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TO: GERLACH*ROSE M 12/15/2006
LOCATION: USNRC
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ATTENTION: "REPLACE" directions do not affect the Table of Contents, Therefore no TOC will be issued with the updated material.

TRM2 - TECHNICAL REQUIREMENTS MANUAL UNIT 2

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TRM2 Text TOC
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## 3.7.3 Fire Protection

### 3.7.3.8 Fire Detection Instrumentation

TRO 3.7.3.8 The fire detection instrumentation for each fire detection zone shown in Table 3.7.3.8-1 shall be OPERABLE.

APPLICABILITY: Whenever equipment protected by the fire detection instrument is required to be OPERABLE.

ACTIONS

----------NOTE----------

1. Separate condition entry is allowed for each instrument.

---

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. The number of OPERABLE fire detection instruments less than the Minimum Instruments Operable requirement of Table 3.7.3.8-1 | A.1 Establish an hourly fire watch patrol | 1 hour |
| | AND | |
| | A.2.1 Inspect the accessible zone(s) with inoperable instrument(s) | Once per hour |
| | OR | |
| | A.2.2 Inspect the affected area surrounding any inaccessible zones | Once per hour |

TECHNICAL REQUIREMENT SURVEILLANCE

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| ----------NOTE---------- When a detector is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and required Actions may be delayed for up to 15 minutes. ---------- | | N/A |
| TRS 3.7.3.8.1 | Perform CHANNEL FUNCTIONAL TEST on accessible fire detection instruments. | 12 months |
| TRS 3.7.3.8.2 | Verify that the supervised circuits supervision associated with the detector alarms of each of the fire detection instruments listed in Table 3.7.3.8-1 are OPERABLE. | 12 months |
| TRS 3.7.3.8.3 | Perform CHANNEL FUNCTIONAL TEST on inaccessible fire detection instruments. | Prior to startup from each COLD SHUTDOWN exceeding 48 hours unless performed in the previous 12 months |

**TABLE 3.7.3.8-1**
**FIRE DETECTION INSTRUMENTATION**

| INSTRUMENT LOCATION | | | | INSTRUMENT OPERABLE | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FIRE | | | | HEAT | | IONIZATION | | PHOTO ELECTRIC | |
| ZONE | ROOM OR AREA | | ELEV. | TOTAL | MIN. | TOTAL | MIN. | TOTAL | MIN. |
| *a.* | *Control Building* | | | | | | | | |
| 0-21A | Common Equipment Room Elevator Lobby | | 656'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-22A | Above Ceiling/Filter Area | | 687'-8" | NA | NA | 10 | 5 | NA | NA |
| 0-22A | Elevator Lobby | | 676'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-22A | Chem Lab 0F135 High Temp. Alarm | | 687'-10" | 2 | 1 | NA | NA | NA | NA |
| | Chem Lab DS-021 | | 687'-10" | 2 | 1 | NA | NA | NA | NA |
| | Chem Lab 0F138 High Temp. Alarm | | 687'-10" | 2 | 1 | NA | NA | NA | NA |
| | Chem Lab DS-022 | | 687'-10" | 2 | 1 | NA | NA | NA | NA |
| | Chem Lab 0F141 High Temp. Alarm | | 687'-10" | 2 | 1 | NA | NA | NA | NA |
| | Chem Lab DS-023 | | 687'-10" | 2 | 1 | NA | NA | NA | NA |
| | Chem Lab 0F144 High Temp. Alarm | | 687'-10" | 2 | 1 | NA | NA | NA | NA |
| | Chem Lab DS-024 | | 687'-10" | 2 | 1 | NA | NA | NA | NA |
| 0-23 | Egress Corridor to South Stairwell | | 686'-6" | NA | NA | 1 | 1 | NA | NA |
| 0-24A | UPS Panel Room U-2 | | 698'-0" | 4 | 2 | 2 | 1 | NA | NA |
| 0-24B | Corridor | | 698'-0" | NA | NA | 3 | 2 | NA | NA |
| | | | | | | | | | |
| | | | | | | | | | |
| 0-24B | Corridor Elevator Lobby | | 698'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-24D | U1 Lower Relay Room | | 698'-0" | 4 | 2 | 4 | 2 | NA | NA |
| 0-24E | Computer Room | | 698'-0" | NA | NA | 6 | 3 | NA | NA |
| 0-24E | Computer Room (Above Ceiling) | | 698'-0" | 12 | 6 | 4 | 2 | NA | NA |
| 0-24E | Computer Room | 1U720 | 697'-0" | NA | NA | 4 | 2 | NA | NA |
| | PGCC Underfloor | 1U722 | 697'-0" | NA | NA | 4 | 2 | NA | NA |
| | | 1U724 | 697'-0" | NA | NA | 4 | 2 | NA | NA |
| | | 1U726 | 697'-0" | NA | NA | 4 | 2 | NA | NA |
| | | 2U721 | 697'-0" | NA | NA | 4 | 2 | NA | NA |
| | | 2U723 | 697'-0" | NA | NA | 4 | 2 | NA | NA |
| | | 2U725 | 697'-0" | NA | NA | 4 | 2 | NA | NA |
| | | 2U727 | 697'-0" | NA | NA | 4 | 2 | NA | NA |
| 0-24F | Computer Maintenance Rm and Office | | 698'-0" | NA | NA | 2 | 1 | NA | NA |
| | | | | | | | | | |
| | | | | | | | | | |
| 0-24G | U2 Lower Relay Room | | 698'-0" | 4 | 2 | 4 | 2 | NA | NA |
| 0-24G | U-2 Lower Relay Room | 2U704 | 697'-0" | 11 | 6 | 6 | 3 | NA | NA |
| | PGCC Halon Panel | 2U705 | 697'-0" | 11 | 6 | 6 | 3 | NA | NA |
| | Division II | 2U706 | 697'-0" | 11 | 6 | 6 | 3 | NA | NA |
| | | 2U731 | 697'-0" | 10 | 5 | 6 | 3 | NA | NA |
| | | 2U732 | 697'-0" | 11 | 6 | 6 | 3 | NA | NA |

**TABLE 3.7.3.8-1**
**FIRE DETECTION INSTRUMENTATION**

| INSTRUMENT LOCATION | | | INSTRUMENT OPERABLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| FIRE | | | HEAT | | IONIZATION | | PHOTO ELECTRIC | |
| ZONE | ROOM OR AREA | ELEV. | TOTAL | MIN. | TOTAL | MIN. | TOTAL | MIN. |
| 0-24J | South Cable Chase | 698'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-24L | Center Cable Chase | 698'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-24M | North Cable Chase | 698'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-25A | U-2 Lower Cable Spreading Room | 714'-0" | 20 | 10 | 6 | 3 | NA | NA |
| 0-25B | South Cable Chase | 714'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-25C | Center Cable Chase | 714'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-25D | North Cable Chase | 714'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-25E | U-1 Lower Cable Spreading Room | 714'-0" | 26 | 13 | 5 | 3 | NA | NA |
| 0-25E | U-1 Lower Cable Spreading Room Elevator Lobby | 714'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-26A | Copy Room | 729'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26B | South Cable Chase | 729'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26C | Center Cable Chase | 729'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26D | North Cable Chase | 729'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26E | Locker Room | 729'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26F | Vestibule Elevator Lobby | 729'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26F | Vestibule (Under Floor) | 728'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26G | Shift Office | 729'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26G | Shift Office (Under Floor) | 728'-1" | NA | NA | 2 | 1 | NA | NA |
| 0-26H | Control Room (Under Floor Unit 1) | 728'-1" | NA | NA | 15 | 8 | NA | NA |
| 0-26H | Control Room (Under Floor Unit 2) | 728'-1" | NA | NA | 12 | 6 | NA | NA |
| 0-26H | Control Room | 729'-1" | NA | NA | 10 | 5 | NA | NA |
| 0-26H | Control Room (Above Ceiling) | 729'-1" | NA | NA | 9 | 5 | NA | NA |
| 0-26I | Operational Support Center | 729'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26I | Operational Support Center (Under Floor) | 728'-1" | NA | NA | 2 | 1 | NA | NA |
| 0-26J | Vestibule | 729'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26J | Vestibule (Under Floor) | 728'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26K | Technical Support Center | 741'-1" | NA | NA | 10 | 5 | NA | NA |
| 0-26K | Technical Support Center Elevator Lobby | 741'-1" | NA | NA | 1 | 1 | NA | NA |
| 0-26K | Technical Support Center (Above Ceiling) | 741'-1" | NA | NA | 5 | 3 | NA | NA |
| 0-26L | Conference Room | 741'-1" | NA | NA | 6 | 3 | NA | NA |
| 0-26L | Conference Room (Above Ceiling) | 741'-1" | NA | NA | 2 | 1 | NA | NA |
| 0-26M | U-1 TSC Soffit | 729'-1" | NA | NA | 2 | 1 | NA | NA |
| 0-26M | U-1 TSC Soffit | 741'-1" | NA | NA | 2 | 1 | NA | NA |
| 0-26N | U-1 Control Room Soffit | 741'-1" | NA | NA | 2 | 1 | NA | NA |
| 0-26P | U-2 Control Room Soffit | 741'-1" | NA | NA | 2 | 1 | NA | NA |
| 0-26R | U-2 TSC Soffit | 729'-1" | NA | NA | 2 | 1 | NA | NA |
| 0-26R | U-2 TSC Soffit | 741'-1" | NA | NA | 2 | 1 | NA | NA |

**TABLE 3.7.3.8-1**
**FIRE DETECTION INSTRUMENTATION**

| INSTRUMENT LOCATION | | | | INSTRUMENT OPERABLE | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FIRE | | | | HEAT | | IONIZATION | | PHOTO ELECTRIC | |
| ZONE | ROOM OR AREA | | ELEV. | TOTAL | MIN. | TOTAL | MIN. | TOTAL | MIN. |
| 0-26S | South Cable Chase | | 741'-1" | 1 | 1 | NA | NA | NA | NA |
| 0-26T | Center Cable Chase | | 741'-1" | 1 | 1 | NA | NA | NA | NA |
| 0-26V | North Cable Chase | | 741'-1" | 1 | 1 | NA | NA | NA | NA |
| 0-27A | U-2 Upper Relay Room | | 754'-0" | 4 | 2 | 3 | 2 | NA | NA |
| 0-27A | U-2 Upper Relay Room | 2U700 | 753'-0" | 11 | 6 | 6 | 3 | NA | NA |
| | PGCC Halon Panel | 2U701 | 753'-0" | 11 | 6 | 6 | 3 | NA | NA |
| | Division I | 2U702 | 753'-0" | 11 | 6 | 6 | 3 | NA | NA |
| | | 2U703 | 753'-0" | 11 | 6 | 6 | 3 | NA | NA |
| | | 2U730 | 753'-0" | 11 | 6 | 6 | 3 | NA | NA |
| 0-27B | U-2 Upper Cable Spreading Room | | 753'-0" | 24 | 12 | 5 | 3 | NA | NA |
| 0-27C | U-1 Upper Cable Spreading Room | | 753'-0" | 23 | 12 | 7 | 4 | NA | NA |
| | | | | | | | | | |
| 0-27C | U-1 Upper Cable Spreading Room Elevator Lobby | | 754'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-27D | Electrician's Office | | 754'-0" | 2 | 1 | 1 | 1 | NA | NA |
| 0-27E | U-1 Upper Relay Room | | 754'-0" | 4 | 2 | 2 | 1 | NA | NA |
| 0-27F | South Cable Chase | | 754'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-27G | Center Cable Chase | | 754'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-27H | North Cable Chase | | 754'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-28A-I | Equipment Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28A-II | Equipment Room | | 771'-0" | NA | NA | 3 | 2 | NA | NA |
| 0-28B-I | Equipment Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28B-II | Equipment Room | | 771'-0" | NA | NA | 2 | 1 | NA | NA |
| 0-28B-II | Equipment Room Elevator Lobby | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28C | Battery Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28D | Battery Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28E | Battery Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28F | Battery Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28G | Battery Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28H | Repair Shop | | 771'-0" | NA | NA | 2 | 1 | NA | NA |
| 0-28I | Battery Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28J | Battery Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28K | Battery Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28L | Battery Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28M | Battery Room | | 771'-0" | NA | NA | 1 | 1 | NA | NA |

**TABLE 3.7.3.8-1**
**FIRE DETECTION INSTRUMENTATION**

| INSTRUMENT LOCATION | | | INSTRUMENT OPERABLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | HEAT | | IONIZATION | | PHOTO ELECTRIC | |
| FIRE ZONE | ROOM OR AREA | ELEV. | TOTAL | MIN. | TOTAL | MIN. | TOTAL | MIN. |
| 0-28N | Battery Room | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-28P | South Cable Chase | 771'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-28Q | Center Cable Chase | 771'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-28R | North Cable Chase | 771'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-28T | Battery Room | 771'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-29A | Elevator Vestibule | 783'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-29B | H&V Equipment Room | 783'-0" | NA | NA | 10 | 5 | NA | NA |
| 0-30A | HVAC Equipment Room | 806'-0" | NA | NA | 19 | 10 | NA | NA |
| 0-30A | Freight Elevator Lobby | 806'-0" | NA | NA | 1 | 1 | NA | NA |
| 0-30A | CREOASS 0F125A High Temp. Alarm | 806'-0" | 7 | 4 | NA | NA | NA | NA |
| 0-30A | CREOASS DS-091 | 806'-0" | 7 | 4 | NA | NA | NA | NA |
| 0-30A | CREOASS 0F125B High Temp. Alarm | 806'-0" | 7 | 4 | NA | NA | NA | NA |
| 0-30A | CREOASS DS-092 | 806'-0" | 7 | 4 | NA | NA | NA | NA |
| 0-30A | SGTS - 0F169A High Temp. Alarm | 806'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-30A | SGTS - DS-093 | 806'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-30A | SGTS - 0F169B High Temp. Alarm | 806'-0" | 1 | 1 | NA | NA | NA | NA |
| 0-30A | SGTS - DS-094 | 806'-0" | 1 | 1 | NA | NA | NA | NA |
| ***b.*** | ***Reactor Building*** | | | | | | | |
| 2-1A | Core Spray Pump Room | 645'-0" | NA | NA | 8 | 4 | NA | NA |
| 2-1B | Core Spray Pump Room | 645'-0" | NA | NA | 6 | 3 | NA | NA |
| 2-1B | Elevator Lobby | 645'-0" | NA | NA | 1 | 1 | NA | NA |
| 2-1C | HPCI Pump Room | 645'-0" | 2 | 1 | NA | NA | 7 | 4 |
| 2-1D | RCIC Pump Room | 645'-0" | 2 | 1 | NA | NA | 5 | 3 |
| 2-1E | RHR Pump Room | 645'-0" | NA | NA | NA | NA | 13 | 7 |
| 2-1F | RHR Pump Room | 645'-0" | NA | NA | NA | NA | 15 | 8 |
| 2-1G | Sump Room | 645'-0" | NA | NA | 2 | 1 | NA | NA |
| 2-1I | Stairwell 202 | 645'-818' | NA | NA | 2 | 1 | NA | NA |
| 2-2A | Access Area and Remote Shutdown Panel Room | 670'-0" | NA | NA | 5 | 3 | NA | NA |
| 2-2A | Elevator Lobby | 670'-0" | NA | NA | 1 | 1 | NA | NA |
| 2-2B | Core Spray Pump Room | 670'-0" | NA | NA | 11 | 6 | NA | NA |
| 2-3A | Access Area | 683'-0" | NA | NA | 4 | 2 | NA | NA |
| 2-3A | Access Area Elevator Lobby | 683'-0" | NA | NA | 1 | 1 | NA | NA |
| 2-3B-N | Equipment Removal Area - North | 683'-0" | NA | NA | 13 | 7 | NA | NA |
| 2-3B-S | Equipment Removal Area - South | 683'-0" | NA | NA | 1 | 1 | NA | NA |
| 2-3B-W | Equipment Removal Area - Wraparound | 683'-0" | NA | NA | 2 | 1 | NA | NA |
| 2-3C-N | Equipment Access Area - North | 683'-0" | NA | NA | NA | NA | 4 | 2 |

**TABLE 3.7.3.8-1**
**FIRE DETECTION INSTRUMENTATION**

| INSTRUMENT LOCATION | | | INSTRUMENT OPERABLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| FIRE | | | HEAT | | IONIZATION | | PHOTO ELECTRIC | |
| ZONE | ROOM OR AREA | ELEV. | TOTAL | MIN. | TOTAL | MIN. | TOTAL | MIN. |
| 2-3C-S | Equipment Access Area - South | 683'-0" | NA | NA | NA | NA | 4 | 2 |
| 2-3C-W | Equipment Access Area - Wraparound | 683'-0" | NA | NA | NA | NA | 5 | 3 |
| 2-4A-N | Containment Access Area - North | 719'-0" | NA | NA | 11 | 6 | 3 | 2 |
| 2-4A-S | Containment Access Area - South | 719'-0" | NA | NA | 10 | 5 | NA | NA |
| 2-4A-S | Containment Access Area Elevator Lobby | 719'-0" | NA | NA | 1 | 1 | NA | NA |
| 2-4A-W | Containment Access Area - Wraparound | 719'-0" | NA | NA | 5 | 3 | NA | NA |
| 2-4B | Pipe Penetration Room | 719'-1" | NA | NA | 1 | 1 | NA | NA |
| 2-4C | Switchgear Room | 719'-1" | NA | NA | 2 | 1 | NA | NA |
| 2-4D | Switchgear Room | 719'-1" | NA | NA | 2 | 1 | NA | NA |
| 2-4G | Main Steam Pipeway | 719'-1" | NA | NA | NA | NA | 4* | 2 |
| 2-4G | Exhaust Fan Room | 799'-0" | NA | NA | NA | NA | 2 | 1 |
| 2-5A-N | Standby Control Systems Area | 749'-0" | NA | NA | 16 | 8 | 7 | 4 |
| 2-5A-S | General Access Area - South | 749'-0" | NA | NA | 5 | 3 | 2 | 1 |
| 2-5A-S | General Access Area Elevator Lobby | 749'-0" | NA | NA | 1 | 1 | NA | NA |
| 2-5A-W | Access Corridor - Wraparound | 749'-0" | NA | NA | 3 | 2 | 2 | 1 |
| 2-5B | Valve Access Area | 761'-10" | NA | NA | NA | NA | 4 | 2 |
| 2-5C | RWCU Backwash Tank | 749'-1" | NA | NA | NA | NA | 1 | 1 |
| 2-5D | RWCU Pumps & Heat Exchangers | 749'-1" | NA | NA | NA | NA | 8 | 4 |
| 2-5E | Penetration Room | 749'-1" | NA | NA | NA | NA | 2 | 1 |
| 2-5F | Load Center Room | 749'-1" | NA | NA | 2 | 1 | NA | NA |
| 2-5G | Load Center Room | 749'-1" | NA | NA | 2 | 1 | NA | NA |
| 2-5H | Instrument Repair Room | 749'-1" | NA | NA | 2 | 1 | NA | NA |
| 2-6A | Access Area | 779'-1" | NA | NA | 11 | 6 | NA | NA |
| 2-6B | Load Center Room | 779'-1" | NA | NA | 4 | 2 | NA | NA |
| 2-6C | Electrical Equipment Room | 779'-1" | NA | NA | 2 | 1 | NA | NA |
| 2-6D | H&V Equipment Room | 779'-1" | NA | NA | 12 | 6 | NA | NA |
| 2-6E | Hatch and Laydown Area | 779'-1" | NA | NA | 2 | 1 | NA | NA |
| 2-7A | H&V Fan & Filter Rooms | 799'-1" | NA | NA | 14 | 7 | NA | NA |
| 2-7A | HVAC Filter 2F257A High Temp. Alarm | 799'-0" | 7 | 4 | NA | NA | NA | NA |
| 2-7A | HVAC Filter 2F257A DS-281 | 799'-0" | 7 | 4 | NA | NA | NA | NA |
| 2-7A | HVAC Filter 2F257B High Temp. Alarm | 799'-0" | 7 | 4 | NA | NA | NA | NA |
| 2-7A | HVAC Filter 2F257B DS-282 | 799'-0" | 7 | 4 | NA | NA | NA | NA |
| 2-7A | HVAC Filter 2F217A High Temp. Alarm | 799'-0" | 5 | 3 | NA | NA | NA | NA |
| 2-7A | HVAC Filter 2F217A DS-283 | 799'-0" | 5 | 3 | NA | NA | NA | NA |
| 2-7A | HVAC Filter 2F217B High Temp. Alarm | 799'-0" | 5 | 3 | NA | NA | NA | NA |

* Inaccessible

**TABLE 3.7.3.8-1**
**FIRE DETECTION INSTRUMENTATION**

| INSTRUMENT LOCATION | | | INSTRUMENT OPERABLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | HEAT | | IONIZATION | | PHOTO ELECTRIC | |
| FIRE ZONE | ROOM OR AREA | ELEV. | TOTAL | MIN. | TOTAL | MIN. | TOTAL | MIN. |
| 2-7A | HVAC Filter 2F217B DS-284 | 799'-0" | 5 | 3 | NA | NA | NA | NA |
| 0-6G | Surge Tank Vault | 779'-4" | NA | NA | 2 | 1 | NA | NA |
| 0-8A | Refueling Floor | 818'-1" | NA | NA | NA | NA | 60 | 30 |
| 0-8A | Refueling Floor Elevators | 818'-1" | NA | NA | 2 | 1 | NA | NA |
| ***c.*** | ***ESW Pumphouse*** | | | | | | | |
| 0-51 | Pump Room | 685'-6" | NA | NA | 6 | 3 | NA | NA |
| 0-52 | Pump Room | 685'-6" | NA | NA | 6 | 3 | NA | NA |
| ***c.*** | ***ESW Pumphouse*** | | | | | | | |
| 0-51 | Pump Room | 685'-6" | NA | NA | 6 | 3 | NA | NA |
| 0-52 | Pump Room | 685'-6" | NA | NA | 6 | 3 | NA | NA |
| ***d.*** | ***Diesel Generator Building*** | | ***HEAT*** | | ***INFRA-RED*** | | ***PHOTO-ELECTRIC*** | |
| 0-41A | Diesel Generator "A" Bay | 660'-0" & 677'-0" | 22 | 11 | 2 | 1 | 15 | 8 |
| | | 710'-9" | N/A | N/A | N/A | N/A | 8 | 4 |
| 0-41B | Diesel Generator "B" Bay | 660'-0" & 677'-0" | 23 | 12 | 2 | 1 | 15 | 8 |
| | | 710'-9" | N/A | N/A | N/A | N/A | 9 | 5 |
| 0-41C | Diesel Generator "C" Bay | 660'-0" & 677'-0" | 22 | 11 | 2 | 1 | 15 | 8 |
| | | 710'-9" | N/A | N/A | N/A | N/A | 8 | 4 |
| 0-41D | Diesel Generator "D" Bay | 660'-0" & 677'-0" | 22 | 11 | 2 | 1 | 15 | 8 |
| | | 710'9" | N/A | N/A | N/A | N/A | 8 | 4 |
| ***e.*** | ***Diesel Generator E Building*** | | ***HEAT*** | | ***INFRA-RED*** | | ***IONIZATION*** | |
| 0-41E | Diesel Generator Rooms | 656'-6" & | 1 | 1 | NA | NA | 21 | 11 |
| | | 675'-6" & | NA | NA | 6 | 3 | 3 | 2 |
| | | 708'-0" | NA | NA | 4 | 2 | NA | NA |
| ***f.*** | ***Outside Area*** | | ***HEAT*** | | ***IONIZATION*** | | ***PHOTO-ELECTRIC*** | |
| 0-00 | Startup Transformer (0X103) DS-014 | NA | 10 | 5 | NA | NA | NA | NA |
| 0-00 | Startup Transformer (0X104) DS-015 | NA | 12 | 6 | NA | NA | NA | NA |
| 0-00 | ESS Transformer – DS-016 | | | | | | | |
| | 0X201 | NA | 6 | 3 | NA | NA | NA | NA |
| | 0X 213 | NA | 6 | 3 | NA | NA | NA | NA |
| 0-00 | ESS Transformer – DS-017 | | | | | | | |
| | 0X203 | NA | 6 | 3 | NA | NA | NA | NA |
| | 0X211 | NA | 6 | 3 | NA | NA | NA | NA |

3.8.7 Battery Monitoring and Maintenance Program

TRO 3.8.7 Battery cell parameters for the Class 1E 250 V batteries and Class 1E 125 V batteries shall be within limits.

APPLICABILITY: When associated DC electrical power subsystems are required to be OPERABLE.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each battery.
---

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One or more batteries with one or more battery cell parameters not within Category A or B limits. | A.1 Verify pilot cell electrolyte level and float voltage meet Table 3.8.7-1 Category C limits. | 1 hour |
| | AND | |
| | A.2 Verify battery cell parameters meet Table 3.8.7-1 Category C limits for electrolyte level, average cell temperature, and float voltage. | 8 hours<br>AND<br>Once per 7 days thereafter |
| | AND | |
| | A.3 Restore battery cell parameters to Category A and B limits of Table 3.8.7-1. | 31 Days |
| B. Required Action A.1 or A.2 and associated Completion Time for Condition A not met. | B.1 Enter TS 3.8.6 | Immediately |
| C. Required Action A.3 and associated Completion Time for Condition A not met. | C.1 Declare associated battery inoperable. | Immediately |

(continued)

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| D. Entry into TS 3.8.6 Condition C with electrolyte level below the top of the plates. | D.1 Apply equalizing charge to battery/or affected cell.<br><br>AND<br><br>Verify affected cell meets Table 3.8.7-1 Category A and B Limits for float voltage and temperature. | 31 Days |
| E. Required Action D.1 and associated Completion Time for Condition D not met.<br><br>OR<br><br>One or more batteries on one 125 VDC electrical power subsystem or on one 250 VDC electrical power subsystem with average electrolyte temperature less than the Table 3.8.7-1 Category B Limits.<br><br>OR<br><br>One or more batteries on one 125 VDC electrical power subsystem or on one 250 VDC electrical power subsystem with connection resistance ≥ 100.0 E-6 ohms for any single connection or the calculated average resistance for the battery is > 50.0 E-6 ohms. | E.1 Declare associated battery inoperable. | Immediately |

TECHNICAL REQUIREMENT SURVEILLANCE

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| TRS 3.8.7.1 | Verify for each terminal and connector:<br><br>No visible corrosion<br><br>OR<br><br>a. ≤ 50.0E-6 ohms;<br><br>OR<br><br>b. ≤ 100.0E-6 ohms with the calculated average resistance for the battery < 50.0E-6 ohms. | 92 Days |
| TRS 3.8.7.2 | Verify average electrolyte temperature (minimum of 10% of cells) is within Table 3.8.7-1 Category B limits. | 92 Days |
| TRS 3.8.7.3 | Verify battery cell parameters meet Table 3.8.7-1 Category B Limits for Specific Gravity. | 2 Years |
| TRS 3.8.7.4 | Verify Battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration that could potentially degrade battery performance. | 2 Years |
| TRS 3.8.7.5 | Verify the battery connection resistance is:<br><br>a. < 100.0 E-6 ohms for any single connection;<br><br>AND<br><br>b. The calculated average resistance for the battery is < 50.0 E-6 ohms. | 2 Years |

Table 3.8.7-1 (page 1 of 1)
Battery/Battery Cell Parameter Requirements

| CELL PARAMETER | CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL | CATEGORY B: LIMITS FOR EACH CONNECTED CELL | CATEGORY C: ALLOWABLE LIMITS FOR EACH CONNECTED CELL |
|---|---|---|---|
| Electrolyte Level | ≥ Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a] | ≥ Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a] | Above top of plates, and not overflowing |
| Float Voltage | ≥ 2.13 V | ≥ 2.13 V | ≥ 2.07 V |
| Specific Gravity[b] | N/A | Not more than 0.020 below average of all connected cells<br><br>AND<br><br>Average of all connected cells ≥ 1.195 | N/A |
| Cell Temperature | ≥ 60 Degrees F | ≥ 60 Degrees F | ≥ 60 Degrees F |

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum level during and immediately following equalizing charges provided it is not overflowing.

(b) Corrected for cell temperature. Level correction is not required.

B 3.8.7 Battery Monitoring and Maintenance Program

BASES

BACKGROUND

This TRO delineates the limits on electrolyte temperature, electrolyte level, float voltage, and specific gravity for the Unit 1, when common loads are aligned, and Unit 2 DC electrical power subsystems batteries and comprises the "Battery Monitoring and Maintenance Program" as required under Technical Specification 5.5.13. A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for Technical Specification LCO 3.8.4, "DC Sources–Operating," and LCO 3.8.5, "DC Sources–Shutdown."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in FSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power subsystems provide normal and emergency DC electrical power for the diesel generators (DGs), emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining DC sources identified in Technical Specification Table 3.8.4-1 OPERABLE during accident conditions, in the event of:

a. An assumed loss of all offsite AC or all onsite AC power; and

b. A worst case single failure.

Since battery cell parameters support the operation of the DC electrical power subsystems, they satisfy Criterion 3 of the NRC Policy Statement (Ref. 3).

TRO

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA.

Electrolyte limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met.

(continued)

BASES (continued)

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power subsystem. Therefore, battery cell parameters are required to be within required limits only when the associated DC power source is required to be OPERABLE. Refer to the Applicability discussions in Technical Specification Bases for LCO 3.8.4 and LCO 3.8.5.

ACTIONS

A Note has been added to provide clarification that, for the purpose of this TRO, separate Condition entry is allowed for each battery. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable battery. Complying with the Required Actions may allow for continued operation, and subsequent inoperable batteries are governed by subsequent Condition entry and application of associated Required Actions.

A.1, A.2, and A.3

With parameters of one or more cells in one or more batteries not within limits (i.e., Category A limits not met or Category B limits not met, or Category A and B limits not met) but within the Category C limits specified in Table 3.8.7-1, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met and continued operation is permitted for a limited period.

The pilot cell electrolyte level and float voltage are required to be verified to meet the Category C limits within 1 hour (Required Action A.1). This check provides a quick indication of the status of the remainder of the battery cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cell. One hour is considered a reasonable amount of time to perform the required verification.

Verification that the Category C limits are met (Required Action A.2) provides assurance that during the time needed to restore the parameters to the Category A and B limits, the battery is still capable of performing its intended function. A period of 8 hours is allowed to complete the initial verification because average temperature measurement must be obtained for the battery. Taking into consideration both the time required to perform the required verification and the assurance that the battery cell parameters are not severely degraded, this time is considered reasonable.

(continued)

BASES

ACTIONS

A.1, A.2, and A.3 (continued)

Verification of the average temperature of the battery within the design bases ensures operability. The verification is repeated at 7-day intervals until the parameters are restored to Category A and B limits.

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. Taking into consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable for operation prior to declaring the DC batteries inoperable.

B.1

Failure to complete the checks required for Actions A.1 or A.2 require immediate action. Entry into Technical Specification 3.8.6 must be entered immediately.

C.1

When any battery parameter is outside the Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not ensured and the corresponding DC electrical power subsystem must be declared inoperable. Additionally, other potentially extreme conditions, such as not completing the Required Action A.3 within the required Completion Time also are cause for immediately declaring the associated DC electrical power subsystem inoperable.

D.1

Cells that have been discovered with electrolyte level below the top of the plates are equalized and tested IAW Technical Specification 5.5.13.

E.1

Required Action E.1 is to ensure that under extreme conditions, such as failure to complete the required Action D.1 within the required completion time, average electrolyte temperature falling below 60°F, or intercell connections found not within required connection resistance also are cause for immediately declaring the associated battery inoperable.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

TRS 3.8.7.1

The quarterly inspection for visible corrosion at the terminal and connector is consistent with IEEE-450. The "OR" condition is to ensure, if there is visible corrosion, intercell connection resistance is not impacted.

TRS 3.8.7.2

The quarterly inspection of average electrolyte temperature is consistent with IEEE-450 recommendation to check 10% of the connected cells. Lower than normal temperatures act to inhibit or reduce battery capacity. This TRS ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer's recommendations and battery sizing calculations.

TRS 3.8.7.3

IEEE-450 (Ref. 4) recommends a check of specific gravity every year. The Frequency of the TRS (every 2 years) is acceptable because other administrative controls ensure adequate battery performance during the 2-year interval and aligns performance during refueling outages. Further, operating experience has shown this component usually pass the TRS when performed at the 2-year Frequency; therefore, the frequency is acceptable from a reliability standpoint.

TRS 3.8.7.4

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The presence of physical damage or deterioration does not represent a failure of the TRS, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function). The Frequency of the TRS is acceptable because other administrative controls ensure adequate battery performance during the 2-year interval and aligns performance during refueling outages. Further, operating experience has shown these components usually pass the TRS when performed at the 2-year Frequency; therefore, the frequency is acceptable from a reliability standpoint.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

TRS 3.8.7.5

The connection resistance limits for this SR must be below the limits specified in the SR. The calculated average resistance limit ensure that the total voltage drop across the battery connections is consistent to those assumed in the battery calculations, while the upper limit for battery resistance prevents the possibility of battery damage due to overheating of the connections.

The Frequency of this SR is acceptable because other administrative controls ensure adequate battery performance during the 2-year interval and aligns performance with refueling outage intervals. Furthermore, operating experience has shown these components usually pass the Surveillance when performed at the 2-year Frequency; therefore, the Frequency is acceptable from a reliability standpoint.

Table 3.8.7-1

This table delineates the limits on electrolyte level, float voltage, temperature and specific gravity for three different categories. The meaning of each category is discussed below.

Category A defines the normal parameter limit for each designated pilot cell in each battery. The cells selected as pilot cells are those whose temperature and voltage provide an indication of the state of charge of the entire battery.

The Category A limits specified for electrolyte level are based on manufacturer's recommendations and are consistent with the guidance in IEEE-450 (Ref. 4), with the extra ¼ inch allowance above the high water level indication for operating margin to account for temperature and charge effects. In addition to this allowance, footnote (a) to Table 3.8.7-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 4) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.7-1 (continued)

The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on the recommendation of IEEE-450 (Ref. 4) which states that prolonged operation of cells below 2.13 V can reduce the life expectancy of cells.

Category B defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that may be jumpered out.

The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A. The Category B limit specified for specific gravity for each connected cell is no more than 0.20 below the average of all connected cells with the average ≥ 1.195. These values are based on manufacturer's recommendations for the minimum required value. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell do not mask overall degradation of the battery.

Because of specific gravity gradients that are produced during the re-charging process, delays of several days may occur while waiting for the specific gravity to stabilize. However, following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant.

Category C defines the limits for each connected cell. These values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety. When any battery parameter is outside the Category C limits, the assurance of sufficient capacity described above no longer exists, and the battery must be declared inoperable.

The Category C limit specified for electrolyte level (above the top of the plates and not overflowing) ensures that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C allowable limit for voltage is based on IEEE-450 (Ref. 4), which states that a cell voltage of 2.07 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.7-1 (continued)

Footnote (b) to Table 3.8.7-1 applies to Category B Specific Gravity and requires correction for electrolyte temperature.

REFERENCES

1. FSAR, Chapter 6

2. FSAR, Chapter 15

3. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132)

4. IEEE Standard 450-1995