuation of the system upon detection of a fire. R4

g. Fire Zone AB-FZ-5

Fire Barriers

One hour fire barriers will be installed on tray 726.

One of the borated water storage tank level monitoring circuits located in trays 846 and 847 and conduit RK-6 will be rerouted. Where both circuits are located in fire zone AB-FZ-5, one train will be protected with one hour fire barriers.

Fire Detection

An automatic fire detection system will be installed in an area twenty (20) feet south and west from where the fire barrier protection will be provided. In addition, the detection will be extended to the hallway that provides entrance to fire zone AB-FZ-1 where redundant circuits for safe shutdown valves are not in compliance with Appendix R. R4

An exemption from a requirement to install an automatic fire suppression system is requested.

h. Fire Zone AB-FZ-6

Fire Barriers

A one hour fire rated wall will be provided between switchgear 480V AC ESV CC-1A in this zone and switchgear 480V AC ESV CC-1B switchgear in adjacent zone AB-FZ-6a. A Class B labeled personnel door and 1-1/2 hour rated fire damper will be installed in the wall. All penetrations through this wall will be sealed to provide a one hour rating.

Safe shutdown valves are located in this zone. Circuit protection is not proposed for these valves since time is available for manual operation. This zone is presently provided with ionization detection.

An exemption from a requirement to install an automatic fire suppression system and one hour fire barriers on safe shutdown valves and valve circuits is requested.

i. Fire Zone AB-FZ-6a

Fire Barriers

See Section 1.2.2h for description of proposed 1 hour rated fire wall.

An exemption from a requirement to install an automatic fire suppression system is requested.

j. Fire Zone AB-FZ-7

Fire Barriers

One hour fire barriers will be installed on trays 590, 596, T-54-25 and T-54-28; conduits LP-2 and LP-6.

Partial barriers exist between pumps NS-P-1A, 1B, and 1C, DC-P-1A and 1B. R4

An exemption from a requirement to completely separate pumps NS-P-1A, 1B & 1C with fire barriers and pumps DC-P-1A and 1B with fire barriers is requested. Also an exemption from a requirement to install an automatic fire suppression system is requested.

k. Fire Zone AB-FZ-8

No Appendix R Section IIIG non-compliances. No exemption request is required.

l. Fire Zone AB-FZ-9

No Appendix R Section IIIG non-compliances. No exemption request is required.

1.2.3 Intermediate Building

a. Fire Zone IB-FZ-1

Safe shutdown valves are located in this zone. Circuit protection is not proposed for these valves since time is available for manual operation. This zone is presently provided with ionization detection.

An exemption from a requirement to install one hour fire barriers on valves and valve circuits and an automatic fire suppression system is requested.

Emergency Lighting

This zone will be provided with emergency lighting in accordance with the requirements of Appendix R Section IIIJ.

b. Fire Zone IB-FZ-2

No Appendix R Section IIIG non-compliances. No exemption request is required.

c. Fire Zone IB-FZ-3

Safe shutdown valves are located in this zone. Circuit protection is not proposed for these valves or valves controlling steam supply to the turbine driven emergency feedwater pump in zone IB-FZ-2 since time is available for manual operation. This zone is presently provided with ionization detection.

An exemption from requirements to install one hour fire barriers on valves and valve circuits and an automatic fire suppression system is requested. TMI-1 proposes to use HPI cooling until the main steam valves can be opened to start the turbine driven emergency feedwater pump. When the emergency feedwater system is upgraded to a safety grade system (Cycle 6 refueling outage) modifications to prevent a complete loss of emergency feedwater due to a fire will be proposed.

d. Fire Zone IB-FZ-4

No Appendix R Section IIIG non-compliances. No exemption request is required.

e. Fire Zone IB-FZ-5

No Appendix R Section IIIG non-compliances. No exemption request is required.

f. Fire Zone IB-FZ-6

No Appendix R Section IIIG non-compliances. No exemption request is required.

g. Fire Zone IB-FZ-7

No Appendix R Section IIIG non-compliances. No exemption request is required.

h. Fire Zone IB-FZ-8

No Appendix R Section IIIG non-compliances. No exemption request is required.

1.2.4 Control Building

a. Fire Area CB-FA-1

Fire Barriers

One hour fire barriers will be provided for conduits CG-67, MD-5, CG-1, CG-2, ED-2A, ED-2B, ED-3, ED-4, ED-5, ED-6, CG-3, CG-4, CG-5, ED-8, ED-9, ED-14, ED-7A, ED-7B, LP-1A, LP-1B, and LB-1C; trays 536, 537, 538, 539, T-47-1, 535 and 740. | R4

Fire Detection

An automatic fire detection system will be installed above the false ceiling in this fire area.

Structural Steel Fireproofing Repairs

Three hour rated fireproofing on exposed structural steel beams and Q-Deck will be repaired.

An exemption from a requirement to install an automatic fire suppression system above the false ceiling where cable tray and conduit are located is requested. Note that the area under the false ceiling in this fire area is provided with an automatic wet pipe sprinkler system.

b. Fire Area CB-FA-2a

Structural Steel Fireproofing Repairs

Three hour rated fireproofing on exposed structural steel beam and Q-Deck will be repaired.

Appendix R Section IIIG non-compliances will be eliminated. No exemption request is required.

c. Fire Area CB-FA-2b

Structural Steel Fireproofing Repairs

Three hour rated fireproofing on exposed structural steel beams, column and Q-Deck will be repaired.

Appendix R Section IIIG non-compliances will be eliminated. No exemption request is required.

d. Fire Area CB-FA-2c

Structural Steel Fireproofing Repairs

Three hour rated fireproofing on exposed structural steel beams, column and Q-Deck will be repaired.

Appendix R Section IIIG non-compliances will be eliminated. No exemption request is required.

e. Fire Area CB-FA-2d

Fire Barriers

A three hour fire barrier will be installed on tray 144.

Structural Steel Fireproofing Repairs

Three hour rated fireproofing on exposed structural steel beam and column will be repaired.

Appendix R Section IIIG non-compliances will be eliminated. No exemption request is required.

f. Fire Area CB-FA-2e

Structural Steel Fireproofing Repairs

Three hour rated fireproofing on exposed structural steel beam and column will be repaired.

Appendix R Section IIIG non-compliances will be eliminated. No exemption request is required.

g. Fire Area CB-FA-2f

Structural Steel Fireproofing Repairs

Three hour rated fireproofing on exposed structural steel beam and column will be repaired.

Appendix R Section IIIG non-compliances will be eliminated. No exemption request is required.

h. Fire Area CB-FA-3a

Structural Steel Fireproofing Repairs

Three hour rated fireproofing on exposed structural steel column will be repaired.

Appendix R Section IIIG non-compliances will be eliminated. No exemption request is required.

i. Fire Area CB-FA-3b

Fire Barriers

A three hour fire barrier will be installed on conduit MD-65.

Appendix R Section IIIG non-compliances will be eliminated. No exemption request is required. R4

j. Fire Area CB-FA-3c

Circuit Rerouting

One of the Borated Water Storage Tank Level Transmitter instrument circuits will be routed out of this fire area.

Structural Steel Fire Proofing Repair

Three hour rated fireproofing on exposed structural steel column, beams and Q-Deck will be repaired.

Appendix R Section IIIG non-compliances will be eliminated. No exemption request is required.

k. Fire Area CB-FA-3d

Structural Steel Fireproofing Repairs

Three hour rated fireproofing on exposed structural steel column and beam will be repaired.

A fire in this area is addressed in System Design Descriptions 614A "Alternate Shutdown Facility" and 614B "TMI-1 Remote Shutdown Panel." Modifications are described in the SDD.

l. Fire Area CB-FA-4a

No Appendix R Section IIIG non-compliances. No exemption request is required.

m. Fire Area CB-FA-4b

Structural Steel Fireproofing Repairs R4

Three hour rated fireproofing on exposed structural steel beams and Q-Deck will be repaired.

A fire in this area is addressed in System Design Descriptions 614A "Alternate Shutdown Facility" and 614B "TMI-1 Remote Shutdown Panel." Modifications are described in the SDD.

n. Fire Zone CB-FZ-5a

No Appendix R Section IIIG non-compliances. No exemption request is required.

o. Fire Zone CB-FZ-5b

No Appendix R Section IIIG non-compliances. No exemption request is required.

1.2.5 Diesel Generator Building

a. Fire Area DG-FA-1

No Appendix R Section IIIG non-compliances. No exemption request is required.

b. Fire Area DG-FA-2

No Appendix R Section IIIG non-compliances. No exemption request is required.

1.2.6 Intake Screen and Pump House

a. Fire Zone ISPH-FZ-1

Circuit Rerouting

NR-P-1C/2C pump circuits will be rerouted from the 1T switchgear to the 1R switchgear.

RR-P-2B pump circuits will be rerouted from the 1T switchgear to the 1R switchgear.

Fire Barriers

One hour fire barriers will be provided for trays 114, 115, 511, 512, 735 and 736. R4

2.0 METHODOLOGY - FIRE HAZARDS ANALYSIS AND APPENDIX R EVALUATION

2.1 Introduction

A major task within the Fire Protection Evaluation program was the Plant Fire Hazards Analysis Update. This task consisted of assessing a postulated fire at any location within TMI-1 based upon the plants updated combustible inventory, comparing this with the construction features of the fire area or fire zone boundaries and determining the adequacy of the installed fire protection and detection systems available for that fire area or fire zone.

In addition, the objective of the Appendix R Section IIIG evaluation was to evaluate whether a single fire within a fire area or fire zone might jeopardize the capability of the plant to bring the reactor to hot and subsequently cold shutdown. Where it was determined that a single fire might jeopardize safe reactor shutdown, a modification has been planned to retain safe shutdown capability. A summary of planned modifications is presented in Section 1.2 of this report.

The Plant Fire Hazards Analysis Update was performed in two phases. The first was an information collection process to review all the modifications in the plant since the initial analysis was performed to update the combustible inventory. The second was the actual analysis and effects evaluation which takes credit for fire protection features which have been installed as a result of the NRC Safety Evaluation Report for TMI-1.

The Appendix R Section IIIG evaluation was performed in three phases. The first was to identify all systems and components of those systems whose operation is essential to retaining the capability to bring the reactor to hot shutdown and cold shutdown within 72 hours assuming loss of offsite power concurrent with a fire. The second relates to locating redundant components such as pumps, valves, switchgear and motor control centers that are located in the same fire area or fire zone. The third relates to redundant circuits both in cable trays and conduits that are located in the same fire area or fire zone. After gathering all the information as described in the above three phases, the separation criteria as defined in Appendix R Section IIIG was utilized in determining where non-compliances exist, the combustible loading within that fire area or fire zone was considered, and recommendations for eliminating the non-compliances were determined. R4

2.2 Information Collection

2.2.1 Appendix R Section IIIG Safe Shutdown Evaluation

Safe Shutdown equipment is defined as the mechanical and electrical equipment including instrumentation, controls and cable which are required to bring the reactor to hot and cold shutdown. All systems

3.2 Auxiliary Building - Appendix R Section III G Non-Compliances and Proposed Modifications

3.2.1 Fire Area AB-FA-1

There are no non-compliances with respect to Appendix R Section III G in this fire area. As a result, no modifications will be required.

3.2.2 Fire Area AB-FA-2

There are no non-compliances with respect to Appendix R Section III G in this fire area. As a result, no modifications will be required.

3.2.3.1 Fire Zone AB-FZ-1

Valves listed in Section 4.2.3.1 required to support safe shutdown are located in this fire zone. Although electrical circuits for these valves are in non-compliance with Appendix R, Section IIIG there is time available for manual operation of these valves. An automatic fire detection system will be installed in the areas where circuits for safe shutdown valves are not in compliance with Appendix R. (See Section 3.10 of this report which lists all valves required for safe shutdown - either hot or cold.) Fusing of valves as a result of a fire such that valves cannot be operated is not considered realistic because of fire loading in the area and water filled pipes. R4

Conclusions

The addition of an automatic fire detection system as discussed in this section in conjunction with existing fire protection capability and the time available to operate the safe shutdown valves in this area is sufficient to assure safe shutdown capability. Due to the low fire loading in the zone (Ref. Section 4.2.3.1) automatic fire detection is considered adequate for safe shutdown circuits. Therefore, the addition of an automatic suppression system will not enhance safe shutdown capability. R4

3.2.3.2 Fire Zone AB-FZ-2a, 2b and 2c

Makeup Pumps MU-P-1A, 1B and 1C, MU-P-2A, 2B, 2C and MU-P-3A, 3B, 3C are located in zones AB-FZ-2a, 2b and 2c respectively. The walls separating each zone are fire barriers. The west wall of each zone is not fire rated. However, a fire will not spread from one cubicle to the other or from outside the west wall to all three cubicles simultaneously as detailed in Section 4.2.3.2. The existing fire protection for each zone consists of area ionization detection. Hose protection and portable extinguishers are available in adjacent zones as detailed in section 4.2.3.2.

Therefore, no modifications will be required in these zones.

3.2.3.3 Fire Zone AB-FZ-3

a. Makeup and Purification Pump MU-P-1A, 1B and 1C power circuits are routed in this area above elevation 295'-0". This fire zone is presently provided with automatic area smoke detection. Hose protection and portable extinguishers are available in adjacent areas as detailed in Section 4.2.3.3.

Tray 755 will be protected with one hour fire barrier enclosures to preserve circuits for MU-P-1A Makeup and Purification Pump.

b. Makeup Pump Auxiliary Oil Pumps MU-P-2A and 2B power and control circuits are routed in this zone above elevation 295'-0". See Section 3.2.3.3a for existing fire protection features.

Trays 587 and 176 will be protected with radiant energy heat shields to preserve circuits for MU-P-2A Makeup Pump Auxiliary Oil Pump.

Conclusion: The addition of one hour fire barriers to protect electrical circuits as discussed in this section in conjunction with existing fire protection capability is sufficient to assure safe shutdown capability. Due to the low fire loading in this zone (Ref. Section 4.2.3.3), one hour fire barrier protection is considered adequate for safe shutdown circuits. Therefore, the addition of an automatic fire suppression system will not enhance safe shutdown capability.

3.2.3.4 Fire Zone AB-FZ-4

a. Decay Heat Removal Pumps DH-P-1A power circuits are routed in this zone and DH-P-1B power circuits are routed at the zone boundary of AB-FZ-5 adjacent to AB-FZ-4. This fire zone is presently provided with automatic area smoke detection. A deluge water spray system is located in this zone which is presently designed to actuate upon smoke detection. NOTE: As a result of this evaluation, GPUN proposes to actuate the deluge water spray system manually and use the ionization detection as a means of early warning. Hose protection and portable extinguishers are available in adjacent zones as detailed in Section 4.2.3.4. R4

Trays 726 and 750 will be protected with radiant energy heat shields to preserve circuits for DH-P-1A Decay Heat Pump.

b. Feeder circuits for 480V AC ESV CC-1A and 1B are routed in this zone. See Section 3.2.3.4a for existing fire protection features.

Trays 554 and 556 will be protected with radiant energy heat shields to preserve circuits for 480V AC ESV CC-1A.

c. Reactor Building Emergency Cooling Units AH-E-1A, 1B and 1C power circuits are routed in this fire zone. See Section 3.2.3.4a for existing fire protection features.

Trays 555 and 554 will be protected with radiant energy heat shields to preserve circuits for AH-E-1A Reactor Building Emergency Cooling Unit.

d. Valves listed in Section 4.2.4.1 required to support safe shutdown are located in this fire zone. Although electrical circuits for these valves are in non-compliance with Appendix R, Section IIIG, there is time available for manual operation of these valves (See Section 3.10 of this report which lists all valves required for safe shutdown - either hot or cold). Fusing of valves as a result of a fire such that valves cannot be operated is not considered realistic because of fire loading in the area. Automatic suppression exists in the area, therefore, no modifications will be made for valves or valve electrical circuits in this fire zone.

Conclusion: The addition of one hour fire barriers to protect electrical circuits as discussed in this section in conjunction with existing fire protection system capability will eliminate Appendix R non-compliances with respect to the equipment whose circuits will be protected. However, converting operation of the existing deluge water spray system to manual will create a non-compliance with Appendix R. Due to the low fire loading in this zone (Ref. Section 4.2.3.4) no protection is deemed necessary for safe shutdown valves located in this zone and fixed suppression need not be automatic. R4 R4

3.2.3.5 Fire Zone AB-FZ-5

a. Decay Heat Removal Pump DH-P-1B power circuits are routed in this zone and DH-P-1A power circuits are routed at the zone boundary of AB-FZ-4 adjacent to AB-FZ-5. This fire zone is presently provided with hose protection and a portable fire extinguisher. Additional hose and portable extinguishing capability is available in adjacent zones as detailed in Section 4.2.3.5.

Tray 726 will be protected with one hour fire barrier enclosures to preserve circuits for DH-P-1A Decay Heat Pump. An automatic detection system will be installed in an area twenty (20) feet south and west from where the fire barrier protection will be provided. In addition, the detection will be extended to the hallway that provides entrance to fire zone AB-FZ-1 where redundant circuits for safe shutdown valves are not in compliance with Appendix R. R4

b. Borated water storage tank level monitoring DH3-LT1 and LT2 circuits are routed in this zone in the same tray. See Section 3.2.3.5a for existing fire protection features.

DH3-LT1 circuits (RE-236) will be rerouted from trays 846 and 847 and conduit RK-6 and protected where trays are located in the same fire zone with radiant energy heat shields to preserve circuits for DH3-LT1. An automatic detection system will be installed in an area twenty (20) feet south and west from where the fire barrier protection will be provided. In addition, the detection will be extended to the hallway that provides entrance to fire zone AB-FZ-1 where redundant circuits for safe shutdown valves are not in compliance with Appendix R. R4

Conclusion: The addition of one hour fire barriers to protect electrical circuits as well as the reroute of circuits as described in this section as well as the addition of an automatic fire detection system in an area twenty (20) feet south and west from where fire barrier protection will be provided in conjunction with existing fire protection system capability is sufficient to assure safe shutdown capability. Note that the detection system will extend to the hallway that provides entrance to fire zone AB-FZ-1. Due to the low fire loading in this zone (Ref. Section 4.2.3.5), one hour fire barrier protection and automatic detection is considered adequate for safe shutdown circuits and not required for valves. Therefore, the addition of an automatic fire suppression system will not enhance safe shutdown capability. R4

3.2.3.6 Fire Zone AB-FZ-6

a. Presently, 480V AC ESV CC-1A is located in this zone adjacent to zone AB-FZ-6A where 480V AC ESV CC-1B is located. This fire zone is presently provided with automatic area ionization detection. Hose protection and portable extinguishers are provided in the zone. Additional hose protection and portable extinguishers are provided in adjacent zones as detailed in Section 4.2.3.6.

A one hour fire rated wall will be provided between the two switchgear running north to south to separate them. A Class B labeled personnel door and 1 1/2 hour rated fire damper will be installed in the wall. All penetrations through the wall will be sealed to provide a one hour rating.

b. Valves listed in Section 4.2.3.6 required to support safe shutdown are located in this zone. Although electrical circuits for these valves are in non-compliance with Appendix R, Section IIIG, there is time available for manual operation of these valves. (See Section 3.10 of this report which lists all valves required for safe shutdown - hot or cold.) Fusing of valves as a result of a fire such that valves cannot be operated is not realistic because of fire loading in the area. Therefore, no fire barrier protection will be provided.

Conclusion: The imposition of a one hour fire barrier between zones AB-FZ-6 and AB-FZ-6a as discussed in this Section in conjunction with existing fire protection capability is sufficient to assure safe shutdown capability. Due to the low fire loading in this zone (Ref. Section 4.2.3.6), a one hour barrier wall is considered adequate. Therefore, the addition of an automatic suppression system will not enhance safe shutdown capability.

3.2.3.6a Fire Zone AB-FZ-6a

Presently, 480V AC ESV CC-1B is located in this zone adjacent to zone AB-FZ-6 where 480V AC ESV CC-1A is located.

Refer to Section 3.2.3.6 for proposed modifications and Section 4.2.3.6a for fire protection features and combustible loading in this zone.

Conclusion: Identical to those stated in Section 3.2.3.6.

3.2.3.7 Fire Zone AB-FZ-7

a. Nuclear Services Closed Cycle Cooling Pumps NS-P-1A, 1B & 1C are located in this fire zone as well as power circuits for each pump. This fire zone is presently provided with automatic area smoke detection. Hose protection and portable extinguishers are available in adjacent zones detailed in Section 4.2.3.7.

Trays 590, 596, T-54-28 and conduit LP-6 will be protected with radiant energy heat shields to preserve circuits for NS-P-1A Nuclear Services Closed Cycle Cooling Pump.

b. Decay Heat Closed Cycle Cooling Pumps, DC-P-1A and 1B are located in this fire zone as well as power circuits for each pump. See Section 3.2.3.7a for existing fire protection features.

Trays 590, 596, T-54-25 and conduit LP-2 will be protected with one hour fire barrier enclosures to preserve circuits for DC-P-1A Decay Heat Closed Cycle Cooling Pump. R4

Conclusion: The addition of one hour fire barriers to protect electrical circuits in conjunction with existing fire protection capability is sufficient to assure safe shutdown capability. Partial barriers are provided between each Nuclear Services Closed Cycle Cooling Pump and Decay Heat Closed Cycle Cooling Pump. No barrier protection between pumps is deemed necessary. Due to the low fire loading in this zone (Ref. Section 4.2.3.7) one hour fire barrier protection is considered adequate for safe shutdown circuits. Therefore, the addition of an automatic fire suppression system will not enhance safe shutdown capability. R4

3.2.3.8 Fire Zone AB-FZ-8

There are no non-compliances with respect to Appendix R, Section IIIG in this fire zone. As a result, no modifications will be required.

3.2.3.9 Fire Zone AB-FZ-9

There are no non-compliances with respect to Appendix R Section IIIG in this fire zone. As a result, no modifications will be required.

Tray T-47-1 and conduit MD-5 will be protected with radiant energy heat shields to preserve circuits for the 480V AC ES SWGR-1P. In addition, an automatic fire detection system will be added above the false ceiling where the cable and conduit are located.

f. Feeders to the 480V AC ESV CC-1A and 1B are routed in this area. See Section 3.4.1a for existing fire protection features.

One hour fire barrier protection which will be added to trays 536 and 539 (Section 3.4.1a) will protect feeders to the 480V AC ESV CC 1A. In addition, an automatic fire detection system will be added above the false ceiling where the cable and conduit are located. | R4

g. Feeders to the 120V Vital AC Distribution Panels - VBA, VBB, VBC and VBD are routed in this area. See Section 3.4.1a for existing fire protection features.

Trays 536, 537, 538 and 539 and conduits CG1 and CG2 will be protected with radiant energy heat shields to preserve circuits for 120V Vital AC Distribution Panels VBA and VBC. In addition, an automatic fire detection system will be added above the false ceiling where the cable and conduit are located.

h. Feeders to 125V/250V DC ES Distribution Panels 1E and 1F are routed in this area. See Section 3.4.1a for existing fire protection features.

Tray 535 will be protected with a one hour fire barrier enclosure to preserve circuits for 125V/250V DC ES Distribution Panel 1E. In addition, an automatic fire detection system will be added above the false ceiling where the cable and conduit are located.

i. Feeders to 125V/250V DC ES Distribution Panels 1A and 1B are routed in this area. See Section 3.4.1a for existing fire protection features.

Conduits ED-2A, ED-2B, ED-3, ED-4, ED-5 and ED-6 will be protected with a one hour fire barrier enclosure to preserve circuits for 125V/250V DC Distribution Panel 1A. In addition, an automatic fire detection system will be added above the false ceiling where the conduits are located.

j. Feeders to the 125V/250V DC ES Diesel Generator Distribution Panels 1P and 1Q are routed in this area. See Section 3.4.1a for existing fire protection features.

Trays 535, 536 and 539 as stated previously will be protected with a one hour fire barrier to preserve circuits for 125V/250V DC ES DG Distribution Panel 1P. In addition, an automatic fire detection system will be added above the false ceiling where the trays are located.

k. Decay Heat Closed Cycle Cooling Pumps, DC-P-1A and 1B power circuits are routed in this area. See Section 3.4.1a for existing fire protection features.

Trays 536 and 539, as stated previously, will be protected with a one hour fire barrier to preserve circuits for DC-P-1A Decay Heat Closed Cycle Cooling Pump. In addition, an automatic fire detection system will be added above the false ceiling where the trays are located.

l. Power circuits for Battery Chargers 1A, 1B, 1C, 1D, 1E and 1F are routed in this area. See Section 3.4.1a for existing for fire protection features.

Trays 535, 536, 537 and 538 and conduits CG-3, CG-4 and CG-5 will be protected with radiant energy heat shields to preserve circuits for Battery Chargers 1A, 1C and 1E.

m. Circuits between 125V/250V DC Distribution Panels 1A and 1B to Inverters 1A, 1B, 1C, 1D and 1E are routed in this area. See Section 3.4.1a for existing fire protection features.

Conduits ED-8, ED-9 and ED-14 will be protected with radiant energy heat shields to preserve circuits for Inverters 1A, 1C and 1E.

n. Battery feed circuits to isolating switch for Batteries A, B, C and D are routed in this area. See Section 3.4.1a for existing fire protection features. Conduits ED-7A and ED-7B will be protected with one hour fire barrier enclosures to preserve circuits for Batteries A & C.

o. Feeders to the 480V AC ES CC-1A and 1B are routed in this area. See section 3.4.1a for existing fire protection features. Trays 536, 537 and 538 and circuits LP-1A, LP-1B and LP-1C will be protected with one hour fire barrier enclosures to preserve circuits for 480V AC ES CC-1A. In addition, an automatic fire detection system will be added above the false ceiling where the tray and circuits are located. R4

Conclusion: The addition of one hour fire barriers on cable tray and conduit as discussed in this section, as well as the addition of an automatic fire detection system, is adequate to meet the requirements

of Appendix R, Section IIIG. Note that the existing sprinkler system is located below the false ceiling to protect against fires on the floor below. Electrically initiated fires which may occur in exposed cable above the false ceiling will be mitigated due to the imposition of the one hour fire barriers.

3.4.2 Fire Area CB-FA-2a

There are no non-compliances with respect to Appendix R, Section IIIG in this fire area. As a result, no modifications will be required.

3.4.3 Fire Area CB-FA-2b

There are no non-compliances with respect to Appendix R, Section IIIG in this fire area. As a result, no modifications will be required.

3.4.4 Fire Area CB-FA-2c

There are no non-compliances with respect to Appendix R, Section IIIG in this fire area. As a result, no modifications will be required.

3.4.5 Fire Area CB-FA-2d

a. Nuclear Services Closed Cycle Cooling Pumps NS-P-1A, 1B and 1C control circuits are routed in this area. This fire area is presently provided with automatic HVAC duct smoke detection. Hose protection and portable extinguishers are provided in adjacent areas as detailed in Section 4.4.5.

   Tray 144 will be protected with a three hour fire barrier enclosure to preserve circuits for NS-P-1A, Nuclear Services Closed Cycle Cooling Pump.

b. Decay Heat Closed Cycle Cooling Pumps DC-P-1A and 1B control circuits are routed in this area. See Section 2.4.5a for existing fire protection features.

   Tray 144 will be protected with a three hour fire barrier enclosure to preserve circuits for DC-P-1A Decay Heat Closed Cycle Cooling Pump.

   Conclusion: The addition of a three hour fire barrier enclosure to protect electrical circuits as discussed in this section due to fire loading which approaches one hour will eliminate noncompliances with Appendix R, Section III G. No further modifications will be required.

3.4.6 Fire Area CB-FA-2e

There are no non-compliances with respect to Appendix R, Section IIIG in this fire area. As a result, no modifications will be required.

3.4.7 Fire Area CB-FA-2f

There are no non-compliances with respect to Appendix R, Section IIIG in this fire area. As a result, no modifications will be required.

3.4.8 Fire Area CB-FA-2g

There are no non-compliances with respect to Appendix R, Section IIIG in this fire area. As a result, no modifications will be required.

3.4.9 Fire Area CB-FA-3a

There are no non-compliances with respect to Appendix R, Section IIIG in this fire area. As a result, no modifications will be required.

Note: Procedures will be developed and parts made available for restoration of the incoming off-site power bus to switch- gear located in this fire area or to switchgear located in Fire Area CB-FA-3b in order to restore off-site power.

3.4.10 Fire Area CB-FA-3b

Make-up pumps MU-P-1A, 1B and 1C control circuits are routed in this area. This fire area is presently provided with automatic HVAC duct smoke detection. Hose protection and portable extinguishers are provided in adjacent areas as detailed in Section 4.4.10.

Conduit MD-65 will be protected with a three hour fire barrier enclosure to preserve circuits for makeup pump MU-P-1A.

Conclusion: The addition of a three hour fire barrier enclosure to protect the electrical circuit as discussed in this section will eliminate non-compliances with Appendix R Section IIIG. No further modifications will be required. R4

Note: Procedures will be developed and parts made available to disconnect the damaged off-site power incoming bus in this fire area so that off-site power may be fed to switchgear in fire area CB-FA-3a from undamaged portions of the same bus in order to restore off-site power.

ELECTRICAL - All equipment on this page (H)

COMPONENT	TRAY ROUTING
4160V ES SWGR-1D (MD-1,2)	740
4160V ES SWGR-1E (ME-1,2)	745
480V AC ESV CC-1A (LP-8)	536, 539, 554, 556
480V AC ESV CC-1B (LS-7)	530, 529, 528, 955, 576, 575, 558, 559, 560
480V AC ES SWGR-1P (MD-5)	747, 740, T-47-1
480V AC ES SWGR-1S (ME-5)	744, 745 T-47-2
480V AC SH ES SWGR-1R (MD-11)	747, 740, 750, 757, 732, 733, 734
480V AC SH ES SWGR-1T (ME-11)	744, 743, 739, 751, 756, 735, 736
480V AC SH ES CC-1A (LR-8A)	LR-8A
(LR-8B)	LR-8B
480V AC SH ES CC-1B (LT-7A)	LT-7A
(LT-7B)	LT-7B
480V AC ES CC-1A (LP-1A,B,C)	536, 537, 538
480V AC ES CC-1B (LS-1A,B,C)	530, 531, 532
125/250V DC ES Dist. Pnl.-1A (ED-2A)	ED-2A
(ED-2B)	ED-2B
125/250V DC ES Dist. Pnl.-1B (ED-52A)	ED-52A
(ED-52B)	ED-52B
125/250V DC ES DG Dist. Pnl.-1P (ED-112)	535, 536, 539
-1Q (ED-313)	533, 528, 529, 530
120V AC Vital Dist Pnl - VBA (CG-1)	538, 537, 536, 535
120V AC Vital Dist Pnl - VBB (CH-1)	532, 531, 530, 529, 528
120V AC Vital Dist Pnl - VBC (CG-2)	CG-2
120V AC Vital Dist. Pnl- VBD (CH-2)	CH-2
Battery Charger-1A (CG-3)	538, 537, 536, 535, CG-3.
Battery Charger-1B (CG-3)	532, 531, 530, 529, 523, 533, CH-3.
Battery Charger-1C (CG-4)	CG-4.
Battery Charger-1D (CH-4)	CH-4.
Battery Charger-1E (CG-5)	538, 537, 536, 535, CG-5.
Battery Charger-1F (CH-5)	532, 531, 530, 529, 528, 533, CH-5.
Inverter-1A (ED-8)	ED-8.
Inverter-1B (ED-58)	ED-58.
Inverter-1C (ED-9)	ED-9.
Inverter-1D (ED-59)	533, 528, ED-59.
Inverter-1E (ED-14)	535, ED-14.
125/250V DC ES Dist Panel IE-(ED-10A,B)	535
125/250V DC ES Dist Panel IF-(ED-60A,B)	533

R4

Appendix R

Three Mile Island Unit 1 Evaluation Report

Fire Area

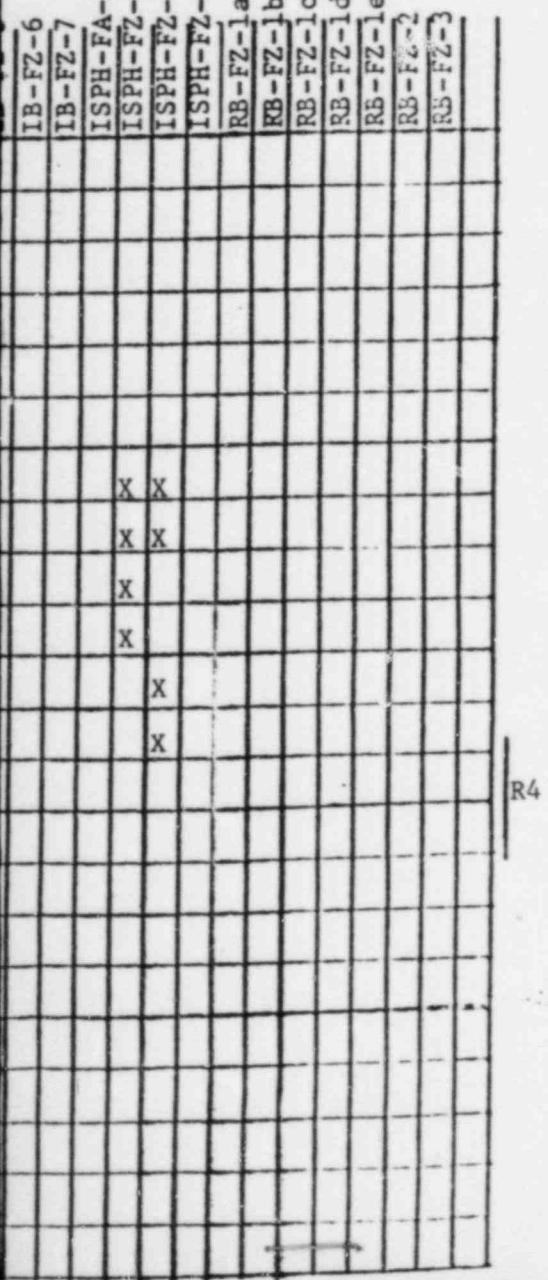
*In TB-FA-1 circuits are routed in which are embedded in concrete.

ELECTRICAL

1 of 3

COMPONENTS	AB-FZ-1	AB-FZ-2a	AB-FZ-2b	AB-FZ-2c	AB-FZ-3	AB-FZ-4	AB-FZ-5	AB-FZ-6	AB-FZ-6a	AB-FZ-7	AB-FZ-8	AB-FA-1	AB-FA-2	AlT-FA-1	TB-FA-1	CB-FA-1	CB-FA-2a	CB-FA-2b	CB-FA-2c	CB-FA-2d	CB-FA-2e	CB-FA-2f	CB-FA-2g	CB-FA-3a	CB-FA-3b	CB-FA-3c	CB-FA-3d	CB-FA-4a	CB-FA-4b	CB-FA-5a	CB-FA-5b	DG-FA-1	DG-FA-2	FH-FZ-1	FH-FZ-2	FH-FZ-3	FH-FZ-4	FH-FZ-5	FH-FZ-6	FH-FZ-7	IB-FZ-1	IB-FZ-2	IB-FZ-3	IB-FZ-4	IB-FZ-
*4160V ES SWGR-1D (MD-1,2)															X	X	X							X																					
*4160V ES SWGR-1E (ME-1,2)															X	X		X							X																					
480V AC ESV CC-1A (LP-8)							X		X							X	X							X										X											
480V AC ESVCC-1B (LS-7)								X		X						X		X							X										X	X									
480V AC ES SWGR-1P (MD-5)																	X							X																					
480V AC ES SWGR-1S (ME-5)																		X							X																					
480V AC SH ES SWGR-1R (MD-11)																X	X							X										X											
480V AC SH ES SWGR-1T (ME-11)																		X	X						X										X	X			X						
480V AC SH ES CC-1A (LR-8A)																																														
(LR-8B)																																														
480V AC SH ES CC-1B (LT-7A)																																														
(LT-7B)																																														
480V AC ES CC-1A(LP-1A/1B/1C)															X	X																													
480V AC ES CC-1B(LS-1A/1B/1C)															X			X																											
125/250V DC ES Dist. Pnl.-1A (ED-2A)															X					X		X																						
(ED-2B)															X					X		X																						
125/250V DC ES Dist Pnl.-1B (ED-52A)															X						X		X																						
(ED-52B)															X						X		X																						
125/250V DC ES DG Dist Pnl.-1P (ED-112)															X	X				X																									
125/250V DC ES DG Dist. Pnl.-1Q (ED-313)															X			X			X																								
125/250V DC ES Dist Pnl-1E															X					X																									
125/250V DC ES Dist Pnl-1F															X						X																								

separate raceways



4.2.3.1.2 Analysis

The combustibles in this zone consist of cable insulation and transient material. As a result, there is a total fire loading of 2400 Btu/ft^2 contained within a 7,000 ft^2 area. Fire protection in the zone consists of a dry chemical fire extinguisher and a fire hose station as shown on drawing 1-FHA-025. Ionization detection will be added in areas where circuits for safe shutdown valves are not in compliance with Appendix R. This system will actuate alarms in the Control Room. R4

4.2.3.1.3 Conclusions

Due to the limited amount of combustible material in the zone and the availability of hose protection and portable extinguishing equipment, and the ionization detection which will be provided, fire protection for this zone is considered adequate. R4

Penetrations: All penetrations through the floor of this zone except for the access hatch and the south wall adjoining zone AB-FZ-2a are sealed with three hour rated fire seals. Penetrations through the remaining walls or ceiling of this zone are not fire sealed. Containment penetrations do not have a specific fire rating due to overriding nuclear considerations, however their construction is adequate to prevent the spread of fire to the Reactor Building. All duct penetrations through the floor are provided with three hour fire dampers.

Fire Barriers: One hour fire barrier protection will be provided for electrical circuits which serve the following equipment: AH-E-1A, DH-P-1A, 480V AC, ESV CC-1A.

The safe shutdown equipment located within this zone consists of decay heat removal valves (DH-V3, DH-V4A, 4B, 7A and 7B), and make up and purification valves (MU-V14A, 14B, 16A and 16B), safety related cable and instrumentation (1-FHA-026, 031, 032).

4.2.3.4.2 Analysis

The combustibles in this zone consist of cable insulation and transient material. As a result, there is a total fire loading of 52,822 Btu/ft^2 contained within a 750 ft^2 area. Fire protection for this zone consists of a deluge water spray system which will be actuated manually and a hose station. Ionization fire detection is provided which actuates alarms in the Control Room. Additional hose protection is provided in zone AB-FZ-5 and portable dry chemical extinguishers are provided in zones AB-FZ-5 ad FH-FZ-1 as shown on drawing 1-FHA-026. R4

Penetrations: All penetrations through the south wall of this fire zone are sealed with three hour fire seals including the wall adjoining zone AB-FZ-2c and this zone. Penetrations through the floor of this zone over Fire Areas AB-FA-1 and 2 are sealed with three hour fire seals except for the steel access hatch to area AB-FA-1. Penetrations through the remaining walls or ceiling of this fire zone are not fire sealed.

Fire Barriers: One hour fire barrier protection will be provided for electrical circuits which serve the following equipment: DH-P-1A, DH-3-LT1.

The only safe shutdown equipment located in this zone in safety related cable. Liquid and gaseous radioactive material is contained within this zone. The bulk of this material is contained in evaporators and steel tanks. (1-FHA-026, 031, 032)

4.2.3.5.2 Analysis

The combustibles in this zone consist of pump lube oil, cable insulation and transient material. As a result, there is a total fire loading of 20,062 Btu/ft^2 contained within a 14,000 ft^2 area. Fire protection for this zone consists of a dry chemical fire extinguisher and a hose station. Additional hose protection is provided in zone AB-FZ-4 and zone FH-FZ-1 as well as additional portable dry chemical extinguishers located in zone FH-FZ-1 as shown on drawing 1-FHA-026. Ionization detection will be added in an area twenty (20) feet south and west from where fire barrier protection will be provided. In addition, the detection will be extended to the hallway that provides entrance to fire zone AB-FZ-1. R4

4.2.3.5.3 Conclusion

Due to the limited amount of combustible material in the zone, the protection which will be provided for electrical circuits as described in Section 4.2.3.5.1, the availability of hose protection and portable extinguishers both in this zone and in adjacent zones, and the ionization detection which will be provided, fire protection for this zone is considered adequate. R4

Penetrations: All penetrations through walls, and the ceiling and floor of this fire area are sealed with three hour rated fire seals. All duct penetrations through these walls and ceiling are provided with three hour rated fire dampers.

Fire Barriers: One hour fire barrier protection will be provided for electrical circuits which serve the following equipment: NS-P1A, AH-E-1A, 4160V ES SWGR ID, 480V AC ES SWGR-1P, 480V AC ESV CC-1A, 120V AC Vital Dist. Pnl.-VBA and VBC 125V/250V DC ES Dist. Pnl.-1E, 125V/250V Diesel Gen. Dist Panel 1P, AH-E-18A, 125V/250V DC ES Dist. Pnl.-1A, Battery Chargers 1A, 1C & 1E and Inverters 1A, 1C & 1E, DC-P-1A, Batteries A&C, 480V AC ES CC-1A. R4

The only safe shutdown equipment located in this area is safety related cables (1-FHA-034, 037 and 038).

4.4.1.2 Analysis

The combustibles in the area consist of stored and transient materials and cable insulation. As a result, there is a total fire loading of 52,518 Btu/ft^2 in a 6,000 ft^2 area. Fire protection for this area consists of an automatic wet pipe sprinkler system and a portable dry chemical extinguisher is located outside this fire area in fire zone FH-FZ-2 all as shown on drawing 1-FHA-034. The wet pipe sprinkler system is located below the false ceiling in the area and does not protect cable tray and conduit above the false ceiling. There is no false ceiling in the northeast corner of the area. Sprinkler protection also extends into the stair

Penetrations: All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All duct penetrations through these walls, ceilings and floors are provided with three hour rated fire dampers.

Fire Barriers: Three hour fire barrier protection will be provided for electrical circuits which serve the following equipment: NS-P-1A and DC-P-1A. R4

The safe shutdown equipment in the area consists of battery chargers 1A, 1B, and 1E, inverters 1A, 1C, and 1E, DC distribution panels 1A and 1E, and AC distribution panels VBA and VBC (1-FHA-035).

4.4.5.2 Analysis

The combustibles in this area consist of cable insulation, transient materials and the electrical equipment. As a result, there is a total fire loading of 80,798 Btu/ft^2 contained within a 600 ft^2 area. Fire protection for this area consists of HVAC duct smoke detectors which actuate alarms in the control room. Hose protection is provided outside this area in zone FH-FZ-5. In addition a portable dry chemical extinguisher is located inside this fire area and in adjacent areas as shown on drawing 1-FHA-035.

4.4.5.3 Conclusion

The results of the analysis indicate that boundaries of this fire area are adequate to contain a postulated fire. Due to the protection which will be provided for electrical circuits as described in Section 4.4.5.1, the availability of fire detection and portable extinguishers in the area and the availability of hose protection and portable extinguishers in nearby areas, the fire protection for this area is considered adequate.

Penetrations: All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All duct penetrations through the walls, ceilings and floors are provided with three hour rated fire dampers.

Fire Barriers: Three hour fire barrier protection will be provided for electrical circuits which serve the following equipment: MU-P-1A. R4

The safe shutdown equipment in the area consists of engineered safeguards 4160 volt switchgear 1E (1-FHA-035, 038).

4.4.10.2 Analysis

The combustibles in this area consist of cable insulation, the electrical equipment and transient materials. As a result, there is a total fire loading of 66,668 Btu/ft^2 contained within an 800 ft^2 area. The fire protection for this area consists of HVAC duct smoke detectors which actuate alarms in the control room. Hose protection is provided outside this area in zone FH-FZ-5. In addition portable extinguishers are located in adjacent areas as shown on drawing 1-FHA-035.

4.4.10.3 Conclusion

The results of the analysis indicate the boundaries of this fire area are adequate to contain a postulated fire. Due to the protection which will be provided for electrical circuits as described in Section 4.4.10.1, the availability of fire detection in the area and the availability of hose protection and portable extinguishers in nearby areas, the fire protection for this area is considered adequate.