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June 24, 1983
ANPP-24107 - WFQ/TFQ

Director of Nuclear Reactor Regulation
Attention: Mr. George Knighton, Chief
Licensing Branch No. 3
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket Nos. STN-50-528/529/530
File: 83-056-026; G.1.01.10

Reference: Letter from G. W. Knighton, NRC to E. E Van Brunt, Jr., APS, dated March 14, 1983. Subject: Request for Additional Information Concerning the PVNGS Environmental Qualification Report.

Dear Mr. Knighton:

Arizona Public Service Company (APS), as Project Manager and Operating Agent for Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2 and 3, is submitting herewith fifteen (15) copies of Amendment 1 to the PVNGS Environmental Qualification Report (EQR). The EQR provides a summary of the progress of the PVNGS Equipment Qualification Team (EQT) on environmental qualification of nuclear safety-related equipment. Amendment 1 to the EQR is submitted in response to your request for information stated in the referenced letter, and to support the Audit of the Environmental Qualification Program tentatively scheduled for the week of June 27, 1983.

Very truly yours,

E. E. Van Brunt, Jr.
APS Vice President
Nuclear Projects Management
ANPP Project Director

EEVB/TFQ/sp
Attachment

cc: E. A. Licitra
A. C. Gehr

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June 24, 1983
ANPP-24107 - WFQ/TFQ

STATE OF ARIZONA )
) ss.
COUNTY OF MARICOPA)

I, Edwin E. Van Brunt, Jr., represent that I am Vice President, Nuclear Projects of Arizona Public Service Company, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority to do so, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

Edwin E. Van Brunt, Jr.

Sworn to before me this 17th day of June, 1983.

Notary Public

My Commission Expires:

My Commission Expires April 6, 1987



Arizona Public Service Company
P.O. BOX 21666 • PHOENIX, ARIZONA 85036

June 24, 1983
ANPP-24107 - WFQ/TFQ

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Nuclear Projects Management
ANPP Project Director

EEVB/TFQ/sp
Attachment

cc: E. A. Licitra
A. C. Gehr

June 24, 1983
ANPP-24107 - WFQ/TFQ

STATE OF ARIZONA )
) ss.
COUNTY OF MARICOPA)

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Edwin E. Van Brunt, Jr.

Sworn to before me this 17th day of June, 1983.

Notary Public

My Commission Expires:

My Commission Expires April 6, 1987

ENVIRONMENTAL QUALIFICATION REPORT
PER REQUIREMENTS OF NUREG-0588

Revised 7/13/83

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50-528



# ENVIRONMENTAL QUALIFICATION REPORT PER REQUIREMENTS OF NUREG-0588

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# 1. INTRODUCTION

## 1.1 INTRODUCTION

As part of the environmental qualification program for Class IE equipment for the Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2 and 3, Arizona Public Service Company (APS) has organized an Equipment Qualification Team (EQT) to coordinate and review qualification of nuclear safety-related equipment. The equipment covered in this effort includes all Class IE equipment, both inside and outside containment, and in harsh and non-harsh environments. However, since this report is intended to meet the requirements of NUREG-0588, its scope is limited to Class IE equipment inside containment and in harsh environment areas outside containment. Harsh environment is defined as the environment in any area where there is a significant change in one or more of the environmental parameters due to a Design Basis Accident (DBA). The harsh environments result from the following DBA's:

1. Loss of Coolant Accident (LOCA)/Main Steam Line Break (MSLB)/High Energy Line Break (HELB) inside containment
2. MSLB outside containment
3. HELB outside containment

The EQT review includes the effects of radiation on equipment outside the containment during post-LOCA recirculation of containment sump fluids. Review of supporting documentation is made to determine that the equipment necessary to protect the public health and safety will perform its function when subjected to DBA's up to and including its end-of-life condition.

This qualification coordination and review, ongoing since approximately 1976 (commencing with preparation of specifications), was originally based on IEEE 323-1974 and was oriented toward the preferred use of type testing and analysis based on type testing, in lieu of the other techniques offered by

that document. Since the issuance of NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety Related Electrical Equipment", this effort has been adjusted to meet the requirements outlined for Category I plants of that document. This effort is being performed by a team composed of personnel experienced in reactor systems safety analysis and design, plant operations, emergency operating procedures, nuclear safety and licensing, and environmental qualification.

This report is supported by an auditable record of documentation. The documentation identifies the specific equipment and its function, the criteria used in preparation and review of the qualification reports (starting with the project initial procurement activities and proceeding through report approval), the preparers and reviewers of the documents, and the report references.

The purpose of the EQT review is to evaluate specific safety-related equipment for the worst environment that it would experience and to demonstrate its qualification. Class IE equipment subject to harsh environments is documented in this report on summary sheets, with requirements and results included in accordance with Nuclear Regulatory Commission (NRC) guidelines. Additional documentation is available for NRC audit for further comparison and demonstration that the environmental qualification data and reports conform to the requirements of NUREG-0588. These data are included in APS and Bechtel Power Corporation review sheets which accompany the qualification reports and document their compliance with NUREG-0588, Regulatory Guide 1.89 (Rev. 0), IEEE Standard 323-1974, and other industry standards and regulatory guides. Tables 4.1-1 and 4.1-2 provide the summary sheets for Balance-of-Plant (BOP) and Nuclear Steam Supply System (NSSS) Class IE equipment considered in this report, including demonstration of qualification to NUREG-0588 Category I requirements. The last column of these

tables identifies the status of the qualification effort. All equipment in tables 4.1-1 and 4.1-2 will be qualified prior to fuel load unless otherwise indicated. It is recognized that even with APS's best efforts, certain items may not be qualified prior to commercial operation. Items described in IE Information Notice 82-52 are being qualified in programs outside the control of APS. As such, failure to demonstrate qualification for these particular items should not be held against the APS program inasmuch as qualification for these items is an industry wide problem. APS, however, commits to provide a letter to the commission prior to exceeding 5% power on PVNGS Unit 1 describing the current status of qualification efforts. This letter will assess the safety implications of full power operation without completion of qualification and will provide justification for interim full power operation if considered desired by APS. In addition programs of equipment qualification, described in appendix A, assure that equipment will remain qualified throughout the life of the plant.

# 2. SAFETY-RELATED SYSTEMS REQUIRED TO FUNCTION FOR LOCA/MSLB/HELB SAFE SHUTDOWN

## 2.1 SAFE SHUTDOWN AND ACCIDENT MITIGATION

APS has evaluated the environmental qualification of the Class 1E equipment which experiences a harsh environment due to LOCA, MSLB, and HELB accidents. This report includes equipment required to bring the reactor to a safe shutdown condition. PVNGS has been designed to achieve both the hot and cold safe shutdown conditions relying only upon safety related equipment. Although APS is aware of recent changes to 10CFR 50.49 (commissioner vote of January 7, 1983) that would delete cold shutdown qualification from the scope of this report, APS has identified in appendix E, the list of equipment required for cold shutdown pursuant to the NRC staff request made in the meeting held in Bethesda, Maryland, on March 25, 1982.

Class 1E equipment required to reach safe shutdown is qualified to assure operability in the accident environment for the time required to mitigate a postulated accident. The LOCA accident evaluation also includes areas where equipment will be exposed to high radiation from piping systems containing recirculated containment sump fluids.

Table 2.2-1

LIST OF SYSTEMS CONTAINING CLASS IE EQUIPMENT (Sheet 2 of 2)

Services

- Instrument and Service Air System[a]
- Fire Protection System[a]
- Service Gas System ($N_2$ and $H_2$)[a]
- Diesel Generator Systems

2. ELECTRICAL SYSTEMS

Class IE Power Systems

- Class IE 4.16-kV Power System
- Class IE Standby Generation System
- Class IE 480-V Power Switchgear System
- Class IE 480-V Power MCC System[a]
- Class IE 125-V DC Power System
- Class IE Instrument AC Power System[a]

3. INSTRUMENTATION AND CONTROL SYSTEMS

- Engineered Safety Features Actuation System[a]
- Reactor Protection System[a]
- Ex-Core Neutron Monitoring System[a]
- Radiation Monitoring System[a]

## Table 2.2-2

## SAFETY SYSTEMS REQUIRED TO PERFORM SAFETY FUNCTIONS (Sheet 1 of 4)

| Safety System Identification | | Function | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Name | System Designator | Reactivity Control[a] | Reactor Core Cooling[b] | Heat Removal From the RCS[a] | RCS Integrity[d] | Radio-activity Control[e] | Containment Integrity[f] | Support System[g] |
| Main Steam System | SG | | | X | | | X | |
| Auxiliary Feedwater System | AF | | | X | | | X | |
| Condensate Transfer and Storage System | CT | | | X | | | | |
| Reactor Coolant System | RC | | X | X | X | X | | |
| Safety Injection and Shutdown Cooling System | SI | X | X | X | X | X | X | |
| Chemical and Volume Control System | CH | X | | | X | | X | |
| Nuclear Sampling System | SS | | | | X | | X | |
| Essential Spray Pond System | SP | | | X | | | | X |
| Essential Cooling Water System | EW | | | X | | | | X |

a. Instrumentation or systems for reactivity control.
b. Instrumentation to detect or systems to mitigate inadequate core cooling.
c. Systems involved in transferring primary heat to ultimate heat sinks.
d. Systems part of reactor coolant pressure boundary.
e. Barrier or filter for radioactivity and instrumentation to detect breach.
f. Containment pressure boundary.
g. Supports other ESF systems.

## Table 2.2-2

## SAFETY SYSTEMS REQUIRED TO PERFORM SAFETY FUNCTIONS (Sheet 2 of 4)

| Safety System Identification | | Function | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Name | System Designator | Reactivity Control[a] | Reactor Core Cooling[b] | Heat Removal From the RCS[a] | RCS Integrity[d] | Radio-activity Control[e] | Containment Integrity[f] | Support System[g] |
| Essential Chilled Water System | EC | | | | | | | X |
| HVAC - Fuel Building | HF | | | | | X | | X |
| HVAC - Control Building | HJ | | | | | X | | |
| HVAC - Diesel Generator Building | HD | | | | | | | X |
| Containment Hydrogen Control System | HP | | | | | X | X | |
| Diesel Fuel Oil and Transfer System | DF | | | | | | | X |
| Diesel Generator System | DG | | | | | | | X |
| Class IE 4.16 kV Power System | PB | | | | | | | X |
| Class IE Standby Generation System | PE | | | | | | | X |
| Class IE 480V Power Switchgear System | PG | | | | | | | X |
| Class IE 480V Power MCC System | PH | | | | | | | X |
| Class IE 125V dc Power System | PK | | | | | | | X |
| Class IE Instrument ac Power System | PN | | | | | | | X |

Table 2.2-2

SAFETY SYSTEMS REQUIRED TO PERFORM SAFETY FUNCTIONS (Sheet 3 of 4)

| Safety System Identification | | Function | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Name | System Designator | Reactivity Control[a] | Reactor Core Cooling[b] | Heat Removal From the RCS[a] | RCS Integrity[d] | Radio-activity Control[e] | Containment Integrity[f] | Support System[g] |
| Engineered Safety Features Actuation System | SA | | | | | | | X |
| Reactor Protection System | SB | X | | | | | | X |
| Ex-Core Neutron Monitoring System | SE | X | | | | | | X |
| Radiation Monitoring System | SQ | | | | | | X | X |
| Demineralized Water System | DW | | | | | | | X |
| Fuel Pool Cooling System | DC | | X | | | | | X |
| Nuclear Cooling System | NC | | | | | | | X |
| Chilled Water | WC | | | | | | | X |
| Chemical and Volume Control System | CH | X | | | X | | | |
| HVAC - Auxiliary Building | HA | | | | | | | X |
| HVAC - Containment | HC | | | | | | | X |
| Gaseous Radwaste System | GR | | | | | | X | X |

## Table 2.2-2

## SAFETY SYSTEMS REQUIRED TO PERFORM SAFETY FUNCTIONS (Sheet 4 of 4)

| Safety System Identification | | Function | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Name | System Designator | Reactivity Control[a] | Reactor Core Cooling[b] | Heat Removal From the RCS[a] | RCS Integrity[d] | Radio-activity Control[e] | Containment Integrity[f] | Support System[g] |
| Radioactive Waste Drains System | RD | | | | | | X | X |
| Instrument & Service Air System | IA | | | | | | | X |
| Fire Protection | FP | | | | | | | X |
| Service Gas System | GA | | | | | | | X |
| Containment Purif. | CP | | | | | X | | |

Table 2.5-1

SAFETY-RELATED DISPLAY INDICATION/POST-ACCIDENT MONITORING INSTRUMENTATION (PAMI) (Sheet 5 of 6)

| Bechtel Tag No. | Description | Required For Cold Shutdown | PAMI | Accident Mitigation |
|---|---|---|---|---|
| J-SIN-TI-712 | Emergency Sump Water Temperature | | X | |
| J-CHN-LI-226 | Volume Control Tank Level | | X | X |
| J-EWN-FI-13 | Essential Cooling Water System Flow | | X | X |
| J-EWN-TI-51 | Essential Cooling Water System Temperature | | X | |
| J-SQA-RU-150<br>J-SQB-RU-151 | High Range In-Containment Area Radiation Monitor[(a)] | | X | X |
| J-SQA-RU-152<br>J-SQB-RU-153 | Primary Coolant Monitor[(a)] | | X | X |
| J-SQN-RU-141<br>J-SQN-RU-142<br>J-SQN-RU-143<br>J-SQN-RU-144<br>J-SQN-RU-145<br>J-SQN-RU-146 | High Range Effluent Monitors[(a)] | | X | |
| J-SQN-RU-139<br>J-SQN-RU-140 | Main Steam Line Monitor[(a)] | | X | X |
| J-SQN-RU-152A, B, C, D through J-SQN-RU-158A, B, C, D | Intermediate Range Area Radiation Monitors[(a)] | | X | |

Table 2.5-1

SAFETY-RELATED DISPLAY INDICATION/POST-ACCIDENT MONITORING INSTRUMENTATION (PAMI) (Sheet 6 of 6)

| Bechtel Tag No. | Description | Required For Cold Shutdown | PAMI | Accident Mitigation |
|---|---|---|---|---|
| J-SQA-RI-31 | Fuel Building Area Monitor(b) | | | X |
| J-SQA-RU-37<br>J-SQA-RU-38 | Power Access Purge Area Monitors | | | X |

a. Sensitive electronics are located in a benign environment and are not included in this report.

b. Trip monitors - long term qualification not required.

# 3. ENVIRONMENTAL CONDITIONS

## 3.1 ACCIDENT PROFILE

The normal/abnormal and DBA environmental conditions for equipment used at PVNGS are described in table 4.1-3. IEEE Standard 323-1974 and NUREG-0588 Category I have been used to establish requirements for qualification tests and analyses performed on the Class 1E equipment exposed to these environmental conditions.

### 3.1.1 ENVIRONMENTAL CONDITIONS INSIDE CONTAINMENT

#### 3.1.1.1 LOCA

The environmental qualification and design condition envelope is based on an analysis of the containment response to various hot leg and cold leg LOCA's. The analyses were performed using Bechtel's COPATTA containment response analysis program. The COPATTA program predicts pressures and temperatures within the containment building atmosphere and sump regions and the temperature profiles in various modeled structures. A condensed description of the COPATTA code appears in FSAR Paragraph 6.2.1.1.3 and a complete description can be found in Bechtel Topical Report BN-TOP-3. The methodology used in the COPATTA program is consistent with that provided in NUREG-0588 as applied to LOCA analyses. The analyses used to define the qualification envelope (table 4.1-3) were developed from break mass/energy flow data provided by CE and are presented in FSAR Section 6.2. For temperature considerations, the worst case LOCA is a double-ended suction leg slot break (9.82 $ft^2$) at 102% power with loss of off-site power and failure of one emergency core cooling system (ECCS) train. This postulated LOCA generates a calculated peak containment pressure of 46.5 psig and a peak containment vapor temperature of 300F. This temperature profile is bounded by the MSLB

profile shown in figure 3.1-1. For pressure considerations, the worst case LOCA is a double-ended discharge leg slot break (9.82 $ft^2$) at 102% power with loss of off-site power and maximum ECCS flow. This postulated LOCA generates a calculated peak containment pressure of 49.2 psig and a peak containment vapor temperature of 293F. The post-accident design envelope for safety-related equipment is shown in figures 3.1-1 and 3.1-2.

3.1.1.2 MSLB

The evaluation of environmental conditions associated with a MSLB in containment was performed utilizing the Bechtel COPATTA code modified to incorporate the modeling set forth in the NRC Containment Systems Branch Interim Evaluation Model (CSB-IEM) and is consistent with the methodology presented in NUREG-0588, Appendix B. The most severe MSLB accident, 102% power with failure of one cooling train and off-site power available, has been analyzed.

Previously reported MSLB containment response analyses in FSAR Table 6.2-9 are conservative compared to the CSB-IEM and remain valid for the purpose of identifying the worst case MSLB to be used for the environmental qualification analysis. On the basis of peak containment pressure and temperature, the 102% power MSLB with cooling train failure is most severe. This MSLB exhibits peak containment conditions of 41.1 psig and 369.8F.

3.1.1.3 HELB

A listing of the lines within safety-related structures that are considered capable of failure is given in FSAR Tables 3.6-1 and 3.6-2. For each line break postulated, a zone of influence was generated and any safety-related equipment in that zone of influence was identified. Design

4. The margin applied to the minimum operability time when combined with the other test margins will account for the uncertainties associated with the design, production tolerances, testing techniques, and the number of units tested.

## 3.3 HIGH RADIATION

### 3.3.1 LEVELS INSIDE CONTAINMENT

A review of safety-related equipment which may be degraded by radiation during post-accident operation has been conducted. The guidance provided by NUREG-0588 has been used in determining radiation exposures.

A LOCA results in depressurization of the primary system and large release of radioactive material to the containment atmosphere. The PVNGS qualification effort is also considering an intact primary degraded core event in accordance with NUREG-0737. Source term changes derived from the guidance of NUREG-0737 are consistent with NUREG-0588.

#### 3.3.1.1 Core Inventory

Table 3.3-1 presents the core inventory of radionuclides. These sources are based on 108% of full power core conditions or 4100 MWt. Note that the full power identified in the application for the operating license (dated October 1, 1979) is 3800 MWt. Thus, all values identified in the table include 8% margin.

#### 3.3.1.2 Containment Airborne Activity

The following fractions of core inventory are diluted in the containment volume of $2.6 \times 10^6$ $ft^3$.

A. 100% Noble Gas
B. 25% Halogens

Table 3.3-2 presents containment airborne concentrations at the start of a postulated accident.

HIGH RADIATION

Table 3.3-1

TOTAL CORE INVENTORY

| Nuclide | Activity[a] (Curies) | Nuclide | Activity[a] (Curies) | Nuclide | Activity[a] (Curies) |
|---|---|---|---|---|---|
| Se-84 | 2.55(+7) | Sn-129 | 1.08(+7) | Cs-140 | 2.00(+8) |
| Br-84 | 2.55(+7) | Sb-129 | 2.08(+7) | Ba-140 | 2.11(+8) |
| As-85 | 5.52(+6) | Te-129m | 3.68(+6) | La-140 | 2.11(+8) |
| Se-85 | 3.02(+7) | Te-129 | 2.03(+7) | Xe-143 | 2.75(+6) |
| Br-85 | 3.21(+7) | I-129 | 1.61(+0) | Cs-143 | 4.52(+7) |
| Kr-85m | 3.48(+7) | Sn-131 | 3.50(+7) | Ba-143 | 1.47(+8) |
| Kr-85 | 1.21(+6) | Sb-131 | 9.30(+7) | La-143 | 1.81(+8) |
| Se-87 | 3.29(+7) | Te-131m | 1.72(+7) | Ce-143 | 1.83(+8) |
| Br-87 | 5.73(+7) | Te-131 | 1.00(+8) | Pr-143 | 1.84(+8) |
| Kr-87 | 5.91(+7) | I-131 | 1.13(+8) | Xe-144 | 4.03(+5) |
| Br-88 | 7.74(+7) | Xe-131m | 6.17(+5) | Cs-144 | 1.25(+7) |
| Kr-88 | 8.59(+7) | Sn-132 | 3.08(+7) | Ba-144 | 8.75(+7) |
| Rb-88 | 8.61(+7) | Sb-132 | 8.24(+7) | La-144 | 1.61(+8) |
| Br-89 | 7.92(+7) | Te-132 | 1.15(+8) | Ce-144 | 1.25(+8) |
| Kr-89 | 1.08(+8) | I-132 | 1.16(+8) | Pr-144 | 1.25(+8) |
| Rb-89 | 1.12(+8) | Sn-133 | 5.37(+6) | | |
| Sr-89 | 1.13(+8) | Sb-133 | 1.10(+8) | | |
| Br-90 | 7.78(+7) | Te-133m | 1.42(+8) | | |
| Kr-90 | 1.16(+8) | Te-133 | 1.01(+8) | | |
| Rb-90 | 1.31(+8) | I-133 | 2.32(+8) | | |
| Sr-90 | 6.60(+6) | Xe-133 | 2.26(+8) | | |
| Y-90 | 6.57(+6) | Cs-134 | 1.28(+6) | | |
| Kr-91 | 8.95(+7) | Sb-134 | 5.69(+7) | | |
| Rb-91 | 1.45(+8) | Te-134 | 2.14(+8) | | |
| Sr-91 | 1.49(+8) | I-134 | 2.54(+8) | | |
| Y-91m | 8.80(+7) | Sb-135 | 1.80(+7) | | |
| Y-91 | 1.49(+8) | Te-135 | 1.09(+8) | | |
| Sr-95 | 1.64(+8) | I-135 | 2.21(+8) | | |
| Y-95 | 2.02(+8) | Xe-135m | 6.38(+7) | | |
| Zr-95 | 1.99(+8) | Xe-135 | 5.31(+7) | | |
| Nb-95 | 1.95(+8) | Cs-135 | 2.50(+1) | | |
| Zr-99 | 2.61(+8) | Cs-136 | 1.32(+6) | | |
| Nb-99 | 2.61(+8) | I-137 | 1.44(+8) | | |
| Mo-99 | 2.69(+8) | Xe-137 | 2.09(+8) | | |
| Tc-99m | 3.23(+7) | Cs-137 | 4.84(+6) | | |
| Mo-103 | 1.46(+8) | Ba-137m | 4.52(+6) | | |
| Tc-103 | 1.53(+8) | I-138 | 8.77(+7) | | |
| Ru-103 | 1.53(+8) | Xe-138 | 2.05(+8) | | |
| Tc-106 | 6.72(+7) | Cs-138 | 2.07(+8) | | |
| Ru-106 | 5.27(+7) | Xe-140 | 1.16(+8) | | |

a. Numbers in parentheses denote powers of ten

HIGH RADIATION

Table 3.3-2

CONTAINMENT AIRBORNE ACTIVITY AT START OF ACCIDENT

| Nuclide | Activity[a][b] (Curies) |
|---|---|
| Kr-85m | 3.48(+7) |
| Kr-85 | 1.21(+6) |
| Kr-87 | 5.91(+7) |
| Kr-88 | 8.59(+7) |
| Kr-89 | 1.08(+8) |
| Kr-90 | 1.16(+8) |
| Kr-91 | 8.95(+7) |
| I-129 | 4.03(-1) |
| I-131 | 2.83(+7) |
| Xe-131m | 6.17(+5) |
| I-132 | 2.90(+7) |
| I-133 | 5.80(+7) |
| Xe-133 | 2.26(+8) |
| I-134 | 6.35(+7) |
| I-135 | 5.53(+7) |
| Xe-135m | 6.38(+7) |
| Xe-135 | 5.31(+7) |
| I-137 | 3.60(+7) |
| Xe-137 | 2.09(+8) |
| I-138 | 2.19(+7) |
| Xe-138 | 2.05(+8) |
| Xe-140 | 1.16(+8) |
| Xe-143 | 2.75(+6) |
| Xe-144 | 4.03(+5) |

a. Numbers in parentheses denote powers of ten.
b. Containment free volume is $2.6 \times 10^6$ $ft^3$.

3.3.1.3 Reactor Coolant Activity

The following fractions of core inventory are diluted in the reactor coolant volume of $9.15 \times 10^3$ $ft^3$ for a degraded core intact primary event (NUREG 0737).

A. 100% Noble Gas
B. 50% Halogens
C. 1% Solids

Table 3.3-3 presents reactor coolant concentrations at the start of a postulated accident.

3.3.1.4 Plateout Source Terms

Iodine released from the core will plateout on surfaces within containment. The amount of iodine which is available for plateout is 25% of the core iodine inventory. Conservatively, no time dependency was assumed for the mechanism of plateout. The entire 25% of the core iodine inventory was assumed to plateout immediately following a postulated accident with the activity the same as the airborne iodine activity throughout the accident.

The total available iodine plateout surface area taken into consideration was the concrete, stainless, galvanized, and carbon steel surfaces within containment. The total surface area available is $5.6 \times 10^5$ $ft^2$.

3.3.1.5 Sump Sources

For the purpose of qualifying equipment which is located near the containment sumps, a sump source was determined. The following fractions of core inventory are assumed to be diluted in the sump volume of approximately 600,000 gallons immediately following the postulated accident.

A. 50% Halogens
B. 1% Solids

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Table 3.3-3

REACTOR COOLANT ACTIVITY AT START OF ACCIDENT

| Nuclide | Activity[a][b] (Curies) | Nuclide | Activity[a][b] (Curies) | Nuclide | Activity[a][b] (Curies) |
|---|---|---|---|---|---|
| Se-84 | 2.55(+5) | Sn-129 | 1.08(+5) | Cs-140 | 2.00(+6) |
| Br-84 | 1.28(+7) | Sb-129 | 2.08(+5) | Ba-140 | 2.11(+6) |
| As-85 | 5.52(+4) | Te-129m | 3.68(+4) | La-140 | 2.11(+6) |
| Se-85 | 3.02(+5) | Te-129 | 2.03(+5) | Xe-143 | 2.75(+6) |
| Br-85 | 1.61(+7) | I-129 | 8.05(-1) | Cs-143 | 4.52(+5) |
| Kr-85m | 3.48(+7) | Sn-131 | 3.50(+5) | Ba-143 | 1.47(+6) |
| Kr-85 | 1.21(+6) | Sb-131 | 9.30(+5) | La-143 | 1.81(+6) |
| Se-87 | 3.29(+5) | Te-131m | 1.72(+5) | Ce-143 | 1.83(+6) |
| Br-87 | 2.87(+7) | Te-131 | 1.00(+6) | Pr-143 | 1.84(+6) |
| Kr-87 | 5.91(+7) | I-131 | 5.65(+7) | Xe-144 | 4.03(+5) |
| Br-88 | 3.87(+7) | Xe-131m | 6.17(+5) | Cs-144 | 1.25(+5) |
| Kr-88 | 3.59(+7) | Sn-132 | 3.08(+5) | Ba-144 | 8.75(+5) |
| Rb-88 | 8.61(+5) | Sb-132 | 8.24(+5) | La-144 | 1.61(+6) |
| Br-89 | 3.96(+7) | Te-132 | 1.15(+6) | Ce-144 | 1.25(+6) |
| Kr-89 | 1.08(+8) | I-132 | 5.80(+7) | Pr-144 | 1.25(+6) |
| Rb-89 | 1.12(+6) | Sn-133 | 5.37(+4) | | |
| Sr-89 | 1.13(+6) | Sb-133 | 1.10(+6) | | |
| Br-90 | 3.89(+7) | Te-133m | 1.42(+6) | | |
| Kr-90 | 1.16(+8) | Te-133 | 1.01(+6) | | |
| Rb-90 | 1.31(+6) | I-133 | 1.16(+8) | | |
| Sr-90 | 6.60(+4) | Xe-133 | 2.26(+8) | | |
| Y-90 | 6.57(+4) | Cs-134 | 1.28(+4) | | |
| Kr-91 | 8.95(+7) | Sb-134 | 5.69(+5) | | |
| Rb-91 | 1.45(+6) | Te-134 | 2.14(+6) | | |
| Sr-91 | 1.49(+6) | I-134 | 1.27(+8) | | |
| Y-91m | 8.80(+5) | Sb-135 | 1.80(+5) | | |
| Y-91 | 1.49(+6) | Te-135 | 1.09(+6) | | |
| Sr-95 | 1.64(+6) | I-135 | 1.10(+8) | | |
| Y-95 | 2.02(+6) | Xe-135m | 6.38(+7) | | |
| Zr-95 | 1.99(+6) | Xe-135 | 5.31(+7) | | |
| Nb-95 | 1.95(+6) | Cs-135 | 2.50(-1) | | |
| Zr-99 | 2.61(+6) | Cs-136 | 1.32(+4) | | |
| Nb-99 | 2.61(+6) | I-137 | 7.20(+7) | | |
| Mo-99 | 2.69(+6) | Xe-137 | 2.09(+8) | | |
| Tc-99m | 3.23(+5) | Cs-137 | 4.84(+4) | | |
| Mo-103 | 1.46(+6) | Ba-137m | 4.52(+4) | | |
| Tc-103 | 1.53(+6) | I-138 | 4.39(+7) | | |
| Ru-103 | 1.53(+6) | Xe-138 | 2.05(+8) | | |
| Tc-106 | 6.72(+5) | Cs-138 | 2.07(+6) | | |
| Ru-106 | 5.27(+5) | Xe-140 | 1.16(+8) | | |

a. Numbers in parentheses denote powers of ten.

b. Reactor coolant system volume is $9.15 \times 10^3$ $ft^3$.

Table 3.3-4 presents the isotopic inventory in the sump immediately following the postulated accident.

3.3.1.6 Methodology

The following calculation methodology is utilized. Gamma and beta doses are determined for three types of radioactive source distributions: nuclides suspended in the containment atmosphere, plated-out on containment surfaces, or mixed in the containment sump water. A given piece of equipment may receive a dose contribution from any or all of these sources. The amount of dose contributed by each of these sources is determined by the location of the equipment and the effects of shielding as follows:

A. Gamma Radiation

1. Containment Airborne

The finite cloud model is used to calculate the gamma dose to equipment from airborne sources. This model uses a sphere with the same volume as that of the containment.

2. Plateout

The contribution to the gamma dose from iodine plateout is calculated using a cylindrical shell source of the same height and volume as that of the containment. No internal structures are modeled. Air attenuation is not considered.

3. Sump

The gamma dose from the sump is calculated by modeling the sump as a cylinder with a radius equal to that of the containment. To conserve the volume of the source, the height of the cylinder is set at about 4.5 feet. Figure 3.3-1

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Table 3.3-4

CONTAINMENT SUMP ACTIVITY AT START OF ACCIDENT

| Nuclide | Activity[a][b] (Curies) | Nuclide | Activity[a][b] (Curies) | Nuclide | Activity[a][b] (Curies) |
|---|---|---|---|---|---|
| Se-84 | 2.55(+5) | Sn-129 | 1.08(+5) | Cs-140 | 2.00(+6) |
| Br-84 | 1.28(+7) | Sb-129 | 2.08(+5) | Ba-140 | 2.11(+6) |
| As-85 | 5.52(+4) | Te-129m | 3.68(+4) | La-140 | 2.11(+6) |
| Se-85 | 3.02(+5) | Te-129 | 2.03(+5) | Cs-143 | 4.52(+5) |
| Br-85 | 1.61(+7) | I-129 | 8.05(-1) | Ba-143 | 1.47(+6) |
| Se-87 | 3.29(+5) | Sn-131 | 3.50(+5) | La-143 | 1.81(+6) |
| Br-87 | 2.87(+7) | Sb-131 | 9.30(+5) | Ce-143 | 1.83(+6) |
| Br-88 | 3.87(+7) | Te-131m | 1.72(+5) | Pr-143 | 1.84(+6) |
| Rb-88 | 8.61(+5) | Te-131 | 1.00(+6) | Cs-144 | 1.25(+5) |
| Br-89 | 3.96(+7) | I-131 | 5.65(+7) | Ba-144 | 8.75(+5) |
| Rb-89 | 1.12(+6) | Sn-132 | 3.08(+5) | La-144 | 1.61(+6) |
| Sr-89 | 1.13(+6) | Sb-132 | 8.24(+5) | Ce-144 | 1.25(+6) |
| Br-90 | 3.89(+7) | Te-132 | 1.15(+6) | Pr-144 | 1.25(+6) |
| Rb-90 | 1.31(+6) | I-132 | 5.80(+7) | | |
| Sr-90 | 6.60(+4) | Sn-133 | 5.37(+4) | | |
| Y-90 | 6.57(+4) | Sb-133 | 1.10(+6) | | |
| Rb-91 | 1.45(+6) | Te-133m | 1.42(+6) | | |
| Sr-91 | 1.49(+6) | Te-133 | 1.01(+6) | | |
| Y-91m | 8.80(+5) | I-133 | 1.16(+8) | | |
| Y-91 | 1.49(+6) | Cs-134 | 1.28(+4) | | |
| Sr-95 | 1.64(+6) | Sb-134 | 5.69(+5) | | |
| Y-95 | 2.02(+6) | Te-134 | 2.14(+6) | | |
| Zr-95 | 1.99(+6) | I-134 | 1.27(+8) | | |
| Nb-95 | 1.95(+6) | Sb-135 | 1.80(+5) | | |
| Zr-99 | 2.61(+6) | Te-135 | 1.09(+6) | | |
| Nb-99 | 2.61(+6) | I-135 | 1.10(+8) | | |
| Mo-99 | 2.69(+6) | Cs-135 | 2.50(-1) | | |
| Tc-99m | 3.23(+5) | Cs-136 | 1.32(+4) | | |
| Mo-103 | 1.46(+6) | I-137 | 7.20(+7) | | |
| Tc-103 | 1.53(+6) | Cs-137 | 4.84(+4) | | |
| Ru-103 | 1.53(+6) | Ba-137m | 4.52(+4) | | |
| Tc-106 | 6.72(+5) | I-138 | 4.39(+7) | | |
| Ru-106 | 5.27(+5) | Cs-138 | 2.07(+6) | | |

a. Numbers in parentheses denote powers of ten.

b. Containment sump volume is minimum of $7.76 \times 10^4$ $ft^3$.

shows the gamma dose above the sump as a function of distance.

B. Beta Radiation

1. Containment Airborne

The beta doses to equipment from airborne sources following a postulated accident are calculated using a semi-infinite cloud model. All the beta energy is assumed to be absorbed by the equipment.

2. Plateout

Beta doses to equipment due to plateout assume that the iodine plates out uniformly on all the plateout surfaces. An infinite plane source model is used to calculate the equipment dose.

3. Sump

The contribution to the beta dose from the sump can be ignored as beta contribution at air distances greater than 1 inch will be less than 10% of gamma dose rates.

In addition to gamma and beta radiation from accident sources, doses due to normal operation over a 40-year plant life are also considered. Contributions from neutrons and Nitrogen-16 in reactor coolant with 1% failed fuel were included.

Table 3.3-5 presents the 0-30 day integrated accident doses. For each specific component, the appropriate normal operational dose is included along with the pertinent accident contributors. Credit for equipment and internal containment shielding is taken for various components.

HIGH RADIATION

Table 3.3-5

INTEGRATED 0-30 DAY POST-ACCIDENT DOSES INSIDE CONTAINMENT

| Source Contributor | Gamma (Rads) | Beta (Rads) |
|---|---|---|
| Airborne | 9.5(+6) | 8.7(+7) |
| Plateout | 3.7(+5) | 9.0(+6) |
| Sump | (a) | (b) |

a. Refer to figure 3.3-1.
b. Negligible - refer to section 3.3.1.6.B.3.

## 3.3.2 LEVELS OUTSIDE CONTAINMENT

Radiation levels outside the containment are noted in FSAR Appendix 3E based upon the assumptions specified in FSAR Section 3.11.5.2. A review has been conducted to consider the effects of noble gases in recirculation piping in accordance with NUREG-0737 Item II.B.2.2.4.b. The results are summarized in table 3.3-6.

HIGH RADIATION

Table 3.3-6
INTEGRATED POST-ACCIDENT AUXILIARY BUILDING DOSES(a)(b)
(INTACT PRIMARY, DEGRADED CORE)

| Dose Point | 0-30 Days Dose (Rads) |
|---|---|
| Contact dose, on recirculation piping | $2.1 \times 10^8$ |
| Area field in room containing recirculation fluids | $6.4 \times 10^6$ |
| Areas not containing recirculation fluids | $<10^6$ |

a. Calculated in accordance with NUREG 0737.

b. NUREG 0588 doses are presented in Table 4.1-3.

## 3.7 FLOODING AND SUBMERGENCE

Flooding is considered to be part of the design basis event for equipment located in the lower levels of the containment building. Flooding outside containment is not part of the design basis for qualification for the reasons described in FSAR section 9.3.3.2. The water surface elevation in containment after a LOCA will be a maximum of 90'-6" (or 10-1/2' above the floor level at 80'-0"). All safety related equipment that may become submerged as a result of this LOCA are evaluated to determine the respective accident mitigation or post accident functionability requirements. Verification of as-installed equipment locations are performed by means of actual in-plant inspections. Where the devices must remain operable and are located below the maximum flood elevation, the equipment will either be relocated above the 90'-6" elevation or will be qualified for submergence.

## 3.8 CHEMICAL SPRAY

The chemical spray is applicable only to the containment building post-LOCA/MSLB environment. Applicable parameters are summarized in table 4.1-3 and were established on the basis of containment spray system operation.

# 4. MASTER EQUIPMENT LIST AND QUALIFICATION REVIEW

## 4.1 REVIEW TECHNIQUE

### 4.1.1 BOP

A master list was compiled using the instrument, valve and equipment indices and separating the systems into Class IE and non-Class IE. The equipment associated with the Class IE systems, noted in table 2.2-1, were then categorized into harsh and non-harsh environments. In addition, a review of other project documents, such as specifications, P&ID's, electrical single line and elementary diagrams, was conducted as a check for Class IE equipment. Lastly, the FSAR was used to determine that all safety-related equipment had been identified. Table 4.1-1 presents the BOP Class IE equipment in a harsh environment requiring qualification.

To facilitate a uniform review of the environmental qualification of equipment, review forms entitled "Equipment Environmental Qualification Check Lists" and "Seismic Check Lists" were prepared. A copy of these forms is included as Appendix B. The review forms were prepared based upon the requirements of NUREG-0588 Category I and emphasize the requirements to be addressed on a case by case basis. The review forms are designed to guide the reviewer in obtaining information from vendors which is in an auditable form.

### 4.1.2 NSSS

The safety-related Class IE equipment within the NSSS scope of supply was identified from a review of CESSAR Sections 3.9, 3.11, and Chapters 6, 7, and 15, procurement specifications,

System Design Requirements, electrical drawings, and P&IDs. The safety-related systems listed in section 2.2 have been systematically analyzed in accordance with NUREG-0588 to determine if components required to mitigate or monitor the consequence of an accident or place the plant in a hot standby/ cold shutdown condition are located in a harsh environment. Component locations were defined using a list provided by C-E, in conjunction with a review of physical drawings. Table 4.1-2 presents the NSSS Class IE equipment located in a harsh environment.

Once the Class IE equipment was identified for the NSSS scope of supply, a systematic review on a component-level basis was performed to determine the extent to which the component environmental qualification program complied with the requirements of NUREG-0588.

### 4.1.3. INDEPENDENT APS REVIEW

In addition to the review activities described in sections 4.1.1 and 4.1.2, APS performs a detailed independent review of each qualification program, both environmentally and seismically, utilizing the Equipment Qualification Program Check List, included as Appendix C.

The review procedure for qualification plans and reports between the Bechtel and APS is intended to insure compliance to IEEE-323, 344, and NUREG-0588.

The following procedure requires that, when the qualification document is received at Bechtel a copy is formally transmitted to APS requesting a review by a specific date. The transmittal letter and the qualification document are routed to the electrical section, upon its arrival in-house, where it is logged

in and a review request form is filled out and routed to the appropriate engineering discipline, requesting that the qualification document be reviewed and comments provided by the specified date on the form. The discipline supervising engineer or his designee retrieves the qualification document from the Central File and reviews it against the Equipment Qualification Program Checklist.

The checklist is designed to insure that the qualification test information required by IEEE-323 and 344 is incorporated into the documents. Section 6.3.1.1 of IEEE-323 specifies the recommended content of test plans and reports and is incorporated as indicated on the checklist under the item "Documentation". It is the reviewers responsibility to insure that this area is covered sufficiently throughout the qualification test submittal to meet the intent of the requirements. The qualification review document does provide for specific entries that are required to meet the Section 6.3.1.1 documentation requirements which are considered significant to be separated out to insure their entry into the qualification submittal by the supplier such as:

1. Life Limiting Components required by item 5 of Section 6.2, IEEE-323.
2. Preventive Maintenance as required by item 4 of Section 6.2, IEEE-323.
3. Environmental Service Conditions as required by item 7 of Section 6.2, IEEE-323.

The review of the seismic test report, to insure that all applicable areas are covered as required by IEEE-344, is patterned after Section 8.2.1 of this standard, with each item requiring a specific review check to insure its incorporation.

REVIEW TECHNIQUE

Upon completion of the Equipment Qualification Program Checklist, the review request form is signed and dated as well as the applicable section within the qualification checklist. If the review was conducted by someone other than the discipline supervising engineer, then they review the content of the qualification review document and also provides their signature and date in the appropriate section. The completed review forms are then submitted to the electrical section where copies of the qualification review document form are made, the transmittal letter is drafted and all required data is entered into the log to indicate review has been completed and documented. Copies of all documentation are placed within a single package and filed in the Central File.

The Equipment Qualification Program Checklist is then transmitted, in its entirety, to the Bechtel where it is reviewed along with their generated comments. The APS comments are incorporated as appropriate in transmittals to the supplier for resolution or incorporation into the qualification test documentation and the supplier resubmits a subsequent report. This cycle continues until all requirements are satisfied upon which time the qualification document receives a Status 1. Final qualification documentation submitted to APS is reviewed and signed off by the reviewer, the Electrical Engineering Supervisor, the Nuclear Engineering Manager and Quality Assurance.

### 4.1.4 QUALIFICATION STATUS

Upon completion of the review discussed in sections 4.1.1 through 4.1.3, the qualification status of each component was placed into one of the following categories and entered in the Qualification Status column of table 4.1-1 and 4.1-2. Status categories are described in sections 4.1.4.1, 4.1.4.2, and 4.1.4.3.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 1 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 480V Class IE Motor Control Centers<br>Auxiliary Bldg | General Electric (P.O. No. 13-EM-018) | Prototype IC7700<br>System: Class IE 480V Power MCC<br>Tag No.<br>E-PHA-M33<br>E-PHB-M34<br>E-PHA-M35<br>E-PHB-M36<br>E-PHA-M37<br>E-PHB-M38 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 104F peak<br>Pressure 0 psig<br>Relative Humidity 90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Post Seismic Stress Test Test sample subjected to: 131F and 90-99% humidity for 96 hr with contactors cycled<br>Post-functional tests included<br>1. Operation<br>2. Dielectric Strength<br>3. Insulation resistance<br>4. Pickup voltage<br>5. Drop out voltage | N/A | N/A | Type Test<br>Breakers cycled per UL489 and NEMA AB1<br>Contactors cycled per UL 508<br>General purpose control relays cycled per UL 508<br>Selector switches and push buttons cycled per UL 508<br>Thermal aging 81 days at 115C<br>G.E. Qualification Report 80GPC004 Feb 25, 1982<br>(cont) | Qualified for 40 years except for life limiting components:<br>Agastat Relays: 10 years<br>Contactors: 50,000 cycles<br>Aux.Relays: 100,000 cycles<br>Circuit breakers: 22 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 2 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identi-fication | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Require-ment | Accuracy or Response Time Demon-strated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 480V Class IE Motor Control Centers<br>Auxiliary Bldg<br>(cont) | | | | | | | | | BPC Log No. 13-10407-E018-2802-2, 2803-2 2770-2 2804-2 March 22, 1982<br>Wyle Reports 43757-2 Sept. 27, 1978, and 44380-1, Feb. 7, 1979 | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 3 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identi-fication | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Require-ment | Accuracy or Response Time Demon-strated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Auxiliary Relay Cabinets<br>Auxiliary Bldg. | Harlo Corp. (P.O. No. 13-EM-022) | Prototype<br>System: ESFAS<br>Tag No.<br>E-ZAA-C01<br>E-ZAA-C02<br>E-ZAA-C03<br>E-ZAA-C04<br>E-ZAA-C05<br>E-ZAA-C06<br>E-ZAB-C01<br>E-ZAB-C02<br>E-ZAB-C03<br>E-ZAB-C04<br>E-ZAB-C05<br>E-ZAB-C06 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 119F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1.1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 16 hr Post-aging functional test 50F for 8 hrs followed by 135F for 8 hrs at 90 ±10% humidity | N/A | N/A | Type Test<br>Aging analysis performed on all materials<br>Major component aging:<br>1. Westinghouse FT1 test switch 69 days at 110C<br>2. Westinghouse ARD relay 441 days at 110C<br>3. Agastat timing relay 62 days at 110C<br>BPC Log No. 13-10407-E600-1-3 May 26, 1982<br>Wyle Qualification Plan NES26331, May 7, 1982 | In progress (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 4 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 5kV Power Cables<br>MSSS<br>Auxiliary Bldg | Anaconda (PO No. 13-EM-029) | Insulation FR-EP jacket hypalon | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II, III | Temperature 346F peak<br>Pressure 113 psig peak<br>Relative Humidity 100%<br>Radiation $2 \times 10^8$ rads<br>Chemical Spray 3000 ppm $H_3BO_3$ 0.064 molar $Na_2S_2O_3$ pH 9-11, with NaOH<br>Submergence N/A | 30 days | 30 days Cable energized throughout test<br>Cables subjected to post-LOCA mandrel bend/high potential withstand test (passed) | N/A | N/A | Type Test - in containment 168 hrs at 150C<br>Anaconda Report F-C4350-3, July, 1976<br>BPC Log 13-10407-E029-II-6<br>July 20, 1982<br>Type Test out of containment and MSSS 350 hrs at 150C<br>BPC Log No. E029-41-1 Oct. 26, 1982 | Qualified for 40 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 5 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Low Voltage Electrical Penetration Assemblies<br>Containment Wall | Conax Corp. (PO No. 13-EM-035A) | Prototype for low voltage power and control<br>System: Non-Class IE 480V Power Switchgear<br>Tag No.<br>E-NGN-Z01<br>E-NGN-Z03<br>E-NGN-Z05<br>E-NGN-Z07<br>E-NGN-Z11<br>E-NGN-Z13<br>E-NGN-Z32<br>E-NGN-Z54<br>E-NGN-Z60<br>E-NGN-Z71<br>E-NGN-Z88<br>E-NGN-Z90<br>System: Non-Class IE 480V Power MCC and Control<br>Tag No.<br>E-NHN-Z09<br>E-NHN-Z10<br>(cont) | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig peak see fig. 3.1-2<br>Relative Humidity Steam/air mixture<br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>(cont) | Temperature 370F peak<br>Pressure 74.5 psig peak<br>Relative Humidity 100%<br>Radiation $1.28 \times 10^8$ rads<br>Chemical Spray[b] 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH = 8.6 with $Na_3PO_4$ for 13.5 days<br>(cont) | 30 days | 13.5 days<br>Post LOCA/ MSLB dielectric strength test at 660V-ac for 5 minutes; insulation resistance test range<br>$4 \times 10^8$ - $1 \times 10^{10}$ Ω<br>Passed gas leak rate test<br>Rated short circuit test conducted | N/A | N/A | Type Test<br>Qualified per IEEE-317-1976 as modified by NRC Reg. Guide 1.63, July 1978<br>104 hours at 303F<br>Conax Corp. Report No. IPS 585.3, Jan. 26, 1981<br>BPC Log No. 13-10407-E035A-320-1, Feb. 6, 1981<br>Conax Corp. Report No. IPS 447.1 July 28, 1981<br>BPC Log No. E-035A-313-2 Sept. 9, 1981 | Qualified for 40 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.
b. Results of prior tests demonstrated no significant impact of chemical spray; no chemicals were used in qualification test.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 6 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Low Voltage Electrical Penetration Assemblies | | E-NHN-Z12<br>E-NHN-Z15<br>E-NHN-Z17<br>E-NHN-Z19<br>E-NHN-Z61<br>E-NHN-Z67 | Submergence N/A<br>Env. Desig. I | Submergence N/A | | | | | | |
| Containment Wall (cont) | | System: Class IE 480V Power MCC and Control<br>Tag No.<br>E-PHC-Z29<br>E-PHB-Z41<br>E-PHN-Z43<br>E-PHA-Z46<br>E-PHN-Z86<br><br>System: Reactor Control<br>Tag No.<br>E-RIB-Z35<br><br>System: CEDM Control Power<br>Tag Nos.<br>E-SFN-Z56<br>E-SFN-Z58<br>E-SFN-Z64<br>E-SFN-Z66<br>E-NHN-Z67<br>E-SFN-Z76<br>E-SFD-Z78<br>E-SFN-Z82<br>E-SFN-Z84 | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 7 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Medium Voltage Electrical Penetration Assembly<br>Containment Wall | Conax Corp. (P.O. No. 13-EM-035A) | Prototype for medium voltage<br>System: Non-Class IE 13.8kV power<br>Tag Nos.<br>E-NAN-231<br>E-NAN-244<br>E-NAN-245<br>E-NAN-270 | Temperature 370F peak see fig. 3.1-1 | Temperature 400 peak | 30 days | 13 days<br>Conductors energized throughout test with leakage current monitored<br>Post LOCA/ MSLB test of gas leak rate, continuity, dielectric strength, and insulation resistance | N/A | N/A | Type Test<br>Qualified per IEEE-317-1976 as modified by NRC Reg. Guide 1.63, July 1978<br>Aged for 168 hours at 250F<br>Conax Corp. test report No. IPS-447.2 Aug 24, 1981<br>BPC Log No. E-035A-426-1 | Qualified for 40 years |
| | | | Pressure 60 psig peak see fig. 3.1-2 | Pressure 70 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $1.05 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray (b) 6200 ppm $H_3BO_3$, 50 ppm $N_2H_4$ and $Na_3PO_4$ pH = 8.7 for 48 hrs | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.
b. Results of prior tests demonstrated no significant impact of chemical spray; no chemicals were used in qualification test.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 8 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Instrumentation Electrical Penetration Assemblies<br><br>Containment Wall | Conax Corp. (P.O. No. 13-EM-035A) | Prototypes for instrumentation<br><br>System: HVAC - Containment<br>Tag No. E-HCN-Z53<br><br>System: Non-IE Power 480V MCC<br>Tag Nos. E-NHN-Z16 E-NHN-Z20<br><br>System: In-plant communication<br>Tag Nos. E-QFN-Z14 E-QFN-Z57<br><br>System: In-core Reactor Instrumentation<br>Tag Nos. E-RIA-Z49 E-RIC-Z30 E-RID-Z79<br><br>(cont) | Temperature 370F peak See fig. 3.1-1<br><br>Pressure 60 psig peak See fig. 3.1-2<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes See table 4.1-3<br><br>Submergence N/A<br><br>Env. Desig. I | Temperature 396F peak<br><br>Pressure 80 psig peak<br><br>Relative Humidity 100%<br><br>Radiation $1.8 \times 10^8$ rads<br><br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $H_2H_4$ and $Na_3PO_4$ pH = 8.7<br><br>Submergence N/A | 30 day | 16 days<br><br>Cables energized throughout test<br><br>Post LOCA/ MSLB test of gas leak rate test, continuity test dielectric strength test.<br><br>Supplemental MSLB/ LOCA conducted peak temp: 510F, peak pressure: 80 psig duration: 8 days passed post supplemental MSLB/ LOCA tests | N/A | N/A | Type test<br><br>Qualified per IEEE-317-1976 as modified per NRC Reg. Guide 1.63, July 1978<br><br>Aged for 100 hours at 302F.<br><br>Conax Corp. Report No. IPS-585.2 Jan. 12, 1981<br><br>BPC Log No. E-035A-420-1 Sept. 9, 1981<br><br>Conax Corp. Report No. IPS-447.3 Aug. 5, 1981<br><br>BPC Log No. E-035A-421-1 Sept. 9, 1981 | In progress (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 9 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Instrumentation Electrical Penetration Assemblies<br><br>Containment Wall<br><br>(cont) | | System:<br>ESF Actuation<br>Tag Nos.<br>E-SAA-247<br>E-SAB-237<br>E-SAC-228<br>E-SAD-281<br><br>System:<br>Ex-Core Neutron Monitoring<br>Tag Nos.<br>E-SEA-251<br>E-SEB-236<br>E-SEN-275<br><br>System:<br>Reactor Control<br>Tag No.<br>E-SFA-250<br>E-SFB-238<br>E-SFC-222<br>E-SFC-225<br>E-SFC-226<br>E-SFC-227<br>E-SFD-277<br>E-SFD-283<br>E-SFN-202<br>E-SFN-204<br>E-SFN-287<br>E-SFN-289<br>E-SFN-291 | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 10 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 600V Control Cable<br>Containment<br>MSSS<br>Auxiliary Bldg | Brand-Rex Co. (P.O. No. 13-EM-057) | XLPE Insulation Neoprene jacket | Temperature 370F peak. See fig. 3.1-1 | Temperature 385F peak | 30 days | 16 days<br>Cables energized throughout LOCA/MSLB test<br>Cables subjected to post-LOCA/MSLB mandrel bend and high-potential withstand test (passed) | N/A | N/A | Type Test<br>168 hours at 136C<br>Brand-Rex Report No. F-C4771, Nov. 1977<br>BPC Log No. 13-10407-E057-24-7, Sept. 11, 1981 | Qualified for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH 8.6-10 with $Na_3PO_4$ | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 11 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 600V Power Cable<br>Containment<br>MSSS<br>Auxiliary Bldg | Rockbestos (P.O. No. 13-EM-058) | XLPE Insulation Neoprene jacket | Temperature 370F peak See fig. 3.1-1 | Temperature 440F peak | 30 days | 30 days<br>Cables energized at rated voltage and current throughout MSLB/LOCA test<br>Post-LOCA test environment 200F<br>Humidity 100%<br>Duration 100 days<br>Passed voltage withstand test of 80V-ac/mil for 5 minutes | N/A | N/A | Type Test<br>Aged 1300 hours at 150C prior to LOCA<br>Rockbestos Report June 30, 1981<br>BPC Log No. 13-10407-E058-40-3 June 9, 1982 | Qualified for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 31 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 3000 ppm $H_3BO_3$ 0.064 molar $Na_2S_2O_3$ pH = 9 to 11 with NaOH for 30 days | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 12 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 600V Power Cable<br><br>Containment MSSS<br><br>Auxiliary Bldg. | Brand Rex (P.O. No. 13-EM-058A | XLPE Insulation Hypalon jacket | Temperature 370F peak See fig. 3.1-1 | Temperature 385F peak | 30 days | 30 days<br><br>Cables energized with 600V- and 300V-ac throughout LOCA/MSLB test<br><br>Passed post LOCA/MSLB 40 x mandrel bend test and 5 minute 80V per mil high potential withstand test | N/A | N/A | Type Test<br><br>Brand Rex Report No. F-C-5120-1, Aug. 19, 1980<br><br>BPC Log No. 13-10407-E058 1-2 April 22, 1982<br><br>Samples aged 168 hrs at 136C or 168 hrs at 158C | Qualified for 40 years (pending) |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | 50 ppm hydrazine pH=8.5 to 10 with sodium triphosphate and sodium hydroxide | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 13 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Coaxial Cables<br>Containment<br>Auxiliary Bldg | Brand-Rex (P.O. No. 13-EM-060) | XLPE insulation Hypalon jacket | Temperature 370F peak See fig. 3.1-1 | Temperature 385F | 30 days | 30 days<br>Cables energized with 600V-ac throughout simulated LOCA/MSLB test<br>Cables subjected to a final 40 x mandrel bend and high potential withstand test of 80V per mil (passed) | N/A | N/A | Type Test<br>Aged 168 hours at 136C<br>Brand-Rex Report No. F-C5120-2, Sept. 2, 1980<br>BPC Log No. 13-10407-E060-7-4 Jan. 18, 1982 | Qualified for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH 8.5-10 with $Na_3PO_4$ to pH 8.5 and NaOH to pH 10 | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, III | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 14 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Shielded Instrument/ Thermocouple Extension Cables<br><br>Containment<br><br>MSSS<br><br>Auxiliary Bldg | Anaconda Ericcson (P.O. No. 13-EM-061) | FR-EP insulation Hypalon (CPE) jacket | Temperature 370F peak See fig. 3.1-1 | Temperature 385F | 30 days | 16 days<br><br>Cables energized throughout test<br><br>Cables subjected to a mandrel bend/high potential withstand test of 80V per mil for 5 min. (passed) | N/A | N/A | Type Test<br><br>168 hours at 150C<br><br>Franklin Institute Research Laboratories Report No. F-C4836-2, January, 1978<br><br>BPC Log No. 13-10407-E061-14-6 January 15, 1982 | Qualified for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH 8.6-10 with $Na_3PO_4$ for 16 days | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 15 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Shielded Instrumentation Cable<br><br>Containment<br><br>MSSS<br><br>Auxiliary Bldg | The Anoconda Company (P.O. No. 13-EM-062) | FR-EP Insulation CPE jacket | Temperature 370F peak See fig. 3.1-1 | Temperature 385F peak | 30 days | 16 days<br><br>Cables energized throughout test<br><br>Cables subjected to a mandrel bend/high potential withstand test of 80V per mil (passed) | N/A | N/A | Type Test<br><br>168 hours at 150C<br><br>Franklin Institute Research Laboratories Report F-C4836-2, January 1978<br><br>BPC Log No. 13-10407-E062 14-7, January 1982 | Qualified for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH = 8.6 to 10.0 with $Na_3PO_4$ for 16 days | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 16 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Outside Containment Prefab Cables<br>Auxiliary Bldg | Bendix/ Anaconda Ericson (P.O. No. 13-EM-064) | FR-EP Insulation CPE Jacket | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 385F peak<br>Pressure 60 psig<br>Relative Humidity 100%<br>Radiation $2 \times 10^8$ rads<br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH=8.6-10 with $Na_3PO_4$<br>Submergence N/A | 30 days | 16 days<br>All cables energized throughout 16 day simulated LOCA/ MSLB<br>Post MSLB/ LOCA mandrel bend and high potential withstand tests. 80V/ mil for 5 minutes (passed) | N/A | N/A | Type Test<br>168 hours at 150C<br>Franklin Institute F-C4836-2 Jan. 1978<br>BPC Log No. 13-10407-E064-22-2. Sept. 1, 1981 and BPC Log No. 13-10407-E064-23-8 | Qualified for 40 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 17 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Inside Containment Prefab Cables<br><br>Containment | BIW Cable Systems (P.O. No. 13-EM-064A) | Silicone Insulation silicone jacket<br><br>RSPT cable from CEDM to disconnect panel.<br><br>RSPT I 3/C #16 AWG shielded triad<br><br>RSPT II 6/C, #16 AWG twisted shielded triplet CEDM power cable | Temperature 370F peak See fig. 3.1-1<br><br>Pressure 60 psig peak See fig 3.1-2<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes See table 4.1-3<br><br>Submergence N/A<br><br>Env. Desig. I | Temperature 370F<br><br>Pressure 155 psig<br><br>Relative Humidity 90%<br><br>Radiation $5 \times 10^7$ rads<br><br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH 8.6 to 10 with $Na_3PO_4$<br><br>Submergence N/A | 30 days | 30 days<br><br>Cables energized throughout LOCA/MSLB<br><br>Subjected to post LOCA/MSLB test of 50 x mandrel bend and 750V ac for 5 minutes | N/A | N/A | Silicone Rubber<br><br>Type Test<br><br>750 hours at 160C<br><br>BIW Report No. 82E080 Sept. 9, 1982<br><br>BPC Log No. 13-10407-E064-77-2, Oct. 1, 1982 | In progress |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 18 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Inside Containment Prefab Cables<br>Containment | BIW Cable Systems (P.O. No. 13-EM-064A) | FREP insulation CPE jacket<br>RSPT cable from disconnect panel to EPA<br>RSPT I 3C, #16 AWG shielded twisted triplex<br>RSPT II 6/C, #14 AWG twisted shielded triplex CEDM power cable | Temperature 370F peak See fig. 3.1-1 | Temperature 370F | 30 days | 30 days<br>Cables energized throughout LOCA/MSLB with 60V ac passed<br>Post LOCA/ MSLB 40 x mandrel bend test and 70V ac for 5 minutes immersed in water | N/A | N/A | Type Test<br>Aged 126 hrs at 150C<br>BIW Report No. 82C033C Nov. 24, 1982<br>BPC Log No. B-10407-E064A-66-5 Dec. 9, 1982 | Qualified for 30 years (pending) |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 155 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 90% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $5 \times 10^7$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH 8.6 to 10 with $Na_3PO_4$ | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 19 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Inside Containment Prefab Cables<br><br>Containment | BIW Cable Systems (P.O. No. 13-EM-064A) | Tefzel Insulation CSPE Jacket<br><br>RG-71B/U Coaxial & Triaxial Cables for Fixed Incore Instrumentation used from Bulkhead to Electrical Penetration Assembly | Temperature 370F peak See fig. 3.1-1 | Temperature 340F | 30 days | 100 days<br><br>Cable energized throughout LOCA/MSLB with 2300V ac between conductor and shield.<br><br>Cable subjected to post LOCA/MSLB 40 x mandrel bend and passed 6000V ac for 5 minutes<br><br>Simulated environment of 167F and 0 psig continued for an additional 59 days. Cable remained functional throughout 159 day test | N/A | N/A | Type Test<br><br>Aged for 168 hrs at 150C<br><br>BIW Report No. B913-PV Oct. 12, 1982<br><br>BPC Log No. 13-10407-E064A-74-4 | Qualified for 40 years (pending) |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 105 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 90% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray .28 molar $H_3BO_3$ pH=10.5 with NaOH for 24 hours | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 20 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Ring Tongue Terminals<br>Containment<br>MSSS<br>Auxiliary Bldg | AMP Incorporated (P.O. No. 13-EM-106A) | N/A<br>Kynar Insulating Sleeves<br>Radiation resistant PIDG and Plastigrip Terminals | Temperature 370F peak See fig. 3.1-1 | Temperature 370F | 30 days | 16 days<br>Representative number of samples energized to 600V-ac and current of 5 amp throughout MSLB/LOCA test<br>Samples passed post LOCA/ MSLB tensile strength test | N/A | N/A | Type Test<br>Separate samples aged for: 168 hours at 150C 400 hours at 150C<br>750 hours at 150C 1000 hours at 150C 1500 hours at 150C<br>AMP Report No. 302940016 July 18, 1980<br>BPC Log No. 13-10407-E106A-52-3, August 7, 1980 | Qualified for for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 60 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2.05 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH=9.0 to 9.5 with $Na_3PO_4$ for 16 days | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 21 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| High Voltage Terminations 5 & 15 kV<br><br>MSSS Elev. 80'<br><br>Auxiliary Bldg | Raychem (P.O. No. 13-EM-106B) | NHVT (formerly identified as HVT)<br><br>HVMC | Temperature 28-120F<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation $1 \times 10^5$<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II, III | Temperature 360F peak<br><br>Pressure 70 psig peak<br><br>Relative Humidity 100%<br><br>Radiation $2 \times 10^8$ rads<br><br>Chemical Spray 0.2% $H_3BO_3$ pH=10<br><br>Submergence N/A | 30 days | 113 days<br><br>Cables energized throughout LOCA test at rated voltage (passed) | N/A | N/A | Type Test<br><br>168 hours at 121C<br><br>Raychem Test Report No. 71100 Rev. 1<br><br>BPC Log No. 13-10407-E106B-7-4, Jan. 22, 1981 | In Progress |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 22 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat Shrinkable Motor Connection Kits, Molded Cable Breakout Kits, Cable and Sealing Kits, and Heat Shrinkable Tubing<br><br>MSSS<br><br>Auxiliary Bldg<br><br>Containment | Raychem (P.O. No. 13-EM-106B) | NHCK<br>NCBK<br>NESK<br>WCSF-N | Temperature 370F peak See fig. 3.1-1 | Temperature 390F peak | 30 days | 30 days<br><br>Samples energized throughout LOCA/MSLB test<br><br>Samples passed post LOCA/ MSLB IR Test and 3.6 kV withstand test | N/A | N/A | Type Test<br><br>1500 hours at 150C<br><br>Raychem Report No. QP-PV123 Apr. 23, 1981<br><br>BPC Log No. 13-10407-E106B-10-5 Sept. 14, 1981 | Qualified for 40 years (pending) |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2.9 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH=10.5 with $NA_3PO_4$ | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 23 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat Shrinkable Motor Connection Kits<br><br>MSSS, Elev. 80'<br><br>Auxiliary Bldg | Raychem (P.O. No. 13-EM-106B) | NMCK8 | Temperature 120F peak<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation $10^3$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II, III | Temperature 348F peak<br><br>Pressure 28 psig peak<br><br>Relative Humidity 100% Steam/air mixture<br><br>Radiation $5.0 \times 10^7$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 4 hours<br><br>Samples energized throughout MSLB test at 5 kV ac.<br><br>Samples passed post MSLB IR test and 5.5 kV ac withstand test | N/A | N/A | Type Test<br><br>Aging performed: 504 hours at 150C<br><br>Raychem Report No. EDR-5037 Sept. 10, 1982<br><br>BPC Log No. 13-10407-E-1068-62-3 Sept. 20, 1982 | Qualified for 40 years (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 24 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 4.16 kV Transfer Switch<br>Auxiliary Bldg | ITE Golden Gate Swbd Co. (P.O. No. 13-EM-117) | HPL-C Switch<br>480V Power Switchgear<br>Tag No. E-PGE-036 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 104F<br>Pressure 0 psig<br>Relative Humidity 0-100%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Passed post aging and seismic testing | N/A | N/A | Type Test<br>1716 hours at 134C and ambient relative humidity<br>Golden Gate Report No. QR-2141 Rev. 5 May 18, 1982<br>BPC Log No. 13-10407-E-117-10-6 June 18, 1982 | Qualified for 40 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 25 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Hydrogen Recombiner Damper Panel Hand Switches<br>Auxiliary Bldg<br>Fuel Pool Cooling Pump Panel Hand Switches<br>Fuel Bldg | Comsip Custom Line (P.O. No. 13-JM-200) | Microswitch Model No. PTSB-C2-12-C<br>System: HP<br>Tag Nos. J-HPA-HS61 J-HPB-HS62<br>Panel No. J-HPA-E03 J-HPB-E03<br>Env. Desig. III<br>GE SBM Switch Model 10CG211<br>System: PC<br>Tag Nos. J-PCA-HS7 J-PCB-HS8<br>Panel No. J-PCA-E01 J-PCB-E01<br>Env. Desig. VI | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | Later | 30 days | Later | N/A | N/A | Later | In progress |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 26 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter<br>Auxiliary Bldg | Rosemount (P.O. No. 13-JM-311) | Model No. 1153GB7<br>System: HVAC-Con Bldg<br>Tag Nos. J-HCA-PT-353A<br>J-HCB-PT-353B | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 318F<br>Pressure 72 psig<br>Relative Humidity 0-100%<br>Radiation $2.44 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days | Accuracy: ±0.25% of calibrated span<br>Response Time: N/A | Accuracy: -.77% of calibrated span<br>Response Time: 63% of final value in .01 seconds at 100F (100% FS to 36.8% FS) | Type Test<br>Each unit aged for 1110 hours at 95C and cycled from 0 to 100% FR 8,030 times<br>Rosemount Report No. 108026 Vol I & II Feb. 12, 1981<br>Qualification Report No. 18025, Rev. A Feb. 4, 1981<br>Analysis Report No. 57820, Rev. D Aug. 18, 1978<br>BPC Log No. 13-10407-J311-44-1, 46-2, 19-4 | Qualified for 4 years |
| | | Model No. 1153GB6<br>System: HVAC-Con Bldg<br>Tag Nos. J-HCA-PT-351A<br>J-HCB-PT-351B<br>J-HCC-PT-351C<br>J-HCD-PT-351D<br>J-HCA-PT-352A<br>J-HCB-PT 352B<br>J-HCC-PT-352C<br>J-HCD-PT-352D | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 27 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter<br>Auxiliary Bldg | Rosemount (P.O. No. 13-JM-311) | Model No. 1153DB4<br>System: ECWS<br>Tag Nos. J-EWA-LT-91 J-EWB-LT-92 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 318F<br>Pressure 72 psig<br>Relative Humidity 0-100%<br>Radiation $2.44 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days | Accuracy: ±0.25% of calibrated span<br>Response Time: N/A | Accuracy: -3.19% of calibrated span<br>Response Time: 63% of final value in 2.46 seconds at 100F (100% FS to 36.8% FS) | Type Test<br>Each unit aged for 1110 hours at 95C and cycled from 0 to 100% FR 8,030 times<br>Rosemount Report No. 108026, Vol. I & II Feb. 12, 1981<br>Qualification Report No. 18025, Rev. A Feb. 1, 1981<br>Analysis Report No. 57820, Rev. D Aug. 18, 1978<br>BPC Log No. 13-10407-J311-44-1, 46-2, 19-4 | Qualified for 4 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 28 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Flow Transmitter<br><br>MSSS | Rosemount (P.O. No. 13-JM-311) | Model No. 1153DB5<br><br>System: AFS<br>Tag Nos.<br>J-AFA-FT-40B<br>J-AFB-FT-41B<br>J-AFA-FT-40A<br>J-AFB-FT-41A | Temperature 28-120F<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation $1 \times 10^5$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 318F<br><br>Pressure 72 psig<br><br>Relative Humidity 0-100%<br><br>Radiation $2.44 \times 10^7$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 30 days | Accuracy: ±0.25% of calibrated span<br><br>Response Time: N/A | Accuracy: ±0.20% of calibrated span<br><br>Response Time: 63% of final value in .09 seconds at 100F (100% FS to 36.8% FS) | Type Test<br><br>Each unit aged for 1110 hours at 95C and cycled from 0 to 100% FR 8,030 times<br><br>Rosemount No. 108026 Vol I & II<br><br>Qualification Report No. 18025, Rev. A<br><br>Analysis Report No. 57820, Rev D<br><br>BPC Log No. 13-10407-J311-44-1, 46-2, 19-4 | Qualified for 4 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 29 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter<br>MSSS | Rosemount (P.O. No. 13-JM-311) | Model No. 1153GB9<br>System: AFS<br>Tag Nos. J-AFB-PT-17 J-AFA-PT-18<br>Model No. 1153GB6<br>System: MSS<br>Tag Nos. J-SGB-PT-306 J-SGA-PT-313<br>Model No. 1153GB8<br>System: MSS<br>Tag Nos. J-SGB-PT-301 J-SGA-PT-308 J-SGB-PT-315 J-SGB-PT-321 | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 318F<br>Pressure 72 psig<br>Relative Humidity 0-100%<br>Radiation $2.44 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days | Accuracy: ±0.25% of calibrated span<br>Response Time: N/A | Accuracy: ±0.25% of calibrated span<br>Response Time: 63% of final value in 0.1 seconds at 100F (100% FS to 36.8% FS) | Type Test<br>Each unit aged for 1110 hours at 95C and cycled from 0 to 100% FR 8,030 times<br>Rosemount Report No. 108026 Vol I & II Feb. 12, 1981<br>Qualification Report No. 18025, Rev. A Feb. 4, 1981<br>Analysis Report No. 57820, Rev. D Aug. 18, 1978<br>Qualification Report No. 88114, Rev. B Sept. 4, 1982<br>(cont) | Qualified for 4 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 30 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter | | | | | | | | | BPC Log No. B-10407-J311-44-1, 46-2, 19-4, 51-2 | |
| MSSS (cont) | | | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 31 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| I/P Convertor<br>MSSS (El. 81'-0") | Masoneilan (P.O. No. 13-JM-312) | Model No. 8005A<br>System: MSS<br>Tag Nos. J-SGB-HY-178C, J-SGA-HY-179C, J-SGA-HY-184C, J-SGB-HY-185C | Temperature 28 to 120<br>Pressure 0 psig<br>Relative Humidity 20 to 90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 160F<br>Pressure 0 psig<br>Relative Humidity 95 to 100%<br>Radiation $1.016 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Transducers operated at 160F 95 to 100% RH for 10 days. Also subjected to 335F and 23.2 psig within 8 minutes during 0.30 minute SLB test. | Response Time: N/A<br>Accuracy: ±0.5% of operating span | Response and Accuracy No anomalies were found after MSLB test | Type Test<br>Aged 1080 hours at 100C. Unit cycled 0 to 100% 2000 times during aging.<br>Masoneilan Report No. 1129 Jan. 18, 1982<br>BPC Log No. 13-10407-J-312-7-1 March 16, 1982 | Qualified for 5.4 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.
** Not yet awarded.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 32 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Containment Post-LOCA Hydrogen Monitor<br>Auxiliary Bldg | Comsip Delphi (P.O. No. 13-JM-359) | Model No. System KIII per P.O. No. 13-JM-359<br>System: CHCS<br>Panel Nos. JHPAE02 JHPBE02 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 150F peak<br>Pressure 0 psig peak<br>Relative Humidity 90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 100 days Simulated LOCA at sample points for 100 days at 300F and 70 psig | Response Time: 30 min | Not Specified by supplier | Type Test<br>Engineering Analysis and Test Co. 1035-1, Rev. 1 Sept. 1981<br>Engineering Analysis and Test Co. Report No. 1035-8 Sept. 1982<br>BPC Log No. 10407-J359-29-2, 42-1 March 1, 1982, Oct. 28, 1982 | Qualified life for misc. parts is 5 and 10 years (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 33 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Acoustic Monitors | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. BBN424ISO | Temperature 300F | Temperature 510F peak | 30 days | 33 days | Change sensitivity 20pc/g ±15% at 500F<br><br>Voltage sensitivity 90mV/g<br><br>Transverse sensitivity 5% | Passed | Type Test<br><br>Aging performed 100C for 1488 hrs<br><br>TEC Report No. 517-TR-03 April 1982<br><br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Qualified for 4 years (pending)<br><br>Note: These tag numbers are the result of TMI plant modification |
| MSSS | | System: Main Steam<br>Tag Nos.<br>J-SGE-ZE-696<br>J-SGE-ZE-697<br>J-SGE-ZE-698<br>J-SGE-ZE-699<br>J-SGE-ZE-700<br>J-SGE-ZE-701<br>J-SGE-ZE-702<br>J-SGE-ZE-703<br>J-SGE-ZE-704<br>J-SGE-ZE-705<br>J-SGE-ZE-706<br>J-SGE-ZE-707<br>J-SGE-ZE-708<br>J-SGE-ZE-709<br>J-SGE-ZE-710<br>J-SGE-ZE-711<br><br>(cont) | Pressure 21 psig | Pressure 92 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $1 \times 10^6$ rads | Radiation $2.2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray N/A | Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.5 to 7.5 with $NaPO_4$ | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. II | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 34 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Acoustic Monitors | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. BBN424ISO | Temperature 300F | | | | | | | In progress |
| MSSS (cont) | | System: Main Steam Tag Nos. J-SGE-ZE-712 J-SGE-ZE-713 J-SGE-ZE-714 J-SGE-ZE-715 | Pressure 21 psig | | | | | | | |
| | | | Relative Humidity Steam/air mixture | | | | | | | |
| | | | Radiation $1 \times 10^6$ rads | | | | | | | |
| | | | Chemical Spray N/A | | | | | | | |
| | | | Submergence N/A | | | | | | | |
| | | | Env. Desig. II | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 35 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Acoustic Monitors<br>MSSS | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. 424-C2<br>System: RCS<br>Tag No. N/A<br>20 cables approximately 150 feet each in length | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 510 peak<br>Pressure 92 psig peak<br>Relative Humidity 100%<br>Radiation $2.2 \times 10^8$ rads<br>Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.5 to 7.5 with $NaPO_4$<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test<br>Aging performed: 100C for 1988 hrs<br>TEC Report No. 517-TR-03 April, 1982<br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Qualified for 4 years (pending)<br>Note: These tag numbers are the result of TMI plant modification |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 36 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Acoustic Monitors<br>Containment | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. 2273AMI<br>System: RCS<br>Tag Nos.<br>J-RCE-ZE-726<br>J-RCE-ZE-727<br>J-RCE-ZE-728<br>J-RCE-ZE-729 | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig peak See fig. 3.1-2<br>Relative Humidity Steam/air mixture<br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence N/A<br>Env. Desig. I | Temperature 510F peak<br>Pressure 92 psig peak<br>Relative Humidity 100%<br>Radiation $2.2 \times 10^8$ rads<br>Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.5 to 7.5 with $NaPO_3$<br>Submergence N/A | 30 days | 33 days | Charge sensitivity 10.0 ±1pC/g<br>Voltage sensitivity 12mV/g<br>Transverse sensitivity 3% maximum | Passed | Type Test<br>Aging performed: 100C for 1488 hrs<br>TEC Report No. 517-TR-03 April 1982<br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Qualified for 4 years (pending)<br>Note: These tag numbers are the result of TMI plant modification |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 37 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Preamplifier | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. TEC-504A | Temperature 370F peak See fig. 3.1-1 | Temperature 510F peak | 30 days | 33 days | Bias Voltage 18V ±1V | Bias Voltage 17.83V | Type Test | Qualified for 4 years (pending) |
| Containment | | System: RCS J-RCE-ZY-726 J-RCE-ZY-727 J-RCE-ZY-728 J-RCE-ZY-729 | Pressure 60 psig peak See fig. 3.1-2 | Pressure 92 psig peak | | | Gain 2mV/pC ±5% | Gain 2.02 mV/pC | Aging Performed: 100C for 1488 hrs | Note: These tag numbers are the result of TMI plant modification |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | Dynamic Range 10V pp-min | Dynamic Range 13.0 pp-min | TEC Report No. 517-TR-03 April, 1982 | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2.2 \times 10^8$ rads | | | Low Frequency 130-390 Hz | Low Frequency 385 Hz | BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.5 to 7.5 with $NaPO_4$ | | | High Frequency 1 MHz/min | High Frequency >1MHz/min | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 38 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Transient Shield<br>Containment | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. TEC-160-2<br>System: RCS<br>Tag Nos. J-RCN-E03 J-RCN-E06 | Temperature 370F peak See fig. 3.1-1 | Temperature 510F peak | 30 days | 33 days | N/A | N/A | Type Test qualified similarity to TEC-160<br>Aging performed: 100C for 672 hrs<br>TEC Report No. 517-TR-03 April, 1982<br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Qualified for 4 years (pending)<br>Note: These tag numbers are the result of TMI plant modification |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 92 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2.2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.5 to 7.5 with $NaPO_4$ | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 39 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Radiation Resistant Cable | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. 2273-C2<br>System: RCS<br>Tag Nos.<br>N/A<br>Four cables approximately 75 feet each in length<br>XLPE insulation hypalon jacket | Temperature 370F peak See fig. 3.1-1 | Temperature 510F peak | 30 days | 33 days | N/A | N/A | Type Test<br>Aging performed: 100C for 1488 hrs<br>TEC Report No. 517-TR-03 April, 1982<br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Qualified for 4 years (pending)<br>Note: This material is the result of TMI plant modifications. |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 92 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2.2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.7-7.5 with $NaPO_4$ | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 40 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter<br>Containment | Transamerica Delaval Gems Sensors (P.O. No. 13-JM-475 | Model No. Later<br>System: RWDS<br>Tag Nos. J-RDE-LE-410 J-RDE-LE-411 XM-54854<br>System: SIS<br>Tag Nos. J-SIA-LE-706A J-SIB-LE-707A J-SIA-LE-706B J-SIB-LE-707B XM-54852 XM-54853 | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig peak See fig. 3.1-2<br>Relative Humidity Steam/air mixture<br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence Yes<br>Env. Desig. I | Later | 30 days | Later | Accuracy: ±0.5" | Later | Later | In progress<br>Note: These tag numbers are the result of TMI plant modifications. |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 41 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Switch<br>Auxiliary Bldg<br>MSSS Elev. 80' | Magnetrol (P.O. No. 13-JM-481) | Model No. FLS-X-MPX-SIMD4DC<br>System: RWDS<br>Tag Nos. J-RDA-LSH-147, J-RDB-LSH-148, J-RDA-LSH-149, J-RDB-LSH-150, J-RDA-LSH-151, J-RDB-LSH-152<br>System: MSSS HVAC Bldg<br>Tag Nos. J-HAA-LSH-125A, J-HAA-LSH-125B, J-HAA-LSH-126A, J-HAA-LSH-126B | Temperature 28 to 120F<br>Pressure 0 psig<br>Relative Humidity 20 to 90%<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II, III | Temperature 120F peak<br>Pressure 0 psig<br>Relative Humidity 100%<br>Radiation $1.0 \times 10^7$ min rads<br>Chemical Spray N/A<br>Submergence Switch placed in pressure vessel, submerged in water and pressurized for 180 min at 104 psig.<br>Leakage was 4.2 milliliters of water | 30 days | Post-Functional Tests:<br>Switch insulation resistance<br>Switch contact resistance<br>Switch operation verified at operating temperatures and pressures as indicated on Magnetrol Dwg. No. SKC-3013 sheets 1-5 | N/A | N/A | Type Test<br>Qualified by similarity to model BCS-751-EP/VPX-SIMD4DC<br>Thermal aging 160 hours at 300F 480 hours at 100F and 95%-100% RH<br>Mechanical cycling 10,000 cycles<br>Magnetrol Report No. M131830-102/202 Sept. 8, 1981<br>Wyle Report No. 43235-1, May 2, 1977<br>BPC Log No. 13-10407-J481-10-2 Sept. 18, 1981<br>13-10407-J481-13-2 Aug. 11, 1982 | Qualified for 40 years except for micro-switch, qualified for 5 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 42 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| RTD's and Thermo-couples<br><br>Containment Bldg<br><br>Auxiliary Bldg | Weed Inst. Company (P.O. No. 13-JM-556) | Model Nos. RTD's 611-18-C4-C-2-A2-0 TC's K28250G<br><br>System: Safety Injection<br>Tag Nos.<br>J-S1A-TE-712<br>J-S1B-TE-713<br><br>System: Essential Cooling Water<br>Tag Nos.<br>J-EWA-TE-083<br>J-EWB-TE-084 | Temperature 370F peak See fig. 3.1-1<br><br>Pressure 60 psig peak See fig. 3.1-2<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes, see table 4.1-3<br><br>Submergence Yes<br><br>Env. Desig. I, III | Temperature 485F peak<br><br>Pressure 70 psig<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $3.03 \times 10^8$ rads<br><br>Chemical Spray 80-110 ppm $N_2H_4$ 11,000-13,000 ppm $H_3BO_3$ pH = 4.0-11.0 $Na_2PO_3$<br><br>Submergence Qualified | 30 days | 30 days minimum temperature used throughout LOCA was 300F continuous | RTD's Resistance at 0C 99.780-100.228 ohms<br><br>Resistance at 100C 138.590 - 139.450 ohms<br><br>Thermo-couples Voltage at 0C -0.130 to 0.131mV<br><br>Voltage at 100C +6.167 to +6.467 mV | Post-Qualification results<br><br>Resistances at 0C 99.88 to 100.82 ohms<br><br>Resistances at 100C 138.20 to 139.15 ohms<br><br>Voltage at 0C 0.003 to 0.010 mV<br><br>Voltage at 100C 6.350 to 6.391 mV | Type Test<br><br>Aging performed at 304F for 724 hrs<br><br>NTS Report No. 548-8854-2 March 1, 1982<br><br>BPC Log No. 13-10407-J556-89-1 March 25, 1982 | Qualified for 40 years (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 43 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| D.C. Motor-Operated Valve Actuator<br>MSSS below 100' | Control Components Inc. (P.O. No. 13-JM-601A) | Limitorque Model No. SB-00-10<br>System: AFS<br>Tag Nos. J-AFA-HV-32 J-AFC-HV-33 | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 340F peak<br>Pressure 105 psig peak<br>Relative Humidity 100%<br>Radiation $1 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days cycled 70 times throughout 25 hrs LOCA/MSLB test.<br>Cycled once post LOCA | None | N/A<br>Open times: 31.0-32.5 secs<br>Close times 31.0-37.7 secs<br>Post LOCA/ MSLB<br>Open: 33 seconds<br>Close 33 seconds | Type Test and Analysis<br>Aged for 100 hours at 180C unit cycled 2004 times<br>Prequalified per Limitorque Report No. B-0058 | Qualified for 8 yrs with maintenance |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 44 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| AC Motor-Operated Valve Actuator<br>MSSS below 100' | Control Components Inc. (P.O. No. 13-JM-601A) | Limitorque Model No. SB-00-10<br>System: AFS<br>Tag Nos. J-AFB-HV-30 J-AFB-HV-31 | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 250F peak<br>Pressure 25 psig peak<br>Relative Humidity 100%<br>Radiation $2 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days Cycled 9 times throughout LOCA/MSLB<br>Post-LOCA load cycling test: 794 cycles | None<br>Not specified by supplier | N/A | Type Test<br>Thermal aging: 100 hrs at 180C<br>Mechanical aging: 1028 cycles<br>Limitorque Report No. B0058 Jan. 11, 1981<br>BPC Log No. 13-10407-P221B-349-1 March 4, 1981 | Qualified for 8 yrs with maintenance |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 45 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Position Transmitters<br>MSSS | Control Components Inc. (P.O. No. 13-JM-601A) | CCI Valve Model No. EXG9-X3-X6P6-X6P6-13MH31<br>System: AFS<br>Tag Nos. J-AFB-ZT-30<br>J-AFB-ZT-31<br>J-AFA-ZT-32<br>J-AFC-ZT-33 | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A | Temperature 315F peak<br>Pressure 21 psig peak<br>Relative Humidity 100%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Later | N/A | Later | Type Test and Analysis<br>Thermal aging (later)<br>Wyle Laboratories Qualification Plan NES 57555, June 9, 1981<br>BPC Log No. 13-10407-J601A-115-4, June 22, 1981 | In progress (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 46 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Position Transmitters<br>MSSS | Control Components Inc. (P.O. No. 13-JM-601A) | Schaevitz Model No. HPA-10000<br>System: MSS<br>Tag Nos.<br>J-SGB-ZT-178<br>J-SGA-ZT-179<br>J-SGA-ZT-184<br>J-SGB-ZT-185 | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation 1 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 315F peak<br>Pressure 21 psig peak<br>Relative Humidity 100%<br>Radiation 1 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Later | N/A | N/A | Type Test and Analysis<br>To be thermally aged at 130C for 100 hours<br>Wyle Laboratories Qualification Plan<br>BPC Log No. 13-10407-J601A | In progress (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 47 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switch<br>MSSS | Control Components Inc. (P.O. No. 13-JM-601A) | Namco Model No. EA 180<br>System: MSS<br>Valve Tag No.<br>J-SGB-HV-178<br>J-SGA-HV 179<br>J-SGA-HV 184<br>J-SGB-HV-185<br>2/Valve | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 340F peak<br>Pressure 70 psig peak<br>Relative Humidity 100%<br>Radiation $2 \times 10^8$ rads<br>Chemical Spray $H_3BO_3$, $Na_2S_2O_3$, NaOH with pH 10-11<br>Submergence N/A | 30 days | 33 days Functional throughout LOCA/MSLB at 5 MΩ open contact resistance | N/A | N/A | Type Test and Analysis<br>Prequalified per qualification.<br>Namco Report No. QTR 105 April 3, 1980<br>Wyle Laboratories Qualification Plan NES 57555, Rev. 0 June 9, 1981<br>BPC Log No. 13-10407-J601A-134-1, 115-4 July 13, 1981 Sept. 25, 1981<br>Aged 400 hrs at 120C switch actuated 100, 200 times at a rate 0<br>(cont) | Qualified for 40 years with maintenance parts |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 48 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switch<br>MSSS<br>(cont) | | | | | | | | | 70 cycles 1 min while loaded at .54 and 100V DC<br><br>Qualified by CE Namco program. | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 49 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valves<br>MSSS | Control Components Inc. (P.O. No. 13-JM-601A) | ASCO Model No. 206-381-44<br>System: MSS<br>Tag Nos. J-SGB-HY-178A, J-SGD-HY-178B, J-SGB-HY-178H, J-SGD-HY-178I, J-SGA-HY-179A, J-SGC-HY-179B, J-SGA-HY-179H, J-SGC-HY-179I, J-SGA-HY-184A, J-SGC-HY-184B, J-SFA-HY-184H, J-SGC-HY-184I, J-SGB-HY-185A, J-SGD-HY-185B, J-SGB-HY-185H, J-SGD-HY-185I | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 450 peak<br>Pressure 78 psig peak<br>Relative Humidity 100%<br>Radiation $1.82 \times 10^8$ $\lambda$ $1.1 \times 10^8$ $\beta$<br>Chemical Spray 6626 ppm 196 ppm $N_2H_4$ pH 7.0-8.5<br>Submergence N/A | 30 days | 33 days<br>Valves cycled throughout LOCA test with baseline functional tests conducted following LOCA<br>Passed all tests | N/A | N/A | Type Test and Analysis<br>Prequalified per qualification.<br>ASCO Report No. AQS-216 78/TR & AQR-67368 Rev. 0 & C-E Program PE 5734 & C-E letter V-PAK-250<br>BPC Log No. 13-10407-J601A-137--1, 115-4 Dec. 9, 1981, Sept. 25, 1981 | Qualified for 40 yrs with maintenance. |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 50 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve<br>Containment | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-002<br>System: HVAC-Cont.<br>Tag Nos. J-HCB-UV-44<br>J-HCB-UV-47<br>Model No. 76HH-008<br>System: RCS<br>Tag No. J-RCA-HV-101<br>J-RCB-HV-102<br>J-RCA-HV-103<br>J-RCB-HV-105<br>J-RCA-HV-106 | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig See fig. 3.1-2<br>Relative Humidity Steam/air mixture<br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence No<br>Env. Desig. I | Temperature 385F peak<br>Pressure 66 psig peak<br>Relative Humidity 100%<br>Radiation $3.53 \times 10^7$ rads<br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH = 8.6 to 10.0 with $Na_3PO_4$<br>Submergence N/A | 30 days | 14 days<br>Operational and seat leakage tests post MSLB/LOCA operation: 6 cycles, 60 psig pressure 120V-dc and 6 cycles, 60 psig, 70V-dc Seat leakage 60 psig pressure for 6 min. with no leakage | N/A | N/A | Type Test<br>792 hrs at 350F ± 5F with humidity at 55 ± 5% and $N_2$ at 75 psig supplied to valve inlet port<br>Units cycled 18,000 times with 75 psig inlet pressure while at 122 ± 5F and 90 ± 5% RH<br>Target Rock Corporation Report No. 2302, Feb. 2, 1982<br>BPC Log No. 13-10407-J603-95-8 March 5, 1982 | Qualified for 40 years except for "O" rings - 5 years Coil - 20 years; elect. subassembly parts - 20 years (pending)<br>Additional testing in progress under C-E program PE-5733 |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 51 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve<br>Auxiliary Bldg | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-009-010<br>System: SIS<br>Tag No. J-SIB-UV-710<br>J-SIA-UV-709<br>J-SIA-UV-708<br>System: CVCS<br>Tag No. J-CHB-UV-924<br>Model No. 76HH-020, 76HH-021 76HH-023<br>System: SCS<br>Tag No. J-GAA-UV-1<br>J-GAA-UV-2<br>System: SIAS<br>Tag No. J-IAA-UV-2<br>(cont) | Temperature 50 to 104F<br>Pressure 0 psig<br>Relative Humidity 20 to 90%<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 385F peak<br>Pressure 66 psig peak<br>Relative Humidity 100%<br>Radiation $3.53 \times 10^7$ rads<br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH = 8.6 to 10.0 with $Na_3PO_4$ for 14 days<br>Submergence N/A | 30 days | Operation and seat leakage tests post MSLB/LOCA operation: 6 cycles, 60 psig pressure, 120V-dc and 6 cycles, 60 psig, 70V-dc Seat leakage: 60 psig pressure for 6 minutes with no leakage | N/A | N/A | Type Test<br>792 hrs at 350F ± 5F with humidity at 55 ± 5% and $N_2$ at 75 psig supplied to valve inlet port<br>Units cycled 18.000 times with 75 psig inlet pressure while at 122 ± 5F and 90 ± 5% relative humidity<br>Target Rock Corporation Report No. 2302 dated May 9, 1979<br>BPC Log No. 13-10407-J603-95-6 dated Nov. 21, 1980 | Qualified for 40 years except for: "O" rings - 5 years; coil - 20 years; elec. subassembly parts - 20 years (pending)<br>Additional testing in progress under C-E program PE-5733 |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 52 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve<br>Auxiliary Bldg<br>(cont) | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-005<br>System: CHCS<br>Tag No. J-HPB-HV-8B<br>Model No. 76HH-005<br>System: CHCS<br>Tag Nos. J-HPA-HV-7A, J-HPB-HV-8A<br>Model No. 76HH-003<br>System: HVAC-Cont Bldg<br>J-HCA-HV-74<br>J-HCC-HV-76<br>J-HCB-HV-75<br>J-HCD-HV-77<br>Model No. 76HH-005<br>System: CHCS<br>Tag No. J-HPA-HV-703 | Temperature 50 to 104F<br>Pressure 0 psig<br>Relative Humidity 20 to 90%<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 385F peak<br>Pressure 66 psig peak<br>Relative Humidity 100%<br>Radiation $3.53 \times 10^7$ rads<br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH = 8.6 to 10.0 with $Na_3PO_4$<br>Submergence N/A | 30 days | 14 days<br>Operational and seat leakage tests post MSLB/LOCA operation: 6 cycles, 60 psig pressure 120V-dc and 6 cycles, 60 psig, 70V-dc Seat leakage: 60 psig pressure for 6 min. with no leakage | N/A | N/A | Type Test<br>792 hrs at 350F ± 5F with humidity 55 ± 5% and $N_2$ at 75 psig supplied to valve inlet port<br>Units cycled 18,000 times with 75 psig inlet pressure while at 122 ± 5F and 90 ± 5% relative humidity<br>Target Rock Corporation Report No. 2302, May 9, 1979<br>BPC Log No. 13-10407-J603-95-6, Nov. 21, 1980 | Qualified for 40 years except for: "O" rings - 5 years; coil - 20 years; elect, subassembly parts - 20 years (pending)<br>Additional testing in progress under C-E program PE-5733 |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 53 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve (cont)<br><br>Auxiliary Bldg | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76-HH-009 76-HH-011 76-HH-013<br><br>System: RWDS<br>Tag No. J-RDB-UV-407<br><br>System: CHCS<br>Tag Nos. J-HPA-UV-23 J-HPA-UV-24<br><br>System: GRS<br>J-GRB-UV-2<br><br>Model No. 76HH-002<br><br>System: HVAC-Cont Bldg<br>Tag Nos. J-HCA-UV-46 J-HCA-UV-45 | Temperature 50-104F<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation $10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | Temperature 385F peak<br><br>Pressure 66 psig peak<br><br>Relative Humidity 100%<br><br>Radiation $3.53 \times 10^7$ rads<br><br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH = 8.6 to 10.0 with $Na_3PO_6$<br><br>Submergence N/A | 30 days | 14 days<br><br>Operational and seat leakage tests post MSLB/LOCA Operation: 6 cycles, 60 psig pressure 120V-dc and 6 cycles 60 psig pressure 120V-dc and 6 cycles, 60 psig, 70V-dc Seat leakage: 60 psig pressure for 6 min. with no leakage | N/A | N/A | Type Test<br><br>792 hrs at 350F ± 5F with humidity at 55 ± 5% and $N_2$ at 75 psig supplied to valve inlet port<br><br>Units cycled 18,000 time with 75 psig inlet pressure while at 122 ± 5F and 90 ± 5% relative humidity<br><br>Target Rock Corporation Report No. 2302, May 9, 1979<br><br>BPC Log No. 13-10407-J603-95-6, Nov. 21, 1980 | Qualified for 40 years except for: "O" rings - 5 years; coil - 20 years; elect. sub-assembly parts - 20 years (pending)<br><br>Additional testing in progress under C-E program PE-5733 |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 54 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve (cont)<br>Auxiliary Bldg | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-001<br>System: ECWS<br>Tag Nos. J-EWA-LV-91<br>J-EWB-LV-92 | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 55 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve<br>MSSS | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-007<br>System: SG<br>Tag No. JSGB-PV--306A<br>JSGB-PV--306B<br>JSGA-PV-313A<br>JSGA-PV-313B | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mix<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 385F peak<br>Pressure 66 psig peak<br>Relative Humidity 100%<br>Radiation $2.38 \times 10^7$ rads<br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH = 8.6 to 10.0 with $Na_3PO_4$ for 14 days<br>Submergence N/A | 30 days | Operation and seat leakage tests post MSLB/LOCA operation: 6 cycles, 60 psig pressure, 120V-dc and 6 cycles, 60 psig, 70V-dc Seat leakage: 60 psig pressure for 6 minutes with no leakage | N/A | N/A | Type Test<br>792 hrs at 350F ± 5F with humidity at 55 ± 5% and $N_2$ at 75 psig supplied to valve inlet port<br>Target Rock Corporation Report No. 2302 dated May 9, 1979<br>BPC Log No. 13-10407-J603-95-6 dated Nov. 21, 1980 | Qualified for 40 years except for: "O" rings - 5 years; coil - 20 years elect. subassembly parts - 20 years (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 56 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve<br>MSSS | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. T6HH-008<br>System: SG<br>Tag No.<br>J-SGA-UV-1133<br>J-SGA-UV-1134<br>J-SGB-UV-1135A<br>J-SGB-UV-1135B<br>J-SGB-UV-1136A<br>J-SGB-UV-1136B | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mix<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 385F peak<br>Pressure 66 psig peak<br>Relative Humidity 100%<br>Radiation $2.38 \times 10^7$ rads<br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH = 8.6 to 10.0 with $Na_3PO_4$ for 14 days<br>Submergence N/A | 30 days | Operation and seat leakage tests post MSLB/LOCA operation: 6 cycles, 60 psig pressure, 120V-dc and 6 cycles, 60 psig, 70V-dc Seat leakage: 60 psig pressure for 6 minutes with no leakage | N/A | N/A | Type Test<br>792 hrs at 350F ± 5F with humidity at 55 ± 5% and $N_2$ at 75 psig supplied to valve inlet port<br>Target Rock Corporation Report No. 2302 dated May 9, 1979<br>BPC Log No. 13-10407-J603-95-6 dated Nov. 21, 1980 | Qualified for 40 years except for: "O" rings - 5 years; coil - 20 years; elect. subassembly parts - 20 years (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 57 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| AC Motor Operator<br>Auxiliary Bldg | Henry Pratt (P.O. No. 13-JM-605) | Limitorque Motor: SMB-00-2 Actuator: HlBC<br>System: ECWS Tag Nos. J-EWA-UV-145 J-EWA-UV-65<br>System: NCWS Tag Nos. J-NCB-UV-401 J-NCA-UV-402 | Temperature 50 to 104F<br>Pressure 0 psig<br>Relative Humidity 20 to 90%<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 250 peak<br>Pressure 25 psig peak<br>Relative Humidity 100%<br>Radiation $2 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | None | None | Type Test & Analysis<br>Limitorque test report B-0058 | Qualified for 8 years with maintenance |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 58 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| AC Motor Operator<br>Containment | Henry Pratt (P.O. No. 13-JM-605) | Limitorque Motor: SMB-00-40 Actuator: H3BC<br>System: CPS<br>Valve Tag No.<br>J-CPA-UV-2B<br>J-CPB-UV-3A<br>J-CPA-UV-2A<br>J-CPB-UV-3B<br>Limitorque Motor: SMB-005 Actuator: H1BC<br>System: CPS<br>Valve Tag No.<br>J-CPA-UV-4B<br>J-CPB-UV-5A<br>J-CPA-UV-4A<br>J-CPB-UV-5B<br>Limitorque Motor: SMB-00-2 Actuator H1BC<br>System: NCWS<br>Tag No.<br>J-NCB-UV-403 | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig peak See fig. 3.1-2<br>Relative Humidity Steam/air mixture<br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence N/A<br>Env. Desig. I | Temperature 315 peak<br>Pressure 70 psig peak<br>Relative Humidity 100%<br>Radiation $2.0 \times 10^8$<br>Chemical Spray 3000 ppm $H_3BO_3$ 0.064 molar $Na_2S_2O_3$ pH = 10.5 with NaOH<br>Submergence N/A | 30 days | 30 days Test unit subjected to 794 cycles post LOCA/MSLB | None | N/A | Type Test<br>Motor Stator aged for 100 hrs at 180C.<br>Actuator mechanically cycled 1208 times prior to LOCA/MSLB<br>Limitorque test report 600456 Dec. 9, 1975<br>BPC Log No. 13-10407-J-605-164-1 | Qualified for 40 years (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 59 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Auxiliary Feedwater Pump Motor<br>MSSS | Bingham-Willamette (P.O. No. 13-MM-021) | Westinghouse Model No. 4x6x10½B MSD-8 STG Tag No. M-AFB-P01 | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 120F peak<br>Pressure 0 psig<br>Humidity 20-100%<br>Radiation $2 \times 10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days Stator was cycled -30C to 150C to 25C 4 times, then submerged in water. Insulation resistance was then measured and found to be unchanged.<br>Motor was started with full line voltage, when at full speed it was reversed, when it again reached full speed it was allowed to coast for 1-1/2 minutes. After 500 cycles, stator was immersed in water and insulation resistance was measured and found unchanged. | N/A | N/A | Type Test<br>Thermally aged per IEEE-275-1966.<br>Westinghouse Report No. WCAP-8754 Rev. 1<br>BPC Log No. 13-10407-M021-N001-11.05-14-2. June 3, 1982 | Qualified for 40 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 60 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Auxiliary Feedwater Pumps GS-type Turbine Electronic Control Systems<br>MSSS | Bingham-Willamette Company (P.O. No. 13-MM-021) | Panel and Auxiliaries Custom-Built<br>Tag No. M-AFA-E01 | Temperature 28 to 120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 137F<br>Pressure 0 psig<br>Humidity 95%<br>Radiation $1.1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Equipment to be operated at 137F and 95% RH for 8 hours. Voltage frequency current and pressure to be varied first at minimum levels then at maximum levels. | Later | Later | Type Test<br>Non-metallic components to be aged to 40 year life except for GPD Relay (10 years) and Limitorque valve operator (5 year)<br>Wyle Qualification Test Plan No. 57595. Oct. 1, 1982.<br>BPC Log No. 13-10407-M021-185-2 Nov. 12, 1982 | In progress<br>To be qualified for 40 years except GPDNQ relays (10 years) and Limitorque valve operators (5 years) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 61 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Auxiliary Feedwater Pumps | | Limitorque Model No. SMB-000<br>System AF<br>Tag No. AFA-HV-54 | Temperature 28 to 120F | Temperature 340F peak | 30 days | 33 days | None | N/A | Type Test<br>Limitorque test report B-0058 | Qualified for 8 years with maintenance |
| | | | Pressure 0 psig | Pressure 105 psig peak | | | | | | |
| | | | Relative Humidity 20-90% | Relative Humidity 100% | | | | | | |
| | | | Radiation $1 \times 10^5$ rads | Radiation $1 \times 10^7$ rads | | | | | | |
| | | | Chemical Spray N/A | Chemical Spray N/A | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. II | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 62 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Essential Cooling Water System Motor<br>Auxiliary Building<br>Fuel Pool Cooling Pumps<br>Fuel Bldg | Westinghouse Elect. Corp. (P.O. No. 13-MM-093) | Motor: HSWF Frame 6808L<br>System: ECWS Tag Nos. MEWAP01 MEWBP01<br>System: Fuel Pool Cooling Tag Nos. MPCAP01 MPCBP01 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III, VI | Temperature 104F<br>Pressure 0 psig<br>Relative Humidity 100%<br>Radiation $2 \times 10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days<br>Thermalastic Epoxy Insulation remained intact for varying degrees of thermal/ mechanical aging | N/A | N/A | Type Test<br>Stator cycled from -30C to 150C to 25C, 4 times. Insulation resistance while submerged in water, before and after cycling, stayed 300 kΩ or better. Mechanical cycling: Motor stator at full line voltage and received when at speed, then allowed to coast for 1.5 minutes. Repeated 500 times. No degradation is noticed in megger tests.<br>(cont) | Qualified for 40 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 63 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Essential Cooling Water System Motor (cont) | | | | | | | | | Westinghouse Electric Corporation Report No. WCAP-8754, Rev. 1 Sept. 21, 1982<br><br>BPC Log No. 13-10407-MM-093-235-2 Oct. 7, 1981 | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 64 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Pressure Transmitter<br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Rosemount 1152GP-0-A-92-PB<br>System: MSS<br>Tag Nos. J-SGA-PT-229 J-SGB-PT-230 J-SGA-PT-231 J-SGB-PT-232 J-SGA-PT-233 J-SGB-PT-234 J-SGA-PT-235 J-SGB-PT-236 | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 350F peak<br>Pressure 70 psig peak<br>Relative Humidity Steam/air mixture<br>Radiation $5.0 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Functional test during accident<br>Post functional test | N/A | Accuracy post functional test 0.5% of full scale | Type Test<br>2 cycles of 100F, 1 hour; 0F, 1 hour; 200F, 1 hour; 100F, 1 hour<br>Anchor Darling Report No. E9023-QR-2 Rev. A, April 15, 1980<br>RMT Report No. 117415 Sept. 24, 1975<br>Bechtel Log No. 13-10407-M234A-68-2, April 24, 1980 | Qualified for 40 years except for non-metallic parts (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 65 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Limit Switch<br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Namco EA180<br>System: MSS Valve Tag Nos. J-SGE-UV-170 J-SGE-UV-171 J-SGE-UV-180 J-SGE-UV-181<br>(6/valve) | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/Air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 340F peak<br>Pressure 70 psig peak<br>Relative Humidity 100%<br>Radiation $2.04 \times 10^8$ rads<br>Chemical Spray $H_3BO_3$ $N_2S_2O_3$ and NaOH to pH 10-11<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test<br>Mechanically aged for 100, 200 actuation cycles<br>Thermal aging 400 hours at 120F<br>Anchor/ Darling Report No. E9023-QR-2 Rev. A, April 15, 1980<br>Wyle test Report 43847-2, May 23, 1978<br>BPC Log No. 13-10407-M234A-68-2, April 24, 1980<br>Reference: Namco Report No. QTR 105 April 13, 1980<br>(cont) | Qualified for 40 years with maintenance |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 66 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Limit Switch<br>MSSS<br>(cont) | | | | | | | | | BPC Log No. 13-10407-J601A-134-1<br>Qualified by C-E Namco Program | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 67 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| FWIV Pressure Switch<br>MSSS | Anchor/ Darling (P.O. No. B-MM-234A) | Barksdale BIT-A48SS<br>System: MSS<br>Tag Nos.<br>J-SGA-PSH-245<br>J-SGA-PSH-246<br>J-SGB-PSH-247<br>J-SGB-PSH-248<br>Barksdale BIT-A12SS<br>System: MSS<br>Tag Nos.<br>J-SGA-PSL-268<br>J-SGA-PSL-269<br>J-SGB-PSL-270<br>J-SGB-PSL-271 | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/Air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 450F peak<br>Pressure 0 psig<br>Relative Humidity Saturated steam<br>Radiation $2.5 \times 10^6$ rads<br>Chemical Spray None<br>Submergence N/A | 30 days | Functional tests during accident<br>Post functional test | N/A | N/A | Type Test<br>Cyclic aging full stroke 100 cycles<br>Exercise 150 cycles<br>Thermal aging 317.6 hours at 121C<br>Anchor/ Darling Report No. E9023-QR-2 Rev. A, April 15, 1980<br>Wyle Test Report 43847-2, May 23, 1978<br>BPC Log No. 13-10407 M234A-68-3 Oct. 28, 1980 | Qualified for 40 years except for non-metallic parts |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 68 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| FWIV Pressure Transmitter<br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Rosemount 1152GP-0 -A-92-PB<br>System: MSS<br>Tag Nos. J-SGA-PT-237A J-SGA-PT-237B J-SGA-PT-238A J-SGA-PT-238B J-SGA-PT-239A J-SGA-PT-239B J-SGA-PT-240A J-SGA-PT-240B | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/Air mixture<br>Radiation 1 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 350F peak<br>Pressure 70 psig<br>Relative Humidity Steam/Air mixture<br>Radiation 5.0 x $10^6$ rads<br>Chemical Spray Not Addressed<br>Submergence N/A | 30 days | Functional test during accident<br>Post functional test | Accuracy 2.0% of full scale<br>Response time N/A | Accuracy Post functional test 0.5% of full scale<br>Response time N/A | Type Test<br>2 cycles of 100F, 1 hour; 0F, 1 hour; 200F, 1 hour; 100F, 1 hour<br>Anchor/ Darling Report No. E9023-QR-2 Rev. A, April 15, 1980<br>RMT Report No. 117415, September 24, 1975<br>BPC Log No. 13-10407-M234A-68-2, April 24, 1980 | Qualified for 40 years except for non-metallic parts (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 69 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| FWIV Solenoid Valve<br><br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Skinner V5H65590 -125VDC<br><br>System: MSS<br><br>Tag Nos. J-SGB-UY-132B<br>J-SGB-UY-132D<br>J-SGB-UY-137B<br>J-SGB-UY-137D<br>J-SGA-UY-174B<br>J-SGA-UY-174D<br>J-SGA-UY-177B<br>J-SGA-UY-177D | Temperature 300F<br><br>Pressure 21 psig<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 450F peak<br><br>Pressure 0 psig<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $2.5 \times 10^6$ rads<br><br>Chemical Spray Not Addressed<br><br>Submergence N/A | 30 days | Functional test during accident<br><br>Post functional test | N/A | N/A | Type Test<br><br>Cyclic aging full stroke 100 cycles<br><br>Exercise 150 cycles<br><br>Thermal aging 121C for 317.6 hours<br><br>Anchor/ Darling Report No. E9023-QR-2, Rev. A, April 15, 1980<br><br>Wyle Test Report 43847-2, May 23, 1978<br><br>BPC Log No. 13-10407-M234A-68-3 Oct. 28, 1980 | Qualified for 40 years except for non-metallic parts (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 70 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| FWIV Solenoid Valve (cont) | | Skinner V5H65600 -125VDC<br>System: MSS<br>Tag Nos. J-SGB-UY-132A, J-SGB-UY-132C, J-SGB-UY-137A, J-SGB-UY-137C, J-SGA-UY-174A, J-SGA-UY-174C, J-SGA-UY-177A, J-SGA-UY-177C | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 71 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| FWIV Limit Switch<br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Namco EA180<br>System: MSS<br>Tag Nos.<br>J-SGA-UV-174<br>J-SGA-UV-177<br>J-SGB-UV-132<br>UV-SGB-UV-137<br>(3/valve) | Temperature 300F | Temperature 340F peak | 30 days | 33 days | N/A | N/A | Type Test<br>Thermally aged 400 hours at 120F<br>Mechanically aged for 100,200 actuation cycles<br>Anchor/ Darling Report No. E9023-QR-2, Rev. A, April 15, 1980<br>Acme-Cleveland Development Company, September 5 1978<br>BPC Log No. 13-10407-M234A-68-2, April 24, 1980<br>Reference: Namco Report No. QTR-105 April 13, 1980<br>(cont) | Qualified for 40 years with maintenance |
| | | | Pressure 21 psig | Pressure 70 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% | | | | | | |
| | | | Radiation $1 \times 10^6$ rads | Radiation $2.04 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray N/A | Chemical Spray $H_3BO_3$, $Na_2S_2O_3$ and NaOH to pH = 10-11 | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. II | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 72 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| FWIV Limit Switch<br>MSSS<br>(cont) | | | | | | | | | BPC Log No. 13-10407-J601A-134-1<br>Qualified by C-E Namco program | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 73 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Solenoid Valve<br><br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Skinner V5H65590 -125 VDC<br><br>System: MSS<br>Tag Nos.<br>J-SGB-UY -170B<br>J-SGB-UY -170D<br>J-SGB-UY -170F<br>J-SGB-UY -170H<br>J-SGA-UY -171B<br>J-SGA-UY -171D<br>J-SGA-UY -171F<br>J-SGA-UY -171H<br>J-SGA-UY -180B<br>J-SGA-UY -180D | Temperature 300F<br><br>Pressure 21 psig<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 450F peak<br><br>Pressure 0 psig<br><br>Relative Humidity Saturated steam/air mixture<br><br>Radiation $2.5 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | Functional test during accident<br><br>Post functional test | N/A | N/A | Type Test<br><br>Cyclic aging full stroke 100 cycles<br><br>Exercise 150 cycles<br><br>Thermal aging 317.6 hours at 121C<br><br>Anchor/ Darling Report No. E9023-QR-2, Rev. A, April 15, 1980<br><br>Wyle Test Report No. 43847-2, May 23, 1978<br>BPC Log No. 13-1040-7-M234A-68-2, April 24, 1980 | Qualified for 40 years except for non-metallic (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 74 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Solenoid Valve (cont) | | J-SGA-UY -180F<br>J-SGA-UY -180H<br>J-SGB-UY -181B<br>J-SGB-UY -181D<br>J-SGB-UY -181F<br>J-SGB-UY -181H | | | | | | | | |
| | | Skinner V5H65600 125 VDC | | | | | | | | |
| | | System: MSS<br>Tag Nos.<br>J-SGB-UY -170A<br>J-SGB-UY -170C<br>J-SGB-UY -170E<br>J-SGB-UY -170G | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 75 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Solenoid Valve (cont) | | J-SGA-UY -171A<br>J-SGA-UY -171C<br>J-SGA-UY -171E<br>J-SGA-UY -171G<br>J-SGA-UY -180A<br>J-SGA-UY -180C<br>J-SGA-UY -180E<br>J-SGA-UY -180G<br>J-SGB-UY -181A<br>J-SGB-UY -181C<br>J-SGB-UY -181E<br>J-SGB-UY -181G | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 76 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Pressure Switch<br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Barksdale BIT-A48SS<br>System: MSS<br>Tag Nos.<br>J-SGE-PSH -241<br>J-SGE-PSH -242<br>J-SGE-PSH -243<br>J-SGE-PSH -244 | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $10^6$ rads | Temperature 450F peak<br>Pressure 0 psig<br>Relative Humidity Steam/air mixture<br>Radiation 2.5 x $10^6$ rads | 30 days | Functional test during accident<br>Post functional test | N/A | N/A | Type Test<br>Cyclic aging full stroke 100 cycles<br>Exercise 150 cycles<br>Thermal aging 121C for 317.6 hours<br>Anchor/ Darling Report No. E9023-QR-2, Rev. A, April 15, 1980<br>Wyle Test Report 43847-2, May 23, 1978<br>BPC Log No. 13-10407-M234A-68-2, April 24, 1980 | Qualified for 40 years except for non-metallic parts (pending) |
| | | Barksdale BIT-A12SS<br>System: MSS<br>Tag Nos.<br>J-SGA-PSL -260<br>J-SGB-PSL -261<br>J-SGA-PSL -262<br>J-SGB-PSL -263<br>J-SGA-PSL -264<br>J-SGB-PSL -265<br>J-SGA-PSL -266<br>J-SGB-PSL -267 | Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Chemical Spray N/A<br>Submergence N/A | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 77 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Electric Low-Leakage Damper Actuator<br><br>Auxiliary Bldg.<br><br>MSSS Elev. 80'<br><br>Fuel Bldg. | Waldinger Corp. (P.O. No. 13-MM-598) | Model No. ITT NH95<br><br>System: CHCS<br>Tag Nos.<br>MHPAM02<br>MHPBM01<br>MHPBM02<br>MHPAM01<br><br>System: HVAC MSSS Bldg<br>Tag Nos.<br>MHAAM214<br>MHABM215<br>MHAAM216<br>MHABM217<br><br>System HVAC Fuel Bldg<br>Tag Nos.<br>MHFAM05<br>MHFBM05<br>MHFAM06<br>MHFBM06 | Temperature 28-120F<br><br>Pressure 0 psig<br><br>Humidity 20-90%<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II,III,VI | Temperature 135F peak<br><br>Pressure 0 psig<br><br>Humidity 100% RH<br><br>Radiation $1.16 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | Post Seismic Extreme Environmental Test: 8 hrs at 40F and 8 hrs at 135F specimens cycled six times at each specified temperature | Close Response time not reported | Report States that test units passed extreme environmental functionals | Type Test Aging Performed: 648 hrs at 212F<br><br>Total mechanical cyclic aging: 2800 cycles<br><br>Wyle Report No. 58551 Sept. 22, 1982 BPC Log No. 13-10-407-M598-1712-2<br><br>M598-1715-3 Oct. 5, 1982 | Qualified for 40 yrs (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 78 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pneumatic Low-Leakage Damper Motor<br><br>Auxiliary Bldg.<br><br>Fuel Bldg. | Waldinger Corp. (P.O. No. 13-MM-598) | Model No. Fisher 656<br><br>System: HVAC - Auxiliary Bldg.<br>Tag Nos.<br>M-HAA-M01<br>M-HAA-M02<br>M-HAA-M03<br>M-HAA-M04<br>M-HAA-M05<br>M-HAA-M06<br>M-HAB-M01<br>M-HAB-M02<br>M-HAB-M03<br>M-HAB-M04<br>M-HAB-M05<br>M-HAB-M06<br><br>System: HVAC Fuel Bldg.<br>Tag Nos.<br>M-HFA-M01<br>M-HFB-M01<br>M-HFA-M02<br>M-HFB-M02<br>M-HFA-M03<br>M-HFB-M03<br>M-HFA-M04<br>M-HFB-M04 | Temperature 50-104F<br><br>Pressure 0 psig<br><br>Humidity 20-90%<br><br>Radiation $1 \times 10^6$<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. III,VI | Temperature 135F peak<br><br>Pressure 0 psig<br><br>Humidity 100% RH<br><br>Radiation $1.27 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | Post Seismic Extreme Environmental Test: 8 hrs at 40F and 8 hrs at 135F.<br><br>Specimens cycled 6 times at each specified temperaature. | Fisher 656-30 Receiving Test.<br><br>Open: 5.8 to 7.2 sec.<br>Close: 1.5 to 2 sec.<br><br>Fisher 656-40 Receiving Test.<br><br>Open: 13.5 to 15 sec.<br>Close: 4 sec. | Fisher 656-30 Reported Results<br><br>Open: pass<br><br>Close: pass<br><br>Fisher 656-40 Reported Results<br><br>Open: pass<br><br>Close: pass | Type Test Aging performed 648 hrs at 212F.<br><br>Total mechanical cyclic aging: 2800 cycles<br><br>Wyle Report No. 58551 Sept. 22, 1982 BPC Log No. 13-10407-M598-1712-2<br><br>M598-1715-3 Oct. 5, 1982 | Qualified for 40 yrs (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 79 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valves<br>Auxiliary Bldg.<br>Fuel Bldg. | Waldinger (P.O. No. 13-MM-598) | Automatic Switch Company Model No. NP8320<br>System: HVAC-Aux. Bldg.<br>Tag Nos. J-HAA-UY-114, J-HAB-UY-115, J-HAA-UY-112, J-HAB-UY-113, J-HAA-UY-125, J-HAB-UY-126<br>Fuel Bldg. Tag Nos. J-HFA-UY-26, J-HFA-UY-27, J-HFB-UY-25, J-HFB-UY-28 | Temperature 50 to 104F<br>Pressure 0 psig<br>Relative Humidity 20 to 90%<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III, VI | Temperature 450 peak<br>Pressure 78 psig<br>Humidity 100%<br>Radiation $1.8 \times 10^8\gamma$ $1.1 \times 10^8\beta$<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test<br>ASCO Report No. AQS 787R Rev. A & AQS-67368 Rev. 0 & C-E Letter V-PAK-250 | Qualified 40 yrs with maintenance |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 80 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switches<br>Auxiliary Bldg<br>Fuel Bldg | Waldinger (P.O. No. 13-MM-598) | Namco Controls EA-170<br>System: HVAC-Aux. Bldg<br>Tag Nos.<br>M-HAA-M01<br>M-HAA-M02<br>M-HAA-M03<br>M-HAA-M04<br>M-HAA-M05<br>M-HAA-M06<br>M-HAB-M01<br>M-HAB-M02<br>M-HAB-M03<br>M-HAB-M04<br>M-HAB-M05<br>M-HAB-M06<br>System: HVAC Fuel Bldg<br>M-HFA-M01<br>M-HFB-M01<br>M-HFA-M02<br>M-HFB-M02<br>M-HFA-M03<br>M-HFB-M03<br>M-HFA-M04<br>M-HFB-M04 | Temperature 50 to 104F<br>Pressure 0 psig<br>Relative Humidity 20 to 90%<br>Radiation $10^6$ rads<br>Chemical N/A<br>Submergence N/A<br>Env. Desig. III, VI | Temperature 135F peak<br>Pressure 0 psig<br>Humidity 100%<br>Radiation $1.27 \times 10^6$ rads<br>Chemical N/A<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test<br>Aging performed: 312 hrs at 212F<br>Cycled 2800 times<br>Coyle Report No. 58551 Sept. 22, 1982<br>BPC Log No. 13-10407-M598-1712-2 M598-1715-3 Oct. 5, 1982 | Qualified for 40 years with maintenance<br>Replace with qualified Model EA-180 |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 81 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Essential/ Air Handling Unit Motors<br><br>Auxiliary Bldg<br><br>MSSS | Reliance Motors (P.O. No. 13-MM-721A) | System: HVAC-Aux. Bldg<br>Tag Nos.<br>MHAAZ01<br>MHAAZ02<br>MHAAZ03<br>MHAAZ05<br>MHAAZ06<br>MHABZ01<br>MHABZ02<br>MHABZ03<br>MHABZ05<br>MHABZ06<br>MSSS<br>MHAAZ04<br>MHABZ04 | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II, III | Temperature 122F<br>Pressure 0 psig<br>Relative Humidity 100%<br>Radiation $2.04 \times 10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days<br><br>Motors cycled under load with total time per cycle equal to 40 seconds and 794 cycles after radiation testing and aging | N/A | N/A | Combination analysis and Motorette test to IEEE-117 with temperature to 220C<br><br>Reliance Electric Co. Report No. NUC-9 July 1, 1978 and Supplement<br><br>BPC Log No. 13-10407-M721A-94-6 March 31, 1982 | Qualified for 40 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 82 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Essential Air Handling Unit Motors<br>Fuel Bldg | Reliance Motors (P.O. No. 13-MM-721B) | System: HVAC-Fuel Bldg<br>Tag Nos. M-HFA-J01 M-HFB-J01 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. VI | Temperature 122F<br>Pressure 0 psig<br>Relative Humidity 100%<br>Radiation $2.04 \times 10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days<br>Motors cycled under load with total time per cycle equal to 40 seconds and 794 cycles after radiation testing<br>NUC 9 Supplement motor subjected to postaging tests including: load performance no load, locked, torque current vs. speed at 80% & 100% rated motor voltage | N/A | N/A | NUC 9 Report Combination analysis and Motorette test to IEEE-117 with temperature to 130C<br>Mechanical Cycling: 1208 cycles post thermal aging<br>Thermal aging: 2112 hours at 255C<br>Reliance Electric Co. Report No. NUC-9 July 1, 1978<br>Reliance Electric Co. Report No. NUC-9 Supplement (NUC 18) September 29, 1981<br>BPC Log No. 13-10407-M721B-123-1 June 22, 1978 | Qualified for 40 years (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 83 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Essential Air Handling Unit Heaters<br>Fuel Bldg | Nutherm (P.O. No. 13-MM-721B) | System: HVAC-Fuel Bldg<br>Tag Nos. M-HFA-J01 M-HFB-J01 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. VI | Temperature 104F<br>Pressure 16.5 psig<br>Relative Humidity 100%<br>Radiation $1.1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Functional tests to be performed 4 times during aging. Inspection to follow DBE. | N/A | N/A | Type Test To be thermally aged 31, 36 days at 293F, 50 to 90% $RH_o$ to mechanically cycled 4000 times<br>Nutherm Intr. Qualification Plan No. 51117P Rev. 1 September 14, 1982<br>BPC Log No. 13-10407-M900-1-2 September 20, 1982 | In Progress |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 84 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Hydrogen Recombiner Fan Motor with Class H Insulation System<br>Auxiliary Bldg | Westinghouse Electric Corporation (P.O. No. 13-NM-993) | N/A | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation 1 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 130C<br>Pressure 0 psig<br>Relative Humidity 100%<br>Radiation 2 x $10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days<br>Aged for an additional 38 hours at 210C prior to moisture and voltage tests: 120V, 60 Hz between conductors, 10 minutes 600V, 60 Hz phase to phase, 10 minutes 600V, 60 Hz to ground, 10 minutes | N/A | N/A | Combination analysis and Motorette tests as per IEEE-117. Motorettes aged for 1369 hours at 210C<br>Westinghouse Report No. WCAP-9112, May 12, 1977.<br>BPC Log No. 13-10407-N993-114-2, March 6, 1980 | Qualified for 40 years (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 85 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Hydrogen Recombiner Blower Motor with Class H Insulation System<br><br>Auxiliary Bldg | Rockwell Energy System Group (Atomics International) (P.O. No. 13-NM-993<br><br>Blower motor by Reliance Electric | | Temperature 50-104F<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation 1 x $10^6$ rads<br><br>Chemical Spray N/A | Temperature 245F Inlet<br><br>Pressure 35.8 psia<br><br>Relative Humidity 100%<br><br>Radiation 1.1 x $10^8$ rads<br><br>Chemical Spray Inlet Air sprayed with the following mixture: 108 gallons $H_2O$, 31.3 lbs of boric acid, 18.2 lbs $N_2S_2O_3$, 4.8 oz of hydrazine pH to 10.5 with sodium triphosphate and sodium hydroxide, also added 0.2 cc acetone<br><br>(cont) | 30 days | 402 days system operated 1 week at 245F, 35.8 psia, 3 weeks at 190F, 24.1 psia, 48 weeks at 170F, 21.4 psia winding resistance remained at 50 mΩ or better. | N/A | N/A | Type Test<br><br>Thermal Aging: 125 hours at 170C. Mechanical againg 0.008 in peak to peak at 60 Hz, for 1 hour cycled 277 times.<br><br>Rockwell International Report No. N139QR 120001 Sept. 19, 1982.<br><br>BPC Log No. 13-10407-NM-993-134-1 Nov. 9, 1982. | Qualified for 40 years (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 86 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Hydrogen Recombiner Blower Motor with Class H Insulation System | | | | 0.1 cc paint thinner, 0.1 cc lube oil, 0.1 cc detergent | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| Auxiliary Bldg (cont) | | | Env. Desig. II | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 87 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Containment Atmosphere Monitor<br>Auxiliary Bldg | Kaman Science Corp. (P.O. No. 13-NM-997) | Model 51497<br>System: RMS<br>Tag No. SQB-RU-01 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90% | Temperature 104F<br>Pressure 0 psig<br>Relative Humidity Not addressed | 30 days | Passed postaging functional tests | None specified by supplier | N/A | Type Test<br>Aging per Major Components P.C. Boards 1200 hrs at 100C<br>Field Unit Chassis 1200 hrs at 100C<br>Power Supply 648 hrs at 100C<br>Magnecraft Relays 800 hrs at 100C<br>Motor Starter 1500 hrs at 100C<br>Ledex Solenoid 500 hrs at 85C<br>Moving Step Filter 412 hrs at 100C<br><br>Mechanical Aging:<br>Motor Starter 7280 cycles<br>Magnecraft Relays 4500 cycles<br>Moving Step Filter<br><br>(cont) | Qualified for for 15 yrs maximum except terminal blocks which are qualified for 40 years (pending) |
| Containment Bldg Purge Exhaust "B" Monitor<br>Auxiliary Bldg | | SQB-RU-34 | Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III, VI | Radiation $1 \times 10^3$ rads<br>Chemical Spray N/A<br>Submergence N/A | | | | | | |
| Fuel Bldg Atmosphere Monitor<br>Fuel Bldg | | SQA-RU-32 | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 88 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Containment Atmosphere Monitor | | | | | | | | | 48,048 cycles Ledex Solenoid 12,012 cycles | |
| Auxiliary Bldg | | | | | | | | | Kamen Report No. K-80-63U(R) May 27, 1982<br><br>BPC Log No. 13-10407-N997-164-2 June 3, 1982 | |
| Containment Purge Exhaust "B" Monitor | | | | | | | | | | |
| Auxiliary Bldg | | | | | | | | | | |
| Fuel Bldg Atmosphere Monitor | | | | | | | | | | |
| Fuel Bldg (cont) | | | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 89 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Refueling Machine Area "A" Monitor<br>Containment | Kaman Sciences Corp. (P.O. No. 13-NM-997) | Model No. N117<br>System: RMS<br>Tag No. SQA-RE-033(c) | Temperature 50-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. I, III, VI | Temperature 120F<br>Pressure 0 psig<br>Relative Humidity<br>Radiation $1 \times 10^3$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Passed postaging functional tests | None specified by supplier | N/A | Type Test<br>Aging Performed: Major Components PIC/LIC/RIC Display 768 hrs at 85C<br>Motherboard 648 hrs at 100C<br>Power Supply 648 hrs at 80C<br>HV Board 800 hrs at 100C<br>Pre-Amp Area monitor 1200 hrs at 100C<br>Magnecraft Relays 800 hrs at 100C<br>Mechanical Aging Magnecraft Relays 4500 cycles<br>Kaman Report No. K-80-63U(R) May 27, 1982<br>BPC Log No. 13-10407-N-997-164-2 | Qualified for a maximum of 40 years with life limiting components (pending) |
| Power Access Purge Area "A and B" Monitors<br>Auxiliary Bldg | | SQA-RU-37<br>SQB-RU-38 | | | | | | | | |
| Fuel Bldg Area Monitor<br>Fuel Bldg | | SQA-RU-31 | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.
c. Not required to function post-accident.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 90 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability, Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternating Current Electric Motor Operators<br><br>Containment<br><br>Auxiliary Bldg | Dresser Industries<br><br>Rotork Controls Inc. (P.O. No. 13-PM-221A) | Model No. 7NAB1-43<br><br>System: GRS<br>Tag No. JGRA-UV-1<br>JHPA-UV-1<br>JHPB-UV-2<br><br>System: CHCS<br>JHPA-UV-3<br>JHPB-UV-4<br>JHPA-UV-5<br>JHPB-UV-6 | Temperature 370F peak See fig. 3.1-1<br><br>Pressure 60 psig peak. See fig. 3.1-2<br><br>Relative Humidity Steam/Air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes See table 4.1-3<br><br>Submergence N/A<br><br>Env. Desig. I, III | Temperature 385F peak<br><br>Pressure 75 psig<br><br>Relative Humidity 100%<br><br>Radiation $2.04 \times 10^8$ rads<br><br>Chemical Spray 6200 ppm $H_3BO_3$, NaOH to pH of 9.5<br><br>Submergence N/A | 30 days | 30 days<br><br>Valves cycled 15 times during the pressurization test<br><br>LOCA Post Function 5 complete cycles | N/A | N/A | Type Test<br><br>Environmental and Mechanical Wear Aging Test: 200F for 400 hours in live steam. Cycled once per hour during environmental phase plus 1600 additional tests.<br><br>Wyle Labs Report No. 43979-1, 43979-3, Rev. A, 58364, December 19, 1978<br><br>BPC Log No. 13-10407-P221A-165-6, P-221A-188, P-221A-200, P-221A-201 May 21, 1979<br><br>(cont) | Qualified for 40 years |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 91 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternating Current Electric Motor Operators | | | | | | | | | Rotork Reports TR-3029 TR-3030 Jan. 18, 1982 | |
| Containment<br>Auxiliary Bldg<br>(cont) | | | | | | | | | | |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 92 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternating Current Electric Motor Operators (For Cont. Isolation Valves)<br><br>Containment | Limitorque Corporation (P.O. No. 13-PM-221B)<br><br>Anchor/ Darling Valve Company | Model No. SB-00-7.5<br><br>System: CWS<br>Tag No. JWCB-UV-61<br><br>Model No. SMB-000-2<br><br>System: RWDS<br>Tag No. JRDA-UV-23 | Temperature 370F peak See fig. 3.1-1<br><br>Pressure 60 psig peak. See fig. 3.1-2<br><br>Relative Humidity Steam/Air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes See table 4.1-3<br><br>Submergence N/A<br><br>Env. Desig. I | Temperature 315F peak<br><br>Pressure 70 psig<br><br>Relative Humidity 100%<br><br>Radiation $2.04 \times 10^8$ rads<br><br>Chemical Spray 3000 ppm $H_3BO_3$, 0.064 molar $Na_2S_2O_3$, NaOH added for pH of 10.5<br><br>Submergence N/A | 30 days | 30 days<br><br>Cycled 9 times throughout 30 day test<br><br>Post-LOCA Load Cycling Test: 794 full cycles<br><br>Models tested: Inside Containment: SMB-0-40<br><br>Outside Containment: SMB-0 | Open: 40 second<br>Close: 40 second | 9 cycles run during LOCA<br><br>Open low 41 second High 42 second<br>Close: low 42 second high 43.5 second | Type Test (SMB-0)<br><br>Generic Test (SMB, SB, SBD and SMB HBC)<br><br>Thermal Aging (motor only) 180C for 100 hours<br><br>Mechanical Aging 1028 full cycles prior to LOCA test<br><br>Limitorque Report No. B0058, Jan. 11, 1980<br><br>BPC Log No. 13-10407-P221B-349-1, March 4, 1981 | Qualified for 40 years (pending) |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 93 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switch (For Pneumatic Operated Main Steam Blowdown Isolation Valves)<br>Containment | Namco Controls - Acme Cleveland Company (P.O. No. 13-PM-221B)<br>Anchor/ Darling Valve Co. | Model No. EA-740<br>System: MSS<br>Tag Nos. JSGA-UV-500P JSGA-UV-500R | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig peak. See fig. 3.1-2<br>Relative Humidity Steam/Air mixture<br>Radiation $3.3 \times 10^7$ gamma $2 \times 10^8$ beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence N/A | (Later) | 30 days | (Later) | N/A | N/A | Type Test<br>(Later) | To be replaced with qualified model EA-180 |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 94 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternating and Direct Current Electric Motor Operators (For Main Steam and Feedwater Isolation Valves)<br><br>MSSS | Limitorque Corporation (P.O. No. 13-PM-221B)<br><br>Anchor/ Darling Valve Co. | Model No. SB-0-40<br><br>System: MSSS<br>Tag No. JSGA-UV-134<br>JSGA-UV-138<br><br>Model No. SMB-00-25<br><br>System: AFS<br>Tag No. JAFB-UV-34<br>JAFB-UV-35<br>JAFA-UV-36<br>JAFA-UV-37 | Temperature 300F (above 100 ft)<br><br>Pressure 21 psig (above 100 ft)<br><br>Relative Humidity 100% (above 100 ft)<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 315F peak<br><br>Pressure 25 psig peak<br><br>Relative Humidity 100%<br><br>Radiation $2 \times 10^7$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 33 days<br><br>Cycled 9 times throughout test<br><br>Post LOCA load cycling test: 794 cycles | None | N/A | Type Test<br><br>Thermal aging 100 hours at 180C<br><br>Mechanical aging 1028 cycles<br><br>Limitorque Report No. B0058, January 11, 1981<br><br>BPC Log No. 13-10407-P221B-349-1, March 4, 1981 | Qualified for 8 years with maintenance |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 95 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switch (For Pneumatic Operated Main Steam & Feedwater Isolation Gate Valves)<br><br>MSSS Bldg | Namco Controls - Acme Cleveland Company (P.O. No. 13-PM-221B)<br><br>Anchor/ Darling Valve Co. | Model No. EA-740<br><br>System: MSS<br>Tag No. JSGE-UV-169, JSGE-UV-183 JSGB-UV-500Q JSGA-UV-500S JSGA-UV-172 JSGB-UV-130 JSGB-UV-135 JSGA-UV-175 | Temperature 300F<br><br>Pressure 21 psig<br><br>Relative Humidity 100%<br><br>Radiation $1.x\ 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 340F<br><br>Pressure 63 psig<br><br>Relative Humidity 100%<br><br>Radiation $2.04 \times 10^8$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test<br><br>Thermal aging 200 hrs at 200F | Qualified for 40 years with maintenance<br><br>Replace with qualified model EA 180 |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 96 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valves (For Pneumatic Operated Main Steam & Feedwater Isolation Gate Valves)<br><br>MSSS | Automatic Switch Co. (ASCO) (P.O. No. 13-PM-221B)<br><br>Anchor/ Darling Valve Co. | Model No. NP831654E<br><br>System: MSS<br>Tag No. JSGA-UY-169A<br>JSGB-UY-169B<br>JSGA-UY-183A<br>JSGB-UY-183B<br>JSGB-UY-500Q<br>JSGA-UY-500S<br><br>Model No. NP831665E<br><br>System: MSS<br>Tag No. JSGA-UY-172A<br>JSGA-UY-172B<br>JSGB-UY-130A<br>JSGB-UY-130B<br>JSGA-UY-175A<br>JSGA-UY-175B<br>JSGB-UY-135A<br>JSGB-UY-135B | Temperature 300F (above 100 ft)<br><br>Pressure 21 psig (above 100 ft)<br><br>Relative Humidity 100% (above 100 ft)<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 450F peak<br><br>Pressure 78 psig peak<br><br>Relative Humidity 100%<br><br>Radiation $1.8 \times 10^8 \gamma$ $1.1 \times 10^8 \beta$<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test<br><br>Thermal aging 12 days at 268F<br><br>Mechanical aging 40,000 cycles<br><br>ASCO Report No. AQS 78TR Rev. A and AQS 67368 Rev. 0 and CE letter V-PAK-250 | Qualified for 40 years with maintenance |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 97 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternating Current Electric Motor Operators<br>Auxiliary Bldg | Limitorque Corporation (P.O. No. 13-PM-221B)<br>Anchor/ Darling Valve Co. | Model No. SB-00-7.5<br>System: CWS<br>Tag Nos. JWCB-UV-63<br>JWCA-UV-62 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 250F peak<br>Pressure 25 psig peak<br>Relative Humidity 100%<br>Radiation $2 \times 10^7$ rads<br>Chemical Spray 3000 ppm $H_3BO_3$, 0.064 molar $Na_2S_2O_3$, pH - 10.5 with NaOH<br>Submergence N/A | 30 days | 33 days<br>Cycled 9 times throughout test<br>Post LOCA load cycling test: 794 cycles | N/A | N/A | Type Test and Analysis<br>Thermal aging 100 hrs at 180C<br>Mechanical aging 1028 cycles<br>Limitorque Report No. B0058, January 11, 1981<br>BPC Log No. 13-10407-P221B-349-1, March 4, 1981 | Qualified for 8 years with maintenance |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 98 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switch (For Pneumatic Operated Cont. Radwaste Sump Pump Discharge Valve)<br><br>Auxiliary Bldg | Namco Controls - Acme Cleveland Company (P.O. No. 13-PM-221B)<br><br>Anchor/ Darling Valve Co. | Model No. EA-740<br><br>System: RWDS<br>Tag No. JRDB-UV-24 | Temperature 50-104F<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. III | Temperature 340F peak<br><br>Pressure 63 psig<br><br>Relative Humidity 100%<br><br>Radiation $2.04 \times 10^8$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 30 days<br><br>Switch was cycled 8 times during LOCA test. Open Circuit resistance maintained 40 KΩ or better throughout | N/A | N/A | Type Test<br><br>Thermal aging 200 hrs at 200F | Qualified for 40 years with maintenance<br><br>Replace with qualified model EA-180 |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 99 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valves (For Pneumatic Operated Cont Radwaste Sump Pump Discharge Valve)<br>Auxiliary Bldg | Automatic Switch Company (ASCO) (P.O. No. 13-PM-221B)<br>Anchor/ Darling Valve Co. | Model No. NP831654E<br>System: RWDS<br>Tag No. JRDB-UY-24 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 450F peak<br>Pressure 78 psig<br>Relative Humidity 100%<br>Radiation $1.8 \times 10^8 \gamma$ $1.1 \times 10^8 \beta$<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test<br>ASCO Report No. AQS-78-TR Rev. A & AQS-67368 Rev. 0 & C-E letter V-PAK-250 | Qualified for 40 years with maintenance |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 100 of 100)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valves (For Pneumatic Operated Main Steam Blowdown Isolation Valves)<br>Containment | Valcor Engineering Corporation (P.O. No. 13-PM-221B)<br>Anchor Darling | Model No. V70900-37-4<br>System: MSS<br>Tag No. JSGA-UY-500P JSGB-UY-500R | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig See fig. 3.1-2<br>Relative Humidity $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence N/A<br>Env. Desig. I | | 30 days | 33 days | N/A | N/A | Type Test | Replace with qualified ASCO NP-1 Series |

a. Where equipment is involved with more than one harsh environment, only the worst case environment is shown.

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 1 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor Operated Valve Actuator<br>Auxiliary Building | Limitorque | System: SIS<br>Model/Tag No:<br>SB-0-25 SI-671,SI-672<br>SB-3-150 SI-615,SI-628 SI-635,SI-645<br>SMB-000-5 SI-657,SI-658 SI-678,SI-679<br>SMB-00-10 SI-604,SI-609 SI-674,SI-676<br>SMB-0-10 SI-698,SI-699<br>SMB-0-25 SI-684,SI-685 SI-687,SI-688 SI-689,SI-693 SI-694,SI-695<br>SMB-1-40 SI-306,SI-307 SI-655,SI-656 SI-690,SI-691<br>SMB-1-60 SI-683,SI-686 SI-692,SI-696 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 250F<br>Pressure 25 psig<br>Radiation $2 \times 10^7$ rads $\gamma$<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Remain operable for 30 days following DBE after 40 years of normal operation | Remain operable for 33 days following DBE after simulated 40 years of normal operation including 2000 cycles by type test and analysis | None | Not Applicable | Type test and analysis per Limitorque Report B0058, CE Program 14273-PE-5731 | Qualified for 8 years with preventative maintenance note a |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 2 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor Operated Valve Actuator<br>Auxiliary Building | Limitorque | System: CVCS<br>Model/Tag No:<br>SB-1-60 CH-530,CH-531<br>SMB-00-15 CH-524,CH-255 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 250F<br>Pressure 25 psig<br>Radiation $2 \times 10^7$ rads $\gamma$<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Remain operable for 30 days (except CH-530 and CH-531 which must remain operable for 36 hours) following DBE after 40 years of normal operation | Remain operable for 33 days following DBE after simulated 40 years of normal operation including 2000 cycles by type test and analysis | None | Not Applicable | Type test and analysis per Limitorque Report B0058, CE Program 14273-PE-5731 | Qualified for 8 years with preventative maintenance note a |

## Table 4.1-2

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 3 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor Operated Valve Actuator<br>Auxiliary Building | Limitorque | System: SIS<br>Model/Tag No: SMB-0-25(DC) SI-321,SI-331 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 340F (max)<br>Pressure 105 psig (max)<br>Radiation $1 \times 10^7$ rads $\gamma$<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Remain operable for 30 days following DBE after 40 years of normal operation | Remain operable for 33 days following DBE after simulated 40 years of normal operation including 2000 cycles by type test and analysis | None | Not Applicable | Type test and analysis per Limitorque Report B0058, CE Program 14273-PE-5731 | Qualified for 8 years with preventative maintenance note a |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 4 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor Operated Valve Actuator<br>Auxiliary Building | Limitorque | System: SIS<br>Model/Tag No:<br>SMC-04-5 SI-664,SI-665 SI-668,SI-669<br>SMC-04-7-1/2 SI-616,SI-617 SI-626,SI-627 SI-636,SI-637 SI-646,SI-647 SI-666,SI-667 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads γ<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 250F<br>Pressure 25 psig<br>Radiation $4.2 \times 10^7$ rads γ<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Remain operable for 30 days following DBE after 40 years of normal operation | Remain operable for 33 days following DBE after simulated 40 years of normal operation including 2010 cycles by type test and analysis | None | Not Applicable | Type test and analysis per Limitorque Report B0058, CE Program 14273-PE-5731 | Qualified on interim basis for 1 year with preventative maintenance. Complete type test is scheduled. Note a |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 5 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor Operated Valve Actuator<br>Containment Building | Limitorque | System: SIS<br>Model/Tag No:<br>SMB-00-10 SI-673,SI-675<br>SMB-1-40 SI-653,SI-654<br>SMB-1-60 SI-614,SI-624 SI-634,SI-644<br>SMB-3-100 SI-651,SI-652 | Temperature 370F peak<br>Pressure 60 psig peak<br>Radiation $3.3 \times 10^7$ rads $\gamma$, $1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine, pH 7.0-8.5<br>Submergence None | Testing in Progress | Remain operable for 30 days following DBE after 40 years of normal operation | Testing in progress | None | Not Applicable | Type test and analysis per Limitorque Report B0058 and future amendments | Testing in progress. To be completed June 1983. |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 6 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Valve Limit Switch for Position Indication of Pneumatic Operated Valve (2 per valve)<br>Containment Building | Namco Controls | Model: EA180-11302<br>System: SIS<br>Valve Tag Nos: SI-322,SI-332 SI-611,SI-618 SI-621,SI-628 SI-631,SI-638 SI-641,SI-648 SI-682<br>System: CVCS<br>Valve Tag Nos: CH-506,CH-515 CH-516,CH-560 CH-240 | Temperature 370F peak<br>Pressure 60 psig peak<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine, pH 7.0-8.5<br>Submergence if below plant elevation 90'6" | Temperature 415F peak<br>Pressure 70 psig peak<br>Radiation $8.8 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 110 ppm $NH_3$, pH 7.0-9.0<br>Submergence None | Provide position indication for 36 hours following DBE (CH-240 30 day position indication) after 40 years of normal operation | Position indication maintained for 33 days following DBE after simulated 40 years of normal operation including 50,025 cycles by type test and analysis | None | Not Applicable | Type test and analysis per CE Program 14273-PE-5732 | Qualified for 11 years with preventative maintenance note b |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 7 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Valve Limit Switch for Position Indication of Pneumatic Operated Valve (2 per valve)<br>Auxiliary Building | Namco Controls | Model: EA180-11302<br>System: CVCS<br>Valve Tag Nos: CH-505,CH-523 CH-561,CH-580 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 415F peak<br>Pressure 70 psig peak<br>Radiation $8.8 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 110 ppm $NH_3$, pH 7.0-9.0<br>Submergence None | Provide position indication for 36 hours following DBE after 40 years of normal operation | Position indication maintained for 33 days following DBE after simulated 40 years of normal operation including 50,025 cycles by type test and analysis | None | Not Applicable | Type test and analysis per CE Program 14273-PE-5732 | Qualified for 26 years with preventative maintenance note b |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 8 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Electric Solenoid Valve<br>Containment Building | Valcor Engineering | Valcor Model V526-5683-6<br>CE Tag Nos:<br>SS-203,SS-204<br>SS-205<br>Sampling System | Temperature 370F<br>Pressure 65 psig<br>Radiation $3.3 \times 10^7$ rads γ $1 \times 10^8$ rads β<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron 50 ppm hydrazine pH Adjusted to 7.0-8.5 using $Na_3PO_4$<br>Submergence If below plant elevation 90'6" | Temperature 385F peak<br>Pressure 66 psig<br>Radiation $3.5 \times 10^7$ rads γ $1.1 \times 10^3$ rads β<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine pH 7.0-8.5<br>Submergence None | 36 hours Post DBE and maintenance of pressure boundary | Valve cycling and position indication maintained for 33 days following DBE after simulated 40 years of normal operation including 50,000 cycles | None | Not Applicable | Type test per 14273-PE-5733 | Qualified to 10 years with maintenance note c |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 9 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Electric Solenoid Valve<br>Containment Building | Valcor Engineering | Valcor Model V526-5683-5<br>C-E Tag Nos:<br>SC-204,SC-211<br>SC-220,SC-222<br>SC-224,SC-226<br>Secondary Chemistry System | Temperature 370F peak<br>Pressure 60 psig<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron 50 ppm hydrazine pH Adjusted to 7.0-8.5 using $Na_3PO_4$<br>Submergence If below plant elevation 90'6" | Temperature 385F peak<br>Pressure 66 psig<br>Radiation $3.5 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine pH 7.0-8.5<br>Submergence None | 36 hours post DBE and maintenance of pressure boundary | Valve cycling and position indication maintained for 33 days following DBE after simulated 40 years of normal operation including 50,000 cycles | None | Not Applicable | Type test per 14273-PE-5733 | Qualified to 10 years with maintenance note c |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 10 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Process System Valve<br>Containment Building | Target Rock Corp. | System: SIS<br>Model/Tag Nos: 77L-001 SI-605,SI-606 SI-607,SI-608 SI-613,SI-623 SI-633,SI-643<br>System: CVCS<br>Model/Tag Nos: 77L-003 CH-203,CH-205 | Temperature 370F peak<br>Pressure 60 psig peak<br>Radiation $3.3 \times 10^7$ rads γ $1 \times 10^8$ rads β<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine pH 7.0-8.5<br>Submergence None | Testing in progress | Remain operable for 30 days following DBE (CH-203 and CH-205 36 hours) after 40 years of normal operation | Testing in progress | None | Not Applicable | Type test per CE Program 14273-PE-5733 | Testing in progress. To be completed March 1983 Note d |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 11 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Process System Valve<br>Auxiliary Building | Target Rock Corp. | System: SIS<br>Model/Tag Nos: 77L-002 SI-659,SI-660 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Testing in progress | Remain operable for 30 days following DBE after 40 years of normal operation | Testing in progress | None | Not Applicable | Type test per CE Program 14273-PE-5733 | Testing in progress. To be completed March 1983. Note d |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 12 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Air Solenoid Valve for Pilot Control of Pneumatic Operated Valve<br>Containment Building | Automatic Switch Co. | Model: NP8320A187E<br>System: SIS<br>Valve Tag Nos: SI-322,SI-332 SI-611,SI-618 SI-621,SI-628 SI-631,SI-638 SI-641,SI-648 SI-682 | Temperature 370F peak<br>Pressure 60 psig peak<br>Radiation $3.3 \times 10^7$ rads γ $1 \times 10^8$ rads β<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine pH 7.0-8.5<br>Submergence If below plant elevation 90'6" | Temperature 450F peak<br>Pressure 78 psig peak<br>Radiation $1.82 \times 10^8$ rads γ $1.1 \times 10^8$ rads β<br>Humidity Steam/Air Mixture<br>Chemical Spray 6626 ppm boron as $H_3BO_3$, 196 ppm hydrazine, pH 7.0-8.5<br>Submergence None | Operate for 36 hours following DBE after 40 years of normal operation | Close and remain closed or operate for 33 days (792 hours) following DBE after simulated 40 years of normal operation including 47,460 cycles by type test and analysis | None | Not Applicable | Type test and analysis per ASCO Reports AQS-21678/TR, Rev A; AGR-67368, Rev 0; CE Program 14273-PE-5734, Rev 0; CE letter V-PAK-250 | Qualified for 40 years with preventative maintenance note c |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 13 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Air Solenoid Valve for Pilot Control of Pneumatic Operated Valve<br>Containment Building | Automatic Switch Co. | Model: NP8320A1B7E<br>System: CVCS<br>Valve Tag Nos: CH-506,CH-515 CH-516,CH-560 CH-240 | Temperature 370F peak<br>Pressure 60 psig peak<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine, pH 7.0-8.5<br>Submergence If below plant elevation 90'6" | Temperature 450F peak<br>Pressure 78 psig peak<br>Radiation $1.82 \times 10^8$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 6626 ppm boron as $H_3BO_3$, 196 ppm hydrazine pH 7.0-8.5<br>Submergence None | Close and remain closed for 36 hours or be operable for 30 days (CH-240 only) following DBE after 40 years of normal operation | Close and remain closed or operate for 33 days (792 hours) following DBE after simulated 40 years of normal operation including 47,460 cycles by type test and analysis | None | Not Applicable | Type test and analysis per ASCO Reports AQS-21678/TR, Rev A; AGR-67368, Rev 0; CE Program 14273-PE-5734, Rev 0; CE letter V-PAK-250 | Qualified for 40 years with preventative maintenance note c |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 14 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Air Solenoid Valve for Pilot Control of Pneumatic Operated Valve<br>Auxiliary Building | Automatic Switch Co. | Model: NP8320A187E<br>System: CVCS<br>Valve Tag Nos: CH-505,CH-523 CH-561 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 450F peak<br>Pressure 78 psig peak<br>Radiation $1.82 \times 10^8$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 6626 ppm boron as $H_3BO_3$, 196 ppm hydrazine, pH 7.0-8.5<br>Submergence None | Close and remain closed for 36 hours following DBE after 40 years of normal operation | Close and remain closed or operate for 33 days (792 hours) following DBE after simulated 40 years of normal operation including 47,460 cycles by test and analysis | None | Not Applicable | Type test and analysis per ASCO Reports AQS-21678/TR, Rev A; AGR-67368, Rev 0; CE Program 14273-PE-5734, Rev 0; CE letter V-PAK-250 | Qualified for 40 years with preventative maintenance note c |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 15 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Air Solenoid Valve for Pilot Control of Pneumatic Operated Valve<br>Auxiliary Building | Automatic Switch Co. | Model: NP8321A1E<br>System: CVCS<br>Valve Tag No: CH-580 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 450F peak<br>Pressure 78 psig peak<br>Radiation $1.82 \times 10^8$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 6626 ppm boron as $H_3BO_3$, 196 ppm hydrazine, pH 7.0-8.5<br>Submergence None | Close and remain closed for 36 hours following DBE after 40 years of normal operation | Close and remain closed or operate for 33 days (792 hours) following DBE after simulated 40 years of normal operation and including 40,000 cycles by type test and analysis | None | Not Applicable | Type test and analysis per ASCO Reports AQS-21678/TR, Rev A; AGR-67368, Rev 0; CE Program 14273-PE-5734, Rev 0; CE letter V-PAK-250 | Qualified for 40 years with preventative maintenance note c |

## Table 4.1-2

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 16 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor for High Pressure Safety Injection Pump<br>Auxiliary Building | Westinghouse Large AC Motor Division | Model: 5810H WP2<br>System: SIS<br>Motor S/N: 76F60561-1, 76F60563-1, 76F60564-1, 77F14115-1, 77F14116-1, 77F14117-1<br>Bechtel Tag No: 1MS1AP02, 1MS1BP02, 2MS1AP02, 2MS1BP02, 3MS1AP02, 3MS1BP02 | Temperature 104F<br>Pressure Atmospheric<br>Radiation 1 x $10^6$ rads<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 161F<br>Pressure Atmospheric<br>Radiation 2 x $10^8$ rads<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Continuous operation for up to 30 days following DBE after 40 years of normal operation | 160,778 hours by test and analysis | None | Not Applicable | Westinghouse Report WCAP-8754, Rev 1 with Bibliography by test and analysis<br>Seismic by analysis Westinghouse Report 76F-60562<br>Environmental Qualification Program 14273-PE-5400 Rev 02 | Qualified for 40 years with preventative maintenance |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 17 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor for Low Pressure Safety Injection Pump<br>Auxiliary Building | Westinghouse Large AC Motor Division | Model: 5010P39 WP2<br>System: SIS<br>Motor S/N: 76F60574-1, 76F60574-2, 76F60576-1, 76F60576-2, 76F60578-1, 76F60578-2<br>Bechtel Tag No: 1MS1AP01, 1MS1BP01, 2MS1AP01, 2MS1BP01, 3MS1AP01, 3MS1BP01 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 123F<br>Pressure Atmospheric<br>Radiation $2 \times 10^8$ rads<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Continuous operation for up to 30 days following DBE after 40 years of normal operation | 135,487 hours by test and analysis | None | Not Applicable | Westinghouse Report WCAP-8754, Rev 1 with Bibliography by test and analysis<br>Seismic per Westing house Report 76F-60575<br>Environmental Qualification Program 14273-PE-5401 Rev 02 | Qualified for 40 years with preventative maintenance |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 18 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor for Containment Spray Pump<br>Auxiliary Building | Westinghouse Large AC Motor Division | Model: 5808P39 WP2<br>System: CSS<br>Motor S/N: 76F60580-1, 76F60580-2, 76F60582-1, 76F60582-2, 76F60583-1, 76F60583-2<br>Bechtel Tag No: 1MS1AP03, 1MS1BP03, 2MS1AP03, 2MS1BP03, 3MS1AP03, 3MS1BP03 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 159F<br>Pressure Atmospheric<br>Radiation $2 \times 10^8$ rads<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Continuous operation for up to 30 days following DBE after 40 years of normal operation | 147,559 hours by test and analysis | None | Not Applicable | Westinghouse Report WCAP-8754, Rev 1 with bibliography by test and analysis<br>Seismic per Westinghouse Report 76F-60581<br>Environmental Qualification Program 14273-PE-5402 Rev 02 | Qualified for 40 years with preventative maintenance |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 19 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor for Charging Pump<br>Auxiliary Building | Westinghouse Medium Motor and Gearing Division | Model: 404TS DP<br>System: CVCS<br>Motor S/N: SO 76C62115 7703-01-001 7703-01-002 7703-01-003 7707-02-001 7707-02-002 7707-02-003 7708-03-001 7708-03-002 7708-03-003<br>Bechtel Tag No: 1MCHAP01 1MCHBP01 1MCHEP01 2MCHAP01 2MCHBP01 2MCHEP01 3MCHAP01 3MCHBP01 3MCHEP01 | Temperature 104F<br>Pressure Atmospheric<br>Radiation 1 x $10^6$ rads<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 181F<br>Pressure Atmospheric<br>Radiation 2 x $10^8$ rads<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Continuous operation for up to 30 days following DBE after 40 years of normal operation | 350,400 hours by test and analysis | None | Not Applicable | Westinghouse Report MM-9112 and appendices C and E of Westinghouse Report WCAP-9112 by test and analysis<br>Seismic per Westinghouse Report BS25411-MG<br>Environmental Qualification Program 14273-PE-5403 Rev 03 | Qualified for 40 years with preventative maintenance |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 20 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor for Spray Chemical Addition Pump<br>Auxiliary Building | Reliance Electric Co. | Model: 18FTC TEFC-XT<br>System: IRS<br>Motor S/N: YM209071A1 YM209071A3 YM209071A4 YM209071A5 YM209071A8 YM209071A12<br>Bechtel Tag No: 1MS1AP05 1MS1BP05 2MS1AP05 2MS1BP05 3MS1AP05 3MS1BP05 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 471F<br>Pressure Atmospheric<br>Radiation $2 \times 10^8$ rads<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Continuous operation for up to 30 days following DBE after 40 years of normal operation | 350,000 hours by test and analysis | None | Not Applicable | Reliance Report NUC-9 with Supplement by test and analysis<br>Seismic per Action Report 13831<br>Environmental Qualification Program 14273-PE-5404 Rev 3 | Qualified for 40 years with preventative maintenance |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 21 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter | ITT Barton | Model: 764 | Temperature 370F | (Later) | Accident mitigation not applicable | (Later) | Accident accuracy not applicable | (Later) | (Later) | Qualified life: (Later) |
| C-E Summary Sheet No. 1 | | System: PAMS | Pressure 60 psig | | | | | | E.Q. Program Document 14273-1CE-3535 | Status: Qual. Report note e |
| Containment Building | | CE Tag No: LT-110X,Y | Relative Humidity Sat. Steam/Air Mixture | | Post accident monitoring 30 days | | Post accident accuracy (later) | | | |
| | | | Radiation $3.3 \times 10^7$ rads $\gamma$ $1.0 \times 10^8$ rads $\beta$ | | | | | | | |
| | | | Chemical Spray 4400 ppm boron $H_3BO_3$ 50 ppm hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate | | | | | | | |
| | | | Submergence None | | | | | | | |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 22 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Diff. Pressure Transmitter<br>C-E Summary Sheet No. 2<br>Containment Building | ITT Barton | Model: 764<br>System: PPS<br>CE Tag No: PDT-115A-D PDT-125A-D | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat. Steam/Air Mixture<br>Radiation $3.3 \times 10^7$ rads γ $1.0 \times 10^8$ rads β<br>Chemical Spray 4400 ppm boron $H_3BO_3$ 50 ppm hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate<br>Submergence None | (Later) | Accident mitigation 30 min.<br>Post accident monitoring not applicable | (Later) | Accident accuracy ±12.9%<br>Post accident accuracy not applicable | (Later) | (Later)<br>E.Q. Program Document 14273-1CE-3535 | Qualified life: (Later)<br>Status: Qual. Report note e |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 23 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter<br>C-E Summary Sheet No. 3<br>Containment Building | ITT Barton | Model: 763<br>System(s): PPS LTOP PAMS<br>CE Tag No: PT-101A-D PT-102A-D PT-103 PT-104 | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat. Steam/Air Mixture<br>Radiation $3.3 \times 10^7$ rads γ $1.0 \times 10^8$ rads β<br>Chemical Spray 4400 ppm boron $H_3BO_3$ 50 ppm hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate<br>Submergence None | (Later) | Accident mitigation PT-101A-D 30 min. PT-102A-D 60 min.<br>Post accident monitoring PT-102A-D 30 days PT-103, 104 36 hrs. | (Later) | Accident accuracy PT-101A-D PT-102A-D ±12.8%<br>Post accident accuracy PT-102A-D (later) PT-103, 104 (later) | (Later) | (Later)<br>E.Q. Program Document 14273-1CE-3535 | Qualified life: (Later)<br>Status: Qual. Report note e |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 24 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter<br>C-E Summary Sheet No. 4<br>Containment | Rosemount | Model: 1153AD8<br>System: SDCS<br>CE Tag No: PT-105, 106 | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat-Stm/ Air Mixture<br>Radiation $3.3 \times 10^7$ rads γ $1.0 \times 10^8$ rads β<br>Chemical Spray 4400 ppm Boron $H_3BO_3$ 50 ppm hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate<br>Submergence None | (Later) | Accident Mitigation<br>Not Applicable<br>Post Accident Monitoring<br>36 hrs | (Later) | Accident Accuracy<br>Not Applicable<br>Post Accident Accuracy<br>(Later) | | (Later)<br>E.Q. Program Document 14273-ICE-3535 | Qualified Life:<br>(Later)<br>Status: Testing Complete Qual. Report Due 2/83 |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 25 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter<br>C-E Summary Sheet No. 5<br>Containment | ITT Barton | Model: 763<br>Systems: PAMS<br>CE Tag No: PT-311, 321 PT-331, 341 | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat-Stm/ Air mixture<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1.0 \times 10^8$ rads $\beta$<br>Chemical Spray 4400 PPM Boron $H_3BO_3$ 50 PPM hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate<br>Submergence None | (Later) | Accident Mitigation<br>Not Applicable<br>Post Accident Monitoring<br>30 days | (Later) | Accident Accuracy<br>Not Applicable<br>Post Accident Accuracy<br>(Later) | (Later) | (Later)<br>E.Q. Program Document 14273-ICE-3535 | Qualified Life:<br>(Later)<br>Status: Qual. Report Note e |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 26 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter<br>C-E Summary Sheet No. 6<br>Containment | ITT Barton | Model: 763<br>Systems: PAMS<br>CE Tag No: LT-311, 321 LT-331, 341 | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat-Stm/ Air mixture<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1.0 \times 10^8$ rads $\beta$<br>Chemical Spray 4400 PPM Boron $H_3BO_3$ 50 PPM hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate<br>Submergence None | (Later) | Accident Mitigation<br>Not Applicable<br>Post Accident Monitoring<br>30 days | (Later) | Accident Accuracy<br>Not Applicable<br>Post Accident Accuracy<br>(Later) | (Later) | (Later)<br>E.Q. Program Document 14273-ICE-3535 | Qualified Life:<br>(Later)<br>Status: Qual. Report Note e |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 27 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter<br>C-E Summary Sheet No.7<br>Containment | ITT Barton | Model: 763<br>Systems: PPS PAMS<br>CE Tag No: LT-1113 A-D LT-1123 A-D LT-1114 A-D LT-1124 A-D | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat-Stm/ Air mixture<br>Radiation $3.3\text{-}10^7$ rads γ $1.0\text{-}10^8$ rads β<br>Chemical Spray 4400 PPM Boron $H_3BO_3$ 50 PPM Hydrazine pH adjusted to 7.0-8.5 after 4 hrs using Trisodium Phosphate<br>Submergence None | (Later) | Accident Mitigation LT-1113 A-D LT-1123 A-D LT-1114 A-D LT-1124 A-D 30 min<br>Post Accident Monitoring LT-1113 AB LT-1123 AB 30 days | (Later) | Accident Accuracy LT-1113 A-D LT-1123 A-D LT-1114 A-D LT-1124 A-D ±12.8%<br>Post Accident Accuracy LT-1113 AB LT-1123 AB (Later) | (Later) | (Later)<br>E.Q. Program Document 14273-ICE-3535 | Qualified Life: (Later)<br>Status: Note e |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 28 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter<br>C-E Summary Sheet No. 8<br>Containment | ITT Barton | Model: 763<br>Systems: PAMS, PPS<br>CE Tag No: PT-1013 A-D<br>PT-1023 A-D | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat-Stm/ Air mixture<br>Radiation $3.3\text{-}10^7$ rads γ<br>$1.0\text{-}10^8$ rads β<br>Chemical Spray 4400 PPM Boron $H_3BO_3$ 50 PPM Hydrazine pH adjusted to 7.0-8.5 after 4 hrs using Trisodium Phosphate<br>Submergence None | (Later) | Accident Mitigation PT-1013 A-D PT-1023 A-D<br>30 min<br>Post Accident Monitoring PT-1013 A-B PT-1023 A-B<br>30 days | (Later) | Accident Accuracy PT-1013 A-D PT-1023 A-D<br>±12.8%<br>Post Accident Accuracy PT-1013 A-B PT-1023 A-B<br>(Later) | (Later) | (Later)<br>E.Q. Program Document 14273-ICE-3535 | Qualified Life:<br>(Later)<br>Status: Qual. Report Note e |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 29 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Excore Safety Channel Detector Assembly<br>Containment Building<br>C-E Summary Sheet No. 9 | Westinghouse | Model: WL-24036<br>System: RPS<br>CE Tag No: RW-001-A RW-001-B RW-001-C RW-001-D | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Steam/Air Mixture | 0-2 min<br>Temperature 385F<br>Pressure 65 psig<br>Relative Humidity Saturated Steam | | 0-10 min by test 2 min to 1 hr and 2 min by analysis | Not Applicable<br>Note h | Note h | Qualified by test Westinghouse Test Report No. NC-TR-21-15<br>Program document No. 14273-ICE-3512 | Qualified Life:<br>10 years<br>Status: Qualified to NUREG 0588 |
| | | | | 2-10 min<br>Temperature 400F<br>Pressure 74 psig<br>Relative Humidity Saturated Steam | | | | | | |
| | | | Radiation $2.5 \times 10^6$ rads<br>note f | Radiation Detector Not Applicable note g Transition Joint $4.8 \times 10^6$ rads | | | | | | |
| | | | Chemical Spray None | Chemical Spray Not Applicable | | | | | | |
| | | | Submergence None | Submergence Not Applicable | | | | | | |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 30 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Excore Safety Channel Preamplifier/ Filter Assembly<br>Containment Building<br>C-E Summary Sheet No. 10 | Westinghouse | Model: WL-24037<br>System: RPS<br>CE Tag No: RT-001-A RT-001-B RT-001-C RT-001-D | Preamplifier<br>Temperature 120F<br>Pressure 0 psig<br>Relative Humidity 90%<br>Filter<br>Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Steam/Air Mixture<br>Radiation $3 \times 10^4$ rads<br>Chemical Spray None<br>Submergence None | Preamplifier 0-2 min<br>Temperature 390F<br>Pressure 76 psig<br>Relative Humidity Saturated Steam<br>Filter 0-2 min<br>Temperature 376F<br>Pressure 62 psig<br>Relative Humidity Saturated Steam<br>Radiation $6 \times 10^4$ rads (γ) $7 \times 10^3$ rads (neutron)<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Preamplifier Not Applicable note i<br>Filter 2 min | 0-10 min by test 2 min to 1 hr and 2 min by analysis | Preamplifier Not Applicable<br>Filter Insulation Resistance remain greater than $1 \times 10^8$ ohms | Preamplifier None<br>Filter Insulation Resistance exceeded $2.0 \times 10^{10}$ ohms | Qualified by test Westing house Test Report No. NC-TR-81-15<br>Program Document: 14273-ICE 3511 | Qualified Life: 10 Years<br>Status: Qualified to NUREG 0588 |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 31 of 35)

| Type of Equipment/ Location | Manufac-turer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demon-strated | Accuracy or Response Time Require-ments | Accuracy or Response Time Demon-strated | Qualifi-cation Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Trans-mitter Rack<br>Contain-ment Build-ing<br>Summary Sheet No. 11 | C-E | None | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Steam/Air Mixture<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1 \times 10^8$ rads $\beta$<br>Chemical Spray 4400 PPM Boron, 50 PPM Hydrazine pH ad-justed to 7.0-8.5 after 4 hrs using Trisodium Phosphate<br>Submergence None | (Later) | Accident Mitigation (Later)<br>Post Accident Monitoring (Later) | (Later) | Accident Miti-gation (Later)<br>Post Acci-dent Moni-toring (Later) | (Later) | Test Report No. (Later)<br>Program Docu-ment No. 14273-ICE-3504 | Qualified Life: (Later)<br>Status: Note j |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 32 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter and Flow Transmitter<br>Auxiliary Building<br>C-E Summary Sheet No. 12 | Rosemount | Model: 1153 B<br>System: CVCS<br>CE Tag No: PT-212 FT-212 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1-10^6$ rads<br>Chemical Spray None<br>Submergence None | Temperature 303F<br>Pressure 55 psig<br>Relative Humidity Sat-Stm/ Air Mixture<br>Radiation $2.44-10^7$ rads<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Accident Mitigation<br>None<br>Post Accident Monitoring<br>30 days | 37 days thermal aging + 80 hrs Accident Environment | Accident Accuracy<br>None<br>Post Accident Accuracy<br>(Later) | Post Accident <1% | Rosemount Reports 108025 Rev. A 108026<br>E.Q. Program Document 14273-ICE-3538 | Qualified Life:<br>10 Years<br>Status: Qualified to NUREG 0588 |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 33 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Flow Transmitter and Level Transmitter<br>Auxiliary Building<br>C-E Summary Sheet No. 13 | Rosemount | Model: 1153 B<br>System: PAMS<br>CE Tag No: FT-306, 307 FT-308, 309 FT-311, 321 FT-331, 341 FT-338, 348 FT-390, 391 LT-344, 345 LT-348, 349 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1-10^6$ rads<br>Chemical Spray None<br>Submergence None | Temperature 303F<br>Pressure 55 psig<br>Relative Humidity Sat-Stm/ Air Mixture<br>Radiation $2.44-10^7$ rads<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Accident Mitigation Not Applicable<br>Post Accident Monitoring 30 days | 37 days thermal aging + 80 hrs Accident Environment | Accident Accuracy None<br>Post Accident Accuracy 2.5% | Post Accident <1% | Rosemount Reports 108025 Rev. A 108026<br>E.Q. Program Document 14273-ICE-3538 | Qualified Life: 10 Years<br>Status: Qualified to NUREG 0588 |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 34 of 35)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| RTD (Temp. Detectors)<br>Auxiliary Building<br>C-E Summary Sheet No. 14 | RDF Corp. | Model: 21245<br>System: PAMS SDCS<br>CE Tag No: TE-303X, Y TE-351X, Y TE-352X, Y | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1.10^6$ rads<br>*Chemical Spray None<br>Submergence None | (Later) | Accident Mitigation<br>None<br>Post Accident Monitoring<br>30 days | (Later) | Accident Accuracy<br>None<br>Post Accident Accuracy<br>(Later) | (Later) | (Later)<br>E.Q. Program Document 14273-ICE-3538 | Qualified Life:<br>(Later)<br>note k |

# Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 35 of 35)

NOTES

Note a) May require replacement of electrical auxiliaries pending verification of parts supplied.

Note b) Replacing NAMCO Model EA-170 with NAMCO Model EA-180. See Appendix (X) for listing of Tag Nos. of affected limit switches.

Note c) Refer to Appendix (X) for equipment retrofits required as a result of lessons learned during the Qualification Process.

Note d) Valves may require refurbishment/modification as determined on basis of Qualification Testing.

Note e) Barton Test Report under review. Awaiting resolution of potential 10 CFR Part 21 issued by Barton on these devices.

Note f) The operability time is 2 minutes. The radiation levels "seen" during steam line or feed line break events in this time frame do not significantly increase above the normal total integrated dose (TID) for the 10 year Qualified Life of this equipment. This 10 year TID is $2.5 \times 10^6$ Rad.

Note g) Based on previous operating experience, the fission Camber assembly does not require thermal aging nor irradiation for qualification. Inorganic materials have been shown to not be significantly affected by irradiation flux (see Westinghouse Test Report No. NC-TR-81-15).

Note h) A neutron detector is an uncalibrated instrument. Sensitivity is based on things such as: distance from Core, neutron attenuation due to intervening materials, etc.

The accuracy of the ex-core flux measurement system is established by in-plant calibration by comparison to primary heat balance calculations. The response time of the Ex-core Neutron Detector is basically the detector collection time which is in the order of $2.0 \times 10^{-7}$ seconds.

Note i) The Ex-core Safety Channel Preamplifier is required to provide only low power trips, and has no required function during LOCA or MSLB.

Note j) Qualification program for termination of instruments on transmitter racks is in progress.

Note k) Qualification of these devices to be demonstrated based upon type testing of incontainment service RTD's (similar models). Test report presently being prepared.

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 1 of 8)
CONTAINMENT BUILDING - ENVIRONMENTAL DESIGNATOR I (1 of 2)

| Condition / Parameter | Normal/Abnormal (N) | Design Basis Accident (A) (Includes 40 Year Integrated) | | |
|---|---|---|---|---|
| | | LOCA | MSLB | TIME DURATION |
| Temperature (F) | 50 - 120 | 350<br>350<br>302<br>302-270<br>270-200 | 370<br>350<br>302<br>302-270<br>270-200 | 4 Min<br>8 Min<br>8 Hr<br>42 Hr<br>2 Wk |
| Pressure (psig) | ATM. (a) | 60<br>55<br>25<br>10 | | 12 Min<br>8 Hr<br>42 Hr<br>2 Wk |
| Relative Humidity (%) | 20 - 90% | Steam/Air Mixture | | |
| Radiation (Rads) (40 Year Integrated Dose) | $1 \times 10^7$ | $3.3 \times 10^7$ Gamma<br>$2 \times 10^8$ Beta (non-sprayed enclosures)<br>$1 \times 10^8$ Beta (all other areas) | | |
| Chemicals | None | • 4400 ppm Boron<br>• 50 ppm Hydrazine<br>• pH adjusted to 7.0-8.5 after 4 hours using Trisodium phosphate | | |

a. Structural Integrity Test Pressure = 69 psig.

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 2 of 8)
CONTAINMENT BUILDING - ENVIRONMENTAL DESIGNATOR I (2 of 2)

| Condition / Parameter | Normal/Abnormal | Design Basis Accident |
|---|---|---|
| | | LOCA/MSLB |
| Submergence | None | Below Plant El. 91' |
| Dust | 1.52 $\mu G/M^3$ | 650 $\mu G/M^3$ |
| Seismic | 2 OBE's<br><br>(Refer to Seismic Response Spectra) | 1 SSE<br><br>(Refer to Seismic Response Spectra) |
| Dynamic | Refer to Equipment Specifications for requirements | Refer to Equipment Specifications for requirements |
| Aging | Equipment must be qualified for 40 year life for environmental parameters | Equipment must be qualified for 40 year life plus DBA for environmental parameters |

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 3 of 8)
MAIN STEAM SUPPORT STRUCTURE - ENVIRONMENTAL DESIGNATOR II (1 of 2)

| Condition / Parameter | Normal/Abnormal (N) | Design Basis Accident (A) (Includes 40 Year Integrated) | |
|---|---|---|---|
| | | LOCA/MSLB | Time Duration |
| Temperature (F) | 28 - 120 | 300 (above El. 100') | 15 minutes |
| | | 28-120 (below El. 100') | not applicable(b) |
| Pressure (psig) | ATM | 21 (above El. 100') | 15 minutes |
| | | ATM (below El. 100') | not applicable(b) |
| Relative Humidity (%) | 20 - 90% | Steam/Air Mixture (above El. 100')<br>20-90% (below El. 100') | |
| Radiation (Rads) (40 Year Integrated Dose) | $<10^3$ | $10^6$ (above El. 100')<br>$10^5$ (below El. 100') | |
| Chemicals | None | None | |

b. The subcompartments below elevation 100' are unaffected by the MSSS design basis pipe break.

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 4 of 8)
MAIN STEAM SUPPORT STRUCTURE - ENVIRONMENTAL DESIGNATOR II (2 of 2)

| Condition / Parameter | Normal/Abnormal | Design Basis Accident |
|---|---|---|
| | | LOCA/MSLB |
| Submergence | None | None |
| Dust | 1.52 $\mu G/M^3$ (Below El. 100')<br>61.3 $\mu G/M^3$ (Above El. 100') | 650 $\mu G/M^3$ (Below El. 100')<br>131 $mG/M^3$ (Above El. 100') |
| Seismic | 2 OBE's<br><br>(Refer to Seismic Response Spectra) | 1 SSE<br><br>(Refer to Seismic Response Spectra) |
| Dynamic | Refer to Equipment Specifications for requirements | Refer to Equipment Specifications for requirements |
| Aging | Equipment must be qualified for 40 year life for environmental parameters | Equipment must be qualified for 40 year life plus DBA for environmental parameters |

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 5 of 8)
AUXILIARY BUILDING - ENVIRONMENTAL DESIGNATOR III (1 of 2)

| Condition / Parameter | Normal/Abnormal (N) | Design Basis Accident (A) (Includes 40 Year Integrated) | |
|---|---|---|---|
| | | LOCA/MSLB | Aux Steam Break |
| Temperature (F) | 50 - 104 | 50 - 104 | 50 - 318F[c] |
| Pressure (psig) | ATM | ATM | 1.5[d] |
| Relative Humidity (%) | 20 - 90% | 20 - 90% | 20 - 100% |
| Radiation (Rads) (40 Year Integrated Dose) | $3.5 \times 10^4$ (accessible areas)<br>$1.25 \times 10^7$ (Volume Control Tank)<br>$2.7 \times 10^9$ (Purification Ion Exch.) | $1 \times 10^6$ (accessible areas)<br>$1.25 \times 10^7$ (Volume Control Tank)<br>$2.7 \times 10^9$ (Purification Ion Exch.) | |
| Chemicals | None | None | |

c. Applicable to Class 1E electrical cable only (Class 1E cable satisfies qualification envelope for containment)

d. Pressure is a transient effect (i.e., several seconds duration)

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 6 of 8)
AUXILIARY BUILDING - ENVIRONMENTAL DESIGNATOR III (2 of 2)

| Condition / Parameter | Normal/Abnormal | Design Basis Accident |
|---|---|---|
| | | LOCA/MSLB |
| Submergence | None | None |
| Dust | 1.52 $\mu G/M^3$ | 650 $\mu G/M^3$ |
| Seismic | 2 OBE's<br><br>(Refer to Seismic Response Spectra) | 1 SSE<br><br>(Refer to Seismic Response Spectra) |
| Dynamic | Refer to Equipment Specifications for requirements | Refer to Equipment Specifications for requirements |
| Aging | Equipment must be qualified for 40 year life for environmental parameters | Equipment must be qualified for 40 year life plus DBA for environmental parameters |

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 7 of 8)
FUEL BUILDING - ENVIRONMENTAL DESIGNATOR VI (1 of 2)

| Condition / Parameter | Normal/Abnormal (N) | Design Basis Accident (A) (Includes 40 Year Integrated) |
|---|---|---|
| | | LOCA/MSLB |
| Temperature (F) | 50 - 104 | 50 - 104 |
| Pressure (psig) | ATM | ATM |
| Relative Humidity (%) | 20 - 90% | 20 - 90% |
| Radiation (Rads) (40 Year Integrated Dose) | $<10^3$ | $10^5$ |
| Chemicals | None | None |

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 8 of 8)
FUEL BUILDING - ENVIRONMENTAL DESIGNATOR VI (2 of 2)

| Condition / Parameter | Normal/Abnormal | Design Basis Accident |
|---|---|---|
| | | LOCA/MSLB |
| Submergence | None | None |
| Dust | 1.52 $\mu G/M^3$ | 650 $\mu G/M^3$ |
| Seismic | 2 OBE's<br><br>(Refer to Seismic Response Spectra) | 1 SSE<br><br>(Refer to Seismic Response Spectra) |
| Dynamic | Refer to Equipment Specifications for requirements | Refer to Equipment Specifications for requirements |
| Aging | Equipment must be qualified for 40 year life for environmental parameters | Equipment must be qualified for 40 year life plus DBA for environmental parameters |

REVIEW TECHNIQUE

4.1.6 PERMANENT FILES

The Qualification Report Permanent Files are presently organized into an auditable form to insure that all information may be readily retrieved. The first and subsequent individual plan and report submittals (except the final report) for each specification are arranged in folders in a manner which indicates sequence in which were received. Each folder will identify the specification, the Bechtel log number, the supplier report number and the transmittal letter number. The contents of the folders will be:

- A copy of the transmittal letter
- The qualification report
- FAP-1 review request form
- APS review check sheet (FAP-15) (if applicable)
- A copy of the letter transmitting comments to Bechtel (if applicable).

The following information will also be available, for audit:

- Environmental Requirements as identified in the FSAR
- Applicable Required Response Curves
- SQRT Master Lists
- Harsh Environmental Qualification Summary Report
- PVNGS Checklists

Once a qualification report is judged to be satisfactory, a final qualification package is developed and identified separately from the previous report submittals. In addition to the qualification folder contents as listed in the first paragraph

the following information will be placed in the final qualification package as applicable or available for audit.

- Title and Table of Contents Form (FAP-14) containing
  - Supplier Report Number, Revision and Date
  - Title
  - Appropriate review sign off
- Equipment Qualification Document Certifications
- PVNGS Environmental and Seismic Checklists
- Annotated APS Checklist (FAP-15)
- Qualification Maintenance Spare Parts Form
- Other miscellaneous applicable documentation

In addition the NSSS Environmental Qualification (EQ) Files are also organized in an auditable form as EQ Program Audit Folders. The EQ Program Audit Folders contain EQ Program Documents and Generic Files. The combination of the EQ Program Documents and Generic Files present an overall view of the equipment specific qualification effort.

The EQ Program Documents provide the test plans, test procedures, test reports, equipment specifications, environmental requirements, and analyses to support qualification. The Generic Files contain documents required to verify information presented on the Summary Sheets and in the EQ Program Documents.

For Instrumentation and Control Engineering supplied EQ Program Audit Folders, the Generic Files are provided as a supplementary section to the EQ Program Documents.

For Plant Engineering supplied EQ Program Audit Folders, the Generic Files are provided as separate Audit Folders with specific references made to the Generic Files in the appendices of the EQ Program Documents.

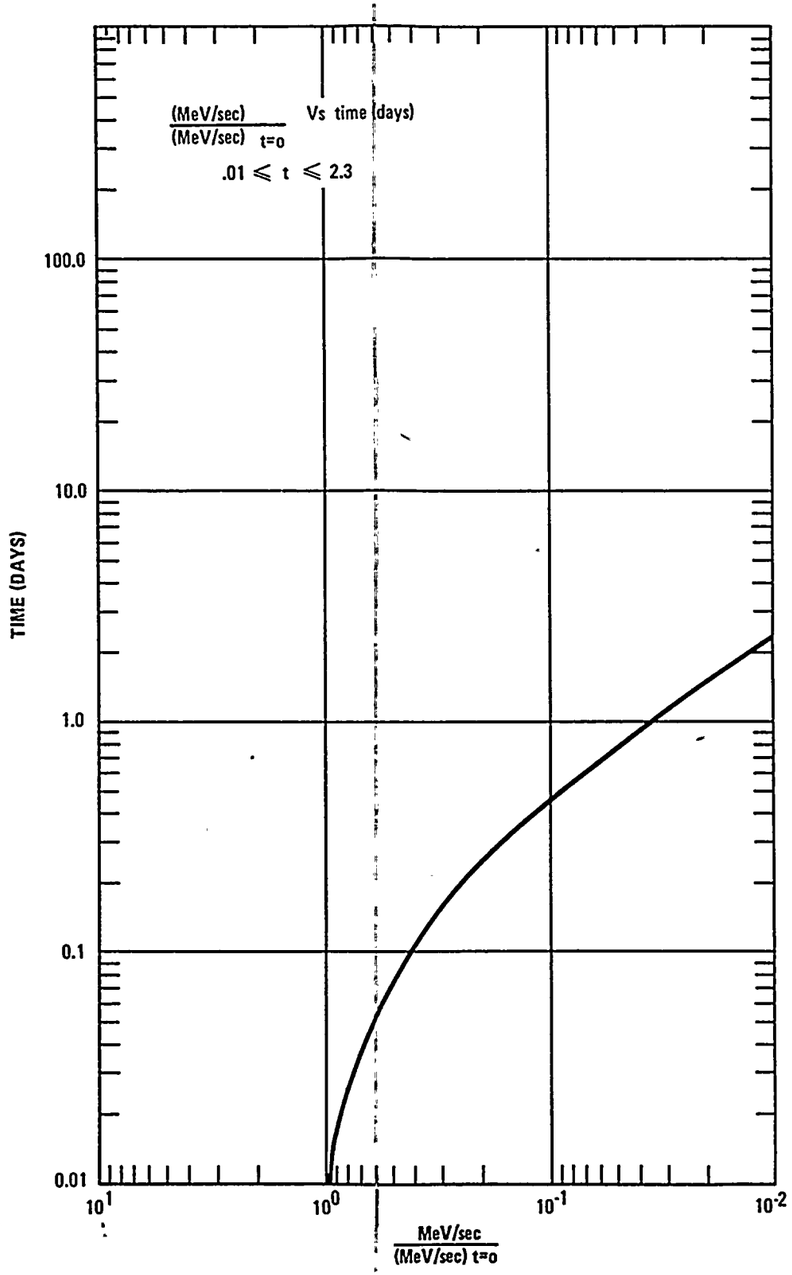
If duplicate original parts cannot be purchased, alternate components will be analyzed for form, fit, and function and supporting qualification documentation will be obtained to insure that they are qualified for their installed location and service conditions.

Maintenance procedures will require that all documentation relating to periodic and preventative maintenance, spare, and replacement part procurement including certification of compliance and component replacement will be placed within the Qualification Central Files.

# APPENDIX B

## PVNGS EQUIPMENT ENVIRONMENTAL AND SEISMIC QUALIFICATION CHECK LISTS (BOP)

Also Available On
Aperture Card




Palo Verde Nuclear Generating Station
Environmental Qualification

DECAY CURVE - SOURCE A
(Sheet 1 of 2)

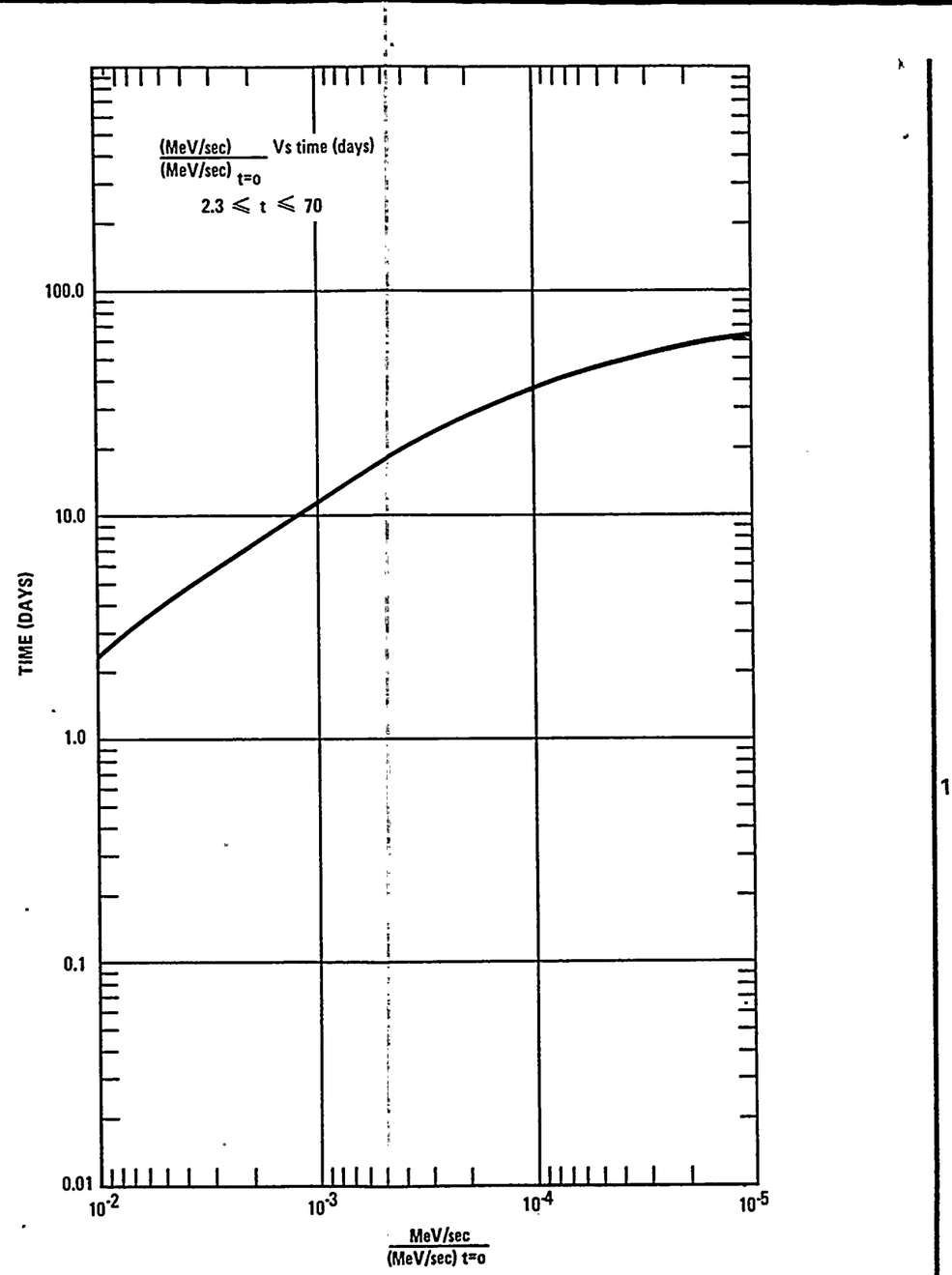
Figure 3.3-2

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Palo Verde Nuclear Generating Station
Environmental Qualification

DECAY CURVE - SOURCE A
(Sheet 2 of 2)

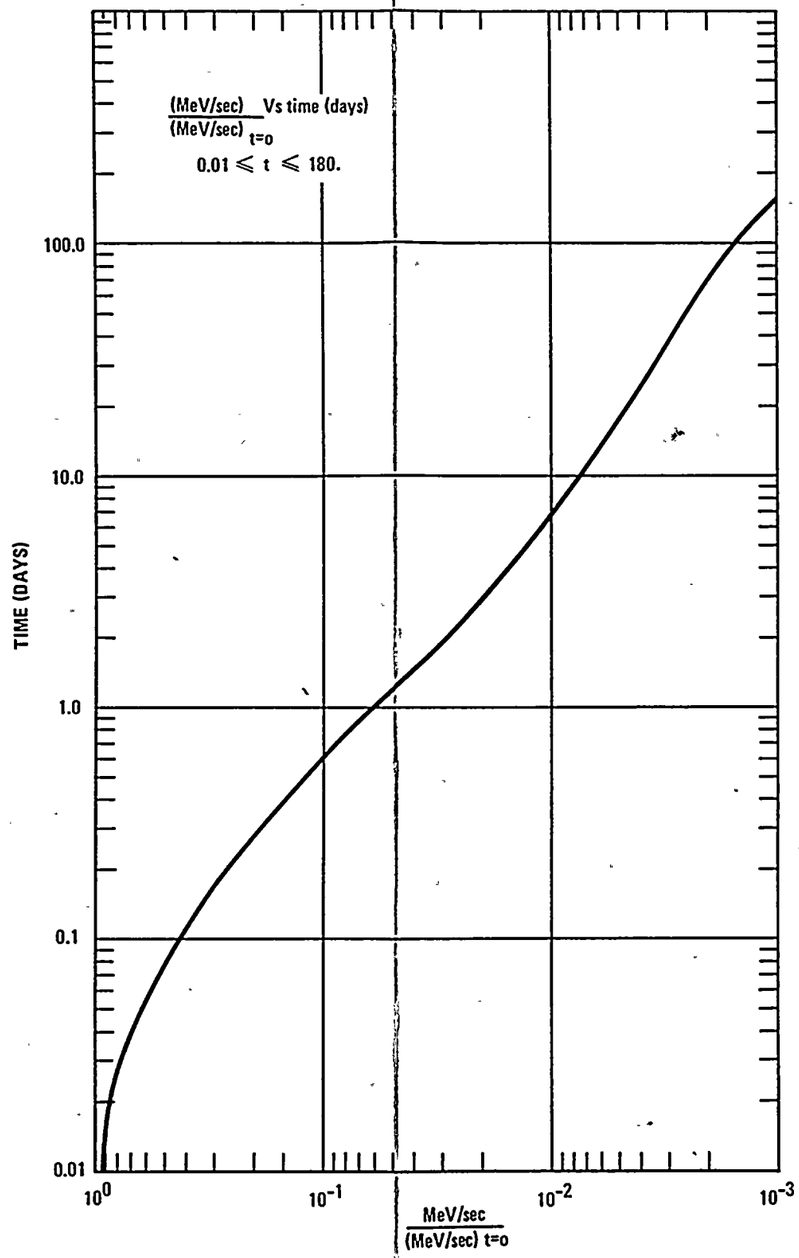
Figure 3.3-2

June 1983 Amendment 1

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'Also Available On
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Palo Verde Nuclear Generating Station
Environmental Qualification

DECAY CURVE - SOURCE B

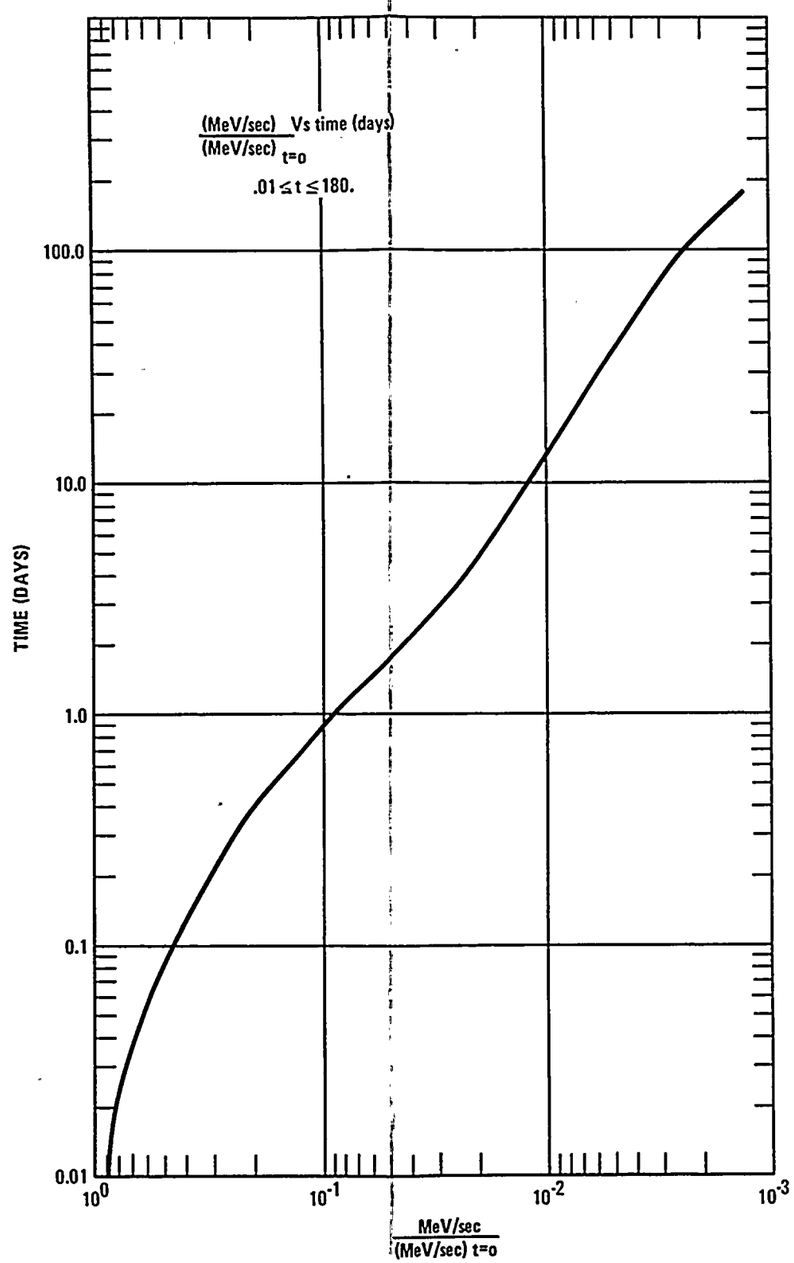
Figure 3.3-3

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1

Palo Verde Nuclear Generating Station
Environmental Qualification

DECAY CURVE - SOURCE C

Figure 3.3-4

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## 3.4 VOLTAGE AND FREQUENCY FLUCTUATIONS

### 3.4.1 VOLTAGE

Sustained voltage variations at rated frequency specified for Class IE equipment operation are as follows:

| | |
|---|---|
| 4.16 kV Power | 4160 volts ac +5%, -10% |
| Standby Generation: | 4160 volts ac ±5% |
| 480-V Power, Switchgear: | 480 volts ac +9%, -6% |
| 480-V Power, MCC: | 480 volts ac, +9%, -6% |
| 125-V Power: | 125 volts dc (range 105 to 140V dc) |
| Instrument ac Power: | 120 volt ac vital bus system ±2% |

Voltage qualification of motors is not required because electrical motors are designed in accordance with NEMA Standard MG-1, which allows sustained fluctuations of ±10% in supply voltage. Motors procured for this station can also function during voltage dips to 75% of normal for 15 seconds.

Control devices are specified to withstand voltage deviations in accordance with NEMA Standard ICS. All control components will operate satisfactorily within the applicable voltage ranges except for dc relays. During 125V dc battery equalizing, the voltage is 140V dc which exceeds the +10% (137.5V dc) upper limit allowed by ICS. Due to the small (2.5V dc) deviation and the fact that equalizing is done infrequently, operation or life of the control devices will not be significantly affected.

For equipment powered by the vital buses, voltage variations are not a common mode concern. Each of the four protective channels is electrically isolated (IEEE Standard 279-1971) from the others and is separately powered by a similarly isolated vital bus, with each bus having its own inverter, battery and battery charger. The qualification of these power sources establishes that they have no common mode failure

mechanisms and they are designed specifically to provide stable, regulated power. In addition, the equipment powered from the vital buses are designed for voltage variations of ±10%, whereas the vital buses are designed to regulate voltage to within ±2%. Therefore, voltage variations will not affect the ability of these systems to perform their required safety functions.

### 3.4.2 FREQUENCY

Sustained frequency variations at rated voltage specified for Class IE equipment operation are as follows:

| | |
|---|---|
| 4.16 kV Power: | 60 ±3 Hz |
| Standby Generation: | 60 ±2 Hz |
| 480V Power, Switchgear: | 60 ±3 Hz |
| 480V Power, MCC: | 60 ±3 Hz |
| Instrument ac Power: | 60 ±0.5 Hz |

Frequency fluctuations which take place on the auxiliary power system are considered minor and will not affect equipment qualification. Transmission system stability studies outlined in FSAR Section 8.2.2 indicate that a trip of the most critical fully-loaded generating unit would not result in underfrequency load shedding.

The diesel generator frequency is limited to 60 ± 2 Hz steady state and 57 Hz during transients.

The frequency deviations described above will have only extremely limited consequences on the performance of induction motors and control components which have been specified to operate at 60 Hz ±5% with rated voltage.

For equipment powered by the vital buses, frequency variations are not a common mode concern for the same reasons as previously described in the discussion of voltage variations. The equipment is designed for frequency variations of ±3 Hz, frequency qualification of motors is not required because electrical motors are designed in accordance with NEMA Standard MG-1, which allows sustained fluctuations of ±5% in supply frequency,

except standby generation which is designed for frequency variations of ±2 Hz, and the vital buses are designed to regulate frequency to within ±0.5 Hz. Therefore, frequency variations will not affect the ability of these systems to perform their required functions.

## 3.5 DUST

Site specific dust loading quantity, size distribution and composition were established by test and analysis. This information was used to size outside air filters for all buildings. Using the filter efficiencies, dust loadings were established for each building.

The diesel generator unit combustion air intake filter was sized by the manufacturer for the dust loadings established and information was provided by the manufacturer for units in similar applications.

Most manufacturers have recommended maintenance intervals. When intervals not available, an engineering analysis was performed to recommend maintenance intervals for all susceptible equipment. Periodic maintenance will be performed in accordance with these recommendations.

## 3.6 AGING

An aging analysis, accelerated aging and design basis event (DBE) testing was performed for items of equipment covered by this report to evaluate the stresses which degrade performance. The objective of the program was to determine a time period for which acceptable equipment performance is anticipated.

The results of the program, including qualified life of the equipment and, where applicable, replacement intervals for life limiting components are listed on tables 4.1-1 and 4.1-2.

## 3.7 FLOODING AND SUBMERGENCE

Internal flooding is considered to be part of the design basis event for the lower levels of the containment building. Flooding outside containment is not part of the design basis for qualification for the reasons described in FSAR Section 9.3.3.2. The water surface elevation in containment after a LOCA will be a maximum of 90'-6" (or 10-1/2' above the floor level at 80'-0"). All safety related equipment that may become submerged as a result of this LOCA has been evaluated to determine the respective accident mitigation or post accident functionability requirements. As-installed equipment locations were verified by in-plant inspections.

The containment water level instrumentation (Tag nos. J-RDE-LE-410, 411) is the only equipment important to safety that would be submerged that requires continued operability post flooding. These items are being qualified for submergence. Refer to table 4.1-1 (sheet 39). The signal cables from these level transmitters have been qualified for an environment of 100% relative humidity and a peak pressure of 66 psig. The submergence qualification is demonstrated by the spray environment with LOCA pressure. In addition, as part of the test of these cables there is an immersion test. Therefore, these signal cables are qualified for submergence. (See table 4.1-1 sheet 15 for cable qualification data.) All safety-related cables inside containment are qualified for similar environment parameters as those cables to the level transmitters (See table 4.1-1 sheets 4, 10, 11, 12, 13, 14, 17, and 18). All other necessary equipment completes its function prior to submergence and does not have a failure mode when submerged that would compromise safety (e.g., an air operated containment isolation valve).

## 3.8 CHEMICAL SPRAY

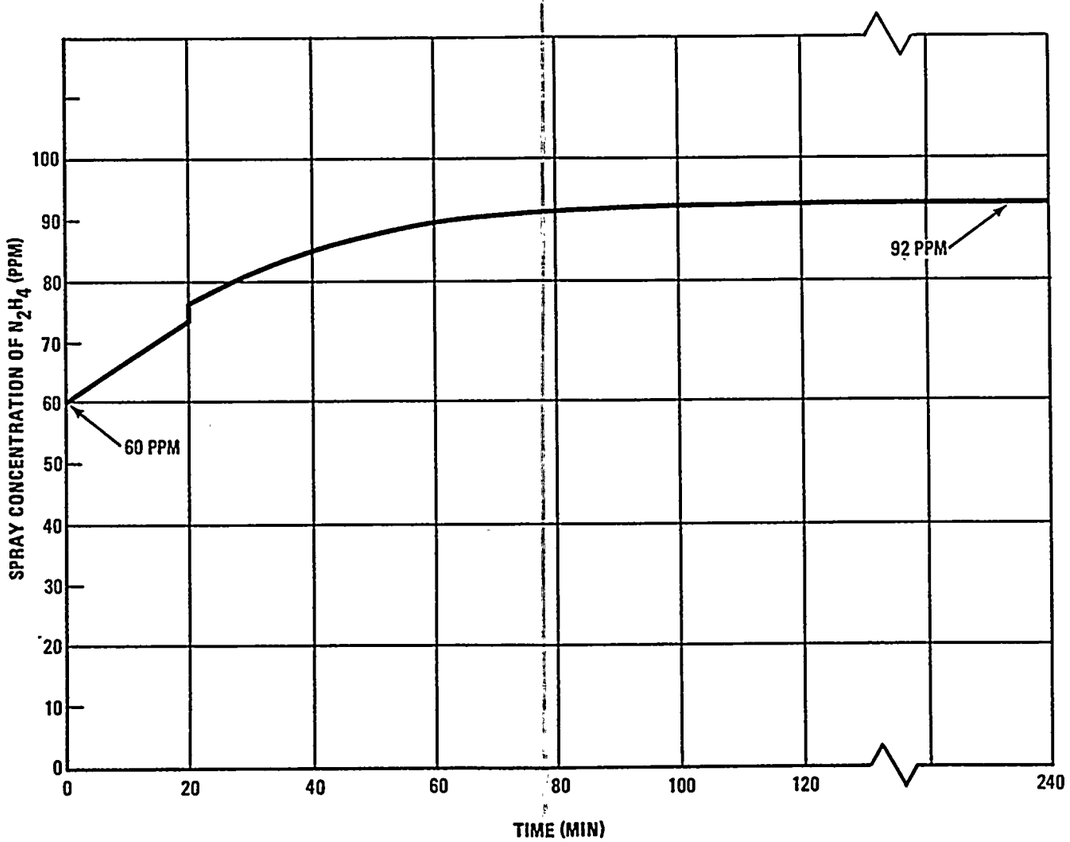
The chemical spray is applicable only to the containment building post-LOCA/MSLB environment. Applicable parameters are summarized in table 4.1-3 and were established on the basis of normal containment spray system operation.

Figure 3.8-1 presents the estimate of hydrazine concentration under the most limiting single failure. The limiting failure would be closure of the containment isolation valve on one train of the containment spray system. The chemical addition portion of the isolated train would discharge to the refueling water tank (RWT), resulting in a more concentrated spray through the non isolated train. Operator action to terminate the discharge to the RWT is assumed at 30 minutes.

The use of 50 ppm hydrazine for qualification purposes is consistent with the range of hydrazine concentrations stipulated in CESSAR. Additionally, no significant difference in the various materials' performances should occur due to an increase in the hydrazine concentration of up to 200 ppm. This statement assumes that the related safety equipment consist of materials' normally found in these items, including but not limited to stainless steels, nickel-based alloys, copper-based alloys, EPDM, silicon rubber, phenolics, epoxy materials, low-carbon and mild steels, cast irons, and low alloyed steels. Possible concerns with brass, bronze and other copper-based alloys with the decomposition of hydrazine to ammonia (ammonia readily attacks copper-alloys) have been alleviated based on qualification tests on valve materials. Type testing to demonstrate material capability was conducted by C-E with 200 ppm hydrazine and showed no appreciable corrosion-related attack. The test procedure and the analysis are included in the following reports: ASCO reports AQS-21678/TR Rev. A, AGR-67368 Rev. 0; C-E program report 14273-PE-5734 Rev. 1, and C-E letter V-PAK-250. Therefore, no attack of copper-based alloys is expected to occur in a 50 ppm hydrazine environment. 1

1 Accordingly, the single failure does not result in conditions more severe than the 50 ppm specified in table 4.1-3.

Also Available On
Aperture Card




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Palo Verde Nuclear Generating Station
Environmental Qualification

CONTAINMENT SPRAY HYDRAZINE
CONCENTRATION VS TIME
LIMITING SINGLE FAILURE

Figure 3.8-1



1

8306280436-05

# 4. MASTER EQUIPMENT LIST AND QUALIFICATION REVIEW

## 4.1 REVIEW TECHNIQUE

### 4.1.1 BOP

A master list was compiled using the instrument, valve and equipment indices and separating the systems into Class IE and non-Class IE. The equipment associated with the Class IE systems, noted in table 2.2-1, were then categorized into harsh and non-harsh environments. In addition, a review of other project documents, such as specifications, P&ID's, electrical single line and elementary diagrams, was conducted as a check for Class IE equipment. Lastly, the FSAR was used to determine that all safety-related equipment had been identified. Table 4.1-1 presents the BOP Class IE equipment in a harsh environment requiring qualification.

To facilitate a uniform review of the environmental qualification of equipment, review forms entitled "Equipment Environmental Qualification Check Lists" and "Seismic Check Lists" were prepared. A copy of these forms is included as Appendix B. The review forms were prepared based upon the requirements of NUREG-0588 Category I and emphasize the requirements to be addressed on a case by case basis. The review forms are designed to guide the reviewer in obtaining information from vendors which is in an auditable form.

### 4.1.2 NSSS

The safety-related Class IE equipment within the NSSS scope of supply was identified from a review of CESSAR Sections 3.9, 3.11, and Chapters 6, 7, and 15, procurement specifications,

System Design Requirements, electrical drawings, and P&IDs. The safety-related systems listed in section 2.2 have been systematically analyzed in accordance with NUREG-0588,
1 Category I to determine if components required to mitigate or monitor the consequence of an accident or place the plant in a hot standby/cold shutdown condition are located in a harsh environment. Component locations were defined using a list provided by C-E, in conjunction with a review of physical drawings. Table 4.1-2 presents the NSSS Class IE equipment located in a harsh environment.

Once the Class IE equipment was identified for the NSSS scope of supply, a systematic review on a component-level basis was performed to determine the extent to which the component environmental qualification program complied with the require-
1 ments of NUREG-0588, Category I.

### 4.1.3. INDEPENDENT APS REVIEW

In addition to the review activities described in sections 4.1.1 and 4.1.2, APS performs a detailed independent review of each qualification program, both environmentally and seismically, utilizing the Equipment Qualification Program Check List, included as Appendix C.

The review procedure for qualification plans and reports between the Bechtel and APS is intended to insure compliance
1 to IEEE-323-74, 344-75, and NUREG-0588, Category I.

The following procedure requires that, when the qualification document is received at Bechtel a copy is formally transmitted to APS requesting a review by a specific date. The transmittal letter and the qualification document are routed to the electrical section, upon its arrival in-house, where it is logged

REVIEW TECHNIQUE

in and a review request form is filled out and routed to the appropriate engineering discipline, requesting that the qualification document be reviewed and comments provided by the specified date on the form. The discipline supervising engineer or his designee retrieves the qualification document from the Central File and reviews it against the Equipment Qualification Program Checklist.

The checklist is designed to insure that the qualification test information required by IEEE-323-74 and 344-75 is incorporated into the documents. Section 6.3.1.1 of IEEE-323-74 specifies the recommended content of test plans and reports and is incorporated as indicated on the checklist under the item "Documentation". It is the reviewers responsibility to insure that this area is covered sufficiently throughout the qualification test submittal to meet the intent of the requirements. The qualification review document does provide for specific entries that are required to meet the Section 6.3.1.1 documentation requirements which are considered significant to be separated out to insure their entry into the qualification submittal by the supplier such as: 1

1. Life Limiting Components required by item 5 of Section 6.2, IEEE-323-74. 1
2. Preventive Maintenance as required by item 4 of Section 6.2, IEEE-323-74. 1
3. Environmental Service Conditions as required by item 7 of Section 6.2, IEEE-323-74. 1

The review of the seismic test report, to insure that all applicable areas are covered as required by IEEE-344-75 is patterned after Section 8.2.1 of this standard, with each item requiring a specific review check to insure its incorporation.

REVIEW TECHNIQUE

Upon completion of the Equipment Qualification Program Checklist, the review request form is signed and dated as well as the applicable section within the qualification checklist. If the review was conducted by someone other than the discipline supervising engineer, then they review the content of the qualification review document and also provides their signature and date in the appropriate section. The completed review forms are then submitted to the electrical section where copies of the qualification review document form are made, the transmittal letter is drafted and all required data is entered into the log to indicate review has been completed and documented. Copies of all documentation are placed within a single package and filed in the Central File.

The Equipment Qualification Program Checklist is then transmitted, in its entirety, to the Bechtel where it is reviewed along with their generated comments. The APS comments are incorporated as appropriate in transmittals to the supplier for resolution or incorporation into the qualification test documentation and the supplier resubmits a subsequent report. This cycle continues until all requirements are satisfied upon which time the qualification document receives a Status 1. Final qualification documentation submitted to APS is reviewed and signed off by the reviewer, the Electrical Engineering Supervisor, the Nuclear Engineering Manager and Quality Assurance.

### 4.1.4 QUALIFICATION STATUS

Upon completion of the review discussed in sections 4.1.1 through 4.1.3, the qualification status of each component was placed into one of the following categories and entered in the Qualification Status column of table 4.1-1 and 4.1-2. Status categories are described in sections 4.1.4.1, 4.1.4.2, and 4.1.4.3.

4.1.4.1 Qualified

The qualification documentation is complete. The qualified life is identified, along with the life limiting component, if applicable.

4.1.4.2 Qualified (Pending)

The qualification documentation is not complete, but documentation is in the review process and the equipment is considered qualified. A brief explanation of the outstanding items and forecasted completion date are also included.

4.1.4.3 In Progress

The qualification documentation is not complete enough to establish a qualified life. The usual case for placing components in this category would be when testing is not complete or retesting or additional testing is required. A brief statement of status and forecasted completion date is included.

4.1.5 QUALITY ASSURANCE

All equipment and information listed in this report is controlled by the APS, Bechtel and C-E QA programs. This includes such actions as requiring establishment of a QA program by the equipment manufacturers and testing facilities. Periodic QA audits of the manufacturers and testing facilities have been performed by APS, C-E (for NSSS equipment) and Bechtel (for BOP equipment). In addition, APS carries out periodic audits of the C-E and Bechtel QA programs.

APS initiated and organized the environmental qualification program and has maintained a direct involvement in the program, including review of the environmental qualification documents and monitoring of the qualification status of each

piece of equipment. As a result of these activities and the application of the C-E and Bechtel QA programs to the data files and check lists, APS has a high degree of confidence that the qualification status shown in tables 4.1-1 and 4.1-2 are correct. APS Quality Assurance regularly conducts audits of Design Control, Procurement Document Control, Control of Purchased Material, Equipment and Services, and other applicable criteria at APS, Bechtel, and C-E.

In conjunction with APS Quality Assurance Department audits and surveillances, APS Nuclear Engineering personnel perform quality assurance functions by detailed review of equipment qualification documentation, and coordination with Bechtel, C-E and other Suppliers. An Equipment Qualification Team consisting of APS, Bechtel, and C-E personnel has been designated to coordinate, review, and monitor the completion of equipment qualification for PVNGS.

| Company | Position | Equipment Qualification Responsibility |
|---|---|---|
| APS | Supervising Electrical Engineer | Overall Equipment Qualification Responsibility |
| APS | Electrical Engineer | Balance of Plant Coordinator |
| APS | Electrical Engineer | Combustion Engineering Coordinator |
| APS | Quality Systems Engineer | Quality Assurance Support |
| Bechtel | Assistant Project Engineer | Project Overall Equipment Qualification Responsibility |

REVIEW TECHNIQUE

| Company | Position | Equipment Qualification Responsibility |
|---|---|---|
| Bechtel | Senior Engineer | Project Equipment Qualification Coordinator |
| Bechtel | Staff Environmental Group Supervisor | Technical Qualification Consultant |
| Bechtel | Staff Seismic Group Supervisor | Technical Seismic Consultant |
| C-E | Assistant Project Manager | Qualification Interface Coordinator |
| C-E | Product Manager | Equipment Qualification Manager |

APS Nuclear Engineering personnel use the Nuclear Projects Department Procedures Manual, Procedure NS-15, "Class IE Equipment Qualification Procedures IEEE-323 (1974), IEEE-344 (1975)," for review, approval, and revision of programs, procedures and data for equipment qualification. Upon completion of an equipment qualification package, it is reviewed and approved by APS Nuclear Engineering Management for transmittal to the NRC. APS Nuclear Engineering compliance with Procedure NS-15 and other applicable criteria is verified by regularly scheduled audits conducted by APS Quality Assurance.

Bechtel uses their Internal Procedures Manual, No. IP-5.22, "Qualification of Safety-Related Plant Equipment", for review of equipment environmental and seismic qualification plans, procedures, reports, and Bechtel/Supplier interfaces. Bechtel transmits a monthly summary to APS Nuclear Engineering and Quality Assurance, updating the Equipment Qualification Program schedule, status report, and action item list. APS Quality Assurance conducts regularly scheduled audits of Bechtel's QA Program, Internal Procedures including IP-5.22, and other applicable criteria.

REVIEW TECHNIQUE

C-E qualification criteria for Nuclear Steam Supply System equipment contained in CESSAR, and C-E Topical Report CENPD 255 Rev 3. APS Quality Assurance, in conjunction with Bechtel Quality Assurance, conducts annual audits of CE's quality assurance program at their three principal work locations in Windsor, CT, Avery, NH, and Chattanooga, TN.

APS Bechtel and CE Quality Assurance and Engineering also conduct surveillance of equipment suppliers and test laboratories. Documentation of these reviews and audits, including findings and corrective actions, are on file, along with current status lists and schedules of future audits.

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 1 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 480V Class IE Motor Control Centers<br>Auxiliary Bldg | General Electric (P.O. No. 13-EM-018) | Prototype IC7700<br>System: Class IE 480V Power MCC<br>Tag No.<br>E-PHA-M33<br>E-PHB-M34<br>E-PHA-M35<br>E-PHB-M36<br>E-PHA-M37<br>E-PHB-M38 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation 1 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 104F peak<br>Pressure 0 psig<br>Relative Humidity 90% (f)<br>Radiation 1 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days (h)<br>Post Seismic Stress Test Test sample subjected to: 131F and 90-99% humidity for 96 hr with contactors cycled<br>Post-functional tests included<br>1. Operation<br>2. Dielectric strength<br>3. Insulation resistance<br>4. Pickup voltage<br>5. Drop out voltage | N/A | N/A | Type Test<br>Breakers cycled per UL489 and NEMA AB1<br>Contactors cycled per UL 508<br>General purpose control relays cycled per UL 508<br>Selector switches and push buttons cycled per UL 508<br>Thermal aging 81 days at 115C<br>G.E. Qualification Report 80GPC004 Feb 25, 1982<br>(cont) | Review Complete(k) expected to be qualified for 40 years except for life limiting components:<br>Agastat Relays: 10 years<br>Contactors: 50,000 cycles<br>Aux.Relays: 100,000 cycles<br>Circuit breakers: 22 years<br>Scheduled Completion Date<br>June 30, 1983 |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 2 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 480V Class IE Motor Control Centers<br>Auxiliary Bldg<br>(cont) | | | | | | | | | BPC Log No. 13-10407-E018-2802-2, 2803-2 2770-2 2804-2 March 22, 1982<br>Wyle Reports 43757-2 Sept. 27, 1978, and 44380-1, Feb. 7, 1979 | |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 3 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Auxiliary Relay Cabinets<br>Auxiliary Bldg. | Harlo Corp. (P.O. No. 13-EM-022) | Prototype<br>System: ESFAS<br>Tag No.<br>E-ZAA-C01<br>E-ZAA-C02<br>E-ZAA-C03<br>E-ZAA-C04<br>E-ZAA-C05<br>E-ZAA-C06<br>E-ZAB-C01<br>E-ZAB-C02<br>E-ZAB-C03<br>E-ZAB-C04<br>E-ZAB-C05<br>E-ZAB-C06 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation 1 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 119F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation 1.1 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Testing in progress | N/A | N/A | Type Test<br>Aging analysis performed on all materials<br>Major component aging:<br>1. Westinghouse FT1 test switch 69 days at 110C<br>2. Westinghouse ARD relay 441 days at 110C<br>3. Agastat timing relay 62 days at 110C<br>BPC Log No. 13-10407-E600-1-3 May 26, 1982<br>Wyle Qualification Plan NES26331, May 7, 1982 | Not qualified Aging in progress<br>Scheduled Completion Date<br>July 30, 1983 |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 4 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 5kV Power Cables<br>MSSS<br>Auxiliary Bldg | Anaconda (PO No. 13-EM-029) | Insulation FR-EP jacket hypalon | Temperature 300F | Temperature 346F peak | 30 days | 30 days Cable energized throughout test<br>Cables subjected to post-LOCA mandrel bend/high potential withstand test (passed) | N/A | N/A | Type Test - in containment 168 hrs at 150C<br>Anaconda Report F-C4350-3, July, 1976<br>BPC Log 13-10407-E029-II-6<br>July 20, 1982 | Qualified for 40 years |
| | | | Pressure 21 psig | Pressure 113 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $1 \times 10^6$ rads | Radiation $2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray N/A | Chemical Spray 3000 ppm $H_3BO_3$ 0.064 molar $Na_2S_2O_3$ pH 9-11, with NaOH | | | | | Type Test out of containment and MSSS 350 hrs at 150C<br>BPC Log No. E029-41-1 Oct. 26, 1982 | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. II, III | | | | | | | |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 5 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Low Voltage Electrical Penetration Assemblies<br>Containment Wall | Conax Corp. (PO No. 13-EM-035A) | Prototype for low voltage power and control<br>System: Non-Class IE 480V Power Switchgear<br>Tag No.<br>E-NGN-Z01<br>E-NGN-Z03<br>E-NGN-Z05<br>E-NGN-Z07<br>E-NGN-Z11<br>E-NGN-Z13<br>E-NGN-Z232<br>E-NGN-Z254<br>E-NGN-Z60<br>E-NGN-Z71<br>E-NGN-Z88<br>E-NGN-Z90<br>System: Non-Class IE 480V Power MCC and Control<br>Tag No.<br>E-NHN-Z09<br>E-NHN-Z10 | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig peak see fig. 3.1-2<br>Relative Humidity Steam/air mixture<br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence N/A<br>Env. Desig. I | Temperature 370F peak<br>Pressure 74.5 psig peak<br>Relative Humidity 100% (b)<br>Radiation $1.28 \times 10^8$ rads (g)<br>Chemical Spray (note c) 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH = 8.6 with $Na_3PO_4$ for 13.5 days<br>Submergence N/A | 30 days | 30 days (h)<br>Post LOCA/ MSLB dielectric strength test at 660V-ac for 5 minutes<br>Passed gas leak rate test<br>Rated short circuit test conducted | N/A | N/A | Type Test<br>Qualified per IEEE-317-1976 as modified by NRC Reg. Guide 1.63, July 1978<br>104 hours at 303F<br>Conax Corp. Report No. IPS 585.3, Jan. 26, 1981<br>BPC Log No. 13-10407-E035A-320-1, Feb. 6, 1981<br>Conax Corp. Report No. IPS 447.1 July 28, 1981<br>BPC Log No. E-035A-313-2 Sept. 9, 1981 | Qualified for 40 years |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 6 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Low Voltage Electrical Penetration Assemblies<br><br>Containment Wall<br><br>(cont) | | E-NHN-Z12<br>E-NHN-Z15<br>E-NHN-Z17<br>E-NHN-Z19<br>E-NHN-Z61<br>E-NHN-Z67<br><br>System:<br>Class IE 480V Power MCC and Control<br>Tag No.<br>E-PHC-Z29<br>E-PHB-Z41<br>E-PHN-Z43<br>E-PHA-Z46<br>E-PHN-Z86<br><br>System:<br>Reactor Control<br>Tag No.<br>E-RIB-Z35<br><br>System:<br>CEDM Control Power<br>Tag Nos.<br>E-SFN-Z56<br>E-SFN-Z58<br>E-SFN-Z64<br>E-SFN-Z66<br>E-NHN-Z67<br>E-SFN-Z76<br>E-SFD-Z78<br>E-SFN-Z82<br>E-SFN-Z84 | | | | | | | BPC Log No. E-035A-314-3 March 4, 1982<br><br>BPC Log No. E-035A-428-2 October 4, 1982 | |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 7 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Medium Voltage Electrical Penetration Assembly<br><br>Containment Wall | Conax Corp. (P.O. No. 13-EM-035A) | Prototype for medium voltage<br><br>System: Non-Class IE 13.8kV power<br>Tag Nos.<br>E-NAN-Z31<br>E-NAN-Z44<br>E-NAN-Z45<br>E-NAN-Z70 | Temperature 370F peak see fig. 3.1-1<br><br>Pressure 60 psig peak see fig. 3.1-2<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes See table 4.1-3<br><br>Submergence N/A<br><br>Env. Desig. I | Temperature 400 peak<br><br>Pressure 70 psig peak<br><br>Relative Humidity 100% (b)<br><br>Radiation $1.05 \times 10^8$ rads (g)<br><br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ and $Na_3PO_4$ pH = 8.7 (d)<br><br>Submergence N/A | 30 days | 30 days (h)<br><br>Conductors energized throughout test with leakage current monitored<br><br>Post LOCA/ MSLB test of gas leak rate, continuity, dielectric strength, and insulation resistance | N/A | N/A | Type Test<br><br>Qualified per IEEE-317-1976 as modified by NRC Reg. Guide 1.63, July 1978<br><br>Aged for 168 hours at 250F<br><br>Conax Corp. test report No. IPS-447.2 Aug 24, 1981<br><br>BPC Log No. E-035A-426-1<br><br>BPC Log No. E-035A-314-3 March 4, 1982<br><br>BPC Log No. E-035A-428-2 October 4, 1982 | Qualified for 40 years |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 8 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Instrumentation Electrical Penetration Assemblies<br><br>Containment Wall | Conax Corp. (P.O. No. 13-EM-035A) | Prototypes for instrumentation<br><br>System: HVAC - Containment<br>Tag No. E-HCN-253<br><br>System: Non-IE Power 480V MCC<br>Tag Nos. E-NHN-216 E-NHN-220<br><br>System: In-plant communication<br>Tag Nos. E-QFN-214 E-QFN-257<br><br>System: In-core Reactor Instrumentation<br>Tag Nos. E-RIA-249 E-RIC-230 E-RID-279<br><br>(cont) | Temperature 370F peak See fig. 3.1-1<br><br>Pressure 60 psig peak See fig. 3.1-2<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes See table 4.1-3<br><br>Submergence N/A<br><br>Env. Desig. I | Temperature 396F peak<br><br>Pressure 80 psig peak<br><br>Relative Humidity 100% (b)<br><br>Radiation $1.8 \times 10^8$ rads (g)<br><br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $H_2H_4$ and $Na_3PO_4$ pH = 8.7<br><br>Submergence N/A | 30 day | 30 days (h)<br><br>Cables energized throughout test<br><br>Post LOCA/ MSLB test of gas leak rate test, continuity test dielectric strength test.<br><br>Supplemental MSLB/ LOCA conducted peak temp: 510F, peak pressure: 80 psig duration: 8 days passed post supplemental MSLB/ LOCA tests | N/A | N/A | Type test<br><br>Qualified per IEEE-317-1976 as modified per NRC Reg. Guide 1.63, July 1978<br><br>Aged for 100 hours at 302F.<br><br>Conax Corp. Report No. IPS-585.2 Jan. 12, 1981<br><br>BPC Log No. E-035A-420-1 Sept. 9, 1981<br><br>Conax Corp. Report No. IPS-447.3 Aug. 5, 1981<br><br>BPC Log No. E-035A-421-1 Sept. 9, 1981 | Review complete(1)<br><br>Scheduled Completion Date<br><br>June 30, 1983 |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 9 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Instrumentation Electrical Penetration Assemblies<br><br>Containment Wall<br><br>(cont) | | System:<br>ESF Actuation<br>Tag Nos.<br>E-SAA-Z47<br>E-SAB-Z37<br>E-SAC-Z28<br>E-SAD-Z81<br><br>System:<br>Ex-Core Neutron Monitoring<br>Tag Nos.<br>E-SEA-Z51<br>E-SEB-Z36<br>E-SEN-Z75<br><br>System:<br>Reactor Control<br>Tag No.<br>E-SFA-Z50<br>E-SFB-Z38<br>E-SFC-Z22<br>E-SFC-Z25<br>E-SFC-Z26<br>E-SFC-Z27<br>E-SFD-Z77<br>E-SFD-Z83<br>E-SFN-Z02<br>E-SFN-Z04<br>E-SFN-Z87<br>E-SFN-Z89<br>E-SFN-Z91 | | | | | | | BPC Log No. E-035A-314-3 March 4, 1982<br><br>BPC Log No. E-035A-428-2 October 4, 1982 | |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 10 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 600V Control Cable<br>Containment<br>MSSS<br>Auxiliary Bldg | Brand-Rex Co. (P.O. No. 13-EM-057) | XLPE Insulation Neoprene jacket | Temperature 370F peak. See fig. 3.1-1 | Temperature 385F peak | 30 days | 30 days (h)<br>Cables energized throughout LOCA/MSLB test<br>Cables subjected to post-LOCA/ MSLB mandrel bend and high-potential withstand test (passed) | N/A | N/A | Type Test<br>168 hours at 136C<br>Brand-Rex Report No. F-C4771, Nov. 1977<br>BPC Log No. 13-10407-E057-24-7, Sept. 11, 1981 | Qualified for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $1 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH 8.6-10 with $Na_3PO_4$ (d) | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 11 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 600V Power Cable<br>Containment<br>MSSS<br>Auxiliary Bldg | Rockbestos (P.O. No. 13-EM-058) | XLPE Insulation Neoprene jacket | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig peak See fig. 3.1-2<br>Relative Humidity Steam/air mixture<br>Radiation $3.3 \times 10^7$ rads-gamma $1 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence N/A<br>Env. Desig. I, II, III | Temperature 376F peak<br>Pressure 62 psig peak<br>Relative Humidity 100% (b)<br>Radiation $2 \times 10^8$ rads<br>Chemical Spray 6200 ppm Boron 50 ppm Hydrazine pH = 8.6 to 10 with Trisodium Phosphate (d)<br>Submergence N/A | 30 days | 30 days (h)<br>Cables energized at rated voltage and current throughout MSLB/LOCA test<br>Post-LOCA test environment 200F<br>Humidity 100%<br>Passed voltage withstand test of 80V-ac/mil for 5 minutes | N/A | N/A | Type Test<br>Aged 1300 hours at 150C prior to LOCA<br>Rockbestos Report June 22, 1978<br>BPC Log No. 13-10407-E058-13-4 May 3, 1979 | Qualified for 40 years |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 12 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 600V Power Cable<br><br>Containment MSSS<br><br>Auxiliary Bldg. | Brand Rex (P.O. No. 13-EM-058A | XLPE Insulation Hypalon jacket | Temperature 370F peak See fig. 3.1-1 | Temperature 385F peak | 30 days | 30 days<br><br>Cables energized with 600V- and 300V-ac throughout LOCA/MSLB test<br><br>Passed post LOCA/MSLB 40 x mandrel bend test and 5 minute 80V per mil high potential withstand test | N/A | N/A | Type Test<br><br>Brand Rex Report No. F-C-5120-1, Aug. 19, 1980<br><br>BPC Log No. 13-10407-E058 1-2 April 22, 1982<br><br>Samples aged 168 hrs at 136C or 168 hrs at 158C | Review Complete(m)<br><br>Scheduled Completion Date<br><br>July 30, 1983 |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $1 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm hydrazine pH=8.5 to 10 with sodium triphosphate and sodium hydroxide (d) | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 13 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Coaxial Cables<br>Containment<br>Auxiliary Bldg | Brand-Rex (P.O. No. 13-EM-060) | XLPE insulation Hypalon jacket | Temperature 370F peak See fig. 3.1-1 | Temperature 385F | 30 days | 30 days<br>Cables energized with 600V-ac throughout simulated LOCA/MSLB test<br>Cables subjected to a final 40 x mandrel bend and high potential withstand test of 80V per mil (passed) | N/A | N/A | Type Test<br>Aged 168 hours. at 136C<br>Brand-Rex Report No. F-C5120-2, Sept. 2, 1980<br>BPC Log No. 13-10407-E060-7-4 Jan. 18, 1982 | Qualified for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $1 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH 8.5-10 with $Na_3PO_4$ to pH 8.5 and NaOH to pH 10 (d) | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, III | | | | | | | |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 14 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Shielded Instrument/ Thermocouple Extension Cables<br><br>Containment<br><br>MSSS<br><br>Auxiliary Bldg | Anaconda Ericcson (P.O. No. 13-EM-061) | FR-EP insulation Hypalon (CPE) jacket | Temperature 370F peak See fig. 3.1-1 | Temperature 385F | 30 days | 30 days (h)<br><br>Cables energized throughout test<br><br>Cables subjected to a mandrel bend/high potential withstand test of 80V per mil for 5 min. | N/A | N/A | Type Test<br><br>168 hours at 150C<br><br>Franklin Institute Research Laboratories Report No. F-C4836-2, January, 1978<br><br>BPC Log No. 13-10407-E061-14-6 January 15, 1982 | Qualified for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $1 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH 8.6-10 with $Na_3PO_4$ (d) | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 15 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Shielded Instrumentation Cable<br>Containment<br>MSSS<br>Auxiliary Bldg | The Anaconda Company (P.O. No. 13-EM-062) | FR-EP Insulation CPE jacket | Temperature 370F peak See fig. 3.1-1 | Temperature 385F peak | 30 days | 30 days (h)<br>Cables energized throughout test<br>Cables subjected to a mandrel bend/high potential withstand test of 80V per mil (passed) | N/A | N/A | Type Test<br>168 hours at 150C<br>Franklin Institute Research Laboratories Report F-C4836-2, January 1978<br>BPC Log No. 13-10407-E062 14-7, January 1982 | Qualified for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $1 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH = 8.6 to 10.0 with $Na_3PO_4$ (d) | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 16 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Outside Containment Prefab Cables<br>Auxiliary Bldg | Bendix/ Anaconda Ericson (P.O. No. 13-EM-064) | FR-EP Insulation CPE Jacket | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 385F peak<br>Pressure 60 psig<br>Relative Humidity 100% (f)<br>Radiation $2 \times 10^8$ rads<br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH=8.6-10 with $Na_3PO_4$ (d)<br>Submergence N/A | 30 days | 30 days (h)<br>All cables energized throughout 16 day simulated LOCA/ MSLB<br>Post MSLB/ LOCA mandrel bend and high potential withstand tests. 80V/ mil for 5 minutes (passed) | N/A | N/A | Type Test<br>168 hours at 150C<br>Franklin Institute F-C4836-2 Jan. 1978<br>BPC Log No. 13-10407-E064-22-2. Sept. 1, 1981 and BPC Log No. 13-10407-E064-23-8 | Qualified for 40 years |

REVIEW TECHNIQUE

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 17 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Inside Containment Prefab Cable Assemblies in Conduit<br><br>Containment | BIW Cable Systems (P.O. No. 13-EM-064A) | Silicone Insulation silicone jacket<br><br>RSPT cable from CEDM to disconnect panel.<br><br>RSPT I 3/C #16 AWG shielded triad<br><br>RSPT II 6/C, #16 AWG twisted shielded triplet | Temperature 370F peak See fig. 3.1-1 | Temperature 370F | 30 days | 30 days (h)<br><br>Cables energized throughout LOCA/MSLB<br><br>Subjected to post LOCA/MSLB test of 50 x mandrel bend and 750V ac for 5 minutes | N/A | N/A | Silicone Rubber<br><br>Type Test<br><br>750 hours at 160C<br><br>BIW Report No. 82E080 Sept. 9, 1982<br><br>BPC Log No. 13-10407-E064-77-3, Jan. 10, 1983 | Review Complete(n)<br><br>Scheduled Completion Date<br><br>July 30, 1983 |
| | | | Pressure 60 psig peak See fig 3.1-2 | Pressure 155 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity Steam/air mixture | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $5 \times 10^7$ rads (i) | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH 8.6 to 10 with $Na_3PO_4$ (d) | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

REVIEW TECHNIQUE

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 18 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Inside Containment Prefab Cable Assemblies<br><br>Containment | BIW Cable Systems (P.O. No. 13-EM-064A) | FRP insulation CPE jacket<br><br>RSPT cable from disconnect panel to EPA<br><br>RSPT I 3C, #16 AWG shielded twisted triplex<br><br>RSPT II 6/C, #14 AWG, #16 twisted shielded triplex<br><br>FID 6 STP #18 AWG 1 STP #18 AWG CH-AL from bulkhead to EPA | Temperature 370F peak See fig. 3.1-1 | Temperature 370F | 30 days | 30 days<br><br>Cables energized throughout LOCA/MSLB with 60V ac passed<br><br>Post LOCA/ MSLB 40 x mandrel bend test and 70V ac for 5 minutes immersed in water | N/A | N/A | Type Test<br><br>Aged 126 hrs at 150C<br><br>BIW Report No. 82C033C Nov. 24, 1982<br><br>BPC Log No. B-10407-E064A-66-5 Dec. 9, 1982 | Qualified for 30 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 155 psig | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity Steam/air mixture | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH 8.6 to 10 with $Na_3PO_4$ (d) | | | | | Anaconda F-C4836-2 BPC Log No. E062-14-7 March 3, 1982 | |
| | | | Submergence N/A | Submergence N/A | | | | N/A | N/A | |
| | | | Env. Desig. I | | | | | | | |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 19 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Ring Tongue Terminals<br><br>Containment<br><br>MSSS<br><br>Auxiliary Bldg | AMP Incorporated (P.O. No. 13-EM-106A) | N/A<br><br>Kynar Insulating Sleeves<br><br>Radiation resistant PIDG and Plastigrip Terminals | Temperature 370F peak See fig. 3.1-1<br><br>Pressure 60 psig peak See fig. 3.1-2<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes See table 4.1-3<br><br>Submergence N/A<br><br>Env. Desig. I, II, III | Temperature 370F<br><br>Pressure 60 psig<br><br>Relative Humidity 100% (b)<br><br>Radiation $2.05 \times 10^8$ rads<br><br>Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH=9.0 to 9.5 with $Na_3PO_4$ (d)<br><br>Submergence N/A | 30 days | 30 days (h)<br><br>Representative number of samples energized to 600V-ac and current of 5 amp throughout MSLB/LOCA test<br><br>Samples passed post LOCA/ MSLB tensile strength test | N/A | N/A | Type Test<br><br>Separate samples aged for: 168 hours at 150C 400 hours at 150C<br><br>750 hours at 150C 1000 hours at 150C 1500 hours at 150C<br><br>AMP Report No. 302940016 July 18, 1980<br><br>BPC Log No. 13-10407-E106A-52-3, August 7, 1980 | Qualified for for 40 years |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 20 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| High Voltage Terminations 5 & 15 kV<br><br>MSSS Elev. 80'<br><br>Auxiliary Bldg | Raychem (P.O. No. 13-EM-106B) | NHVT (formerly identified as HVT)<br><br>HVMC | Temperature 28-120F<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation $1 \times 10^6$<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II, III | Temperature 360F peak<br><br>Pressure 70 psig peak<br><br>Relative Humidity 100% (f)<br><br>Radiation $2 \times 10^8$ rads<br><br>Chemical Spray 0.2% $H_3BO_3$ pH=10<br><br>Submergence N/A | 30 days | 113 days<br><br>Cables energized throughout LOCA test at rated voltage | N/A | N/A | Type Test<br><br>168 hours at 121C .<br><br>Raychem Test Report No. 71100 Rev. 1<br><br>BPC Log No. 13-10407-E106B-7-4, Jan. 22, 1981 | Review Complete(o)<br><br>Scheduled Completion Date<br><br>June 30, 1983 |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 21 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat Shrinkable Motor Connection Kits, Molded Cable Breakout Kits, Cable and Sealing Kits, and Heat Shrinkable Tubing | Raychem (P.O. No. 13-EM-106B) | NHCK NCBK NESK WCSF-N | Temperature 370F peak See fig. 3.1-1 | Temperature 390F peak | 30 days | 30 days<br>Samples energized throughout LOCA/MSLB test<br>Samples passed post LOCA/ MSLB IR Test and 3.6 kV withstand test | N/A | N/A | Type Test<br>1500 hours at 150C<br>Raychem Report No. QP-PV123 Apr. 23, 1981<br>BPC Log No. 13-10407-E106B-10-5 Sept. 14, 1981 | Qualified for 40 years |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 66 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2.0 \times 10^8$ rads | | | | | | |
| MSSS<br>Auxiliary Bldg<br>Containment | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm $H_3BO_3$ 50 ppm $N_2H_4$ pH=10.5 with $NA_3PO_4$ (d) | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I, II, III | | | | | | | |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 22 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat Shrinkable Motor Connection Kits<br><br>MSSS, Elev. 80'<br><br>Auxiliary Bldg | Raychem (P.O. No. 13-EM-106B) | NMCK8 | Temperature 120F peak<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation $1 \times 10^6$<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II, III | Temperature 348F peak<br><br>Pressure 28 psig peak<br><br>Relative Humidity 100% Steam/air mixture (note f)<br><br>Radiation $5.0 \times 10^7$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 30 days (h)<br><br>Samples energized throughout MSLB test at 5 kV ac.<br><br>Samples passed post MSLB IR test and 5.5 kV ac withstand test | N/A | N/A | Type Test<br><br>Aging performed: 504 hours at 150C<br><br>Raychem Report No. EDR-5037 Sept. 10, 1982<br><br>BPC Log No. 13-10407-E-1068-62-3 Sept. 20, 1982 | Review Complete(o)<br><br>Scheduled Completion Date<br><br>June 30, 1983 |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 23 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 4.16 kV Transfer Switch<br>Auxiliary Bldg | ITE Golden Gate Swbd Co. (P.O. No. 13-EM-117) | HPL-C Switch<br>480V Power Switchgear<br>Tag No. E-PGE-036 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 104F<br>Pressure 0 psig<br>Relative Humidity 0-100%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days (h)<br>Passed post aging and seismic testing | N/A | N/A | Type Test<br>1716 hours at 134C and ambient relative humidity<br>Golden Gate Report No. QR-2141 Rev. 5 May 18, 1982<br>BPC Log No. 13-10407-E-117-10-6 June 18, 1982 | Qualified for 40 years |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 24 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Hydrogen Recombiner Damper Panel Hand Switches<br><br>Auxiliary Bldg<br><br>Fuel Pool Cooling Pump Panel Hand Switches<br><br>Fuel Bldg | Comsip Custom Line (P.O. No. 13-JM-200) | Microswitch Model No. PTSB-C2-12-C<br><br>System: HP<br>Tag Nos. J-HPA-HS61 J-HPB-HS62<br>Panel No. J-HPA-E03 J-HPB-E03<br><br>Env. Desig. III<br><br>GE SBM Switch Model 10CG211<br><br>System: PC<br>Tag Nos. J-PCA-HS7 J-PCB-HS8<br>Panel No. J-PCA-E01 J-PCB-E01<br><br>Env. Desig. VI | Temperature 50-104F<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | Later | 30 days | Later | N/A | N/A | Later | Not qualified (P)<br>Scheduled Completion Date<br><br>Dec. 30, 1983 |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 25 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter<br>Auxiliary Bldg | Rosemount (P.O. No. 13-JM-311) | Model No. 1153GB7<br>System: HVAC-Con Bldg<br>Tag Nos. J-HCA-PT-353A<br>J-HCB-PT-353B<br>Model No. 1153GB6<br>System: HVAC-Con Bldg<br>Tag Nos. J-HCA-PT-351A<br>J-HCB-PT-351B<br>J-HCC-PT-351C<br>J-HCD-PT-351D<br>J-HCA-PT-352A<br>J-HCB-PT 352B<br>J-HCC-PT-352C<br>J-HCD-PT-352D | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 318F<br>Pressure 72 psig<br>Relative Humidity 0-100%<br>Radiation $2.44 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days | Accuracy: ±0.25% of calibrated span | Accuracy was maintained within specification limits after aging and seismic testing. | Type Test<br>Each unit aged for 1110 hours at 95C and cycled from 0 to 100% FR 8,030 times<br>Rosemount Report No. 108026 Vol I & II Feb. 12, 1981<br>Qualification Report No. 18025, Rev. A Feb. 4, 1981<br>Analysis Report No. 57820, Rev. D Aug. 18, 1978<br>BPC Log No. 13-10407-J311-44-1, 46-2, 19-4 | Qualified for 4 years |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 26 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter<br>Auxiliary Bldg | Rosemount (P.O. No. 13-JM-311) | Model No. 1153DB4<br>System: ECWS<br>Tag Nos. J-EWA-LT-91 J-EWB-LT-92 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 318F<br>Pressure 72 psig<br>Relative Humidity 0-100%<br>Radiation $2.44 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days | Accuracy: ±0.25% of calibrated span | Accuracy was maintained within specification limits after aging and seismic testing. | Type Test<br>Each unit aged for 1110 hours at 95C and cycled from 0 to 100% FR 8,030 times<br>Rosemount Report No. 108026, Vol. I & II Feb. 12, 1981<br>Qualification Report No. 18025, Rev. A Feb. 1, 1981<br>Analysis Report No. 57820, Rev. D Aug. 18, 1978<br>BPC Log No. 13-10407-J311-44-1, 46-2, 19-4 | Qualified for 4 years |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 27 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Flow Transmitter<br>MSSS | Rosemount (P.O. No. 13-JM-311) | Model No. 1153DB5<br>System: AFS<br>Tag Nos.<br>J-AFA-FT-40B<br>J-AFB-FT-41B<br>J-AFA-FT-40A<br>J-AFB-FT-41A | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 318F<br>Pressure 72 psig<br>Relative Humidity 0-100%<br>Radiation $2.44 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days | Accuracy: ±0.25% of calibrated span | Accuracy was maintained within specification limits after aging and seismic testing. | Type Test<br>Each unit aged for 1110 hours at 95C and cycled from 0 to 100% FR 8,030 times<br>Rosemount No. 108026 Vol I & II<br>Qualification Report No. 18025, Rev. A<br>Analysis Report No. 57820, Rev D<br>BPC Log No. 13-10407-J311-44-1, 46-2, 19-4 | Qualified for 4 years |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 28 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter<br>MSSS | Rosemount (P.O. No. 13-JM-311) | Model No. 1153GB9<br>System: AFS<br>Tag Nos. J-AFB-PT-17 J-AFA-PT-18<br>Model No. 1153GB6<br>System: MSS<br>Tag Nos. J-SGB-PT-306 J-SGA-PT-313<br>Model No. 1153GB8<br>System: MSS<br>Tag Nos. J-SGB-PT-301 J-SGA-PT-308 J-SGB-PT-315 J-SGB-PT-321 | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 318F<br>Pressure 72 psig<br>Relative Humidity 0-100%<br>Radiation $2.44 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days | Accuracy: ±0.25% of calibrated span | Accuracy was maintained within specification limits after aging and seismic testing. | Type Test<br>Each unit aged for 1110 hours at 95C and cycled from 0 to 100% FR 8,030 times<br>Rosemount Report No. 108026 Vol I & II Feb. 12, 1981<br>Qualification Report No. 18025, Rev. A Feb. 4, 1981<br>Analysis Report No. 57820, Rev. D Aug. 18, 1978<br>Qualification Report No. 88114, Rev. B Sept. 4, 1982<br>(cont) | Qualified for 4 years |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 29 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter<br>MSSS<br>(cont) | | | | | | | | | BPC Log No. B-10407-J311-44-1, 46-2, .19-4, 51-2 | |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 30 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| I/P Convertor<br><br>MSSS (El. 81'-0") | Masoneilan (P.O. No. 13-JM-312) | Model No. 8005A<br><br>System: MSS<br>Tag Nos.<br>J-SGB-HY-178C<br>J-SGA-HY-179C<br>J-SGA-HY-184C<br>J-SGB-HY-185C | Temperature 28 to 120<br><br>Pressure 0 psig<br><br>Relative Humidity 20 to 90%<br><br>Radiation $1 \times 10^5$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 160F<br><br>Pressure 0 psig<br><br>Relative Humidity 95 to 100% (f)<br><br>Radiation $1.016 \times 10^7$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 30 days (h)<br><br>Tranasucers operated at 160F 95 to 100% RH for 10 days. Also subjected to 335F psig 23.2 psig within 8 minutes during 0.30 minute SLB test. | Response Time: N/A<br><br>Accuracy: ±0.5% of operating span | Response and Accuracy No abnormality or degradation was found | Type Test<br><br>Aged 1080 hours at 100C. Unit cycled 0 to 100% 2000 times during aging.<br><br>Masoneilan Report No. 1129 Jan. 18, 1982<br><br>BPC Log No. 13-10407-J-312-7-1 . March 16, 1982 | Qualified for 5.4 years |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 31 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Containment Post-LOCA Hydrogen Monitor<br>Auxiliary Bldg | Comsip Delphi (P.O. No. 13-JM-359) | Model No. System KIII per P.O. No. 13-JM-359<br>System: CHCS<br>Panel Nos. JHPAE02 JHPBE02 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 150F peak<br>Pressure 0 psig peak<br>Relative Humidity 90% (f)<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 100 days Simulated LOCA at sample points for 100 days at 300F and 70 psig | Accuracy: ±2.5% of full scale | No abnormalities were reported | Type Test<br>Engineering Analysis and Test Co. 1035-1, Rev. 1 Sept. 1981<br>Engineering Analysis and Test Co. Report No. 1035-8 Sept. 1982<br>BPC Log No. 10407-J359-29-2, 42-1 March 1, 1982, Oct. 28, 1982 | Review Complete(q)<br>Scheduled Completion Date<br>Aug. 30, 1983 |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 32 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Acoustic Monitors<br>MSSS | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. BBN424ISO<br>System: Main Steam<br>Tag Nos.<br>J-SGE-ZE-696<br>J-SGE-ZE-697<br>J-SGE-ZE-698<br>J-SGE-ZE-699<br>J-SGE-ZE-700<br>J-SGE-ZE-701<br>J-SGE-ZE-702<br>J-SGE-ZE-703<br>J-SGE-ZE-704<br>J-SGE-ZE-705<br>J-SGE-ZE-706<br>J-SGE-ZE-707<br>J-SGE-ZE-708<br>J-SGE-ZE-709<br>J-SGE-ZE-710<br>J-SGE-ZE-711<br>(cont) | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 510F peak<br>Pressure 92 psig peak<br>Relative Humidity 100% (b)<br>Radiation $2.2 \times 10^8$ rads<br>Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.5 to 7.5 with $NaPO_4$<br>Submergence N/A | 30 days | 33 days | Change sensitivity 20pc/g ±15% at 500F<br>Voltage sensitivity 90mV/g<br>Transverse sensitivity 5% | Passed | Type Test<br>Aging performed 100C for 1488 hrs<br>TEC Report No. 517-TR-03 April 1982<br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Review complete (r)<br>Note: These tag numbers are the result of TMI plant modification<br>Scheduled Completion Date<br>July 30, 1983 |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 33 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Acoustic Monitors<br>MSSS<br>(cont) | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. BBN424ISO<br>System: Main Steam<br>Tag Nos.<br>J-SGE-ZE-712<br>J-SGE-ZE-713<br>J-SGE-ZE-714<br>J-SGE-ZE-715 | | | | | | | | Review complete(r)<br>Scheduled Completion Date<br>July 30, 1983 |

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## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 34 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Acoustic Monitors | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. 424-C2 | Temperature 300F | Temperature 510 peak | 30 days | 33 days | N/A | N/A | Type Test<br>Aging performed: 100C for 1988 hrs<br>TEC Report No. 517-TR-03 April, 1982<br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Review complete(r)<br>Note: This material added as the result of TMI plat modification<br>Scheduled Completion Date<br>July 30, 1983 |
| MSSS | | System: SG<br>Tag No. N/A<br>20 cables approximately 150 feet each in length | Pressure 21 psig | Pressure 92 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $1 \times 10^6$ rads | Radiation $2.2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray N/A | Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.5 to 7.5 with $NaPO_4$ | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. II | | | | | | | |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 35 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Acoustic Monitors<br>Containment | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. 2273AMI<br>System: RCS<br>Tag Nos. J-RCE-ZE-726<br>J-RCE-ZE-727<br>J-RCE-ZE-728<br>J-RCE-ZE-729 | Temperature 370F peak See fig. 3.1-1 | Temperature 510F peak | 30 days | 33 days | Charge sensitivity 10.0 ±1pC/g<br>Voltage sensitivity 12mV/g<br>Transverse sensitivity 3% maximum | Passed | Type Test<br>Aging performed: 100C for 1488 hrs<br>TEC Report No. 517-TR-03 April 1982<br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Review complete(r)<br>Note: These tag numbers are the result of TMI plant modification<br>Scheduled Completion Date<br>July 30, 1983 |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 92 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2.2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.5 to 7.5 with $NaPO_3$ (j) | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 36 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Preamplifier<br>Containment | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. TEC-504A<br>System: RCS J-RCE-ZY-726 J-RCE-ZY-727 J-RCE-ZY-728 J-RCE-ZY-729 | Temperature 370F peak See fig. 3.1-1 | Temperature 510F peak | 30 days | 33 days | Bias Voltage 18V ±1V<br>Gain 2mV/pC ±5%<br>Dynamic Range 10V pp-min<br>Low Frequency 130-390 Hz<br>High Frequency 1 MHz/min | Bias Voltage 17.83V<br>Gain 2.02 mV/pC<br>Dynamic Range 13.0 pp-min<br>Low Frequency 385 Hz<br>High Frequency >1MHz/min | Type Test<br>Aging Performed: 100C for 1488 hrs<br>TEC Report No. 517-TR-03 April, 1982<br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Review complete(r)<br>Note: These tag numbers are the result of TMI plant modification<br>Scheduled Completion Date<br>July 30, 1983 |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 92 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2.2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.5 to 7.5 with $NaPO_4$ (j) | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

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## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 37 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Transient Shield<br>Containment | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. TEC-160-2<br>System: RCS<br>Tag Nos. J-RCN-E03 J-RCN-E06 | Temperature 370F peak See fig. 3.1-1 | Temperature 510F peak | 30 days | 33 days | N/A | N/A | Type Test qualified similarity to TEC-160<br>Aging performed: 100C for 672 hrs<br>TEC Report No. 517-TR-03 April, 1982<br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Review complete(r)<br>Note: These tag numbers are the result of TMI plant modifications.<br>Scheduled Completion Date<br>July 30, 1983 |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 92 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $2.2 \times 10^8$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.5 to 7.5 with $NaPO_4$ (j) | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 38 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Radiation Resistant Cable<br>Containment | Technology for Energy Corp. (P.O. No. 13-JM-366) | Model No. 2273-C2<br>System: RCS<br>Tag Nos.<br>N/A<br>Four cables approximately 75 feet each in length<br>XLPE insulation hypalon jacket | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig peak See fig. 3.1-2<br>Relative Humidity Steam/air mixture<br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence N/A<br>Env. Desig. I | Temperature 510F peak<br>Pressure 92 psig peak<br>Relative Humidity 100% (b)<br>Radiation $2.2 \times 10^8$ rads<br>Chemical Spray 13,000-14,000 ppm $H_3BO_3$ 50-70 ppm $N_2H_4$ pH = 4.7-7.5 with $NaPO_4$ (j)<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test<br>Aging performed: 100C for 1488 hrs<br>TEC Report No. 517-TR-03 April, 1982<br>BPC Log No. 13-10407-J366-292-1 Sept. 17, 1982 | Review complete(r)<br>Note: This material is the result of TMI plant modifications.<br>Scheduled Completion Date<br>July 30, 1983 |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 39 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter<br>Containment | Transamerica Delaval Gems Sensors (P.O. No. 13-JM-475 | Model No. XM-54854<br>System: RWDS<br>Tag Nos. J-RDE-LE-410<br>J-RDE-LE-411 | Temperature 370F peak See fig. 3.1-1 | Temperature 450F peak | 30 days | 30 days subjected to simulated LOCA/MSLB with Chemical Spray Comp. Boric Acid Sodium Thiosulfate Sodium Hydroxide | 3% of full scale | 3% of full scale | Wyle Test Report 45700-1 Dec. 8,. 1982<br>BPC Log No. JM-475-16-1 May 6, 1983 | Review complete(o)<br>Note: These tag numbers are the result of TMI plant modifications.<br>Scheduled Completion Date June 30, 1983 |
| | | | Pressure 60 psig peak See fig. 3.1-2 | Pressure 65 psig peak | | | | | | |
| | | System: SIS Model No. XM-54852<br>Tag Nos. J-SIA-LE-706A J-SIB-LE-707A<br>Model No. XM-54853<br>Tag Nos. J-SIA-LE-706B J-SIB-LE-707B | Relative Humidity Steam/air mixture | Relative Humidity Steam/air mixture | | | | | | |
| | | | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $1.16 \times 10^8$ rads T.I.D | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Submergence Test Chamber filled with Chem. Solution and pressurized to 6.5-7.0 psig and maintained for 30 minutes | | | | | | |
| | | | Submergence Yes | | | | | | | |
| | | | Env. Desig. I | | | | | | | |

REVIEW TECHNIQUE

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 40 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Switch<br>Auxiliary Bldg<br>MSSS Elev. 80' | Magnetrol (P.O. No. 13-JM-481) | Model No. FLS-X-MPX-SIMD4DC<br>System: RWDS<br>Tag Nos. J-RDA-LSH-147, J-RDB-LSH-148, J-RDA-LSH-149, J-RDB-LSH-150, J-RDA-LSH-151, J-RDB-LSH-152<br>System: MSSS HVAC Bldg<br>Tag Nos. J-HAA-LSH-125A, J-HAA-LSH-125B, J-HAA-LSH-126A, J-HAA-LSH-126B | Temperature 28 to 120F<br>Pressure 0 psig<br>Relative Humidity 20 to 90%<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A N/A<br>Env. Desig. II, III | Temperature 120F peak<br>Pressure 0 psig<br>Relative Humidity 100% (f)<br>Radiation $1.0 \times 10^7$ min rads<br>Chemical Spray N/A<br>Submergence Switch placed in pressure vessel, submerged in water and pressurized for 180 min at 104 psig.<br>Leakage was 4.2 milliliters of water | 30 days | 30 days (h)<br>Post-Functional Tests:<br>Switch insulation resistance<br>Switch contact resistance<br>Switch verified at operation verified at operating temperatures and pressures as indicated on Magnetrol Dwg. No. SKC-3013 sheets 1-5 | N/A | N/A | Type Test<br>Qualified by similarity to model BCS-751-EP/VPX-SIMD4DC<br>Thermal aging 160 hours at 300F 480 hours at 100F and 95%-100% RH<br>Mechanical cycling 10,000 cycles<br>Magnetrol Report No. M131830-102/202 Sept. 8, 1981<br>Wyle Report No. 43235-1,<br>BPC Log No. 13-10407-J481-10-2 Sept. 18, 1981<br>13-10407-J481-13-2 Aug. 11, 1982 | Qualified for 40 years except for microswitch, qualified for 5 years<br>May 2, 1977 |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 41 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| RTD's and Thermocouples<br><br>Containment Bldg<br><br>Auxiliary Bldg | Weed Inst. Company (P.O. No. 13-JM-556) | Model Nos. RTD's 611-18-C4-C-2-A2-0 TC's K28250G<br><br>System: Safety Injection<br>Tag Nos.<br>J-S1A-TE-712<br>J-S1B-TE-713<br><br>System: Essential Cooling Water<br>Tag Nos.<br>J-EWA-TE-083<br>J-EWB-TE-084 | Temperature 370F peak See fig. 3.1-1<br><br>Pressure 60 psig peak See fig. 3.1-2<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes, see table 4.1-3<br><br>Submergence N/A<br><br>Env. Desig. I, III | Temperature 485F peak<br><br>Pressure 70 psig<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $3.03 \times 10^8$ rads<br><br>Chemical Spray 80-110 ppm $N_2H_4$ 11,000-13,000 ppm $H_3BO_3$ pH = 4.0 11.0 $Na_2PO_3$ (d)<br><br>Submergence N/A | 30 days | 30 days minimum temperature used throughout LOCA was 300F continuous | Accuracy of the RTD shall be ±0.30C (+0.50F) or ±1/2 percent of the reading, whichever is greater.<br><br>Time constant based upon a 63 percent response to a step temperature change | Passed | Type Test<br><br>Aging performed at 304F for 724 hrs<br><br>NTS Report No. 548-8854-2 March 1, 1982<br><br>BPC Log No. 13-10407-J556-89-1 March 25, 1982 | Review complete(s)<br><br>TMI related tag numbers<br><br>Scheduled Completion Date<br><br>July 30, 1983 |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 42 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| D.C. Motor-Operated Valve Actuator<br>MSSS below 100' | Control Components Inc. (P.O. No. 13-JM-601A) | Limitorque Model No SB-00-10<br>System: AFS<br>Tag Nos. J-AFA-HV-32 J-AFC-HV-33 | Temperature 28-120F | Temperature 340F peak | 30 days | 33 days | None | N/A | Type Test and Analysis<br>Qualified per Limitorque Report No. B-0058 | Qualified for 40 yrs with maintenance |
| | | | Pressure 0 psig | Pressure 105 psig peak | | | | | | |
| | | | Relative Humidity 20-90% | Relative Humidity 100% (f) | | | | | | |
| | | | Radiation $1 \times 10^5$ rads | Radiation $1 \times 10^7$ rads | | | | | | |
| | | | Chemical Spray N/A | Chemical Spray N/A | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. II | | | | | | | |

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Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 43 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| AC Motor-Operated Valve Actuator<br>MSSS below 100' | Control Components Inc. (P.O. No. 13-JM-601A) | Limitorque Model No. SB-00-10<br>System: AFS<br>Tag Nos. J-AFB-HV-30 J-AFB-HV-31 | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 250F peak<br>Pressure 25 psig peak<br>Relative Humidity 100% (f)<br>Radiation $2 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | None | N/A | Type Test<br>Limitorque Report.No. B0058 Jan. 11, 1981<br>BPC Log No. 13-10407-P221B-349-1 March 4, 1981 | Qualified for 40 yrs with maintenance |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 44 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Position Transmitters<br>MSSS | Control Components Inc. (P.O. No. 13-JM-601A) | Schaevitz Model No. HPA-10000<br>System: MSS<br>Tag Nos.<br>J-SGB-ZT-178<br>J-SGA-ZT-179<br>J-SGA-ZT-184<br>J-SGB-ZT-185 | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 315F peak<br>Pressure 21 psig peak<br>Relative Humidity 100% (b)<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | Later | N/A | N/A | Type Test and Analysis<br>To be thermally aged at 130C for 100 hours<br>Wyle Laboratories Qualification Plan<br>BPC Log No. 13-10407-J601A | Not qualified (t)<br>Scheduled Completion Date<br>Aug. 30, 1983 |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 45 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switch<br>MSSS | Control Components Inc. (P.O. No. 13-JM-601A) | Namco Model No. EA 180<br>System: MSS<br>Valve Tag No.<br>J-SGB-HV-178<br>J-SGA-HV 179<br>J-SGA-HV 184<br>J-SGB-HV-185<br>2/Valve | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 415F peak<br>Pressure 70 psig peak<br>Relative Humidity 100% (b)<br>Radiation $8.8 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 110 ppm $NH_3$, pH 2.0-9.0<br>Submergence N/A | 30 days | 33 days | None | N/A | Type Test and Analysis<br>BPC Log No. 13-10407-J601A-134-1, 115-4 July 13, 1981 Sept. 25, 1981<br>Qualified by CE Namco program. 14273-ICE-5732 | Qualified for 1.4 years with maintenance parts<br>Replacement of cam-lok connector thread sealant every 1.4 years and limit switch terminal block every 8 years will provide for qualification to 40 years |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 46 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valves<br>MSSS | Control Components Inc. (P.O. No. 13-JM-601A) | ASCO Model No. 206-381-44<br>System: MSS<br>Tag Nos.<br>J-SGB-HY-178A<br>J-SGD-HY-178B<br>J-SGB-HY-178H<br>J-SGD-HY-178I<br>J-SGA-HY-179A<br>J-SGC-HY-179B<br>J-SGA-HY-179H<br>J-SGC-HY-179I<br>J-SGA-HY-184A<br>J-SGC-HY-184B<br>J-SFA-HY-184H<br>J-SGC-HY-184I<br>J-SGB-HY-185A<br>J-SGD-HY-185B<br>J-SGB-HY-185H<br>J-SGD-HY-185I | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 450 peak<br>Pressure 78 psig peak<br>Relative Humidity 100% (b)<br>Radiation $1.82 \times 10^8$ $\lambda$<br>$1.1 \times 10^8$ $\beta$<br>Chemical Spray 6626 ppm 196 ppm $N_2H_4$ pH 7.0-8.5<br>Submergence N/A | 30 days | 33 days<br>Valves cycled throughout LOCA test with baseline functional tests conducted following LOCA<br>Passed all tests | N/A | N/A | Type Test and Analysis<br>ASCO Report No. AQS-216 78/TR & AQR-67368 Rev. 0 & C-E letter V-PAK-250<br>BPC Log No. 13-10407-J601A-137--1, 115-4 Dec. 9, 1981, Sept. 25, 1981 | Qualified for 40 yrs with maintenance. |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 47 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve<br>Containment | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-002<br>System: HVAC-Cont.<br>Tag Nos. J-HCB-UV-44<br>J-HCB-UV-47 | Temperature 370F peak See fig. 3.1-1 | Temperature 385F peak | 30 days | 30 days (h) | N/A | N/A | Type Test<br>Aged for 792 hours at 350F<br>Valves cycled 18,000 times<br>BPC Log No. 13-10407-J603-95-9 Oct. 6, 1982<br>BPC Log No. 13-10407-174-2 Jan. 25, 1983 | Review complete(u)<br>Scheduled Completion Date<br>June 30, 1983 |
| | | | Pressure 60 psig See fig. 3.1-2 | Pressure 66 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity Steam/air mixture | | | | | | |
| | | Model No. 76HH-008<br>System: RCS<br>Tag No. J-RCA-HV-101<br>J-RCB-HV-102<br>J-RCA-HV-103<br>J-RCB-HV-105<br>J-RCA-HV-106 | Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta | Radiation $3.53 \times 10^7$ rads | | | | | | |
| | | | Chemical Spray Yes See table 4.1-3 | Chemical Spray 6200 ppm boric acid 50 ppm $N_2H_4$ pH = 8.6 to 10 with $Na_3PO_4$ (d) | | | | | | |
| | | | Submergence No | Submergence N/A | | | | | | |
| | | | Env. Desig. I | | | | | | | |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 48 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve<br>Auxiliary Bldg | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-009-010<br>System: SIS<br>Tag No. J-SIB-UV-710<br>J-SIA-UV-709<br>J-SIA-UV-708<br>System: CVCS<br>Tag No. J-CHB-UV-924<br>Model No. 76HH-020, 76HH-021 76HH-023<br>System: SCS<br>Tag No. J-GAA-UV-1<br>J-GAA-UV-2<br>System: SIAS<br>Tag No. J-IAA-UV-2<br>(cont) | Temperature 50 to 104F<br>Pressure 0 psig<br>Relative Humidity 20 to 90%<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 385F peak<br>Pressure 66 psig peak<br>Relative Humidity Steam/air mixture<br>Radiation $3.53 \times 10^7$ rads<br>Chemical Spray 6200 ppm boric acid 50 ppm $N_2H_4$ pH = 8.6 to 10 with $Na_3PO_4$ (d)<br>Submergence N/A | 30 days | 30 days (h) | N/A | N/A | Type Test<br>Aged for 792 hours at 350F<br>Valves cycled 18,000 times<br>BPC Log No. 13-10407-J603-95-9 dated Oct. 6, 1982<br>BPC Log No. 13-10407-174-2 Jan. 25, 1983 | Review complete(u)<br>Scheduled Completion Date<br>June 30, 1983 |

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# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 49 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve<br>Auxiliary Bldg<br>(cont) | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-005<br>System: CHCS<br>Tag No. J-HPB-HV-8B | Temperature 50 to 104F<br>Pressure 0 psig<br>Relative Humidity 20 to 90% | Temperature 385F peak<br>Pressure 66 psig peak<br>Relative Humidity Steam/air mixture | 30 days | 30 days (h) | N/A | N/A | Type Test<br>Aged for 792 hours at 350F<br>Valves cycled 18,000 times<br>BPC Log No. 13-10407-J603-95-9, Oct. 6, 1982<br>BPC Log No. 13-10407-174-2 Jan. 25, 1983 | Review complete(u)<br>Scheduled Completion Date<br>June 30, 1983 |
| | | Model No. 76HH-005<br>System: CHCS<br>Tag Nos. J-HPA-HV-7A J-HPB-HV-8A | Radiation $10^6$ rads<br>Chemical Spray N/A | Radiation $3.53 \times 10^7$ rads<br>Chemical Spray 6200 ppm boric acid 50 ppm $N_2H_4$ pH = 8.6 to 10 with $Na_3PO_4$ (d) | | | | | | |
| | | Model No. 76HH-003<br>System: HVAC-Cont Bldg J-HCA-HV-74 J-HCC-HV-76 J-HCB-HV-75 J-HCD-HV-77 | Submergence N/A<br>Env. Desig. III | Submergence N/A | | | | | | |
| | | Model No. 76HH-005<br>System: CHCS<br>Tag No. J-HPA-HV-703 | | | | | | | | |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 50 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve (cont)<br>Auxiliary Bldg | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76-HH-009<br>76-HH-011<br>76-HH-013<br>System: RWDS<br>Tag No. J-RDB-UV-407<br>System: CHCS<br>Tag Nos. J-HPA-UV-23<br>J-HPA-UV-24<br>System: GRS<br>J-GRB-UV-2<br>Model No. 76HH-002<br>System: HVAC-Cont Bldg<br>Tag Nos. J-HCA-UV-46<br>J-HCA-UV-45 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | Temperature 385F peak<br>Pressure 66 psig peak<br>Relative Humidity Steam/air mixture<br>Radiation $3.53 \times 10^7$ rads<br>Chemical Spray 6200 ppm boric acid 50 ppm $N_2H_4$ pH = 8.6 to 10 with $Na_3PO_4$ (d)<br>Submergence N/A | 30 days | 30 days (h) | N/A | N/A | Type Test<br>Aged for 792 hours at 350F<br>Valves cycled 18,000 times<br>BPC Log No. 13-10407-J603-95-9, Oct. 6, 1982<br>BPC Log No. 13-10407-174-2 Jan. 25, 1983 | Review complete(u)<br>Scheduled Completion Date<br>June 30, 1983 |

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Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 51 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve (cont)<br>Auxiliary Bldg | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-001<br>System: ECWS<br>Tag Nos. J-EWA-LV-91<br>J-EWB-LV-92 | | | | | | | | |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 52 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve<br>MSSS | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-007<br>System: SG<br>Tag No.<br>JSGB-PV--306A<br>JSGB-PV--306B<br>JSGA-PV-313A<br>JSGA-PV-313B | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mix<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 385F peak<br>Pressure 66 psig peak<br>Relative Humidity Steam/air mixture<br>Radiation $3.53 \times 10^7$ rads<br>Chemical Spray 6200 ppm boric acid 50 ppm $N_2H_4$ pH = 8.6 to 10 with $Na_3PO_4$ (d)<br>Submergence N/A | 30 days | 30 days (h) | N/A | N/A | Type Test<br>Aged for 792 hours at 350F<br>Valves cycled 18,000 times<br>BPC Log No. 13-10407-J603-95-9 dated Oct. 6, 1982<br>BPC Log No. 13-10407-174-2 Jan 25, 1983 | Review complete(u)<br>Scheduled Completion Date<br>June 30, 1983 |

REVIEW TECHNIQUE

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 53 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valve<br>MSSS | Target Rock Corp. (P.O. No. 13-JM-603) | Model No. 76HH-008<br>System: SG<br>Tag No.<br>J-SGA-UV-1133<br>J-SGA-UV-1134<br>J-SGB-UV-1135A<br>J-SGB-UV-1135B<br>J-SGB-UV-1136A<br>J-SGB-UV-1136B | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mix<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 385F peak<br>Pressure 66 psig peak<br>Relative Humidity Steam/air mixture<br>Radiation $3.53 \times 10^7$ rads<br>Chemical Spray 6200 ppm boric acid 50 ppm $N_2H_4$ pH = 8.6 to 10 with $Na_3PO_4$ (d)<br>Submergence N/A | 30 days | 30 days (h) | N/A | N/A | Type Test<br>Aged for 792 hours at 350F<br>Valves cycled 18,000 times<br>BPC Log No. 13-10407-J603-95-9 dated Oct. 6, 1982<br>BPC Log No. 13-10407-174-2 Jan. 25, 1983 | Review complete(u)<br>Scheduled Completion Date<br>June 30, 1983 |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 54 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Valve AC Motor Operator<br>Auxiliary Bldg | Henry Pratt (P.O. No. 13-JM-605) | Limitorque Motor: SMB-00-2 Actuator: HlBC<br>System: ECWS Tag Nos. J-EWA-UV-145 J-EWA-UV-65<br>System: NCWS Tag Nos. J-NCB-UV-401 J-NCA-UV-402<br>System: CPS Valve Tag No. J-CPA-UV-2A J-CPB-UV-3B J-CPA-UV-4A J-CPB-UV-5B | Temperature 50 to 104F<br>Pressure 0 psig<br>Relative Humidity 20 to 90%<br>Radiation $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 250 peak<br>Pressure 25 psig peak<br>Relative Humidity 100% (f)<br>Radiation $2 \times 10^7$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | None | None | Type Test & Analysis<br>Limitorque test report B-0058 | Qualified for 40 years with maintenance |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 55 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Valve AC Motor Operator<br>Containment | Henry Pratt (P.O. No. 13-JM-605) | Limitorque Motor: SMB-00-40 Actuator: H3BC<br>System: CPS Valve Tag No. J-CPA-UV-2B J-CPB-UV-3A<br>Limitorque: Motor: SMB-005 Actuator: H1BC<br>System: CPS Valve Tag No. J-CPA-UV-4B J-CPB-UV-5A<br>Limitorque Motor: SMB-00-2 Actuator H1BC:<br>System: NCWS Tag No. J-NCB-UV-403 | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig peak See fig. 3.1-2<br>Relative Humidity Steam/air mixture<br>Radiation $3.3 \times 10^7$ rads-gamma $1 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence N/A<br>Env. Desig. I | Type testing in progress | 30 days | Type testing in progress | None | N/A | Type Test and analysis per Limitorque Report B0058 and future amendments | Not qualified (v) Scheduled Completion Date Sept. 30, 1983 |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 56 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Auxiliary Feedwater Pump Motor<br>MSSS | Bingham-Willamette (P.O. No. 13-MM-021) | Westinghouse Model No. 4x6x10½B MSD-8 STG Tag No. M-AFB-P01 | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 120F peak<br>Pressure 0 psig<br>Humidity 20-100%<br>Radiation $2 \times 10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test and analysis<br>Westinghouse Report No. WCAP-8754 Rev. 1<br>BPC Log No. 13-10407-M021-N001-11.05-14-2. June 3, 1982 | Qualified for 40 years |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 57 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Auxiliary Feedwater Pumps GS-type Turbine Electronic Control Systems<br>MSSS | Bingham-Willamette Company (P.O. No. 13-MM-021) | Panel and Auxiliaries Custom-Built Tag No. M-AFA-E01 | Temperature 28 to 120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 137F<br>Pressure 0 psig<br>Humidity 95% (note f)<br>Radiation $1.1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | In progress | Later | Later | Type Test<br>Non-metallic components to be aged to 40 year life except for GPD Relay (10 years) and Limitorque valve operator (5 year)<br>Wyle Qualification Test Plan No. 57595. Oct. 1, 1982.<br>BPC Log No. 13-10407-M021-185-2 Nov. 12, 1982 | Not qualified (w)<br>To be qualified for 40 years except GPDNQ relays (10 years) and Limitorque valve operators (5 years)<br>Scheduled Completion Date<br>December 30, 1983 |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 58 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Auxiliary Feedwater Pumps | | Limitorque Model No. SMB-000<br>System AF<br>Tag No. AFA-HV-54 | Temperature 28 to 120F | Temperature 340F peak | 30 days | 33 days | None | N/A | Type Test<br>Limitorque test report B-0058 | Qualified for 40 years with maintenance |
| | | | Pressure 0 psig | Pressure 105 psig peak | | | | | | |
| | | | Relative Humidity 20-90% | Relative Humidity 100% (f) | | | | | | |
| | | | Radiation $1 \times 10^5$ rads | Radiation $1 \times 10^7$ rads | | | | | | |
| | | | Chemical Spray N/A | Chemical Spray N/A | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. II | | | | | | | |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 59 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Essential Cooling Water System Motor<br>Auxiliary Building<br>Fuel Pool Cooling Pumps<br>Fuel Bldg | Westinghouse Elect. Corp. (P.O. No. 13-MM-093) | Motor: HSWF Frame 6808L<br>System: ECWS Tag Nos. MEWAP01 MEWBP01<br>System: Fuel Pool Cooling Tag Nos. MPCAP01 MPCBP01 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III, VI | Temperature 104F<br>Pressure 0 psig<br>Relative Humidity 100% (f)<br>Radiation $2 \times 10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test and analysis<br>Westinghouse Electric Corporation Report No. WCAP-8754, Rev. 1 Sept. 21, 1982<br>BPC Log No. 13-10407-MM-093-235-2 Oct. 7, 1981 | Qualified for 40 years |

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 60 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Pressure Transmitter<br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Rosemount 1152GP-0-A-92-PB<br>System: MSS<br>Tag Nos.<br>J-SGA-PT-229<br>J-SGB-PT-230<br>J-SGA-PT-231<br>J-SGB-PT-232<br>J-SGA-PT-233<br>J-SGB-PT-234<br>J-SGA-PT-235<br>J-SGB-PT-236 | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/air mixture<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 350F peak<br>Pressure 70 psig peak<br>Relative Humidity Steam/air mixture<br>Radiation $5.0 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days (h)<br>Functional test during accident<br>Post functional test | N/A | Accuracy post functional test 0.5% of full scale | Type Test<br>2 cycles of 100F,-1 hour; 0F, 1 hour; 200F, 1 hour; 100F, 1 hour<br>Anchor Darling Report No. E9023-QR-2 Rev. A, April 15, 1980<br>RMT Report No. 117415 Sept. 24, 1975<br>Bechtel Log No. 13-10407-M234A-68-2, April 24, 1980 | Review complete(x)<br>Scheduled Completion Date<br>June 30, 1983 |

REVIEW TECHNIQUE

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 61 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Limit Switch<br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Namco EA180<br>System: MSS Valve Tag Nos. J-SGE-UV-170 J-SGE-UV-171 J-SGE-UV-180 J-SGE-UV-181<br>(6/valve) | Temperature 300F | Temperature 415F peak | 30 days | 33 days | None | N/A | Type Test<br>BPC Log No. 13-10407-J601A-134-1<br>Qualified by C-E Namco Program 14273-PE-5732 | Qualified for 1.4 years with maintenance<br>Replacement of cam-lok connector thread sealant every 1.4 years and limit switch terminal block every 8 years will provide for qualification to 40 years |
| | | | Pressure 21 psig | Pressure 70 psig peak | | | | | | |
| | | | Relative Humidity Steam/Air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $1 \times 10^6$ rads | Radiation $8.8 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$ | | | | | | |
| | | | Chemical Spray N/A | Chemical Spray 4400 ppm boron as $H_3BO_3$, 110 ppm $NH_3$, pH 7.0-9,0 | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. II | | | | | | | |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 62 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| FWIV Pressure Transmitter<br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Rosemount 1152GP-0 -A-92-PB<br>System: MSS<br>Tag Nos. J-SGA-PT-237A<br>J-SGA-PT-237B<br>J-SGA-PT-238A<br>J-SGA-PT-238B<br>J-SGB-PT-239A<br>J-SGB-PT-239B<br>J-SGB-PT-240A<br>J-SGB-PT-240B | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity Steam/Air mixture<br>Radiation 1 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 350F peak<br>Pressure 70 psig<br>Relative Humidity Steam/Air mixture<br>Radiation 5.0 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days (h)<br>Functional test during accident<br>Post functional test | N/A | Accuracy Post functional test 0.5% of full scale | Type Test<br>2 cycles of 100F, 1 hour; 0F, 1 hour; 200F, 1 hour; 100F, 1 hour<br>Anchor/ Darling Report No. E9023-QR-2 Rev. A, April 15, 1980<br>RMT Report No. 117415, September 24, 1975<br>BPC Log No. 13-10407-M234A-68-2, April 24, 1980 | Review complete(x)<br>Scheduled Completion Date<br>June 30, 1983 |

REVIEW TECHNIQUE

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 63 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| FWIV Solenoid Valve<br><br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Skinner V5H65590 -125VDC<br><br>System: MSS<br><br>Tag Nos. J-SGB-UY-132B J-SGB-UY-132D J-SGB-UY-137B J-SGB-UY-137D J-SGA-UY-174B J-SGA-UY-174D J-SGA-UY-177B J-SGA-UY-177D | Temperature 300F<br><br>Pressure 21 psig<br><br>Relative Humidity Steam/air mixture<br><br>Radiation 1 x $10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 328F peak<br><br>Pressure 21 psig<br><br>Relative Humidity Steam/air mixture<br><br>Radiation 2.5 x $10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 30 days (h)<br><br>Functional test during accident<br><br>Post functional test | N/A | N/A | Type Test<br><br>Cyclic aging full stroke 100 cycles<br><br>Exercise 150 cycles<br><br>Thermal aging 121C for 317.6 hours<br><br>Anchor/ Darling Report No. E9023-QR-2, Rev. A, April 15, 1980<br><br>Wyle Test Report 43847-2, May 23, 1978<br><br>BPC Log No. 13-10407-M234A-68-3 Oct. 28, 1980 | Review completed(y)<br><br>Scheduled Completion Date<br><br>June 30, 1983 |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 64 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| FWIV Solenoid Valve (cont) | | Skinner V5H65600 -125VDC<br>System: MSS<br>Tag Nos. J-SGB-UY-132A, J-SGB-UY-132C, J-SGB-UY-137A, J-SGB-UY-137C, J-SGA-UY-174A, J-SGA-UY-174C, J-SGA-UY-177A, J-SGA-UY-177C | | | | | | | | |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 65 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| FWIV Limit Switch<br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Namco EA180<br>System: MSS<br>Tag Nos. J-SGA-UV-174 J-SGA-UV-177 J-SGB-UV-132 J-SGB-UV-137<br>(3/valve) | Temperature 300F | Temperature 415F Peak | 30 days | 33 days | N/A | N/A | Type Test<br>BPC Log No. 13-10407-J601A-134-1<br>Qualified by C-E Namco program 14273-ICE-5732 | Qualified for 1.4 years with maintenance<br>Replacement of cam-lok connector thread sealant every 1.4 years and limit switch terminal block every 8 years will provide for qualification to 40 years |
| | | | Pressure 21 psig | Pressure 70 psig peak | | | | | | |
| | | | Relative Humidity Steam/air mixture | Relative Humidity 100% (b) | | | | | | |
| | | | Radiation $1 \times 10^6$ rads | Radiation $8.8 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$ | | | | | | |
| | | | Chemical Spray N/A | Chemical Spray 4400 ppm boron as $H_3BO_3$, 110 ppm $NH_3$, pH 7.0-9.0 | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. II | | | | | | | |

REVIEW TECHNIQUE

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 66 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Solenoid Valve<br><br>MSSS | Anchor/ Darling (P.O. No. 13-MM-234A) | Skinner V5H65590 -125 VDC<br><br>System: MSS<br>Tag Nos. J-SGB-UY -170B J-SGB-UY -170D J-SGB-UY -170F J-SGB-UY -170H J-SGA-UY -171B J-SGA-UY -171D J-SGA-UY -171F J-SGA-UY -171H J-SGA-UY -180B J-SGA-UY -180D | Temperature 300F<br><br>Pressure 21 psig<br><br>Relative Humidity Steam/air mixture<br><br>Radiation $10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 328F peak<br><br>Pressure 21 psig<br><br>Relative Humidity Saturated steam/air mixture<br><br>Radiation $2.5 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 30 days (h)<br><br>Functional test during accident<br><br>Post functional test | N/A | N/A | Type Test<br><br>Cyclic aging full stroke 100 cycles<br><br>Exercise 150 cycles<br><br>Thermal aging 317.6 hours at 121C<br><br>Anchor/ Darling Report No. E9023-QR-2, Rev. A, April 15, 1980<br><br>Wyle Test Report No. 43847-2, May 23, 1978<br>BPC Log No. 13-1040-7-M234A-68-2, April 24, 1980 | Review complete(y)<br><br>Scheduled Completion Date<br><br>June 30, 1983 |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 67 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Solenoid Valve (cont) | | J-SGA-UY -180F<br>J-SGA-UY -180H<br>J-SGB-UY -181B<br>J-SGB-UY -181D<br>J-SGB-UY -181F<br>J-SGB-UY -181H | | | | | | | | |
| | | Skinner V5H65600 125 VDC | | | | | | | | |
| | | System: MSS<br>Tag Nos.<br>J-SGB-UY -170A<br>J-SGB-UY -170C<br>J-SGB-UY -170E<br>J-SGB-UY -170G | | | | | | | | |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 68 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| MSIV Solenoid Valve (cont) | | J-SGA-UY -171A<br>J-SGA-UY -171C<br>J-SGA-UY -171E<br>J-SGA-UY -171G<br>J-SGA-UY -180A<br>J-SGA-UY -180C<br>J-SGA-UY -180E<br>J-SGA-UY -180G<br>J-SGB-UY -181A<br>J-SGB-UY -181C<br>J-SGB-UY -181E<br>J-SGB-UY -181G | | | | | | | | |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 69 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Electric Low-Leakage Damper Actuator<br><br>Auxiliary Bldg.<br><br>MSSS Elev. 80'<br><br>Fuel Bldg. | Waldinger Corp. (P.O. No. 13-MM-598) | Model No. ITT NH95<br><br>System: CHCS<br>Tag Nos.<br>MHPAM02<br>MHPBM01<br>MHPBM02<br>MHPAM01<br><br>System: HVAC MSSS Bldg<br>Tag Nos.<br>MHAAM214<br>MHABM215<br>MHAAM216<br>MHABM217<br><br>System HVAC Fuel Bldg<br>Tag Nos.<br>MHFAM05<br>MHFBM05<br>MHFAM06<br>MHFBM06 | Temperature 28-120F<br><br>Pressure 0 psig<br><br>Humidity 20-90%<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II, III, IV | Temperature 135F peak<br><br>Pressure 0 psig<br><br>Humidity 100% RH (f)<br><br>Radiation $1.16 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 30 days (h)<br><br>Post Seismic Extreme Environmental Test: 8 hrs at 40F and 8 hrs at 135F specimens cycled six times at each specified temperature | Close Response time not reported<br><br>(ab) | Report States that test units passed extreme environmental functionals | Type Test Aging Performed: 648 hrs at 212F<br><br>Total mechanical cyclic aging: 2800 cycles<br><br>Wyle Report No. 58551 Sept. 22, 1982 BPC Log No. 13-10-407-M598-1712-2<br><br>M598-1715-3 Oct. 5, 1982 | Review complete(r)<br><br>Scheduled Completion Date<br><br>June 30, 1983 |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 70 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pneumatic Low-Leakage Damper Motor<br>Auxiliary Bldg.<br>Fuel Bldg. | Waldinger Corp. (P.O. No. 13-MM-598) | Model No. Fisher 656<br>System: HVAC - Auxiliary Bldg.<br>Tag Nos.<br>M-HAA-M01<br>M-HAA-M02<br>M-HAA-M03<br>M-HAA-M04<br>M-HAA-M05<br>M-HAA-M06<br>M-HAB-M01<br>M-HAB-M02<br>M-HAB-M03<br>M-HAB-M04<br>M-HAB-M05<br>M-HAB-M06<br>System: HVAC Fuel Bldg.<br>Tag Nos.<br>M-HFA-M01<br>M-HFB-M01<br>M-HFA-M02<br>M-HFB-M02<br>M-HFA-M03<br>M-HFB-M03<br>M-HFA-M04<br>M-HFB-M04 | Temperature 50-104F<br>Pressure 0 psig<br>Humidity 20-90%<br>Radiation 1 x $10^6$<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III, VI | Temperature 135F peak<br>Pressure 0 psig<br>Humidity 100% RH (f)<br>Radiation 1.27 x $10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 30 days (h)<br>Post Seismic Extreme Environmental Test: 8 hrs at 40F and 8 hrs at 135F<br>Specimens cycled 6 times at each specified temperature. | Fisher 656-30 Receiving Test.<br>Open: 5.8 to 7.2 sec.<br>Close: 1.5 to 2 sec.<br>Fisher 656-40 Receiving Test. BPC<br>Open: 13.5 to 15 sec.<br>Close: 4 sec.<br>(ab) | Fisher 656-30 Reported Results<br>Open: pass<br>Close: pass<br>Fisher 656-40 Reported Results<br>Open: pass<br>Close: pass | Type Test Aging performed 648 hrs at 212F.<br>Total mechanical cyclic aging: 2800 cycles<br>Wyle Report No. 58551 Sept. 22, 1982<br>Log No. 13-10407-M598-1712-2<br>M598-1715-3 Oct. 5, 1982 | Review complete(r)<br>Scheduled Completion Date<br>June 30, 1983 |

REVIEW TECHNIQUE

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 71 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valves<br><br>Auxiliary Bldg.<br><br>Fuel Bldg. | Waldinger (P.O. No. 13-MM-598) | Automatic Switch Company Model No. NP8320 | Temperature 50 to 104F | Temperature 450 peak | 30 days | 33 days | N/A | N/A | Type Test<br><br>ASCO Report No. AQS-21678/TR Rev. A & AQR 67368 Rev. 0 C-E Program 14273-KE-5734 & C-E Letter V-PAK-250 | Review complete(r)<br><br>Scheduled Completion Date<br><br>June 30, 1983 |
| | | | Pressure 0 psig | Pressure 78 psig | | | | | | |
| | | System: HVAC-Aux. Bldg. Tag Nos. J-HAA-UY-114 J-HAB-UY-115 J-HAA-UY-112 J-HAB-UY-113 J-HAA-UY-125 J-HAB-UY-126<br><br>Fuel Bldg. Tag Nos. J-HFA-UY-26 J-HFA-UY-27 J-HFB-UY-25 J-HFB-UY-28 | Relative Humidity 20 to 90% | Humidity 100% (f) | | | | | | |
| | | | Radiation $10^6$ rads | Radiation $1.8 \times 10^8\gamma$ $1.1 \times 10^8\beta$ | | | | | | |
| | | | Chemical Spray N/A | Chemical Spray N/A | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. III, VI | | | | | | | |

# Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 72 of 92)

1

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switches<br><br>Auxiliary Bldg<br><br>Fuel Bldg | Waldinger (P.O. No. 13-MM-598) | Namco Controls EA-170<br><br>System: HVAC-Aux. Bldg<br>Tag Nos.<br>M-HAA-M01<br>M-HAA-M02<br>M-HAA-M03<br>M-HAA-M04<br>M-HAA-M05<br>M-HAA-M06<br>M-HAB-M01<br>M-HAB-M02<br>M-HAB-M03<br>M-HAB-M04<br>M-HAB-M05<br>M-HAB-M06<br>System: HVAC Fuel Bldg<br>M-HFA-M01<br>M-HFB-M01<br>M-HFA-M02<br>M-HFB-M02<br>M-HFA-M03<br>M-HFB-M03<br>M-HFA-M04<br>M-HFB-M04 | Temperature 50 to 104F<br><br>Pressure 0 psig<br><br>Relative Humidity 20 to 90%<br><br>Radiation $10^6$ rads<br><br>Chemical N/A<br><br>Submergence N/A<br><br>Env. Desig. III, VI | Temperature 415F peak<br><br>Pressure 70 psig<br><br>Humidity Steam/air mix (f)<br><br>Radiation $8.6 \times 10^6$ rads $\gamma$ $1.1 \times 10^6$ rads $\beta$<br><br>Chemical N/A<br><br>Submergence N/A | 30 days | 33 days | None | N/A | Type Test<br><br>BPC Log No. 13-10407-M598-1712 -2 M598-1715-3 Oct. 5, 1982<br><br>Qualified by C-E Namco Program 14273-ICE-5732 | Review complete(r)<br><br>Scheduled Completion Date<br><br>June 30, 1983 |

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REVIEW TECHNIQUE

## Table 4.1-1

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
### PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 73 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Essential/ Air Handling Unit Motors<br><br>Auxiliary Bldg<br><br>MSSS | Reliance Motors (P.O. No. 13-MM-721A) | System: HVAC-Aux. Bldg<br>Tag Nos.<br>MHAAZ01<br>MHAAZ02<br>MHAAZ03<br>MHAAZ05<br>MHAAZ06<br>MHABZ01<br>MHABZ02<br>MHABZ03<br>MHABZ05<br>MHABZ06<br>MSSS<br>MHAAZ04<br>MHABZ04 | Temperature 28-120F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>For Motors MHAAZ02 MHABZ02 $6.4 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II, III | Temperature 122F<br>Pressure 0 psig<br>Relative Humidity 100% (f)<br>Radiation $2.04 \times 10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type testing and analysis<br>Reliance Electric Co. Report No. NUC-9 July 1, 1978<br>Reliance Electric Co. Report No. NUC-9 Supplement (NUC-18) September 29, 1981<br>BPC Log No. 13-10407-M721A-94-6 March 31, 1982 | Qualified for 40 years |

REVIEW TECHNIQUE

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 74 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Essential Air Handling Unit Motors<br>Fuel Bldg | Reliance Motors (P.O. No. 13-MM-721B) | System: HVAC-Fuel Bldg<br>Tag Nos. M-HFA-J01 M-HFB-J01 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. VI | Temperature 122F<br>Pressure 0 psig<br>Relative Humidity 100% (f)<br>Radiation $2.04 \times 10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type test and analysis<br>Reliance Electric Co. Report No. NUC-9 July 1, 1978<br>Reliance Electric Co. Report No. NUC-9 Supplement (NUC 18) September 29, 1981<br>BPC Log No. 13-10407-M721B-123-1 June 22, 1978 | Qualified for 40 years |

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## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 75 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Essential Air Handling Unit Heaters<br>Fuel Bldg | Nutherm (P.O. No. 13-MM-721B) | System: HVAC-Fuel Bldg<br>Tag Nos. M-HFA-J01 M-HFB-J01 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. VI | Temperature 104F<br>Pressure 16.5 psig<br>Relative Humidity 100% (f)<br>Radiation $1.1 \times 10^5$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | In progress | N/A | N/A | Type Test To be thermally aged 31, 36 days at 293F, 50 to 90% $RH_o$ to mechanically cycled 4000 times Nutherm Intr. Qualification Plan No. 51117P Rev. 1 September 14, 1982<br>BPC Log No. 13-10407-M900-1-2 September 20, 1982 | Not qualified (z) Scheduled Completion Date July 30, 1983 |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 76 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Hydrogen Recombiner Fan Motor with Class H Insulation System<br>Auxiliary Bldg | Westinghouse Electric Corporation (P.O. No. 13-NM-993) | N/A | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation 1 x $10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 130C<br>Pressure 0 psig<br>Relative Humidity 100% (f)<br>Radiation 2 x $10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test and analysis<br>Westinghouse Report No. MM-9112<br>BPC Log No. 13-10407-N993-114-2, March 6, 1980 | Qualified for 40 years |

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REVIEW TECHNIQUE

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Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 77 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Hydrogen Recombiner Blower Motor with Class H Insulation System<br><br>Auxiliary Bldg | Rockwell Energy System Group (Atomics International) (P.O. No. 13-NM-993<br><br>Blower motor by Reliance Electric | | Temperature 50-104F<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray, N/A | Temperature 245F Inlet<br><br>Pressure 35.8 psia<br><br>Relative Humidity 100% (f)<br><br>Radiation $1.1 \times 10^8$ rads<br><br>Chemical Spray Inlet Air sprayed with the following mixture: 108 gallons $H_2O$, 31.3 lbs of boric acid, 18.2 lbs $N_2S_2O_2$, 4.8 oz of hydrazine pH to 10.5 with sodium triphosphate and sodium hydroxide, also added 0.2 cc acetone<br><br>(cont) | 30 days | 402 days system operated 1 week at 245F, 35.8 psia, 3 weeks at 190F, 24.1 psia, 48 weeks at 170F, 21.4 psia winding resistance remained at 50 mΩ or better. | N/A | N/A | Type Test<br><br>Thermal Aging: 125 hours at 170C. Mechanical againg 0.008 in peak to peak at 60 Hz, for 1 hour cycled 277 times.<br><br>Rockwell International Report No. N139QR 120001 Sept. 19, 1982.<br><br>BPC Log No. 13-10407-NM-993-134-1 Nov. 9, 1982. | Review complete(aa)<br><br>Scheduled Completion Date<br><br>Nov. 30, 1983 |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 78 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Hydrogen Recombiner Blower Motor with Class H Insulation System | | | | 0.1 cc paint thinner, 0.1 cc lube oil, 0.1 cc detergent | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| Auxiliary Bldg (cont) | | | Env. Desig. II | | | | | | | |

REVIEW TECHNIQUE

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 79 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Hydrogen Recombiner<br>Package except blower motor<br>Auxiliary Bldg | Rockwell Energy System Group (Atomics International) (P.O. No. 13-NM-993) | Later | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A | Later | 30 days | Later | N/A | N/A | | Not qualified (aa)<br>Scheduled completion date Nov. 30, 1983 |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 80 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternating Current Electric Motor Operators<br><br>Containment<br><br>Auxiliary Bldg | Dresser Industries<br><br>Rotork Controls Inc. (P.O. No. 13-PM-221A) | Model No. 7NAB1-43<br><br>System: GRS<br>Tag No. JGRA-UV-1<br>JHPA-UV-1<br>JHPB-UV-2<br><br>System: CHCS<br>JHPA-UV-3<br>JHPB-UV-4<br>JHPA-UV-5<br>JHPB-UV-6 | Temperature 370F peak See fig. 3.1-1<br><br>Pressure 60 psig peak. See fig. 3.1-2<br><br>Relative Humidity Steam/Air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes See table 4.1-3<br><br>Submergence N/A<br><br>Env. Desig. I, III | Temperature 385F peak<br><br>Pressure 75 psig<br><br>Relative Humidity 100% (b)<br><br>Radiation $2.04 \times 10^8$ rads<br><br>Chemical Spray 6200 ppm $H_3BO_3$, NaOH to pH of 9.5 (e)<br><br>Submergence N/A | 30 days | 30 days<br><br>Valves cycled 15 times during the pressurization test<br><br>LOCA Post Function 5 complete cycles | N/A | N/A | Type Test<br><br>Environmental and Mechanical Wear Aging Test: 200F for 400 hours in live steam. Cycled once per hour during environmental phase plus 1600 additional tests.<br><br>Wyle Labs Report No. 43979-1, 43979-3, Rev. A, 58364, December 19, 1978<br><br>BPC Log No. 13-10407-P221A-165-6, P-221A-188, P-221A-200, P-221A-201 May 21, 1979<br><br>(cont) | Qualified for 40 years |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 81 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternating Current Electric Motor Operators<br><br>Containment<br><br>Auxiliary Bldg<br><br>(cont) | | | | | | | | | Rotork Reports TR-3029 TR-3030 Jan. 18, 1982 | |

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 82 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternating Current Electric Motor Operators (For Cont. Isolation Valves)<br><br>Containment | Limitorque Corporation (P.O. No. 13-PM-221B)<br><br>Anchor/ Darling Valve Company | Model No. SB-00-7.5<br><br>System: CWS<br>Tag No. JWCB-UV-61<br><br>Model No. SMB-000-2<br><br>System: RWDS<br>Tag No. JRDA-UV-23 | Temperature 370F peak See fig. 3.1-1<br><br>Pressure 60 psig peak. See fig. 3.1-2<br><br>Relative Humidity Steam/Air mixture<br><br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br><br>Chemical Spray Yes See table 4.1-3<br><br>Submergence N/A<br><br>Env. Desig. I | Type testing in progress | 30 days | Type testing in progress | None | N/A | Type Test and analysis per Limitorque Report B0058 and future amendments | Motor not qualified(v)<br><br>Scheduled Completion Date<br><br>Aug. 30, 1983 |

REVIEW TECHNIQUE

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 83 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switch (For Pneumatic Operated Main Steam Blowdown Isolation Valves)<br>Containment | Namco Controls - Acme Cleveland Company (P.O. No. 13-PM-221B)<br>Anchor/ Darling Valve Co. | Model No. EA-180<br>System: MSS<br>Tag Nos. JSGA-UV-500P JSGA-UV-500R | Temperature 370F peak<br>Pressure 60 psig peak. See fig. 3.1-2<br>Relative Humidity Steam/Air mixture<br>Radiation $3.3 \times 10^7$ gamma $2 \times 10^8$ beta<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine, pH 7.0-8.5<br>Submergence N/A<br>Env. Desig. I | Temperature 415F peak<br>Pressure 70 psig peak<br>Relative Humidity Steam/Air mixture<br>Radiation $6.6 \times 10^7$ rads γ $2.2 \times 10^8$ rads β<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 110 ppm $NH_3$, pH 7.0-9.0 | 30 days | 33 days | None | N/A | Type Test<br>Qualified by C-E Namco program 14273-1CE-5732 | Qualified for 1.4 years with maintenance.<br>Replacement of cam-lok connector thread sealant every 1.4 years and limit switch terminal block every 8 years will provide qualification to 40 years |

REVIEW TECHNIQUE

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 84 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternating and Direct Current Electric Motor Operators (For Main Steam and Feedwater Isolation Valves)<br><br>MSSS above el. 100 ft | Limitorque Corporation (P.O. No. 13-PM-221B)<br><br>Anchor/ Darling Valve Co. | Model No. SB-0-40<br><br>System: MSSS<br>Tag No. JSGA-UV-134<br>JSGA-UV-138<br><br>Model No. SMB-00-25<br><br>System: AFS<br>Tag No. JAFB-UV-34<br>JAFB-UV-35<br>JAFA-UV-36<br>JAFA-UV-37 | Temperature 300F<br><br>Pressure 21 psig<br><br>Relative Humidity 100%<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 340F peak (dc) 250F peak (ac)<br><br>Pressure 105 psig peak (dc) 25 psig peak (ac)<br><br>Relative Humidity 100%<br><br>Radiation $1 \times 10^7$ rads (dc) $2 \times 10^7$ rads (ac)<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 33 days | None | N/A | Type Test<br><br>Limitorque Report No. B0058, January 11, 1981<br><br>BPC Log No. 13-10407-P221B-349-1, March 4, 1981 | Qualified for 40 years with maintenance |

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Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 85 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switch (For Pneumatic Operated Main Steam & Feedwater Isolation Gate Valves)<br>MSSS | Namco Controls - Acme Cleveland Company (P.O. No. 13-PM-221B)<br>Anchor/ Darling Valve Co. | Model No. EA-180<br>System: MSS<br>Tag No. JSGE-UV-169<br>JSGE-UV-183<br>JSGB-UV-500Q<br>JSGA-UV-500S<br>JSGA-UV-172<br>JSGB-UV-130<br>JSGB-UV-135<br>JSGB-UV-175 | Temperature 300F<br>Pressure 21 psig<br>Relative Humidity 100%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. II | Temperature 415F<br>Pressure 78 psig<br>Relative Humidity Stm/Air Mix (b)<br>Radiation $8.8 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | None | N/A | Type Test<br>Qualified by C-E Namco Program 14273-PE-5732 | Qualified for 1.4 years with maintenance<br>Replacement of cam-lok connector thread sealant every 1.4 years and limit switch terminal block every 8 years will provide qualification to 40 years |

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REVIEW TECHNIQUE

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 86 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valves (For Pneumatic Operated Main Steam & Feedwater Isolation Gate Valves)<br><br>MSSS above el. 100 ft | Automatic Switch Co. (ASCO) (P.O. No. 13-PM-221B)<br><br>Anchor/ Darling Valve Co. | Model No. NP831654E<br><br>System: MSS<br>Tag No.<br>JSGA-UY-169A<br>JSGB-UY-169B<br>JSGA-UY-183A<br>JSGB-UY-183B<br>JSGB-UY-500Q<br>JSGA-UY-500S<br><br>Model No. NP831665E<br><br>System: MSS<br>Tag No.<br>JSGA-UY-172A<br>JSGA-UY-172B<br>JSGB-UY-130A<br>JSGB-UY-130B<br>JSGA-UY-175A<br>JSGA-UY-175B<br>JSGB-UY-135A<br>JSGB-UY-135B | Temperature 300F<br><br>Pressure 21 psig<br><br>Relative Humidity 100%<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. II | Temperature 450F peak<br><br>Pressure 78 psig peak<br><br>Relative Humidity 100%<br><br>Radiation $1.8 \times 10^8 \gamma$ $1.1 \times 10^8 \beta$<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test<br><br>ASCO Report No. AQS 21678/TR Rev. A and AQR 67368 Rev. 0 and CE letter V-PAK-250 | Qualified for 40 years with maintenance |

REVIEW TECHNIQUE

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 87 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternating Current Electric Motor Operators<br>Auxiliary Bldg | Limitorque Corporation (P.O. No. 13-PM-221B)<br>Anchor/ Darling Valve Co. | Model No. SB-00-7.5<br>System: CWS<br>Tag Nos. JWCB-UV-63 JWCA-UV-62 | Temperature 50-104F | Temperature 250F peak | 30 days | 33 days | N/A | N/A | Type Test and Analysis<br>Limitorque Report No. B0058, January 11, 1981<br>BPC Log No. 13-10407-P221B-349-1, March 4, 1981 | Qualified for 40 years with maintenance |
| | | | Pressure 0 psig | Pressure 25 psig peak | | | | | | |
| | | | Relative Humidity 90% | Relative Humidity 100% | | | | | | |
| | | | Radiation $1 \times 10^6$ rads | Radiation $2 \times 10^7$ rads | | | | | | |
| | | | Chemical Spray N/A | N/A | | | | | | |
| | | | Submergence N/A | Submergence N/A | | | | | | |
| | | | Env. Desig. III | | | | | | | |

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Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 88 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Limit Switch (For Pneumatic Operated Cont. Radwaste Sump Pump Discharge Valve)<br><br>Auxiliary Bldg | Namco Controls - Acme Cleveland Company (P.O. No. 13-PM-221B)<br><br>Anchor/ Darling Valve Co. | Model No. EA-180<br><br>System: RWDS<br>Tag No. JRDB-UV-24 | Temperature 50-104F<br><br>Pressure 0 psig<br><br>Relative Humidity 20-90%<br><br>Radiation $1 \times 10^6$ rads<br><br>Chemical Spray N/A<br><br>Submergence N/A<br><br>Env. Desig. III | Temperature 415F peak<br><br>Pressure 78 psig<br><br>Relative Humidity Stm/Air Mix (f)<br><br>Radiation $8.8 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br><br>Chemical Spray N/A<br><br>Submergence N/A | 30 days | 30 days | None | N/A | Type Test<br><br>Qualified by C-E Namco Program 14273-PE-5732 | Qualified for 2.3 years with maintenance<br><br>Replacement of cam-lok connector thread sealant every 2.3 years and limit switch terminal block every 18 years will provide qualification to 40 years. |

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REVIEW TECHNIQUE

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 89 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valves (For Pneumatic Operated Cont Radwaste Sump Pump Discharge Valve)<br><br>Auxiliary Bldg | Automatic Switch Company (ASCO) (P.O. No. 13-PM-221B)<br><br>Anchor/ Darling Valve Co. | Model No. NP831654E<br>System: RWDS<br>Tag No. JRDB-UY-24 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray N/A<br>Submergence N/A<br>Env. Desig. III | Temperature 450F peak<br>Pressure 78 psig<br>Relative Humidity 100% (f)<br>Radiation $1.8 \times 10^8 \gamma$ $1.1 \times 10^8 \beta$<br>Chemical Spray N/A<br>Submergence N/A | 30 days | 33 days | N/A | N/A | Type Test<br><br>ASCO Report AQS-21678/ TR Rev. A & AQR-67368 Rev. 0 & C-E letter V-PAK-250 | Qualified for 40 years with maintenance |

## Table 4.1-1

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 90 of 92)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification | Abnormal or Accident Environment (a) | Environment to Which Qualified | Operability Requirement | Operability Demonstrated | Accuracy or Response Time Requirement | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Valves (For Pneumatic Operated Main Steam Blowdown Isolation Valves)<br>Containment | Automatic Switch Co. (ASCO) (P.O. No. 13-PM-221B),<br>Anchor Darling | Model No. NP831664E<br>System: MSS<br>Tag No. JSGA-UV-500P JSGB-UV-500R | Temperature 370F peak See fig. 3.1-1<br>Pressure 60 psig See fig. 3.1-2<br>Relative Humidity Steam/air mixture<br>Radiation $3.3 \times 10^7$ rads-gamma $2 \times 10^8$ rads-beta<br>Chemical Spray Yes See table 4.1-3<br>Submergence N/A<br>Env. Desig. I | Temperature 420F<br>Pressure 62 psig<br>Relative Humidity Steam/air mixture<br>Radiation $2.02 \times 10^8$ rads<br>Chemical Spray 3000 ppm Boric Acid 0.064 Molar Sodium Thiosulfate Add NaOH to pH = 10.5<br>Submergence N/A | 30 days | 30 days (h) | N/A | N/A | Type Test<br>Asco Report No. AQS-67368 rev. 0 & C-E letter V-PAK-250 | Qualified for 40 years<br>EPDM seat for 20 years |

REVIEW TECHNIQUE

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1, 2 & 3 (Sheet 91 of 92) 1

NOTES:

a. Where equipment is subjected to more than one harsh environment, only the worst case environment is indicated.

b. The qualification environment of 100% relative humidity is equivalent to the steam/air mixture relative humidity environment.

c. Results of prior tests demonstrated no significant impact of chemical spray; no chemicals were used in the qualification test.

d. The environment to which this equipment is qualified is of a higher pH range. This higher pH results in a more caustic and corrosive environment than that postulated by the abnormal/accident environment conditions of table 4.1-3.

e. In section 3.8 it is stated that no significant difference in the various materials' performance should occur due to the change in the hydrazine concentration of up to 200 ppm. Therefore, the omission of hydrazine in the qualification environment does not invalidate the qualification of this piece of environment.

f. Qualifying the equipment only to the high end of the humidity range is acceptable since electrical equipment experiences no adverse dry-out effect, at the 20% RH point or above.

g. The component materials and terminal blocks that constitute these assemblies were exposed to a radiation level of $2 \times 10^8$ rads and remained functional. Other items were tested to $1 \times 10^8$ rads.

h. Refer to qualification package located in the central file.

i. Conduit attenuates beta radiation.

j. Awaiting vendor confirmation of PH $\geq$8.5.

k. Awaiting documentation for the resolution of open items pertaining to the justification of aging time and temperature. 1

Table 4.1-1

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (BOP)
PALO VERDE NUCLEAR GENERATING STATION UNITS 1, 2 & 3 (Sheet 92 of 92) 1

| | |
|---|---|
| l. | Awaiting results of terminal block testing for influence on instrument loop accuracy. |
| m. | Awaiting the results of the flame test report. |
| n. | Awaiting resolution of open items discovered in testing. |
| o. | Preparing the final qualification package. |
| p. | Commercial negotiations in process with vendor. |
| q. | Awaiting reception of certification of qualification for Reliance motors. |
| r. | Justification of aging time and temperature required. |
| s. | Awaiting documentation of submergence test results. |
| t. | Awaiting completion of test program and submission of qualification package. 1 |
| u. | Analysis presently being performed to establish similarity between tested and supplied models. |
| v. | In-containment motors are not qualified. Motors will be changed upon completion of testing. |
| w. | Testing not yet started. |
| x. | Awaiting qualification of hydraulic pressure transmitters - safety equipment status only. |
| y. | Awaiting resolution of temperature profile MSLB test and justification of the 10 degree rule. |
| z. | Awaiting receipt of test report. |
| aa. | Supplier re-evaluating generic qualification program. |
| ab. | The required response times were established by the vendor. The project does not have a requirement for response time. |

# Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 1 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor Operated Valve Actuator<br>Auxiliary Building | Limitorque | System: SIS<br>Model/Tag No:<br>SB-0-25 SI-671,SI-672<br>SB-3-150 SI-615,SI-625 SI-635,SI-645<br>SMB-000-5 SI-657,SI-658 SI-678,SI-679<br>SMB-00-10 SI-604,SI-609 SI-674,SI-676<br>SMB-0-10 SI-698,SI-699<br>SMB-0-25 SI-684,SI-685 SI-687,SI-688 SI-689,SI-693 SI-694,SI-695<br>SMB-1-40 SI-306,SI-307 SI-655,SI-656 SI-690,SI-691<br>SMB-1-60 SI-683,SI-686 SI-692,SI-696 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads γ Radiation for motors to valves SI-615, SI-625, SI-635, SI-645, SI-657, SI-658, SI-685, SI-694, SI-306, SI-307, SI-655, SI-656, SI-686, SI-696<br>$6.4 \times 10^6$ rads γ<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 250F<br>Pressure 25 psig<br>Radiation $2 \times 10^7$ rads γ<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | 30 days | 33 days | None | Not Applicable | Type test and analysis per Limitorque Report B0058, CE Program 14273-PE-5731 | Qualified for 40 years with preventative maintenance (a) |

# Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS 1,2&3 (Sheet 2 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor Operated Valve Actuator<br>Auxiliary Building | Limitorque | System: CVCS<br>Model/Tag No:<br>SB-1-60 CH-530,CH-531<br>SMB-00-15 CH-524,CH-255 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 250F<br>Pressure 25 psig<br>Radiation $2 \times 10^7$ rads $\gamma$<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | 30 days | 33 days | None | Not Applicable | Type test and analysis per Limitorque Report B0058, CE Program 14273-PE-5731 | Qualified for 40 years with preventative maintenance (a) |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 3 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor Operated Valve Actuator<br>Auxiliary Building | Limitorque | System: SIS<br>Model/Tag No:<br>SMB-0-25(DC) SI-321,SI-331 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 340F (max)<br>Pressure 105 psig (max)<br>Radiation $1 \times 10^7$ rads $\gamma$<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | 30 days | 33 days | None | Not Applicable | Type test and analysis per Limitorque Report B0058, CE Program 14273-PE-5731 | Qualified for 40 years with preventative maintenance (a) |

## Table 4.1-2

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
### PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 4 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor Operated Valve Actuator<br>Auxiliary Building | Limitorque | System: SIS<br>Model/Tag No:<br>SMC-04-5 SI-664,SI-665 SI-668,SI-669<br>SMC-04-7-1/2 SI-616,SI-617 SI-626,SI-627 SI-636,SI-637 SI-646,SI-647 SI-666,SI-667 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads γ<br>Radiation for motors to valves SI-668 SI-669 $6.4 \times 10^6$ rads γ<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 250F<br>Pressure 25 psig<br>Radiation $4.2 \times 10^7$ rads γ<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | 30 days | 33 days | None | Not Applicable | Type test and analysis per Limitorque Report B0058, CE Program 14273-PE-5731 | Qualified for 6 years with preventative maintenance. (a) |

1

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 5 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor Operated Valve Actuator<br>Containment Building | Limitorque | System: SIS<br>Model/Tag No:<br>SMB-00-10 SI-673,SI-675<br>SMB-1-40 SI-653,SI-654<br>SMB-1-60 SI-614,SI-624 SI-634,SI-644<br>SMB-3-100 SI-651,SI-652 | Temperature 370F peak<br>Pressure 60 psig peak<br>Radiation $3.3 \times 10^7$ rads $\gamma$, $1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine, pH 7.0-8.5<br>Submergence None | Testing in Progress | Remain operable for 30 days following DBE after 40 years of normal operation | Testing in progress | None | Not Applicable | Type test and analysis per Limitorque Report B0058 and future amendments | Motor not qualified<br>Testing in progress<br>Motors will be replaced upon completion of testing<br>Scheduled Completion Date Sept 30, 1983 |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 6 of 34) 1

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Valve Limit Switch for Position Indication of Pneumatic Operated Valve (2 per valve)<br>Containment Building | Namco Controls | Model: EA180-11302<br>System: SIS<br>Valve Tag Nos: SI-322,SI-332 SI-611,SI-618 SI-621,SI-628 SI-631,SI-638 SI-641,SI-648 SI-682<br>System: CVCS<br>Valve Tag Nos: CH-506,CH-515 CH-516,CH-560 CH-240 | Temperature 370F peak<br>Pressure 60 psig peak<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine, pH 7.0-8.5<br>Submergence if below plant elevation 90'6" | Temperature 415F peak<br>Pressure 70 psig peak<br>Radiation $8.8 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 110 ppm $NH_3$, pH 7.0-9.0<br>Submergence None | 30 days | 33 days | None | Not Applicable | Type test and analysis per CE Program 14273-PE-5732 | Qualified for 1.4 years with preventative maintenance<br>Replacement of cam-lok connector thread sealant every 1.4 years and limit switch terminal block every 8 years will provide qualification to 40 years. |

1

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 7 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Valve Limit Switch for Position Indication of Pneumatic Operated Valve (2 per valve)<br>Auxiliary Building | Namco Controls | Model: EA180-11302<br>System: CVCS<br>Valve Tag Nos: CH-505,CH-523 CH-561,CH-580 | Temperature 104F<br>Pressure Atmospheric<br>Radiation 1 x $10^6$ rads γ<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 415F peak<br>Pressure 70 psig peak<br>Radiation 8.8 x $10^7$ rads γ 1.1 x $10^8$ rads β<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 110 ppm $NH_3$, pH 7.0-9.0<br>Submergence None | Operate for 30 days following DBE after 40 years of normal operation | Position indication maintained for 33 days following DBE after simulated 40 years of normal operation including 50,025 cycles by type test and analysis | None | Not Applicable | Type test and analysis per CE Program 14273-PE-5732 | Qualified for 2.3 years with preventative maintenance<br>Replacement of cam-lok connector thread sealant every 2.3 years and limit switch terminal block every 18 years will provide qualification to 40 years. |

1

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Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 8 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Electric Solenoid Valve<br>Containment Building | Valcor Engineering | System: SS<br>Model/Tag No.<br>V-526-5683-45<br>SS-203, SS-204, SS-205<br>System: SCCS<br>Model/Tag No.<br>V-526-5683-46<br>SC-204<br>SC-211<br>SC-220<br>SC-222<br>SC-224<br>SC-226 | Temperature 370F<br>Pressure 65 psig<br>Radiation $3.3 \times 10^7$ rads γ $1 \times 10^8$ rads β<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron 50 ppm hydrazine pH Adjusted to 7.0-8.5 using $Na_3PO_4$<br>Submergence If below plant elevation 90'6" | Temperature 385F peak<br>Pressure 66 psig<br>Radiation $3.5 \times 10^7$ rads γ $1.1 \times 10^3$ rads β<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine pH 7.0-8.5<br>Submergence None | Operate for 30 days following DBE after 40 years of normal operation | Valve cycling and position indication maintained for 33 days following DBE after simulated 40 years of normal operation including 50,000 cycles | None | Not Applicable | Type test per 14273-PE-5733 | Qualified to 10 years with maintenance (c) |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 9 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Electric Solenoid Valve<br>Auxiliary Building | Valcor Engineering | System: SS<br>Model/Tag No.<br>V-526-5683-6<br>SS-200,<br>SS-201,<br>SS-202<br>System: SCCS<br>Model/Tag No.<br>V-526-5683-6<br>SC-200,<br>SC-201<br>V-526-5683-5<br>SC-219,<br>SC-221,<br>SC-223,<br>SC-225,<br>SC-227,<br>SC-228<br>System: IRS<br>Model/Tag No.<br>V-526-5292-<br>29-1<br>IR-602,<br>IR-603<br>V-526-5292-<br>17-1<br>IR-680,<br>IR-681 | Temperature 104F peak<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads<br>Humidity 90% RH<br>Chemical None<br>Submergence None | Temperature 385F peak<br>Pressure 66 psig<br>Radiation $3.5 \times 10^7$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine pH 7.0-8.5<br>Submergence None | Operate for 30 years following DBE after 40 years of normal operation | Valve cycling and position indication maintained for 33 days following DBE after simulated 40 years of normal operation including 50,000 cycles | None | Not Applicable | Type test per 14273-PE-5733 | Qualified to 10 years with maintenance (c) |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 10 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Solenoid Process System Valve<br>Containment Building | Target Rock Corp. | System: SIS<br>Model/Tag Nos: 77L-001 SI-605,SI-606 SI-607,SI-608 SI-613,SI-623 SI-633,SI-643<br>System: CVCS<br>Model/Tag Nos: 77L-003 CH-203,CH-205 | Temperature 370F peak<br>Pressure 60 psig peak<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine pH 7.0-8.5<br>Submergence None | Testing in progress | Remain operable for 30 days following DBE after 40 years of normal operation | Testing in progress | None | Not Applicable | Type test per CE Program 14273-PE-5733 | Not qualified (m)<br>Scheduled Completion Date Dec 30, 1983 |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 11 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Air Solenoid Valve for Pilot Control of Pneumatic Operated Valve<br>Containment Building | Automatic Switch Co. | Model: NP8320A187E<br>System: SIS<br>Valve Tag Nos: SI-322,SI-332 SI-611,SI-618 SI-621,SI-628 SI-631,SI-638 SI-641,SI-648 SI-682 | Temperature 370F peak<br>Pressure 60 psig peak<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine pH 7.0-8.5<br>Submergence If below plant elevation 90'6" | Temperature 450F peak<br>Pressure 78 psig peak<br>Radiation $1.82 \times 10^8$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 6626 ppm boron as $H_3BO_3$, 196 ppm hydrazine, pH 7.0-8.5<br>Submergence None | Operate for 30 days following DBE after 40 years of normal operation | Close and remain closed or operate for 33 days (792 hours) following DBE after simulated 40 years of normal operation including 47,460 cycles by type test and analysis | None | Not Applicable | Type test and analysis per ASCO Reports AQS-21678/TR, Rev A; AGR-67368, Rev 0; CE Program 14273-PE-5734, Rev 1; CE letter V-PAK-250 | Qualified for 40 years with preventative maintenance (c) |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 12 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Air Solenoid Valve for Pilot Control of Pneumatic Operated Valve<br>Containment Building | Automatic Switch Co. | Model: NP8320A1B7E<br>System: CVCS<br>Valve Tag Nos: CH-506,CH-515 CH-516,CH-560 CH-240 | Temperature 370F peak<br>Pressure 60 psig peak<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 4400 ppm boron as $H_3BO_3$, 50 ppm hydrazine, pH 7.0-8.5<br>Submergence If below plant elevation 90'6" | Temperature 450F peak<br>Pressure 78 psig peak<br>Radiation $1.82 \times 10^8$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 6626 ppm boron as $H_3BO_3$, 196 ppm hydrazine pH 7.0-8.5<br>Submergence None | Following DBE remain operable for 30 days after 40 years of normal operation | Close and remain closed or operate for 33 days (792 hours) following DBE after simulated 40 years of normal operation including 47,460 cycles by type test and analysis | None | Not Applicable | Type test and analysis per ASCO Reports AQS-21678/TR, Rev A; AGR-67368, Rev 0; CE Program 14273-PE-5734, Rev 0; CE letter V-PAK-250 | Qualified for 40 years with preventative maintenance (c) |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 13 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Air Solenoid Valve for Pilot Control of Pneumatic Operated Valve<br>Auxiliary Building | Automatic Switch Co. | Model: NP8320A187E<br>System: CVCS<br>Valve Tag Nos: CH-505,CH-523 CH-561 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 450F peak<br>Pressure 78 psig peak<br>Radiation $1.82 \times 10^8$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 6626 ppm boron as $H_3BO_3$, 196 ppm hydrazine, pH 7.0-8.5<br>Submergence None | Remain operable for 30 days following DBE after 40 years of normal operation | Close and remain closed or operate for 33 days (792 hours) following DBE after simulated 40 years of normal operation including 47,460 cycles by test and analysis | None | Not Applicable | Type test and analysis per ASCO Reports AQS-21678/TR, Rev A; AGR-67368, Rev 0; CE Program 14273-PE-5734, Rev 0; CE letter V-PAK-250 | Qualified for 40 years with preventative maintenance (c) |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 14 of 34) 1

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Air Solenoid Valve for Pilot Control of Pneumatic Operated Valve<br>Auxiliary Building | Automatic Switch Co. | Model: NP8321A1E<br>System: CVCS<br>Valve Tag No: CH-580 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads $\gamma$<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 450F peak<br>Pressure 78 psig peak<br>Radiation $1.82 \times 10^8$ rads $\gamma$ $1.1 \times 10^8$ rads $\beta$<br>Humidity Steam/Air Mixture<br>Chemical Spray 6626 ppm boron as $H_3BO_3$, 196 ppm hydrazine, pH 7.0-8.5<br>Submergence None | Remain operable for 30 days following DBE after 40 years of normal operation | Close and remain closed or operate for 33 days (792 hours) following DBE after simulated 40 years of normal operation and including 40,000 cycles by type test and analysis | None | Not Applicable | Type test and analysis per ASCO Reports AQS-21678/TR, Rev A; AGR-67368, Rev 0; CE Program 14273-PE-5734, Rev 0; CE letter V-PAK-250 | Qualified for 40 years with preventative maintenance (c) 1 |

## Table 4.1-2

### ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
### PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 15 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified. | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor for High Pressure Safety Injection Pump<br>Auxiliary Building | Westinghouse Large AC Motor Division | Model: 5810H WP2·<br>System: SIS<br>Motor S/N: 76F60561-1 76F60563-1 76F60564-1 77F14115-1 77F14116-1 77F14117-1 | Temperature 104F<br>Pressure Atmospheric<br>Radiation 1 x $10^6$ rads<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 161F<br>Pressure Atmospheric<br>Radiation 2 x $10^8$ rads<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | 30 days | 160,778 hours | None | Not Applicable | Westinghouse Report WCAP-8754, Rev 1 with Bibliography by test and analysis<br>Seismic by analysis Westinghouse Report 76F-60562<br>Environmental Qualification Program 14273-PE-5400 Rev 02 | Qualified for 40 years with preventative maintenance |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 16 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor for Low Pressure Safety Injection Pump<br>Auxiliary Building | Westinghouse Large AC Motor Division | Model: 5010P39 WP2<br>System: SIS<br>Motor S/N: 76F60574-1, 76F60574-2, 76F60576-1, 76F60576-2, 76F60578-1, 76F60578-2 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $6.4 \times 10^6$ rads<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 123F<br>Pressure Atmospheric<br>Radiation $2 \times 10^8$ rads<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | 30 days | 135,487 hours | None | Not Applicable | Westinghouse Report WCAP-8754, Rev 1 with Bibliography by test and analysis<br>Seismic per Westinghouse Report 76F-60575<br>Environmental Qualification Program 14273-PE-5401 Rev 02 | Qualified for 40 years with preventative maintenance |

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Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 17 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor for Containment Spray Pump<br>Auxiliary Building | Westinghouse Large AC Motor Division | Model: 5808P39 WP2<br>System: CSS<br>Motor S/N: 76F60580-1, 76F60580-2, 76F60582-1, 76F60582-2, 76F60583-1, 76F60583-2 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 159F<br>Pressure Atmospheric<br>Radiation $2 \times 10^8$ rads<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | 30 days | 147,559 hours | None | Not Applicable | Westinghouse Report WCAP-8754, Rev 1 with bibliography by test and analysis<br>Seismic per Westinghouse Report 76F-60581<br>Environmental Qualification Program 14273-PE-5402 Rev 02 | Qualified for 40 years with preventative maintenance |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 18 of 34) 1

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor for Charging Pump<br>Auxiliary Building | Westinghouse Medium Motor and Gearing Division | Model: 404TS DP<br>System: CVCS<br>Motor S/N: SO 76C62115<br>7703-01-001<br>7703-01-002<br>7703-01-003<br>7707-02-001<br>7707-02-002<br>7707-02-003<br>7708-03-001<br>7708-03-002<br>7708-03-003 | Temperature 104F<br>Pressure Atmospheric<br>Radiation $1 \times 10^6$ rads<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 181F<br>Pressure Atmospheric<br>Radiation $2 \times 10^8$ rads<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | 30 days | 350,400 hours by test and analysis | None | Not Applicable | Westinghouse Report MM-9112 and appendices C and E of Westinghouse Report WCAP-9112 by test and analysis<br>Seismic per Westinghouse Report BS2541[illegible]-MG<br>Environmental Qualification Program 14273-PE-5403 Rev 03 | Qualified for 40 years with preventative maintenance |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 19 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Motor for Spray Chemical Addition Pump<br>Auxiliary Building | Reliance Electric Co. | Model: 18FTC TEFC-XT<br>System: IRS<br>Motor S/N: YM209071A1 YM209071A3 YM209071A4 YM209071A5 YM209071A8 YM209071A12 | Temperature 104F<br>Pressure Atmospheric<br>Radiation 1 x $10^6$ rads<br>Humidity 90% RH<br>Chemical Spray None<br>Submergence None | Temperature 471F<br>Pressure Atmospheric<br>Radiation 2 x $10^8$ rads<br>Humidity 100% RH<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | 30 days | 350,000 hours | None | Not Applicable | Reliance Report NUC-9 with Supplement by test and analysis<br>Seismic per Action Report 13831<br>Environmental Qualification Program 14273-PE-5404 Rev 3 | Qualified for 40 years with preventative maintenance |

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Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 20 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter | ITT Barton | Model: 764 | Temperature 370F | Temperature 420F | Accident mitigation not applicable | 100 days | (1) | (e) | E.Q. Program Document 14273-1CE-3535 | Review complete (e) expect qualification for 40 years |
| Containment Building | | System: PAMS | Pressure 60 psig | Pressure 75 psig | | | | | | Scheduled Completion Date Oct 30, 1983 |
| | | CE Tag No: LT-110X,Y | Relative Humidity Sat. Steam/Air Mixture | Relative Humidity Sat. Steam/Air Mixture | Post accident monitoring 30 days | | | | Barton report R3-764-9 | |
| | | | Radiation $3.3 \times 10^7$ rads $\gamma$ $1.0 \times 10^8$ rads $\beta$ | Radiation $5 \times 10^7$ rads $\gamma$ and $2 \times 10^8$ rads $\gamma$ diff. samples | | | | | | |
| | | | Chemical Spray 4400 ppm boron $H_3BO_3$ 50 ppm hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate | Chemical Spray 2700 ppm boron $H_3BO_3$ .064 moles NaOH to achieve pH of 10.5 | | | | | | |
| | | | Submergence None | Submergence N/A | | | | | | |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 21 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Diff. Pressure Transmitter<br>Containment Building | ITT Barton | Model: 764<br>System: PPS<br>CE Tag No: PDT-115A-D PDT-125A-D | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat. Steam/Air Mixture<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1.0 \times 10^8$ rads $\beta$<br>Chemical Spray 4400 ppm boron $H_3BO_3$ 50 ppm hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate<br>Submergence None | Temperature 420F<br>Pressure 75 psig<br>Relative Humidity Sat. Steam/Air Mixture<br>Radiation $5 \times 10^7$ rads $\gamma$ and $2 \times 10^8$ rads $\gamma$ diff. samples<br>Chemical Spray 2700 ppm boron $H_3BO_3$ .064 moles NaOH to achieve pH of 10.5<br>Submergence N/A | Accident mitigation 30 min.<br>Post accident monitoring not applicable | 100 days | (1) | (e) | E.Q. Program Document 14273-1CE-3535<br>Barton report R3-764-9 | Review complete (e) expect qualification for 40 years<br>Scheduled Completion Date Oct 30, 1983 |

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Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 22 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter<br>Containment Building | ITT Barton | Model: 763<br>System(s): PPS LTOP PAMS<br>CE Tag No: PT-101A-D PT-102A-D PT-103 PT-104 | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat. Steam/Air Mixture<br>Radiation $3.3 \times 10^7$ rads γ $1.0 \times 10^8$ rads β<br>Chemical Spray 4400 ppm boron $H_3BO_3$ 50 ppm hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate<br>Submergence None | Temperature 420F<br>Pressure 75 psig<br>Relative Humidity Sat. Steam/Air Mixture<br>Radiation $5 \times 10^7$ rads γ and $2 \times 10^8$ rads γ diff. samples<br>Chemical Spray 2700 ppm boron $H_3BO_3$ .064 moles NaOH to achieve pH of 10.5<br>Submergence N/A | Accident mitigation PT-101A-D 30 min. PT-102A-D 60 min.<br>Post accident monitoring PT-102A-D 30 days PT-103, 104 36 hrs. | 100 days | (1) | (e) | E.Q. Program Document 14273-1CE-3535<br>Barton report R3-763-6 | Review complete (e) expect qualification for 40 years<br>Scheduled Completion Date Oct 30, 1983 |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 23 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter<br>Containment | Rosemount | Model: 1153AD8<br>System: SDCS<br>CE Tag No: PT-105, 106 | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat-Stm/ Air Mixture<br>Radiation $3.3 \times 10^7$ rads γ $1.0 \times 10^8$ rads β<br>Chemical Spray 4400 ppm Boron $H_3BO_3$ 50 ppm hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate<br>Submergence None | Temperature 420F<br>Pressure 85 psig<br>Relative Humidity Sat-Stm/ Air Mixture<br>Radiation $5 \times 10^7$ rads γ<br>Chemical Spray 3000 ppm Boron $HBO_2$ .64 moles $Na_2S_2O_3$ pH 8.5 to 11 by addition of NaOH<br>Submergence N/A | Accident Mitigation<br>Not Applicable<br>Post Accident Monitoring<br>36 hrs | 1 year | (1) | ±8% | E.Q. Program Document 14273-ICE-3535<br>Type test report "Preliminary Qualification Report for 1153D Series"<br>RMT Report 48223C Rev. A<br>RMT report 108220A Rev. A | Review complete (n) expect qualification for 10 years<br>Scheduled Completion Date Dec 30, 1983 |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 24 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter | ITT Barton | Model: 763 | Temperature 370F | Temperature 420F | Accident Mitigation | 100 days | (1) | (e) | E.Q. Program Document 14273-ICE-3535 | Review complete (e) expect qualification for 40 years |
| Containment | | Systems: PAMS | Pressure 60 psig | Pressure 75 psig | Not Applicable | | | | | |
| | | CE Tag No: PT-311, 321 PT-331, 341 | Relative Humidity Sat-Stm/ Air mixture | Relative Humidity Sat-Stm/ Air mixture | Post Accident Monitoring 30 days | | | | | Scheduled Completion Date Oct 30, 1983 |
| | | | Radiation $3.3 \times 10^7$ rads $\gamma$ $1.0 \times 10^8$ rads $\beta$ | Radiation $5 \times 10^7$ rads $\gamma$ and $2 \times 10^8$ rads $\gamma$ diff. samples | | | | | Barton report R3-763-6 | |
| | | | Chemical Spray 4400 PPM Boron $H_3BO_3$ 50 PPM hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate | Chemical Spray 2700 ppm Boron $H_3BO_3$ .064 moles NaOH to achieve pH of 10.5 | | | | | | |
| | | | Submergence None | Submergence N/A | | | | | | |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 25 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter | ITT Barton | Model: 763 | Temperature 370F | Temperature 420F | Accident Mitigation | 100 days | (1) | (e) | E.Q. Program Document 14273 ICE-3535 | Review complete (e) expect qualification for 40 years |
| Containment | | Systems: PAMS | Pressure 60 psig | Pressure 75 psig | Not Applicable | | | | | |
| | | CE Tag No: LT-311, 321 LT-331, 341 | Relative Humidity Sat-Stm/ Air mixture | Relative Humidity Sat-Stm/ Air mixture | Post Accident Monitoring 30 days | | | | Barton report R3-763 -6 | Scheduled Completion Date Oct 30, 1983 |
| | | | Radiation $3.3 \times 10^7$ rads γ $1.0 \times 10^8$ rads β | Radiation $5 \times 10^7$ rads γ and $2 \times 10^8$ rads γ diff. samples | | | | | | |
| | | | Chemical Spray 4400 PPM Boron $H_3BO_3$ 50 PPM hydrazine pH adjusted to 7.0-8.5 after 4 hrs using trisodium phosphate | Chemical Spray 2700 ppm Boron $H_3BO_3$ .064 moles NaOH to achieve pH of 10.5 | | | | | | |
| | | | Submergence None | Submergence N/A | | | | | | |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 26 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter | ITT Barton | Model: 763 | Temperature 370F | Temperature 420F | Accident Mitigation LT-1113 A-D LT-1123 A-D LT-1114 A-D LT-1124 A-D 30 min | 100 days | (1) | (e) | E.Q. Program Document 14273-ICE-3535 | Review complete (e) expect qualification for 40 years |
| Containment | | Systems: PPS PAMS | Pressure 60 psig | Pressure 75 psig | | | | | | |
| | | CE Tag No: LT-1113 A-D LT-1123 A-D LT-1114 A-D LT-1124 A-D | Relative Humidity Sat-Stm/ Air mixture | Relative Humidity Sat-Stm/ Air mixture | | | | | Barton report R3-763-6 | Scheduled Completion Date Oct 30, 1983 |
| | | | Radiation $3.3 \times 10^7$ rads $\gamma$ $1.0 \times 10^8$ rads $\beta$ | Radiation $5 \times 10^7$ rads $\gamma$ and $2 \times 10^8$ rads $\gamma$ diff. samples | Post Accident Monitoring LT-1113 AB LT-1123 AB | | | | | |
| | | | Chemical Spray 4400 PPM Boron $H_3BO_3$ 50 PPM Hydrazine pH adjusted to 7.0-8.5 after 4 hrs using Trisodium Phosphate | Chemical Spray 2700 ppm Boron $H_3BO_3$ .064 moles NaOH to achieve pH of 10.5 | 30 days | | | | | |
| | | | Submergence None | Submergence N/A | | | | | | |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 27 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Level Transmitter<br>Containment | ITT Barton | Model: 763<br>Systems: PAMS, PPS<br>CE Tag No: PT-1013 A-D PT-1023 A-D | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Sat-Stm/ Air mixture<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1.0 \times 10^8$ rads $\beta$<br>Chemical Spray 4400 PPM Boron $H_3BO_3$ 50 PPM Hydrazine pH adjusted to 7.0-8.5 after 4 hrs using Trisodium Phosphate<br>Submergence None | Temperature 420F<br>Pressure 75 psig<br>Relative Humidity Sat-Stm/ Air mixture<br>Radiation $5 \times 10^7$ rads $\gamma$ and $2 \times 10^8$ rads $\gamma$ diff. samples<br>Chemical Spray 2700 ppm Boron $H_3BO_3$ .064 moles NaOH to achieve pH of 10.5<br>Submergence N/A | Accident Mitigation PT-1013 A-D PT-1023 A-D 30 min<br>Post Accident Monitoring PT-1013,A,B PT-1023,A,B 30 days | 100 days | (1) | (e) | E.Q. Program Document 14273-ICE-3535<br>Barton report R3-763-6 | Review complete (e) expect qualification for 40 years<br>Scheduled Completion Date Oct 30, 1983 |

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## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 28 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Excore Safety Channel Detector Assembly<br>Containment Building | Westinghouse | Model: WL-24036<br>System: RPS<br>CE Tag No: RW-001-A RW-001-B RW-001-C RW-001-D | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Steam/Air Mixture | 0-2 min<br>Temperature 385F<br>Pressure 65 psig<br>Relative Humidity Saturated Steam | 2 min | 0-10 min by test 2 min to 1 hr and 2 min by analysis | Not Applicable<br>(h) | (h) | Qualified by test Westinghouse Test Report No. NC-TR-21-15<br>Program document No. 14273-ICE-3512 | Qualified for 10 Years |
| | | | | 2-10 min<br>Temperature 400F<br>Pressure 74 psig<br>Relative Humidity Saturated Steam | | | | | | |
| | | | Radiation $2.5 \times 10^6$ rads<br>note f | Radiation Detector Not Applicable note g Transition Joint $4.8 \times 10^6$ rads | | | | | | |
| | | | Chemical Spray None | Chemical Spray Not Applicable | | | | | | |
| | | | Submergence None | Submergence Not Applicable | | | | | | |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 29 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Excore Safety Channel Preamplifier/ Filter Assembly<br>Containment Building | Westinghouse | Model: WL-24037<br>System: RPS<br>CE Tag No: RT-001-A RT-001-B RT-001-C RT-001-D | Preamplifier<br>Temperature 120F<br>Pressure 0 psig<br>Relative Humidity 90%<br>Filter<br>Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Steam/Air Mixture<br>Radiation $<3 \times 10^4$ rads γ negligible neutron<br>Chemical Spray None<br>Submergence None | Preamplifier 0-2 min<br>Temperature 390F<br>Pressure 76 psig<br>Relative Humidity Saturated Steam<br>Filter 0-2 min<br>Temperature 376F<br>Pressure 62 psig<br>Relative Humidity Saturated Steam<br>Radiation $6 \times 10^4$ rads (γ) $7 \times 10^3$ rads (neutron)<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Preamplifier Not Applicable note i<br>Filter 2 min | 0-10 min by test 2 min to 1 hr and 2 min by analysis | Filter Insulation Resistance remain greater than $1 \times 10^8$ ohms | Filter Insulation Resistance exceeded $2.0 \times 10^{10}$ ohms | Qualified by test Westinghouse Test Report No. NC-TR-81-15<br>Program Document: 14273-ICE 3511 | Qualified for 10 Years |

## Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 30 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Transmitter Rack<br>Containment Building | C-E | None | Temperature 370F<br>Pressure 60 psig<br>Relative Humidity Steam/Air Mixture<br>Radiation $3.3 \times 10^7$ rads $\gamma$ $1 \times 10^8$ rads $\infty$<br>Chemical Spray 4400 PPM Boron, 50 PPM Hydrazine pH adjusted to 7.0-8.5 after 4 hrs using Trisodium Phosphate<br>Submergence None | (Later) | Accident Mitigation (Later)<br>Post Accident Monitoring (Later) | (Later) | Accident Mitigation (Later)<br>Post Accident Monitoring (Later) | (Later) | Test Report No. (Later)<br>Program Document No. 14273-ICE-3504 | Not Qualified (j)<br>Scheduled Completion Date Aug 30, 1983 |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 31 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure Transmitter and Flow Transmitter<br>Auxiliary Building | Rosemount | Model: 1153 B<br>System: CVCS<br>CE Tag No: PT-212 FT-212 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation 1 x $10^6$ rads<br>Chemical Spray None<br>Submergence None | Temperature 303F<br>Pressure 55 psig<br>Relative Humidity Sat-Stm/ Air Mixture<br>Radiation 2.44 x $10^7$ rads<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | Accident Mitigation None<br>Post Accident Monitoring 30 days | 37 days thermal aging + 80 hrs Accident Environment | Post Accident Accuracy ±10% | Post Accident <1% | Rosemount Reports 108025 Rev. A and 108026<br>E.Q. Program Document 14273-ICE-3538 | Qualified for 10 Years |

Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 32 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| Flow Transmitter and Level Transmitter<br>Auxiliary Building | Rosemount | Model: 1153 B<br>System: PAMS<br>CE Tag No: FT-306, 307 FT-308, 309 FT-311, 321 FT-331, 341 FT-338, 348 FT-390, 391 LT-344, 345 LT-348, 349 | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1 \times 10^6$ rads<br>Chemical Spray None<br>Submergence None | Temperature 303F<br>Pressure 55 psig<br>Relative Humidity Sat-Stm/ Air Mixture<br>Radiation $2.44 \times 10^7$ rads<br>Chemical Spray Not Applicable<br>Submergence Not Applicable | 30 days | 37 days thermal aging + 80 hrs Accident Environment | Post Accident Accuracy ±10% | Post Accident <1% | Rosemount Reports 108025 Rev. A and 108026<br>E.Q. Program Document 14273-ICE-3538 | Qualified for 10 Years |

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Table 4.1-2

ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 33 of 34)

| Type of Equipment/ Location | Manufacturer | Model No. or Identification No. | Abnormal or Accident Environment | Environment to Which Qualified | Operability Requirements | Operability Demonstrated | Accuracy or Response Time Requirements | Accuracy or Response Time Demonstrated | Qualification Report & Method | Qualification Status |
|---|---|---|---|---|---|---|---|---|---|---|
| RTD (Temp. Detectors)<br>Auxiliary Building | RDF Corp. | Model: 21245<br>System: PAMS SDCS<br>CE Tag No: TE-303X, Y TE-351X, Y TE-352X, Y | Temperature 50-104F<br>Pressure 0 psig<br>Relative Humidity 20-90%<br>Radiation $1.10^6$ rads<br>Chemical Spray None<br>Submergence None | Temperature 385F<br>Pressure 66 psig<br>Relative Humidity<br>Steam/Air Mixture<br>Radiation $2 \times 10^8$ rads<br>Chemical Spray N/A<br>Submergence N/A | Accident Mitigation<br>None<br>Post Accident Monitoring<br>30 days | 30 days | Accident Accuracy<br>None<br>Post Accident Accuracy<br>(Later) | Accuracy < ± 1%<br>Response Time <8 secs | E.Q. Program Document 14273-ICE-3538 | Review complete (k) expect to be qualified for 40 years<br>Scheduled Completion Date Sept 30, 1983 |

1

# Table 4.1-2

## ENVIRONMENTAL QUALIFICATION OF IE ELECTRICAL EQUIPMENT (NSSS)
## PALO VERDE NUCLEAR GENERATING STATION UNITS (1,2&3 (Sheet 34 of 34)

1

NOTES

a. May require replacement of electrical auxiliaries pending verification of parts supplied.

b. Replacing NAMCO Model EA-170 with NAMCO Model EA-180. See Appendix (X) for listing of Tag Nos. of affected limit switches.

c. Refer to Appendix (X) for equipment retrofits required as a result of lessons learned during the Qualification Process.

d. Valves may require refurbishment/modification as determined on basis of Qualification Testing.

e. Barton Test Report review complete. Awaiting resolution of potential 10 CFR Part 21 issued by Barton on these devices. 1

f. The operability time requirement is 2 minutes. The radiation levels "seen" during steam line or feed line break events in this time frame do not significantly increase above the normal total integrated dose (TID) for the 10 year Qualified Life of this equipment. This 10 year TID is $2.5 \times 10^6$ Rad.

g. Based on previous operating experience, the fission chamber assembly does not require thermal aging nor irradiation for qualification. Inorganic materials have been shown to not be significantly affected by irradiation flux (see Westinghouse Test Report No. NC-TR-81-15).

h. A neutron detector is an uncalibrated instrument. Sensitivity is based on things such as: distance from Core, neutron attenuation due to intervening materials, etc.

The accuracy of the ex-core flux measurement system is established by in-plant calibration by comparison to primary heat balance calculations. The response time of the Ex-core Neutron Detector is basically the detector collection time which is in the order of $2.0 \times 10^{-7}$ seconds.

i. The Ex-core Safety Channel Preamplifier is required to provide only low power trips, and has no required function during LOCA, MSLB or FWLB. 1

j. Qualification program for termination of instruments on transmitter racks is in progress.

k. Qualification of these devices to be demonstrated based upon type testing of incontainment service RTD's (similar models). Test report presently being prepared.

l. A re-evaluation of DBE and post-DBE instrument accuracy requirements, on a case-by-case circuit basis, is currently under way.

m. The worst case accident for which these valves (-001) are required is presently being redefined - For valves (-003) the test failure is presently under review, replacement is probable. 1

n. Awaiting the final test report.

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 1 of 8)
CONTAINMENT BUILDING - ENVIRONMENTAL DESIGNATOR I (1 of 2)

| Condition / Parameter | Normal/Abnormal (N) | Design Basis Accident (A) (Includes 40 Year Integrated) | | |
|---|---|---|---|---|
| | | LOCA | MSLB | TIME DURATION |
| Temperature (F) | 50 - 120 | 350<br>350<br>302<br>302-270<br>270-200 | 370<br>350<br>302<br>302-270<br>270-200 | 4 Min<br>8 Min<br>8 Hr<br>42 Hr<br>2 Wk |
| Pressure (psig) | ATM. (a) | 60<br>55<br>25<br>10 | | 12 Min<br>8 Hr<br>42 Hr<br>2 Wk |
| Relative Humidity (%) | 20 - 90% | Steam/Air Mixture | | |
| Radiation (Rads) (40 Year Integrated Dose) | $1 \times 10^7$ | $3.3 \times 10^7$ Gamma<br>$2 \times 10^8$ Beta (non-sprayed enclosures)<br>$1 \times 10^8$ Beta (all other areas) | | |
| Chemicals | None | • 4400 ppm Boron<br>• 50 ppm Hydrazine<br>• pH adjusted to 7.0-8.5 after 4 hours using Trisodium phosphate | | |

a. Structural Integrity Test Pressure = 69 psig.

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 2 of 8)
CONTAINMENT BUILDING - ENVIRONMENTAL DESIGNATOR I (2 of 2)

| Condition / Parameter | Normal/Abnormal | Design Basis Accident |
|---|---|---|
| | | LOCA/MSLB |
| Submergence | None | Below Plant El. 91' |
| Dust | 1.52 $\mu G/M^3$ | 650 $\mu G/M^3$ |
| Seismic | 2 OBE's<br><br>(Refer to Seismic Response Spectra) | 1 SSE<br><br>(Refer to Seismic Response Spectra) |
| Dynamic | Refer to Equipment Specifications for requirements | Refer to Equipment Specifications for requirements |
| Aging | Equipment must be qualified for 40 year life for environmental parameters | Equipment must be qualified for 40 year life plus DBA for environmental parameters |

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 3 of 8)
MAIN STEAM SUPPORT STRUCTURE - ENVIRONMENTAL DESIGNATOR II (1 of 2)

| Condition / Parameter | Normal/Abnormal (N) | Design Basis Accident (A) (Includes 40 Year Integrated) | |
|---|---|---|---|
| | | LOCA/MSLB | Time Duration |
| Temperature (F) | 28 - 120 | 300 (above El. 100') | 15 minutes |
| | | 28-120 (below El. 100') | not applicable(b) |
| Pressure (psig) | ATM | 21 (above El. 100') | 15 minutes |
| | | ATM (below El. 100') | not applicable(b) |
| Relative Humidity (%) | 20 - 90% | Steam/Air Mixture (above El. 100')<br>20-90% (below El. 100') | |
| Radiation (Rads) (40 Year Integrated Dose) | $<10^3$ | $10^6$ (above El. 100')<br>$10^5$ (below El. 100') | |
| Chemicals | None | None | |

b. The subcompartments below elevation 100' are unaffected by the MSSS design basis pipe break.

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 4 of 8)
MAIN STEAM SUPPORT STRUCTURE - ENVIRONMENTAL DESIGNATOR II (2 of 2)

| Condition / Parameter | Normal/Abnormal | Design Basis Accident |
|---|---|---|
| | | LOCA/MSLB |
| Submergence | None | None |
| Dust | 1.52 $\mu G/M^3$ (Below El. 100')<br>61.3 $\mu G/M^3$ (Above El. 100') | 650 $\mu G/M^3$ (Below El. 100')<br>131 $mG/M^3$ (Above El. 100') |
| Seismic | 2 OBE's<br><br>(Refer to Seismic Response Spectra) | 1 SSE<br><br>(Refer to Seismic Response Spectra) |
| Dynamic | Refer to Equipment Specifications for requirements | Refer to Equipment Specifications for requirements |
| Aging | Equipment must be qualified for 40 year life for environmental parameters | Equipment must be qualified for 40 year life plus DBA for environmental parameters |

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 5 of 8)
AUXILIARY BUILDING - ENVIRONMENTAL DESIGNATOR III (1 of 2)

| Condition / Parameter | Normal/Abnormal (N) | Design Basis Accident (A) (Includes 40 Year Integrated) | |
|---|---|---|---|
| | | LOCA/MSLB | Aux Steam Break |
| Temperature (F) | 50 - 104 | 50 - 104 | 50 - 318F(c) |
| Pressure (psig) | ATM | ATM | 1.5(d) |
| Relative Humidity (%) | 20 - 90% | 20 - 90% | 20 - 100% |
| Radiation (Rads) (40 Year Integrated Dose) | $3.5 \times 10^4$ (accessible areas)<br>$1.25 \times 10^7$ (Volume Control Tank)<br>$2.7 \times 10^9$ (Purification Ion Exch.) | $1 \times 10^6$ (accessible areas)(e)<br>$1.25 \times 10^7$ (Volume Control Tank)<br>$2.7 \times 10^9$ (Purification Ion Exch.) | |
| Chemicals | None | None | |

c. Applicable to Class 1E electrical cable only (Class 1E cable satisfies qualification envelope for containment)

d. Pressure is a transient effect (i.e., several seconds duration)

e. For an intact primary degraded core event, rooms containing LPSI recirculation fluids will have integrated radiation levels of $6.4 \times 10^6$ Rads. Equipment subject to this dose is identified in table 3.3-7.

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 6 of 8)
AUXILIARY BUILDING - ENVIRONMENTAL DESIGNATOR III (2 of 2)

| Condition / Parameter | Normal/Abnormal | Design Basis Accident LOCA/MSLB |
|---|---|---|
| Submergence | None | None |
| Dust | 1.52 $\mu G/M^3$ | 650 $\mu G/M^3$ |
| Seismic | 2 OBE's<br>(Refer to Seismic Response Spectra) | 1 SSE<br>(Refer to Seismic Response Spectra) |
| Dynamic | Refer to Equipment Specifications for requirements | Refer to Equipment Specifications for requirements |
| Aging | Equipment must be qualified for 40 year life for environmental parameters | Equipment must be qualified for 40 year life plus DBA for environmental parameters |

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 7 of 8)
FUEL BUILDING - ENVIRONMENTAL DESIGNATOR VI (1 of 2)

| Condition / Parameter | Normal/Abnormal (N) | Design Basis Accident (A) (Includes 40 Year Integrated) |
|---|---|---|
| | | LOCA/MSLB |
| Temperature (F) | 50 - 104 | 50 - 104 |
| Pressure (psig) | ATM | ATM |
| Relative Humidity (%) | 20 - 90% | 20 - 90% |
| Radiation (Rads) (40 Year Integrated Dose) | $<10^3$ | $10^5$ |
| Chemicals | None | None |

Table 4.1-3

ENVIRONMENTAL QUALIFICATION PARAMETERS (Sheet 8 of 8)
FUEL BUILDING - ENVIRONMENTAL DESIGNATOR VI (2 of 2)

| Condition / Parameter | Normal/Abnormal | Design Basis Accident |
|---|---|---|
| | | LOCA/MSLB |
| Submergence | None | None |
| Dust | 1.52 $\mu G/M^3$ | 650 $\mu G/M^3$ |
| Seismic | 2 OBE's<br>(Refer to Seismic Response Spectra) | 1 SSE<br>(Refer to Seismic Response Spectra) |
| Dynamic | Refer to Equipment Specifications for requirements | Refer to Equipment Specifications for requirements |
| Aging | Equipment must be qualified for 40 year life for environmental parameters | Equipment must be qualified for 40 year life plus DBA for environmental parameters |

REVIEW TECHNIQUE

4.1.6 PERMANENT FILES

The Qualification Report Permanent Files are presently organized into an auditable form to insure that all information may be readily retrieved. The first and subsequent individual plan and report submittals (except the final report) for each specification are arranged in folders in a manner which indicates sequence in which were received. Each folder will identify the specification, the Bechtel log number, the supplier report number and the transmittal letter number. The contents of the folders will be:

- A copy of the transmittal letter
- The qualification report
- FAP-1 review request form
- APS review check sheet (FAP-15) (if applicable)
- A copy of the letter transmitting comments to Bechtel (if applicable).

The following information will also be available, for audit:

- Environmental Requirements as identified in the FSAR
- Applicable Required Response Curves
- SQRT Master Lists
- Harsh Environmental Qualification Summary Report
- PVNGS Checklists

Once a qualification report is judged to be satisfactory, a final qualification package is developed and identified separately from the previous report submittals. In addition to the qualification folder contents as listed in the first paragraph

REVIEW TECHNIQUE

the following information will be placed in the final qualification package as applicable or available for audit.

- Title and Table of Contents Form (FAP-14) containing
  - Supplier Report Number, Revision and Date
  - Title
  - Appropriate review sign off
- Equipment Qualification Document Certifications
- PVNGS Environmental and Seismic Checklists
- Annotated APS Checklist (FAP-15)
- Qualification Maintenance Spare Parts Form
- Other miscellaneous applicable documentation

In addition the NSSS Environmental Qualification (EQ) Files are also organized in an auditable form as EQ Program Audit Folders. The EQ Program Audit Folders contain EQ Program Documents and Generic Files. The combination of the EQ Program Documents and Generic Files present an overall view of the equipment specific qualification effort.

The EQ Program Documents provide the test plans, test procedures, test reports, equipment specifications, environmental requirements, and analyses to support qualification. The Generic Files contain documents required to verify information presented on the Summary Sheets and in the EQ Program Documents.

For Instrumentation and Control Engineering supplied EQ Program Audit Folders, the Generic Files are provided as a supplementary section to the EQ Program Documents.

For Plant Engineering supplied EQ Program Audit Folders, the Generic Files are provided as separate Audit Folders with specific references made to the Generic Files in the appendices of the EQ Program Documents.

# 5. MILD ENVIRONMENT EQUIPMENT QUALIFICATION

## 5.1 MILD ENVIRONMENT EQUIPMENT QUALIFICATION

Non-harsh environment, Class 1E equipment will be qualified for the normal and abnormal local environment and a seismic event. An aging analysis will be performed to determine whether or not known significant aging mechanisms exist for that equipment. The aging analysis will focus on the identification of known aging mechanisms that significantly increase the equipments susceptibility to its design basis event (seismic only for non-harsh environments ). Using the results of the aging analysis, the equipment may require an accelerated age conditioning program. The results of the aging analysis and/or age conditioning are used to establish qualified life and equipment component replacement interval.

Appendix A "Procedures for Maintaining Equipment Qualification" is also applicable to mild environment equipment.

# APPENDIX A

## PROCEDURES FOR MAINTAINING EQUIPMENT QUALIFICATION

# APPENDIX A

## PROCEDURES FOR MAINTAINING EQUIPMENT QUALIFICATION

A Qualification Maintenance Program is presently under development for safety related equipment to insure that such equipment remains qualified throughout the life of the plant.

Since many categories of equipment have life limiting components and forty year consumables, it is necessary to collect and classify equipment component data and store this information in a retrievable data base for immediate access. The data base to be employed at PVNGS is integrated into the (Station Information Management System/Maintenance Management Information System) SIMS/MMIS program. The objectives of the SIMS/MMIS program is to assure a streamlined information flow with auditable record keeping and to provide for resource planning and station work management.

To support a Qualification Maintenance Program, all Class IE specifications are reviewed to extract and classify equipment components so that life limiting components and forty year consumables are identified. Collection of this data is obtained by reviewing:

- qualification reports
- bills of material
- instruction manuals
- maintenance manuals
- supplier recommended spare parts

For each specification, equipment model numbers are identified along with all equipment tag numbers. For each specific model number the following information is listed for each component, as applicable, but not limited to:

- equipment tag number(s) and purchase order number
- part nomenclature or description

- manufacture/supplier
- alternate sources
- part number/manufacturer model number
- part safety classification
- qualified life
- unique preventative maintenance requirements
- consumable or required for regular maintenance/repair
- shelf life
- parts list identification by log number(s)
- quantity on hand
- inventory location
- lead time for placing orders

This information will be placed into the SIMS/MMIS random access data base which may be sorted in any desired fashion. Hard copies of this data will be placed in the Qualification Central Files.

The major functional area of the SIMS/MMIS data base, which supports this effort, is called Station Work Management, which performs work initiation and control, work planning and scheduling, work execution and closing with supporting documentation. Additional functions performed by SIMS/MMIS is preventative maintenance flagging and providing stock status information to inform the user when purchases are required at reorder levels.

Procedures are presently being developed to aid in the procurement of Class IE spare and replacement parts. This is to ensure that proper procurement activities are performed in obtaining fully qualified parts, to the installed environment that they will experience. All Class IE parts will be specified and purchased with proper documentation to demonstrate that qualification has been obtained for both the environmental and seismic requirements of its installed location.

If duplicate original parts cannot be purchased, alternate components will be analyzed for form, fit, and function and supporting qualification documentation will be obtained to insure that they are qualified for their installed location and service conditions.

Maintenance procedures will require that all documentation relating to periodic and preventative maintenance, spare, and replacement part procurement including certification of compliance and component replacement will be placed within the Qualification Central Files.

The quality assurance requirements of Regulatory Guide 1.33, Revision 2 and ANS-3.2/ANSI N18.7-1976 will be met as described in FSAR Section 1.8. These requirements will be implemented in the qualification maintenance program. 1

# APPENDIX B

## PVNGS EQUIPMENT ENVIRONMENTAL AND SEISMIC QUALIFICATION CHECK LISTS

ENVIRONMENTAL QUALIFICATION REPORT
PER REQUIREMENTS OF NUREG-0588 APPENDIX B

PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT ENVIRONMENTAL QUALIFICATION
CHECK LIST (SHEET 1 OF 10)

*I General

This checklist is designed as an aid for reviewing safety-related equipment qualification reports and to assure that all requirements have been met. Complete one checklist sheet for each safety-related component. Like components with the same environmental designator can be listed on the same sheet.

| System Description | System Components (General Description) | Equipment Location Bldg. Elev. | Manufacturer | Model Number | PVNGS Spec. | PVNGS Tag Number |
|---|---|---|---|---|---|---|
| | | | | | | |

Additional Information _____

_____

*II. Operability Requirements

| Environmental Designator | Design(1) Basis Accident | Time Requirements for Operation(a) | Nature of Operation | Equipment Function |
|---|---|---|---|---|
| | | | | |

(1)Defines requirements for operation, not environment. If required to operate during seismic, state and define under additional information (include unacceptable function).
(2)If required during DBA, state duration from onset of DBA

Additional Information _____

_____

_____

*To be completed by responsible engineer (RE)

PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT ENVIRONMENTAL QUALIFICATION
CHECK LIST (SHEET 2 OF 10)

*III Designated Environment

Append copy of FSAR Table 3E-1 Environmental Designator Service condition characterization

IV Qualified Environment

Complete Table 1. Compare Table 1 to FSAR designated service condition. Does supplier's qualified service meet or exceed the FSAR requirements:

☐ Yes - Proceed to item V

☐ No - Describe the differences. Indicate whether differences will impair the equipment function. Justify any conclusions that qualification to less than full service conditions is acceptable. (Attach additional sheets as required.)

_____

_____

_____

_____

V Margin

Identify margins, if any, provided by qualification on Table 2. Compare the listed margins to IEEE-323-1974 requirements. Are margins acceptable?

☐ Yes - Proceed to item VI

☐ No - Describe differences and indicate whether or not differences are significant

☐ Significant ☐ Not Significant

Justification: _____

_____

_____

*To be completed by RE.

PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT ENVIRONMENTAL QUALIFICATION
CHECK LIST (SHEET 3 OF 10)

VI Equipment Mounting and Orientation

A. Was equipment qualification for a unique installed orientation (horizontal, vertical, upside down, etc.)? Specify orientation of required installation (check all that are permissible).

☐ Horizontal (e.g., floor)

☐ Vertical (e.g., wall)

☐ Canted at _____ degrees from vertical (e.g., piping)

☐ No orientation requirement

☐ Other - Clarify: _____

_____

*B. Mounting method (welding, bolts, rivets, etc.)

Was test mount same as intended site installation?

☐ Yes - Proceed to item VII

☐ No - Explain: _____

_____

*VIII Qualification Method

A. Identify qualification method:

☐ Type Test - Report #_____

☐ Analysis - Report #_____

☐ Operating Experience Report #_____

☐ On-Going Qualification - Report #_____

☐ Combination of Methods (check all that apply)

*To be completed by RE.

PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT ENVIRONMENTAL QUALIFICATION
CHECK LIST (SHEET 4 OF 10)

B. Describe qualification method. What codes and standards were utilized? Discuss all extrapolations from test data that supplier claims qualify different items by a prototype/modulator test. If on-going qualification is used, describe program and identify scope and schedule of required re-testing, re-analysis, or inspection.

_____

_____

_____

_____

C. Were tests conducted in the following sequence? (Steps may be omitted if not applicable.) Sequence specified in IEEE 323-1974.

1. Inspection
2. Operation (baseline)
3. Operation (extremes)
4. Aging
5. Seismic
6. DBA Operation
7. Post DBA Operation
8. Inspection

☐ Yes - Proceed to D

☐ No - Explain test sequence

_____

Was actual test sequence equal to or more severe than this sequence?

☐ Yes - Explain

☐ No - Equipment is not qualified

D. Provide additional test data as noted:

1. Seismic testing consisting of _____ OBEs before/after _____ SSEs using the required response spectra/required input motion noted in FSAR Section _____.*

*To be completed and provided by RE.

ENVIRONMENTAL QUALIFICATION REPORT
PER REQUIREMENTS OF NUREG-0588 APPENDIX B

PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT ENVIRONMENTAL QUALIFICATION
CHECK LIST (SHEET 5 OF 10)

2. Specimen tested in identical to permanent plant equipment:

☐ Yes - Proceed to 3

☐ No - Explain: _____

_____

_____

3. Test temperatures were measured by:

☐ Direct Mounted Thermocouple - Proceed to 4

☐ Other - Explain and Justify: _____

_____

_____

4. Heat aging was conducted by:

☐ Arrhenius Methods - Satisfactory, Proceed to 5

☐ Arrhenius Methods - Unsatisfactory, Explain: _____

_____

☐ Other - Explain and Justify: _____

_____

_____

5. Humidity testing was conducted by: _____

_____

_____

6. Were heat, humidity, and radiation aging performed simultaneously?

☐ Yes

☐ No - Justify: _____

_____

_____

PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT ENVIRONMENTAL QUALIFICATION
CHECK LIST (SHEET 6 OF 10)

7. The performance characteristics required to be monitored were:

_____

_____

8. Functional operability verified: Operational modes monitored

| Before | During | After | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Acceptable | _____ |
| ☐ | ☐ | ☐ | Unacceptable | _____ |
| ☐ | ☐ | ☐ | Not Applicable | _____ |

9. Performance characteristics during testing were monitored

☐ Continuously

☐ Intermittently at _____ intervals

☐ Not applicable - Justify: _____

_____

_____

10. Does test report identify that instrumentation was in current calibration and traceable to the National Bureau of standards?

☐ Yes ☐ No - Justify: _____

*11. Does qualification test interfaces (electrical connections, piping supports, etc.) simulate installed condition?

☐ Yes

☐ No - Justify: _____

_____

_____

*To be completed by RE.

ENVIRONMENTAL QUALIFICATION REPORT
PER REQUIREMENTS OF NUREG-0588 APPENDIX B

PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT ENVIRONMENTAL QUALIFICATION
CHECK LIST (SHEET 7 OF 10)

VIII Evaluation

Qualified lifetime is:

☐ 40 years

☐ Other - Specify times(s) and replacement schedule(s): _____

_____

Is preventative maintenance required to maintain qualified life?

☐ Yes - Maintenance instruction reference: _____

_____

☐ No

*Identify documentation that supports qualification evaluation:

| Bechtel Log No. | Report No. | Subject | Proprietary (Yes/No) (If proprietary, identify location of report) |
|---|---|---|---|
| | | | |

IX Qualification Deficiencies

The following is a list of qualification deficiencies requiring corrections and/or work orders:

1. _____

2. _____

3. _____

4. _____

5. _____

*To be completed by the responsible engineer

PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT ENVIRONMENTAL QUALIFICATION
CHECK LIST (SHEET 8 OF 10)

Work orders written:

_____

_____

_____

Method of analysis, calculation, and/or testing is:

☐ Acceptable ☐ Not Acceptable

Reviewed by_____Date_____

Group Supervisor_____Date_____

ENVIRONMENTAL QUALIFICATION REPORT
PER REQUIREMENTS OF NUREG-0588 APPENDIX B

PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT ENVIRONMENTAL QUALIFICATION
CHECK LIST (SHEET 9 OF 10)

Table 1
ENVIRONMENTAL SERVICE CONDITION AS QUALIFIED
(TEST, ANALYSIS, ETC) BY SUPPLIER

| CONDITION / PARAMETER | NORMAL/ABNORMAL | DESIGN BASIS ACCIDENT (INCLUDES 40 YEAR INTEGRATED) |
|---|---|---|
| TEMPERATURE (F) | | |
| PRESSURE (PSIG) | | |
| RELATIVE HUMIDITY (%) | | |
| RADIATION (RADS) (40 YEAR INTEGRATED DOSE | | |
| CHEMICALS | | |
| SUBMERGENCE | | |
| DUST | | |
| SEISMIC | | |
| DYNAMIC | | |
| AGING | | |

Table 2
QUALIFICATION MARGIN

| CONDITION / PARAMETER | NORMAL/ABNORMAL | DESIGN BASIS ACCIDENT (INCLUDES 40 YEAR INTEGRATED) |
|---|---|---|
| TEMPERATURE (F) | | |
| PRESSURE (PSIG) | | |
| RELATIVE HUMIDITY (%) | | |
| RADIATION (RADS) (40 YEAR INTEGRATED DOSE) | | |
| CHEMICALS | | |
| SUBMERGENCE | | |
| DUST | | |
| SEISMIC | | |
| DYNAMIC | | |
| AGING | | |

PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT ENVIRONMENTAL QUALIFICATION
CHECK LIST (SHEET 10 OF 10)

REFERENCES

PALO VERDE NUCLEAR GENERATING STATION
SEISMIC QUALIFICATION
CHECK LIST (Sheet 1 of 7)

I. Component Name:

*1. Scope: [ ] NSSS [ ] BOP

| System Description | System Components (General Description) | Equipment Location Bldg. Elev. | Manufacturer | Model Number | PVNGS Spec. | PVNGS Tag Number |
|---|---|---|---|---|---|---|
| | | | | | | |

Additional Information _____

_____

Identify documentation that supports qualification evaluation:

| Bechtel Log No. | Report No. | Subject | Proprietary (Yes/No) (If proprietary, identify location of report) |
|---|---|---|---|
| | | | |

*2. Physical Description

a. Appearance _____

b. Dimensions _____

c. Weight _____

*To be completed by the responsible engineer (RE).

ENVIRONMENTAL QUALIFICATION REPORT
PER REQUIREMENTS OF NUREG-0588 APPENDIX B

PALO VERDE NUCLEAR GENERATING STATION
SEISMIC QUALIFICATION
CHECK LIST (Sheet 2 of 7)

*3. Field Mounting Conditions [ ] Bolt (No. _____, Size _____)
[ ] Weld (Length _____)
[ ] _____

Is field mounting the same as qualification mounting?
[ ] Yes [ ] No

Are field connections other than mounting the same as the qualification connections?
[ ] Yes [ ] No

4. Natural Frequencies in each direction (Side/Side, Front/Back, Vertical):

S/S: _____ F/B: _____ V: _____

*5. a. Functional Description: _____

_____

b. Is the equipment required for

[ ] Hot Standby [ ] Cold Shutdown

[ ] Both _____

*6. Pertinent reference Design Specification: _____

*7. Equipment function during seismic event (include unacceptable function): _____

_____

*II Is equipment available for inspection in the plant: [ ] Yes [ ] No

III Equipment Qualification Method:

Test: _____

Analysis: _____

Combination of Test and Analysis: _____

Test and/or Analysis by _____
(Name of Company or Laboratory & Report No.)

*To be completed by RE.

PALO VERDE NUCLEAR GENERATING STATION
SEISMIC QUALIFICATION
CHECK LIST (Sheet 3 of 7)

IV Vibration Input:

1. Loads considered:

a. [ ] Seismic only

b. [ ] Hydrodynamic only

c. [ ] Explosive only

d. [ ] Other (Specify) _____

e. [ ] Combination of _____

f. Method of combining RRS: [ ] Absolute Sum
[ ] SRSS
[ ] _____ (other, specify)

*2. Required Response Spectra (attach the graphs): _____
(ZPA for RRS and/or max. of rim)

3. Required Acceleration in each direction: (Req'd by specification)

S/S = _____ F/B = _____ V = _____

V If Qualification by test, then Complete:

1. [ ] Single Frequency [ ] Multi-Frequency: [ ] random
[ ] sine beat
[ ] _____

2. [ ] Single Axis [ ] Multi-Axis

3. No. of Qualification Tests: OBE_____ SSE_____ Other_____ (specify)

4. Frequency Range: _____

*To be completed by RE.

PALO VERDE NUCLEAR GENERATING STATION
SEISMIC QUALIFICATION
CHECK LIST (Sheet 4 of 7)

5. TRS enveloping RRS using Multi-Frequency Test

[ ] Yes (plot TRS on RRS graphs)
[ ] No

---

6. Input g-level Test at S/S = _____ F/B = _____ V = _____

7. Laboratory Mounting: _____

a. [ ] Bolt (No. _____, Size _____)
[ ] Weld (Length _____)
[ ] _____

8. Functional operability verified:

| Before | During | After | | Operational modes monitored |
|---|---|---|---|---|
| [ ] | [ ] | [ ] | Acceptable | _____ |
| [ ] | [ ] | [ ] | Unacceptable | _____ |
| [ ] | [ ] | [ ] | Not Applicable | _____ |

9. Test Results including modifications made: _____

10. Other tests performed (such as fragility test, including results):

---

VI <u>If Qualification by analysis or by the combination of test and analysis, then complete</u>:

1. Description of Test including Results: _____

2. Method of Analysis: _____

[ ] Static Analysis [ ] Equivalent Static Analysis
[ ] Dynamic Analysis [ ] Time-History
[ ] Response Spectrum

3. Model Type: [ ] 3D [ ] 2D [ ] 1D

[ ] Finite Element [ ] Beam [ ] Closed Form Solution

*To be completed by RE and Staff

ENVIRONMENTAL QUALIFICATION REPORT
PER REQUIREMENTS OF NUREG-0588 APPENDIX B

PALO VERDE NUCLEAR GENERATING STATION
SEISMIC QUALIFICATION
CHECK LIST (Sheet 5 of 7)

4. [ ] Computer Codes: _____

Frequency Range and No. of modes considered: _____

[ ] Hand Calculations

5. Method of Combining Dynamic Responses: [ ] Absolute Sum
[ ] SRSS
[ ] Other: _____ (specify)

6. Damping: _____ Basis for the damping used: _____

7. Support Considerations in the model: _____

8. Critical Structural Elements: _____

A.

| Identification | Location | Governing Load or Response Combination | Seismic Stress | Total Stress | Stress Allowable |
|---|---|---|---|---|---|
| | | | | | |

B.

| Maximum Deflection | Location | Effect Upon Functional Operability | | | Parameter Measured |
|---|---|---|---|---|---|
| | | Before Test | During Test | After Test | |
| | | | | | |

VII Aging Requirements

*A. Is aging required prior to seismic qualification: ☐ Yes ☐ No

B. Was equipment aged prior to seismic qualification: ☐ Yes ☐ No

*To be completed by the RE

PALO VERDE NUCLEAR GENERATING STATION
SEISMIC QUALIFICATION
CHECK LIST (Sheet 6 of 7)

VIII Qualification Deficiencies

The following is a list of qualification deficiencies requiring work orders:

_____

_____

_____

_____

_____

_____

Work orders written:

_____

_____

_____

Method of analysis, calculation, and/or testing is:

☐ Acceptable ☐ Not Acceptable

Reviewed by_____Date_____

Group Supervisor_____Date_____

ENVIRONMENTAL QUALIFICATION REPORT
PER REQUIREMENTS OF NUREG-0588



PALO VERDE NUCLEAR GENERATING STATION
SEISMIC QUALIFICATION
CHECK LIST (Sheet 7 of 7)

REFERENCES

# APPENDIX C

# EQUIPMENT QUALIFICATION PROGRAM CHECK LIST

# ENVIRONMENTAL QUALIFICATION REPORT PER REQUIREMENTS OF NUREG-0588

APPENDIX C

F-AP-15
PAGE 1 OF 8
NUCLEAR PROJECTS ENGINEERING DEPARTMENT
IEEE-323-1974, 344-1975
EQUIPMENT QUALIFICATION PROGRAM CHECKLIST

BECHTEL PACKAGE #_____ LOG #_____

TEST PLAN #_____ REV. #_____

Specification _____ Manufacturer_____

Equipment Identification in accordance with specification data sheets

_____YES _____NO

Proprietary _____YES _____NO

Applicable Specification Appendix:

BOP Environmental 4V ____ 4Y ____

Seismic 4E ____ 4F ____ 4G ____ 4H ____

4I ____ 4J ____ 4K ____ 4U ____

NSSS CE Specification _____

Environmental Service Conditions:

I-A____ I-B____ I-C____ I-D____ I-E____ I-F____

Equipment Description:

Equipment Life:_____ (year)

Life Limiting Components:

| Item | Part Number | Life (Cycles or years) |
|---|---|---|

PV214-09D Rev. 6-82 (Rev. 1)

IEEE-323-1974 Qualification Type (Mark exhibits B,C,D,&E as appropriate or mark "Not Applicable")

_____ Type Testing

_____ Operating Experience

_____ Analysis

_____ On-Going

_____ Combination of the above

Note Any Exceptions Taken

IEEE-344-1975 Qualification Type

_____ Testing _____ Analysis _____ N/A

_____ RRS: The RRS for the surface on which equipment will be mounted should contain the data for the principal horizontal axis and the vertical axis as a minimum. The RRS should include critical damping values at which the RRS was made and should indicate artificially broadened areas (see Sections 3.5 and 6.6.1.1). Equipment location relative to the location for the RRS should be included as should any unusual mounting plans.

_____ Floor Motion: If an RRS is not furnished, either surface (floor or structure) motion maximum accelerations at all significant frequencies or a time history should be provided.

_____ Functional Requirements: A listing or description of the functional requirements and malfunction criteria should be provided.

_____ Operations Settings: Typical operational settings (or ranges) for adjustable devices should be provided.

_____ Class IE: Identification of Class IE devices and circuitry, and the functions of related Class IE equipment should be provided.

_____ Duration: The earthquake's strong motion time duration should be specified.

_____ Loading: Loading requirements to be applied during the test, if any, should be specified.

_____ Acceptance: Special acceptance criteria, if any, should be specified.

_____ Tests versus Analysis: Special requirements for tests or analysis on specific equipment should be provided.

_____ Margin: All margins included in this document shall be identified (see IEEE Std 323-1974).

Special Maintenance Procedure

Any special maintenance or surveillance procedure required to maintain equipment qualifications.

_____ Yes _____ No

Will qualfication need updated or ongoing data to requalify or maintain present qualification?

_____ Yes _____ No

(If yes, by whom & when will data be provided.)

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PAGE 4 OF 8

IEEE-323-1974, 344-1975
TYPE TEST PROGRAM/PLAN
CHECKLIST

IEEE-323-1974, 344-1975 Type Test

The test plan must contain the following information:

_____ (1) Equipment descriptions

_____ (2) Number (quantity) of units to be tested

_____ (3) Mounting and connection requirements

_____ (4) Aging simulation procedure

_____ (5) The service conditions to be simulated

_____ (6) Performance and environmental variables to be measured

_____ (7) Test equipment requirements including accuracies

_____ (8) Environmental, operating, and measurement sequence in step-by-step detail

_____ (9) Performance limits or failure definition

_____ (10) Documentation (See Section 8.3 IEEE-323)

_____ (11) Statement of nonapplicable portions of the specification

_____ (12) A description of any conditions peculiar to the equipment which are not covered above, but which would probably affect said equipment during testing

Additional qualification methods required

_____ Yes _____ No

(If yes, give details below)

Comments:

PV214-09D Rev. 6-82 (Rev. 1)

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PAGE 5 OF 8

IEEE-323-1974
OPERATING EXPERIENCE PROGRAM/PLAN
CHECK LIST

IEEE-323-1974 Operating Experience

Note: This method is usually of limited use as a sole means of qualfications

_____ Identification of specific features to be demonstrated by operating experience

_____ Past history of performance and service conditions of equipment identified

_____ Equipment whose operating history is being demonstrated is shown to be typical of equipment to be qualified

_____ Equipment to be qualified is within envelope of operating experience equipment

Additional operating experience to be provided to qualify or keep equipment qualified:

_____ Yes _____ No

(If yes, give details below)

Comments:

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PAGE 6 OF 8

IEEE-323-1974, 344-1975
ANALYSIS TEST PROGRAM/PLAN
CHECKLIST

Note: This method of limited value as a sole means of qualfication

IEEE-323-1974, 344-1975 Analysis

_____ Interface or boundary conditions of equipment

_____ What is to be analyzed

_____ Assumptions, empirically derived values, and mathematical models used and justifications

_____ Descriptions of analytical methods and/or computer programs used

_____ Environmental compatibility

_____ Similarity of equipment

_____ Basis for any extrapolation

_____ Failure modes and effects identified

Additional analysis needed to qualify equipment - keep equipment qualified

_____ Yes _____ No

(If yes, give details below)

Comments:

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PAGE 7 OF 8

IEEE-323-1974
ON-GOING QUALIFICATION PROGRAM/PLAN
CHECKLIST

Note: This method of qualification should be minimized due to its adverse effect on maintenance and surveillance at PVNGS during operation.

IEEE-323-1974 On-Going Qualification

On-Going Method Proposed

_____ Aging and testing of identical equipment or components continuing during the qualified period of installed equiment (spare program)

_____ Additional equipment to be installed under similar conditions to be removed before end of life of installed equipment and type tested to determine additional qualified life (pacing program)

_____ Periodic replacement plan. (can be components or total equipment)

_____ Combined scheduled and unscheduled maintenance with periodic testing

_____ Reliability predictions based on similar equipment or other accepted techniques

_____ Maintainability predictions based on experience with supplied equipment or similar equipment

_____ Use of continuous on-line testing

Has Vendor Provided:

_____ Proposed Testing Plans

_____ Proposed Maintenance Plans

_____ Equipment Replacement Plans

F-AP-15
PAGE 8 OF 8

APPROVAL & SIGNATURES

Designated Representative:_____ Date_____

Other Review:_____ Date _____

Responsible Supervisor/Supervising Engineer:

_____ Date _____

Nuclear Engineering Manager: _____ Date _____

Corporate Quality Assurance: _____ Date _____

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# APPENDIX D

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 1 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 1 AUXILIARY FEEDWATER (AF-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JAFAE01 | AUX FW TURBINE CONTROL PANEL | 13MM021 |
| 1MAFAE01 | AUX FW TURB OIL COOLER | 13MM021 |
| 1MAFAK01 | AUX FDWTR PUMP TURBINE | 13MM021 |
| 1MAFAP01 | AUX FEEDWTR PUMP-TURB DRIVEN | 13MM021 |
| 1MAFAP02 | AUX FW TURB MAIN OIL PUMP | 13MM021 |
| 1MAFA117S | PENETRATION-AUX FEED | 13MM500 |
| 1MAFBF01 | AUX FDWTR PMP START-UP STRNR | 13MM021 |
| 1MAFBP01 | AUX FEEDWTR PUMP-MOTOR DRIVEN | 13MM021 |
| 1MAFB117A | PENETRATION-AUX FEED | 13MM500 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 2 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 1 (AF-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JAFBHS 0010 | AF PP B | J-200 |
| 1JAFAHS 0011 | AF PP N | J-200 |
| 1JAFBFD 0012 | AF PP B RECIRC | M-021 |
| 1JAFAFO 0013 | AF PP A RECIRC | M-021 |
| 1JAFBFE 0015 | AF PP B TEST/EXERCISE | J-425 |
| 1JAFBXCV 0016 | EXC FLOW CHK VLV FOR PI-16 | J-705 |
| 1JAFBPT 0017 | AF PP B DISCH | J-311 |
| 1JAFBPY 0017 | I/E CONVERTOR | J-111 |
| 1JAFBPI 0017A | AF PP B DISCH | J-111 |
| 1JAFAPT 0018 | AF PP A DISCH | J-311 |
| 1JAFAPY 0018 | I/E CONVERTOR | J-111 |
| 1JAFAPI 0018A | AF PP A DISCH | J-111 |
| 1JAFAXCV 0020 | EXC FLOW CHK VLV FOR PI-20 | J-705 |
| 1JAFAFE 0026 | AF PP A TEST/EXERCISE | J-425 |
| 1JAFBHV 0030 | AF REG VLV PP B TO SG 1 | J-601A |
| 1JAFBZT 0030 | AF REG VLV PP B TO SG 1 | J-601A |
| 1JAFBHS 0030A | AF REG VLV PP B TO SG 1-CR | J-200 |
| 1JAFBZI 0030A | AF REG VLV PP B TO SG 1-CR | J-200 |
| 1JAFBHS 0030B | AF REG VLV PP B TO SG 1-RS | N-001 |
| 1JAFBZI 0030B | AF REG VLV PP B TO SG 1-RS | N-001 |
| 1JAFBHS 0030C | AF REG VLV PP B TO SG 1-CR OR | J-200 |
| 1JAFBHS 0030D | AF REG VLV PP B TO SG 1-RS OR | N-001 |
| 1JAFBHS 0030E | AF REG VLV PP B TO SG 1 DISC | N-001 |
| 1JAFBHV 0031 | AF REG VLV PP B TO SG 2 | J-601A |
| 1JAFBZT 0031 | AF REG VLV PP B TO SG 2 | J-601A |
| 1JAFBHS 0031A | AF REG VLV PP B TO SG 2-CR | J-200 |
| 1JAFBZI 0031A | AF REG VLV PP B TO SG 2-CR | J-200 |
| 1JAFBHS 0031B | AF REG VLV PP B TO SG 2-RS | N-001 |
| 1JAFBZI 0031B | AF REG VLV PP B TO SG 2-RS | N-001 |
| 1JAFBHS 0031C | AF REG VLV PP B TO SG 2-CR OR | J-200 |
| 1JAFBHS 0031D | AF REG VLV PP B TO SG 2-RS OR | N-001 |
| 1JAFBHS 0031E | AF REG VLV PP B TO SG 2 DISC | N-001 |
| 1JAFAHV 0032 | AF REG VLV PP A TO SG 1 | J-601A |
| 1JAFAZT 0032 | AF REG VLV PP A TO SG 1 | J-601A |
| 1JAFAHS 0032A | AF REG VLV PP A TO SG 1-CR | J-200 |
| 1JAFAZI 0032A | AF REG VLV PP A TO SG 1-CR | J-200 |
| 1JAFAHS 0032B | AF REG VLV PP A TO SG 1-RS | N-001 |
| 1JAFAZI 0032B | AF REG VLV PP A TO SG 1-RS | N-001 |
| 1JAFAHS 0032C | AF REG VLV PP A TO SG 1-CR OR | J-200 |
| 1JAFAHS 0032D | AF REG VLV PP A TO SG 1-RS OR | N-001 |
| 1JAFCHV 0033 | AF REG VLV PP A TO SG 2 | J-601A |
| 1JAFCZT 0033 | AF REG VLV PP A TO SG 2 | J-601A |
| 1JAFCHS 0033A | AF REG VLV PP A TO SG 2-CR | J-200 |
| 1JAFCZI 0033A | AF REG VLV PP A TO SG 2-CR | J-200 |
| 1JAFCHS 0033B | AF REG VLV PP A TO SG 2-RS | N-001 |
| 1JAFCZI 0033B | AF REG VLV PP A TO SG 2-RS | N-001 |
| 1JAFCHS 0033C | AF REG VLV PP A TO SG 2-CR OR | J-200 |
| 1JAFCHS 0033D | AF REG VLV PP A TO SG 2-RS OR | N-001 |
| 1JAFBUV 0034 | AF ISOL VLV PP B TO SG 1 | P-2218 |
| 1JAFBHS 0034A | AF ISOL VLV PP B TO SG 1-CR | J-200 |
| 1JAFBHS 0034B | AF ISOL VLV PP B TO SG 1-RS | N-001 |
| 1JAFBHS 0034C | AF ISOL VLV PP B TO SG 1-CR OR | J-200 |
| 1JAFBHS 0034D | AF ISOL VLV PP B TO SG 1-RS OR | N-001 |
| 1JAFBHS 0034E | AF ISOL VLV PP B TO SG 1 DISC | N-001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 3 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 2 (AF-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JAFBUV 0035 | AF ISOL VLV PP B TO SG 2 | P-2218 |
| 1JAFBHS 0035A | AF ISOL VLV PP B TO SG 2-CR | J-200 |
| 1JAFBHS 0035B | AF ISOL VLV PP B TO SG 2-RS | N-001 |
| 1JAFBHS 0035C | AF ISOL VLV PP B TO SG 2-CR OR | J-200 |
| 1JAFBHS 0035D | AF ISOL VLV PP B TO SG 2-RS OR | N-001 |
| 1JAFBHS 0035E | AF ISOL VLV PP B TO SG 2 DISC | N-001 |
| 1JAFCUV 0036 | AF ISOL VLV PP A TO SG 1 | P-2218 |
| 1JAFCHS 0036A | AF ISOL VLV PP A TO SG 1-CR | J-200 |
| 1JAFCHS 0036B | AF ISOL VLV PP A TO SG 1-RS | N-001 |
| 1JAFCHS 0036C | AF ISOL VLV PP A TO SG 1-CR OR | J-200 |
| 1JAFCHS 0036D | AF ISOL VLV PP A TO SG 1-RS OR | N-001 |
| 1JAFAUV 0037 | AF ISOL VLV PP A TO SG 2 | P-2218 |
| 1JAFAHS 0037A | AF ISOL VLV PP A TO SG 2-CR | J-200 |
| 1JAFAHS 0037B | AF ISOL VLV PP A TO SG 2-RS | N-001 |
| 1JAFAHS 0037C | AF ISOL VLV PP A TO SG 2-CR OR | J-200 |
| 1JAFAHS 0037D | AF ISOL VLV PP A TO SG 2-RS OR | N-001 |
| 1JAFEFE 0040 | AF FLOW TO SG 1 DOWNCOMER | J-425 |
| 1JAFAFI 0040A | AFW FLOW TO SG 1/2 | J-111 |
| 1JAFAFT 0040A | AFW FLOW TO SG 1 | J-311 |
| 1JAFAFY 0040A | I/E CONVERTOR | J-111 |
| 1JAFAFI 0040B | AFW FLOW TO SG 1/2-RS | J-111 |
| 1JAFAFT 0040B | AFW FLOW TO SG 2 | J-311 |
| 1JAFAFY 0040B | SQ ROOT CONVERTOR | J-111 |
| 1JAFAFY 0040C | I/E CONVERTOR | J-111 |
| 1JAFAFY 0040D | SQ ROOT CONVERTOR | J-111 |
| 1JAFEFE 0041 | AF FLOW TO SG 2 DOWNCOMER | J-425 |
| 1JAFBFI 0041A | AFW FLOW TO SG 1/2 | J-111 |
| 1JAFBFT 0041A | AFW FLOW TO SG 1 | J-311 |
| 1JAFBFY 0041A | I/E CONVERTOR | J-111 |
| 1JAFBFI 0041B | AFW FLOW TO SG 1/2-RS | J-111 |
| 1JAFBFT 0041B | AFW FLOW TO SG 2 | J-311 |
| 1JAFBFY 0041B | SQ ROOT CONVERTOR | J-111 |
| 1JAFBFY 0041C | I/E CONVERTOR | J-111 |
| 1JAFBFY 0041D | SQ ROOT CONVERTOR | J-111 |
| 1JAFAST 0052 | AF TURB SPEED | M-021 |
| 1JAFASV 0052 | AF TURB GOVERNOR VALVE | M-021 |
| 1JAFASY 0052 | I/E CONVERTOR | J-111 |
| 1JAFAHS 0052A | AF TURB SPEED CONTROL XFER--RS | N-001 |
| 1JAFASI 0052A | AF TURB SPEED--CR | J-111 |
| 1JAFASK 0052A | AF TURB CONTROL--CR | M-021 |
| 1JAFAHS 0052B | AF TURB O.S.TEST--LP | M-021 |
| 1JAFASI 0052B | AF TURB SPEED--RS | J-111 |
| 1JAFASK 0052B | AF TURB CONTROL--RS | M-021 |
| 1JAFAHS 0052C | AF TURB SPEED CONTROL XFER--LP | M-021 |
| 1JAFASI 0052C | AF TURB SPEED--LP | M-021 |
| 1JAFASK 0052C | AF TURB CONTROL--LP | M-021 |
| 1JAFAHV 0054 | AF TURB TRIP VLV | M-021 |
| 1JAFAHY 0054 | AF TURB TRIP VLV MAN TRIP | M-021 |
| 1JAFAHS 0054A | AF TURB TRIP--CR | J-200 |
| 1JAFAHS 0054B | AF TURB TRIP--RS | N-001 |
| 1JAFAHS 0054C | AF TURB TRIP--LP | M-021 |
| 1JAFAHS 0054D | AF TURB TRIP VLV JOG--CR | J-200 |
| 1JAFAHS 0054E | AF TURB TRIP VLV JOG--LP | M-021 |
| 1JAFAHS 0054F | AF TURB TRIP VLV JOG--RS | N-001 |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 4 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 8

(AF-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JAFAXCV 0055 | EXC FLOW CHK VLV FOR PI-55 | J-705 |
| 1JAFAFO 0092 | T AND T VALVE DRAIN | J-425 |
| 1JAFAFO 0093 | T AND T VALVE DRAIN | J-425 |
| 1JAFAFO 0094 | AF TURB STEAM RING DRAIN | J-425 |
| 1JAFAFO 0098 | AF PP A TEST LOOP FO | M-021 |
| 1JAFBFO 0099 | AF PP B TEST LOOP FO | M-021 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 5 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 1 (AF-5)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PAFAV002 | 13PM221B |
| 1PAFAV004 | 13PM221A |
| 1PAFAV005 | 13PM221B |
| 1PAFAV006 | 13PM221B |
| 1PAFAV007 | 13PM221B |
| 1PAFAV010 | 13PM221A |
| 1PAFAV014 | 13PM221A |
| 1PAFAV015 | 13PM221B |
| 1PAFAV016 | 13PM221B |
| 1PAFAV017 | 13PM221B |
| 1PAFAV018 | 13PM221B |
| 1PAFAV019 | 13PM221A |
| 1PAFAV020 | 13PM221A |
| 1PAFAV041 | 13PM221A |
| 1PAFAV042 | 13PM221A |
| 1PAFAV047 | 13PM221A |
| 1PAFAV056 | 13PM221A |
| 1PAFAV058 | 13PM221B |
| 1PAFAV059 | 13PM221A |
| 1PAFAV062 | 13PM221A |
| 1PAFAV067 | 13PM221A |
| 1PAFAV069 | 13PM221A |
| 1PAFAV070 | 13PM221A |
| 1PAFAV075 | 13PM221A |
| 1PAFAV076 | 13PM221A |
| 1PAFAV077 | 13PM221B |
| 1PAFAV079 | 13PM221B |
| 1PAFAV081 | 13PM221A |
| 1PAFAV084 | 13PM221A |
| 1PAFAV087 | 13PM221A |
| 1PAFAV090 | 13PM221A |
| 1PAFAV091 | 13PM221A |
| 1PAFAV096 | 13PM221B |
| 1PAFAV097 | 13PM221A |
| 1PAFAV099 | 13PM221A |
| 1PAFAV107 | 13PM221A |
| 1PAFAV108 | 13PM221A |
| 1PAFAV115 | 13PM221C |
| 1PAFAV119 | 13PM221A |
| 1PAFAV122 | 13PM221A |
| 1PAFAV125 | 13PM221A |
| 1PAFAV126 | 13PM221A |
| 1PAFAV127 | 13PM221C |
| 1PAFAV128 | 13PM221C |
| 1PAFAV132 | 13PM221C0 |
| 1PAFAV137 | 13PM221B |
| 1PAFAV139 | 13PM221C0 |
| 1PAFAV140 | 13PM221C0 |
| 1PAFAV141 | 13PM221C |
| 1PAFAV142 | 13PM221C |
| 1PAFAV144 | 13PM221C |
| 1PAFAV504 | |
| 1PAFAV505 | |
| 1PAFAV506 | |
| 1PAFBV009 | 13PM221B |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 6 of 202)

04/19/82 15:50:39 VALVE-"MO" CLASS PAGE 2 (AF-6)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PAFRV021 | 13PM221B |
| 1PAFRV022 | 13PM221B |
| 1PAFRV023 | 13PM221A |
| 1PAFRV024 | 13PM221B |
| 1PAFRV025 | 13PM221B |
| 1PAFRV026 | 13PM221B |
| 1PAFRV027 | 13PM221B |
| 1PAFRV028 | 13PM221B |
| 1PAFRV029 | 13PM221A |
| 1PAFRV030 | 13PM221A |
| 1PAFRV039 | 13PM221A |
| 1PAFRV040 | 13PM221A |
| 1PAFRV048 | 13PM221A |
| 1PAFRV049 | 13PM221A |
| 1PAFRV050 | 13PM221A |
| 1PAFRV061 | 13PM221A |
| 1PAFRV063 | 13PM221A |
| 1PAFRV065 | 13PM221A |
| 1PAFRV066 | 13PM221A |
| 1PAFRV068 | 13PM221A |
| 1PAFRV071 | 13PM221A |
| 1PAFRV072 | 13PM221A |
| 1PAFRV073 | 13PM221A |
| 1PAFRV074 | 13PM221A |
| 1PAFRV078 | 13PM221B |
| 1PAFRV080 | 13PM221B |
| 1PAFRV082 | 13PM221A |
| 1PAFRV083 | 13PM221A |
| 1PAFRV093 | 13PM221A |
| 1PAFRV094 | 13PM221A |
| 1PAFRV129 | 13PM221C |
| 1PAFRV130 | 13PM221C |
| 1PAFRV138 | 13PM221B |
| 1PAFFV080 | 13PM221B |
| 1PAFHV047 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 7 of 202)

04/19/82 15:38:46 EQUIPMENT-"OR" CLASS PAGE 3 * AUXILIARY STEAM (AS-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MASEU05 | PENETRATION, SPARE | |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 8 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 5 CHEMICAL AND VOLUME CONTROL (CH-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JCHNE02 | CNTL PNL-CVCS GAS STRIPPER | 13NM001 |
| 1JCHNE03 | INSTR RACK-CVCS GAS STRIPPER | 13NM001 |
| 1MCHAP01 | CHARGING PUMP (1) | 13NM001 |
| 1MCHAX05 | SUCTION STABILIZER CHG PP A | 13NM001 |
| 1MCHAX07 | PULSATION DAMPENER CHG PP A | 13NM001 |
| 1MCHBP01 | CHARGING PUMP (2) | 13NM001 |
| 1MCHBX05 | SUCTION STABILIZER CHG PP B | 13NM001 |
| 1MCHBX07 | PULSATION DAMPENER CHG PP B | 13NM001 |
| 1MCHEF01 | REGENERATIVE HEAT EXCHANGER | 13NM001 |
| 1MCHEP01 | CHARGING PUMP (3) | 13NM001 |
| 1MCHET01 | REFUELING WATER TANK | 13CM220 |
| 1MCHEU40 | PENETRATION-LETDOWN | 13MM500 |
| 1MCHEU41 | PENETRATION-CHARGING | 13MM500 |
| 1MCHEU43 | PENETRATION-RC PUMP BLEEDOFF | 13MM500 |
| 1MCHEU45 | PENETRATION-RDT MAKE UP | 13MM500 |
| 1MCHEX05 | SUCTION STABILIZER CHG PP E | 13NM001 |
| 1MCHEX07 | PULSATION DAMPENER CHG PP E | 13NM001 |
| 1MCHND01A | PURIFICATION ION EXCHANGER (1) | 13NM001 |
| 1MCHND01B | PURIFICATION ION EXCHANGER (2) | 13NM001 |
| 1MCHND01R | ION EXCHANGER RESIN | 13NM001 |
| 1MCHND02 | DEBORATING ION EXCHANGER | 13NM001 |
| 1MCHND03 | PRE-HOLD UP ION EXCHANGER | 13NM001 |
| 1MCHNE02 | LETDOWN HEAT EXCHANGER | 13NM001 |
| 1MCHNE03 | GAS STRIPPER PACKAGE | 13NM001 |
| 1MCHNE05 | SEAL INJECTION HEAT EXCHANGER | 13NM001 |
| 1MCHNE11 | HEAT REC.H-E IN PKG 1MCHNE03 | 13NM001 |
| 1MCHNE12 | PREHEATER IN PKG 1MCHNE03 | 13NM001 |
| 1MCHNE13 | STRIPPER CLMN IN PKG 1MCHNE03 | 13NM001 |
| 1MCHNE14 | REBOILER IN PKG 1MCHNE03 | 13NM001 |
| 1MCHNE15 | AFTERCOOLER IN PKG 1MCHNE03 | 13NM001 |
| 1MCHNE16 | OVHEAD COND.IN PKG 1MCHNE03 | 13NM001 |
| 1MCHNF01 | BACKFLUSHABLE PURIF FILTER | 13NM001 |
| 1MCHNF02A | SEAL INJECTION FILTER | 13NM001 |
| 1MCHNF02B | SEAL INJECTION FILTER | 13NM001 |
| 1MCHNF03 | BORIC ACID FILTER | 13NM001 |
| 1MCHNF04 | REACTOR DRAIN FILTER | 13NM001 |
| 1MCHNF07 | PRE HOLDUP STRAINER | 13NM001 |
| 1MCHNF08 | LET DOWN STRAINER | 13NM001 |
| 1MCHNF19 | PURIFICATION FILTER | 13NM001 |
| 1MCHNF30 | RE-BLR COND STRAINER- 1MCHNE03 | 13NM001 |
| 1MCHNF31 | PREHTR COND STRNR IN 1MCHNE03 | 13NM001 |
| 1MCHNM13 | RE-BLR STEAM TRAP IN 1MCHNE03 | 13NM001 |
| 1MCHNM14 | PREHTR STEAM TRAP IN 1MCHNE03 | 13NM001 |
| 1MCHNP02A | BORIC ACID MAKEUP PUMP (1) | 13NM001 |
| 1MCHNP02B | BORIC ACID MAKEUP PUMP (2) | 13NM001 |
| 1MCHNP04A | REACTOR DRAIN PUMP | 13NM001 |
| 1MCHNP04B | REACTOR DRAIN PUMP | 13NM001 |
| 1MCHNP10B | DISCH.PUMP IN PKG 1MCHNE03 | 13NM001 |
| 1MCHNX01 | VOLUME CONTROL TANK | 13NM001 |
| 1MCHNX04 | EQUIPMENT DRAIN TANK | 13NM001 |
| 1MCHNX06 | N2 SUPPLY TANK | 13NM001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 9 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 5 (CH-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JCHNFO 0023 | LETDOWN CONTROL VLVS BYPASS | J-425 |
| 1JCHNPSV 0053 | CHG PP 1 OIL | N-001 |
| 1JCHNPSV 0054 | CHG PP 2 OIL | N-001 |
| 1JCHNPSV 0055 | CHG PP 3 OIL | N-001 |
| 1JCHNPI 0056 | CHG PP 1 OIL | N-001 |
| 1JCHNPI 0057 | CHG PP 2 OIL | N-001 |
| 1JCHNPI 0058 | CHG PP 3 OIL | N-001 |
| 1JCHNTW 0064 | REFUELING WATER TANK HEATER | J-556 |
| 1JCHNTW 0065 | REFUELING WATER TANK HEATER | J-556 |
| 1JCHNTW 0071 | REFUELING WATER TANK HEATER | J-556 |
| 1JCHNTW 0072 | REFUELING WATER TANK HEATER | J-556 |
| 1JCHEFO 0077 | RESTRICTION ORIFICE FOR PDT240 | J-425 |
| 1JCHELV 0110P | REGEN HX TO LETDOWN HX | N-001 |
| 1JCHELV 0110Q | REGEN HX TO LETDOWN HX | N-001 |
| 1JCHNPSV 0115 | VOLUME CONTROL TANK OUTLET | N-001 |
| 1JCHNPSV 0199 | RCP CONT BLEED-OFF TO RDT | N-001 |
| 1JCHALT 0200 | REFUELING WATER TANK | J-311 |
| 1JCHALY 0200 | I/E CONVERTOR | N-001 |
| 1JCHETW 0200 | REFUELING WATER TANK | N-001 |
| 1JCHALI 0200-1 | REFUELING WATER TANK--RS | N-001 |
| 1JCHALY 0200-1 | E/E CONVERTOR (ISOL) | N-001 |
| 1JCHBLI 0201 | REFUELING WATER TANK | N-001 |
| 1JCHBLSHLO201 | REFUELING WATER TANK | N-001 |
| 1JCHBLT 0201 | REFUELING WATER TANK | N-001 |
| 1JCHBLY 0201 | I/E CONVERTOR | N-001 |
| 1JCHETW 0201 | REFUELING WATER TANK | N-001 |
| 1JCHBLI 0201-1 | REFUELING WATER TANK--RS | N-001 |
| 1JCHEPV 0201P | LETDOWN BACK PRESS VLV | N-001 |
| 1JCHEPV 0201Q | LETDOWN BACK PRESS VLV | N-001 |
| 1JCHNFE 0202 | LETDOWN FROM PUR FILTER | N-001 |
| 1JCHNXCV 0202A | EXC FLOW CHK VLV FOR PDIS-202 | J-705 |
| 1JCHNXCV 0202B | EXC FLOW CHK VLV FOR PDIS-202 | J-705 |
| 1JCHBHS 0203 | REGEN HX TO AUX SPRAY--CR | J-200 |
| 1JCHBHV 0203 | REGEN HX TO AUX SPRAY | N-001 |
| 1JCHBHS 0203-1 | REGEN HX TO AUX SPRAY--RS | N-001 |
| 1JCHBHS 0203-2 | REGEN HX TO AUX SPRAY DISC | N-001 |
| 1JCHALI 0203A | REFUELING WATER TANK | N-001 |
| 1JCHALT 0203A | REFUELING WATER TANK | J-311 |
| 1JCHALY 0203A | I/E CONVERTOR | N-001 |
| 1JCHNXCV 0203A | EXC FLOW CHK VLV FOR PDIS-203 | J-705 |
| 1JCHBLI 0203B | REFUELING WATER TANK | N-001 |
| 1JCHBLT 0203B | REFUELING WATER TANK | J-311 |
| 1JCHBLY 0203B | I/E CONVERTOR | N-001 |
| 1JCHNXCV 0203B | EXC FLOW CHK VLV FOR PDIS-203 | J-705 |
| 1JCHCLI 0203C | REFUELING WATER TANK | N-001 |
| 1JCHCLT 0203C | REFUELING WATER TANK | J-311 |
| 1JCHCLY 0203C | I/E CONVERTOR | N-001 |
| 1JCHDLI 0203D | REFUELING WATER TANK | N-001 |
| 1JCHDLT 0203D | REFUELING WATER TANK | J-311 |
| 1JCHDLY 0203D | I/E CONVERTOR | N-001 |
| 1JCHEFV 0204 | LETDOWN RAD MONITOR | N-001 |
| 1JCHAHS 0205 | REGEN HX TO AUX SPRAY--CR | J-200 |
| 1JCHAHV 0205 | REGEN HX TO AUX SPRAY | N-001 |
| 1JCHAHS 0205-1 | REGEN HX TO AUX SPRAY--RS | N-001 |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 10 of 202)

12/17/82 02128102 — Q INSTRUMENTS BY SYSTEM — PAGE 6 (CH-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JCHNFV 0210X | REACTOR MU WATER PP TO VCT | N=001 |
| 1JCHNFV 0210Y | BORIC ACID MU PP TO VCT | N=001 |
| 1JCHAPI 0212 | CHARGING PUMPS TO REGEN HX | N=001 |
| 1JCHAPSL 0212 | CHARGING PUMPS TO REGEN HX | N=001 |
| 1JCHAPT 0212 | CHARGING PUMPS TO REGEN AX | N=001 |
| 1JCHAPY 0212 | I/E CONVERTOR | N=001 |
| 1JCHBFE 0212 | CHARGING PUMPS TO REGEN HX | N=001 |
| 1JCHBFI 0212 | CHARGING PUMPS TO REGEN AX | N=001 |
| 1JCHBFSL 0212 | CHARGING PUMPS TO REGEN AX | N=001 |
| 1JCHBFT 0212 | CHARGING PUMPS TO REGEN HX | N=001 |
| 1JCHBFY 0212 | I/E CONVERTOR | N=001 |
| 1JCHAPI 0212-1 | CHARGING PUMPS TO REGEN HX--RS | N=001 |
| 1JCHBFI 0212-1 | CHARGING PUMPS TO REGEN AX--AS | N=001 |
| 1JCHBFY 0212-1 | SQ ROOT CONVERTOR | N=001 |
| 1JCHBFY 0212-2 | E/E CONVERTOR | N=001 |
| 1JCHAHS 0216 | CHARGING PP NO. 1 | J=200 |
| 1JCHAPSL 0216 | CHARGING PP NO. 1 SUCTION | N=001 |
| 1JCHBHS 0217 | CHARGING PP NO. 2 | J=200 |
| 1JCHBPSL 0217 | CHARGING PP NO. 2 SUCTION | N=001 |
| 1JCHBHS 0218 | CHARGING PP NO. 3 | J=200 |
| 1JCHBPSL 0218 | CHARGING PP NO. 3 SUCTION | N=001 |
| 1JCHAHS 0218A | CHARGING PP NO. 3 | J=200 |
| 1JCHAPSL 0218A | CHARGING PP NO. 3 SUCTION | N=001 |
| 1JCHBTE 0221 | REGEN HX TUBE OUTLET | N=001 |
| 1JCHBTT 0221 | REGEN AX TUBE OUTLET | N=001 |
| 1JCHBTW 0221 | REGEN AX TO LETDOWN HX | N=001 |
| 1JCHBTSHH0221-1 | REGEN AX TUBE OUTLET | N=001 |
| 1JCHBTY 0221-1 | E/E CONVERTOR (ISOL) | N=001 |
| 1JCHNTW 0223 | LETDOWN AX OUTLET | N=001 |
| 1JCHNTW 0224 | LD HX TO LD BACK PRESS VLV | N=001 |
| 1JCHNTW 0225 | VOLUME CONTROL TANK | N=001 |
| 1JCHETW 0229 | REGEN HX CHARGING OUTLET | N=001 |
| 1JCHNTW 0231 | SEAL INJECTION TO RC PPS | N=001 |
| 1JCHEOV 0231P | CHARGING PPS TO SEAL INJECT HX | N=001 |
| 1JCHEPOT 0240 | REGEN HX TO CHARGING LINE | N=001 |
| 1JCHEPOV 0240 | REGEN AX TO CHARGING LINE | N=001 |
| 1JCHEFE 0241 | SEAL INJECTION TO RCP 1A | N=001 |
| 1JCHEFV 0241 | SEAL INJECTION TO RCP 1A | N=001 |
| 1JCHNXCV 0241A | EXC FLOW CHK VLV FOR PDIS-241 | J=705 |
| 1JCHNXCV 0241B | EXC FLOW CHK VLV FOR PDIS-241 | J=705 |
| 1JCHEFE 0242 | SEAL INJECTION TO RCP 1B | N=001 |
| 1JCHEFV 0242 | SEAL INJECTION TO RCP 1B | N=001 |
| 1JCHEFE 0243 | SEAL INJECTION TO RCP 2A | N=001 |
| 1JCHEFV 0243 | SEAL INJECTION TO RCP 2A | N=001 |
| 1JCHEFE 0244 | SEAL INJECTION TO RCP 2B | N=001 |
| 1JCHEFV 0244 | SEAL INJECTION TO RCP 2B | N=001 |
| 1JCHEHV 0250 | N2 TO PUR FILTER | N=001 |
| 1JCHBHS 0255 | SEAL INJECTION ISOL | J=200 |
| 1JCHBHV 0255 | SEAL INJECTION ISOL | N=001 |
| 1JCHNXCV 0258A | EXC FLOW CHK VLV FOR PDIS-258 | J=705 |
| 1JCHNXCV 0258B | EXC FLOW CHK VLV FOR PDIS-258 | J=705 |
| 1JCHNXCV 0260A | EXC FLOW CHK VLV FOR PDIS-260 | J=705 |
| 1JCHNXCV 0260B | EXC FLOW CHK VLV FOR PDIS-260 | J=705 |
| 1JCHNTW 0264 | PRE-HOLDUP IX INLET | N=001 |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 11 of 202)

12/17/82 02128102 — Q INSTRUMENTS BY SYSTEM — PAGE 7 (CH-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JCHNXCV 0265A | EXC FLOW CHK VLV FOR PDIS-265 | J-705 |
| 1JCHNXCV 0265B | EXC FLOW CHK VLV FOR PDIS-265 | J-705 |
| 1JCHAPT 0268 | REACTOR DRAIN TANK | N-001 |
| 1JCHAPY 0268 | I/E CONVERTOR | N-001 |
| 1JCHNLT 0268 | REACTOR DRAIN TANK | N-001 |
| 1JCHAP$HH0268-2 | REACTOR DRAIN TANK | N-001 |
| 1JCHAPY 0268-1 | E/E CONVERTOR (ISOL) | N-001 |
| 1JCHNTW 0269 | EQPT DRAIN TANK | N-001 |
| 1JCHAPSV 0315 | CHARGING PP NO. 1 SUCTION | N-001 |
| 1JCHBPSV 0318 | CHARGING PP NO. 2 SUCT | N-001 |
| 1JCHEPSV 0321 | CHARGING PP NO. 3 SUCTION | N-001 |
| 1JCHEPSV 0324 | CHARGING PP NO. 3 RECIRC | N-001 |
| 1JCHBPSV 0325 | CHARGING PP NO. 2 RECIRC | N-001 |
| 1JCHAPSV 0326 | CHARGING PP NO. 1 RECIRC | N-001 |
| 1JCHNPSV 0345 | REGEN HX TO LETDOWN HX | N-001 |
| 1JCHNPSV 0354 | PURIFICATION FICTER INLET | N-001 |
| 1JCHEUV 0500 | VOLUME CONTROL TANK INLET | N-001 |
| 1JCHNUV 0501 | VOLUME CONTROL TANK OUTLET | N-001 |
| 1JCHBHS 0505 | RCP BLEED-OFF TO VCT ISOL | J-200 |
| 1JCHBUV 0505 | RCP BLEED-OFF TO VCT ISOL | N-001 |
| 1JCHBUY 0505 | RCP BLEED-OFF TO VCT ISOL | N-001 |
| 1JCHBHS 0505-1 | RCP BLEED-OFF TO VCT ISOL--RS | N-001 |
| 1JCHBHS 0505-2 | RCP BLEED-OFF TO VCT DISC | N-001 |
| 1JCHAHS 0506 | RCP BLEED-OFF TO VCT ISOL | J-200 |
| 1JCHAUV 0506 | RCP BLEED-OFF TO VCT ISOL | N-001 |
| 1JCHAUV 0506 | RCP BLEED-OFF TO VCT ISOL | N-001 |
| 1JCHAHS 0506-1 | RCP BLEED-OFF TO VCT ISOL--RS | N-001 |
| 1JCHAHS 0507 | RCP BLEED-OFF TO RDT | J-200 |
| 1JCHAHV 0507 | RCP BLEED-OFF TO RDT | N-001 |
| 1JCHAHY 0507 | RCP BLEED-OFF TO RDT | N-001 |
| 1JCHAHS 0507-1 | RCP BLEED-OFF TO RDT--RS | N-001 |
| 1JCHAUV 0510 | BA MU PUMPS TO RWT | N-001 |
| 1JCHNUV 0512 | MAKEUP TO VCT | N-001 |
| 1JCHNHV 0513 | VCT TO GAS SURGE HEADER | N-001 |
| 1JCHNUV 0514 | BORIC ACID MU TO CHRG PUMPS | N-001 |
| 1JCHBHS 0515 | LETDOWN TO REGEN HX CNTMT ISOL | J-200 |
| 1JCHBUV 0515 | LETDOWN TO REGEN HX CNTMT ISOL | N-001 |
| 1JCHBUY 0515 | LETDOWN TO REGEN HX CNTMT ISOL | N-001 |
| 1JCHBHS 0515-1 | LD TO REGEN HX CNTMT ISOL--RS | N-001 |
| 1JCHBHS 0515-2 | LD TO REGEN HX DISCONNECT | N-001 |
| 1JCHAHS 0516 | LETDOWN TO REGEN HX CNTMT ISOL | J-200 |
| 1JCHAUV 0516 | LETDOWN TO REGEN HX CNTMT ISOL | N-001 |
| 1JCHAUY 0516 | LETDOWN TO REGEN HX CNTMT ISOL | N-001 |
| 1JCHAHS 0516-1 | LD TO REGEN HX CNTMT ISOL--RS | N-001 |
| 1JCHEUV 0520 | ION EXCHANGER BYPASS | N-001 |
| 1JCHEUV 0521 | RAD AUX & BORDROMETER BP | N-001 |
| 1JCHBHS 0523 | REGEN HX TO LETDOWN HX ISOL | J-200 |
| 1JCHBUV 0523 | REGEN HX TO LETDOWN HX ISOL | N-001 |
| 1JCHBUY 0523 | REGEN HX TO LETDOWN HX ISOL | N-001 |
| 1JCHAHS 0524 | CHARGING PUMPS TO REGEN HX | J-200 |
| 1JCHAHV 0524 | CHARGING PUMPS TO REGEN HX | N-001 |
| 1JCHNHV 0526 | LETDOWN CONTROL VLVS BYPASS | N-001 |
| 1JCHNUV 0527 | RWT TO CHRG PPS--BP VLV | N-001 |
| 1JCHBHS 0530 | RWT TO TRAIN B SI | J-200 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 12 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 8 (CH-5)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JCHBHV 0530 | RHT TO TRAIN B SI | N=001 |
| 1JCHAHS 0531 | RHT TO TRAIN A SI | J=200 |
| 1JCHAHV 0531 | RHT TO TRAIN A SI | N=001 |
| 1JCHEHV 0532 | RHT TO BORIC ACID MU PUMPS | N=001 |
| 1JCHEHV 0536 | RHT GRAVITY FEED TO CHARG PPS | N=001 |
| 1JCHAHS 0560 | REACTOR DRAIN TANK OUTLET ISOL | J=200 |
| 1JCHAUV 0560 | REACTOR DRAIN TANK OUTLET ISOL | N=001 |
| 1JCHAUV 0560 | REACTOR DRAIN TANK OUTLET ISOL | N=001 |
| 1JCHBHS 0561 | REACTOR DRAIN TANK OUTLET ISOL | J=200 |
| 1JCHBUV 0561 | REACTOR DRAIN TANK OUTLET ISOL | N=001 |
| 1JCHBUV 0561 | REACTOR DRAIN TANK OUTLET ISOL | N=001 |
| 1JCHNUV 0562 | RECYCLE DRAIN ADR TO EDT | N=001 |
| 1JCHNUV 0563 | RDP SUCTION FROM EDT | N=001 |
| 1JCHNUV 0564 | EQPT DRAIN TANK GAS ANAL | N=001 |
| 1JCHEUV 0565 | CD TO PRE-HOLDUP IX BYPASS | N=001 |
| 1JCHEUV 0566 | PRE-HOLDUP IX DISCHARGE | N=001 |
| 1JCHNUV 0567 | GAS STRIPPER DSCH | N=001 |
| 1JCHAHS 0580 | MAKE UP TO REACTOR DRAIN TK | J=200 |
| 1JCHAUV 0580 | MAKE UP TO REACTOR DRAIN TK | N=001 |
| 1JCHAUV 0580 | MAKE UP TO REACTOR DRAIN TK | N=001 |
| 1JCHNPSV 0657 | EQPT DRAIN TANK | N=001 |
| 1JCHAHS 0715 | PASS RETURN TO RDT | J=200 |
| 1JCHAUV 0715 | PASS RETURN TO RDT | J=603 |
| 1JCHAUV 0715A | SPARE | J=603 |
| 1JCHNPCV 0831 | N2 TO EQPT DRAIN TANK | N=001 |
| 1JCHNPSV 0865 | SEAL INJECTION HX | N=001 |
| 1JCHBHS 0924 | PASS LETDOWN SAMPLE | J=200 |
| 1JCHBHV 0924 | TAG # REVISED TO UV-924 | J=603 |
| 1JCHBUV 0924 | PASS LETDOWN SAMPLE | J=603 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 13 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 4 (CH-6)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PCHAVM41 | 13PM221A |
| 1PCHAVX79 | 13PM221A |
| 1PCHAVX80 | 13PM221A |
| 1PCHAVX81 | 13PM221A |
| 1PCHAVX83 | 13PM221A |
| 1PCHAVX85 | 13PM221A |
| 1PCHAV069 | 13PM221A |
| 1PCHAV070 | 13PM221A |
| 1PCHAV118 | 13NM001 |
| 1PCHAV135 | 13NM001 |
| 1PCHAV141 | |
| 1PCHAV158 | 13NM001 |
| 1PCHAV177 | 13NM001 |
| 1PCHAV179 | 13NM001 |
| 1PCHAV190 | 13NM001 |
| 1PCHAV306 | 13NM001 |
| 1PCHAV314 | 13NM001 |
| 1PCHAV316 | 13NM001 |
| 1PCHAV317 | 13NM001 |
| 1PCHAV328 | 13NM001 |
| 1PCHAV329 | 13NM001 C |
| 1PCHAV339 | 13NM001 |
| 1PCHAV437 | 13NM001 |
| 1PCHAV755 | 13NM001 |
| 1PCHBVS08 | 13PM221A |
| 1PCHBV067 | 13PM221A |
| 1PCHBV068 | 13PM221A |
| 1PCHBV136 | 13NM001 |
| 1PCHBV157 | 13NM001 |
| 1PCHBV305 | 13NM001 |
| 1PCHBV319 | 13NM001 |
| 1PCHBV320 | 13NM001 |
| 1PCHBV327 | 13NM001 |
| 1PCHBV331 | 13NM001 |
| 1PCHBV332 | 13NM001 |
| 1PCHBV337 | 13NM001 |
| 1PCHBV438 | 13NM001 |
| 1PCHBV756 | 13NM001 |
| 1PCHBV943 | 13PM221A |
| 1PCHBV960 | 13PM221A |
| 1PCHCV137 | 13NM001 |
| 1PCHCV158 | 13NM001 |
| 1PCHDV138 | 13NM001 |
| 1PCHDV159 | 13NM001 |
| 1PCHEVM36 | 13PM221A |
| 1PCHEVM42 | 13PM221A |
| 1PCHEVM47 | 13PM221C |
| 1PCHEVS07 | 13PM221A |
| 1PCHEVS09 | 13PM221A |
| 1PCHEVS10 | 13PM221A |
| 1PCHEVX01 | 13PM231 |
| 1PCHEVX02 | 13PM231 |
| 1PCHEVX11 | 13PM221A |
| 1PCHEVX12 | 13PM221A |
| 1PCHEVX13 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 14 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 5 (CH-7)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PCHEVX47 | 13PM221B |
| 1PCHEV011 | 13PM221B |
| 1PCHEV021 | 13PM221A |
| 1PCHEV022 | 13PM221A |
| 1PCHEV023 | 13PM221A |
| 1PCHEV024 | 13PM221A |
| 1PCHEV043 | 13PM221A |
| 1PCHEV044 | 13PM221A |
| 1PCHEV045 | 13PM221A |
| 1PCHEV065 | 13PM221A |
| 1PCHEV066 | 13PM221A |
| 1PCHEV068 | 13PM221A |
| 1PCHEV096 | 13PM221A |
| 1PCHEV097 | 13PM221A |
| 1PCHEV098 | 13PM221A |
| 1PCHEV128 | 13NM001 |
| 1PCHEV129 | 13NM001 |
| 1PCHEV322 | 13NM001 |
| 1PCHEV323 | 13NM001 |
| 1PCHEV334 | 13NM001 |
| 1PCHEV335 | 13NM001 |
| 1PCHEV336 | 13NM001 |
| 1PCHEV393 | 13NM001 |
| 1PCHEV405 | 13NM001 |
| 1PCHEV406 | 13NM001 |
| 1PCHEV425 | 13NM001 |
| 1PCHEV427 | 13NM001 |
| 1PCHEV428 | 13NM001 |
| 1PCHEV429 | 13NM001 |
| 1PCHEV431 | 13NM001 |
| 1PCHEV433 | 13NM001 |
| 1PCHEV434 | 13NM001 |
| 1PCHEV435 | 13NM001 |
| 1PCHEV436 | 13NM001 |
| 1PCHEV439 | 13NM001 |
| 1PCHEV440 | 13NM001 |
| 1PCHEV494 | 13NM001 |
| 1PCHEV642 | 13NM001 |
| 1PCHEV757 | 13NM001 |
| 1PCHEV796 | 13NM001 |
| 1PCHEV797 | 13NM001 |
| 1PCHEV798 | 13NM001 |
| 1PCHEV843 | 13NM001 |
| 1PCHEV853 | 13NM001 |
| 1PCHEV854 | 13NM001 |
| 1PCHEV929 | 13PM221A |
| 1PCHEV930 | 13PM221A |
| 1PCHEV939 | 13PM221A |
| 1PCHEV940 | 13PM221A |
| 1PCHEV961 | 13PM221A |
| 1PCHEV962 | 13PM221A |
| 1PCHEV995 | 13PM221A |
| 1PCHNVM19 | 13PM221A |
| 1PCHNVM22 | 13PM221A |
| 1PCHNVM23 | 13PM221A |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 15 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 6 (CH-8)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PCHNVM24 | 13PM221A |
| 1PCHNVM25 | 13PM221A |
| 1PCHNVM26 | 13PM221A |
| 1PCHNVM27 | 13PM221A |
| 1PCHNVM28 | 13PM221A |
| 1PCHNVM33 | 13PM221A |
| 1PCHNVM34 | 13PM221A |
| 1PCHNVM35 | 13PM221A |
| 1PCHNVM37 | 13PM221A |
| 1PCHNVV43 | 13PM221C |
| 1PCHNVR02 | 13PM221A |
| 1PCHNVR04 | 13PM221A |
| 1PCHNVR13 | 13PM221A |
| 1PCHNVR16 | 13PM221A |
| 1PCHNVR17 | 13PM221A |
| 1PCHNVR18 | 13PM221A |
| 1PCHNVR20 | 13PM221A |
| 1PCHNVR21 | 13PM221A |
| 1PCHNVR22 | 13PM221A |
| 1PCHNVR23 | 13PM221A |
| 1PCHNVR24 | 13PM221A |
| 1PCHNVR25 | 13PM221A |
| 1PCHNVR26 | 13PM221A |
| 1PCHNVR27 | 13PM221A |
| 1PCHNVR28 | 13PM221A |
| 1PCHNVR29 | 13PM221A |
| 1PCHNVR30 | 13PM221A |
| 1PCHNVR41 | 13PM221A |
| 1PCHNVR42 | 13PM221A |
| 1PCHNVR43 | 13PM221A |
| 1PCHNVR44 | 13PM221A |
| 1PCHNVR60 | 13PM221A |
| 1PCHNVR61 | 13PM221A |
| 1PCHNVR63 | 13PM221A |
| 1PCHNVR64 | 13PM221A |
| 1PCHNVR68 | 13PM221A |
| 1PCHNVR70 | 13PM221A |
| 1PCHNVR71 | 13PM221A |
| 1PCHNVR72 | 13PM221A |
| 1PCHNVR73 | 13PM221A |
| 1PCHNVR74 | 13PM221A |
| 1PCHNVR75 | 13PM221A |
| 1PCHNVR76 | 13PM221A |
| 1PCHNVR77 | 13PM221A |
| 1PCHNVR78 | 13PM221A |
| 1PCHNVR79 | 13PM221A |
| 1PCHNVR80 | 13PM221A |
| 1PCHNVR81 | 13PM221A |
| 1PCHNVR82 | 13PM221A |
| 1PCHNVR83 | 13PM221A |
| 1PCHNVR84 | 13PM221A |
| 1PCHNVR85 | 13PM221A |
| 1PCHNVR86 | 13PM221A |
| 1PCHNVR87 | 13PM221A |
| 1PCHNVR88 | 13PM221A |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 16 of 202)

(CH-9)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 7

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PCHNVP89 | 13PM221A |
| 1PCHNVP90 | 13PM221A |
| 1PCHNVP91 | 13PM221A |
| 1PCHNVP92 | 13PM221A |
| 1PCHNVP94 | 13PM221A |
| 1PCHNVP95 | 13PM221A |
| 1PCHNVP96 | 13PM221A |
| 1PCHNVS02 | 13PM221A |
| 1PCHNVS06 | 13PM221A |
| 1PCHNVS14 | 13PM221A |
| 1PCHNVS15 | 13PM221A |
| 1PCHNVS29 | 13PM221C |
| 1PCHNVX03 | 13PM221A |
| 1PCHNVX04 | 13PM221A |
| 1PCHNVX05 | 13PM221A |
| 1PCHNVX06 | 13PM221A |
| 1PCHNVX07 | 13PM221A |
| 1PCHNVX08 | 13PM221A |
| 1PCHNVX09 | 13PM221A |
| 1PCHNVX10 | 13PM221A |
| 1PCHNVX23 | 13PM221A |
| 1PCHNVX24 | 13PM221A |
| 1PCHNVX39 | 13PM221A |
| 1PCHNVX40 | 13PM221A |
| 1PCHNVX41 | 13PM221A |
| 1PCHNVX53 | 13PM221A |
| 1PCHNVX59 | 13PM221A |
| 1PCHNVX60 | 13PM221A |
| 1PCHNVX61 | 13PM221A |
| 1PCHNVX62 | 13PM221A |
| 1PCHNVX63 | 13PM221A |
| 1PCHNVX64 | 13PM221A |
| 1PCHNVX66 | 13PM221A |
| 1PCHNVX67 | 13PM221A |
| 1PCHNVX68 | 13PM221A |
| 1PCHNVX70 | 13PM221A |
| 1PCHNVX71 | 13PM221A |
| 1PCHNVX77 | 13PM221A |
| 1PCHNVX84 | 13PM221A |
| 1PCHNVX88 | 13PM221A |
| 1PCHNVX89 | 13PM221A |
| 1PCHNVX90 | 13PM221A |
| 1PCHNVX96 | 13PM221A |
| 1PCHNV001 | 13PM231 |
| 1PCHNV003 | 13PM221A |
| 1PCHNV004 | 13PM221A |
| 1PCHNV006 | 13PM221A |
| 1PCHNV010 | 13PM221A |
| 1PCHNV012 | 13PM221A |
| 1PCHNV013 | 13PM221A |
| 1PCHNV014 | 13PM221A |
| 1PCHNV020 | 13PM221A |
| 1PCHNV025 | 13PM221A |
| 1PCHNV026 | 13PM221A |
| 1PCHNV027 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 17 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 8 (CH-10)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PCHNV028 | 13PM221A |
| 1PCHNV047 | 13PM221A |
| 1PCHNV048 | 13PM221A |
| 1PCHNV049 | 13PM221A |
| 1PCHNV050 | 13PM221A |
| 1PCHNV051 | 13PM221A |
| 1PCHNV052 | 13PM221A |
| 1PCHNV053 | 13PM221A |
| 1PCHNV055 | 13PM221A |
| 1PCHNV056 | 13PM221A |
| 1PCHNV063 | 13PM221A |
| 1PCHNV064 | 13PM221A |
| 1PCHNV074 | 13PM221A |
| 1PCHNV075 | 13PM221A |
| 1PCHNV076 | 13PM221A |
| 1PCHNV077 | 13PM221A |
| 1PCHNV085 | 13PM221A |
| 1PCHNV086 | 13PM221A |
| 1PCHNV087 | 13PM221A |
| 1PCHNV089 | 13PM221A |
| 1PCHNV090 | 13PM221A |
| 1PCHNV091 | 13PM221A |
| 1PCHNV093 | 13PM231 |
| 1PCHNV094 | 13PM231 |
| 1PCHNV095 | 13PM231 |
| 1PCHNV101 | 13NM001 C |
| 1PCHNV103 | 13NM001 C |
| 1PCHNV104 | 13NM001 C |
| 1PCHNV112 | 13NM001 C |
| 1PCHNV113 | 13NM001 C |
| 1PCHNV114 | 13NM001 C |
| 1PCHNV116 | 13NM001 C |
| 1PCHNV117 | 13NM001 C |
| 1PCHNV124 | 13NM001 C |
| 1PCHNV126 | 13NM001 C |
| 1PCHNV127 | 13NM001 C |
| 1PCHNV130 | 13NM001 |
| 1PCHNV131 | 13NM001 C |
| 1PCHNV132 | 13NM001 C |
| 1PCHNV134 | 13NM001 C |
| 1PCHNV139 | 13NM001 C |
| 1PCHNV143 | 13NM001 |
| 1PCHNV144 | 13NM001 |
| 1PCHNV145 | 13NM001 |
| 1PCHNV146 | 13NM001 C |
| 1PCHNV147 | 13NM001 C |
| 1PCHNV152 | 13NM001 C |
| 1PCHNV153 | 13NM001 C |
| 1PCHNV154 | 13NM001 C |
| 1PCHNV155 | 13NM001 C |
| 1PCHNV161 | 13NM001 C |
| 1PCHNV162 | 13NM001 |
| 1PCHNV164 | 13NM001 C |
| 1PCHNV165 | 13NM001 C |
| 1PCHNV166 | 13NM001 C |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 18 of 202)

04/19/82 15:50:39 VALVE-"QM" CLASS PAGE 9 (CH-11)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PCHNV172 | 13NM001 C |
| 1PCHNV174 | 13NM001 C |
| 1PCHNV176 | 13NM001 C |
| 1PCHNV184 | 13NM001 C |
| 1PCHNV185 | 13NM001 C |
| 1PCHNV188 | 13NM001 C |
| 1PCHNV192 | 13NM001 C |
| 1PCHNV197 | 13NM001 C |
| 1PCHNV198 | 13NM001 C |
| 1PCHNV296 | 13PM221C |
| 1PCHNV300 | 13NM001 C |
| 1PCHNV330 | 13NM001 C |
| 1PCHNV340 | 13NM001 C |
| 1PCHNV341 | 13NM001 C |
| 1PCHNV342 | 13NM001 C |
| 1PCHNV343 | 13NM001 C |
| 1PCHNV344 | 13NM001 C |
| 1PCHNV346 | 13NM001 |
| 1PCHNV347 | 13NM001 C |
| 1PCHNV348 | 13NM001 C |
| 1PCHNV349 | 13NM001 C |
| 1PCHNV350 | 13NM001 C |
| 1PCHNV351 | 13NM001 C |
| 1PCHNV352 | 13NM001 C |
| 1PCHNV353 | 13NM001 C |
| 1PCHNV355 | 13NM001 C |
| 1PCHNV356 | 13NM001 C |
| 1PCHNV357 | 13NM001 C |
| 1PCHNV358 | 13NM001 C |
| 1PCHNV359 | 13NM001 |
| 1PCHNV360 | 13NM001 C |
| 1PCHNV362 | 13NM001 C |
| 1PCHNV363 | 13NM001 C |
| 1PCHNV364 | 13NM001 C |
| 1PCHNV366 | 13NM001 |
| 1PCHNV367 | 13NM001 C |
| 1PCHNV368 | 13NM001 C |
| 1PCHNV369 | 13NM001 C |
| 1PCHNV370 | 13NM001 C |
| 1PCHNV371 | 13NM001 C |
| 1PCHNV372 | 13NM001 C |
| 1PCHNV373 | 13NM001 C |
| 1PCHNV374 | 13NM001 C |
| 1PCHNV375 | 13NM001 C |
| 1PCHNV376 | 13NM001 C |
| 1PCHNV378 | 13NM001 C |
| 1PCHNV379 | 13NM001 C |
| 1PCHNV380 | 13NM001 C |
| 1PCHNV381 | 13NM001 C |
| 1PCHNV382 | 13NM001 C |
| 1PCHNV383 | 13NM001 C |
| 1PCHNV384 | 13NM001 C |
| 1PCHNV385 | 13NM001 |
| 1PCHNV386 | 13NM001 C |
| 1PCHNV387 | 13NM001 C |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 19 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 10 (CH-12)

| TAG NUMBER | B/SPEC/ | |
|---|---|---|
| 1PCHNV389 | 13NM001 | C |
| 1PCHNV390 | 13NM001 | C |
| 1PCHNV391 | 13NM001 | C |
| 1PCHNV392 | 13NM001 | C |
| 1PCHNV394 | 13NM001 | C |
| 1PCHNV395 | 13NM001 | C |
| 1PCHNV396 | 13NM001 | C |
| 1PCHNV397 | 13NM001 | C |
| 1PCHNV398 | 13NM001 | |
| 1PCHNV399 | 13NM001 | |
| 1PCHNV400 | 13NM001 | |
| 1PCHNV401 | 13NM001 | |
| 1PCHNV402 | 13NM001 | |
| 1PCHNV403 | 13NM001 | |
| 1PCHNV404 | 13NM001 | |
| 1PCHNV407 | 13NM001 | |
| 1PCHNV408 | 13NM001 | |
| 1PCHNV413 | 13NM001 | |
| 1PCHNV414 | 13NM001 | |
| 1PCHNV415 | 13NM001 | |
| 1PCHNV418 | 13NM001 | |
| 1PCHNV419 | 13NM001 | |
| 1PCHNV420 | 13NM001 | |
| 1PCHNV421 | 13NM001 | |
| 1PCHNV422 | 13NM001 | |
| 1PCHNV423 | 13NM001 | |
| 1PCHNV424 | 13NM001 | C |
| 1PCHNV426 | 13NM001 | C |
| 1PCHNV445 | 13NM001 | |
| 1PCHNV449 | 13NM001 | |
| 1PCHNV450 | 13NM001 | C |
| 1PCHNV459 | 13NM001 | C |
| 1PCHNV460 | 13NM001 | C |
| 1PCHNV461 | 13NM001 | C |
| 1PCHNV462 | 13NM001 | C |
| 1PCHNV464 | 13NM001 | C |
| 1PCHNV465 | 13NM001 | |
| 1PCHNV466 | 13NM001 | |
| 1PCHNV468 | 13NM001 | |
| 1PCHNV469 | 13NM001 | |
| 1PCHNV470 | | |
| 1PCHNV471 | | |
| 1PCHNV472 | 13NM001 | |
| 1PCHNV473 | 13NM001 | |
| 1PCHNV474 | 13NM001 | C |
| 1PCHNV475 | 13NM001 | C |
| 1PCHNV476 | 13NM001 | C |
| 1PCHNV477 | 13NM001 | |
| 1PCHNV478 | 13NM001 | C |
| 1PCHNV479 | 13NM001 | |
| 1PCHNV480 | 13NM001 | C |
| 1PCHNV485 | 13NM001 | C |
| 1PCHNV486 | 13NM001 | C |
| 1PCHNV488 | 13NM001 | C |
| 1PCHNV489 | 13NM001 | C |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 20 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 11 (CH-13)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PCHNV490 | 13NM001 C |
| 1PCHNV491 | 13NM001 C |
| 1PCHNV492 | 13NM001 C |
| 1PCHNV493 | 13NM001 C |
| 1PCHNV494 | 13NM001 C |
| 1PCHNV495 | 13NM001 C |
| 1PCHNV496 | 13NM001 C |
| 1PCHNV612 | 13NM001 |
| 1PCHNV613 | 13NM001 |
| 1PCHNV614 | 13NM001 |
| 1PCHNV645 | 13NM001 C |
| 1PCHNV646 | 13NM001 C |
| 1PCHNV647 | 13NM001 C |
| 1PCHNV648 | 13NM001 C |
| 1PCHNV649 | 13NM001 C |
| 1PCHNV653 | 13NM001 C |
| 1PCHNV654 | 13NM001 C |
| 1PCHNV655 | 13NM001 C |
| 1PCHNV656 | 13NM001 C |
| 1PCHNV660 | 13NM001 C |
| 1PCHNV662 | 13NM001 C |
| 1PCHNV663 | 13NM001 C |
| 1PCHNV665 | 13NM001 |
| 1PCHNV668 | 13NM001 C |
| 1PCHNV686 | 13NM001 C |
| 1PCHNV709 | 13NM001 C |
| 1PCHNV721 | 13NM001 C |
| 1PCHNV722 | 13NM001 C |
| 1PCHNV723 | 13NM001 C |
| 1PCHNV724 | 13NM001 C |
| 1PCHNV725 | 13NM001 C |
| 1PCHNV726 | 13NM001 C |
| 1PCHNV727 | 13NM001 C |
| 1PCHNV728 | 13NM001 C |
| 1PCHNV730 | 13NM001 C |
| 1PCHNV740 | 13NM001A |
| 1PCHNV753 | 13NM001 C |
| 1PCHNV787 | 13NM001 C |
| 1PCHNV788 | 13NM001 C |
| 1PCHNV789 | 13NM001 C |
| 1PCHNV800 | 13NM001 C |
| 1PCHNV802 | 13NM001 C |
| 1PCHNV803 | 13NM001 C |
| 1PCHNV804 | 13NM001 C |
| 1PCHNV805 | 13NM001 C |
| 1PCHNV807 | 13NM001 C |
| 1PCHNV808 | 13NM001 C |
| 1PCHNV809 | 13NM001 C |
| 1PCHNV810 | 13NM001 C |
| 1PCHNV812 | 13NM001 C |
| 1PCHNV813 | 13NM001 C |
| 1PCHNV814 | 13NM001 C |
| 1PCHNV815 | 13NM001 C |
| 1PCHNV816 | 13NM001 C |
| 1PCHNV818 | 13NM001 C |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 21 of 202)

(CH-14)

04/19/82 15:50:39 VALVE-NON CLASS PAGE 12

| TAG NUMBER | B/SPEC/ | |
|---|---|---|
| 1PCHNV819 | 13NM001 | C |
| 1PCHNV821 | 13NM001 | C |
| 1PCHNV822 | 13NM001 | C |
| 1PCHNV823 | 13NM001 | C |
| 1PCHNV825 | 13NM001 | C |
| 1PCHNV826 | 13NM001 | C |
| 1PCHNV830 | 13NM001 | C |
| 1PCHNV833 | 13NM001 | |
| 1PCHNV834 | 13NM001 | |
| 1PCHNV835 | 13NM001 | |
| 1PCHNV836 | 13NM001 | |
| 1PCHNV839 | 13NM001 | |
| 1PCHNV841 | 13NM001 | C |
| 1PCHNV842 | 13NM001 | C |
| 1PCHNV844 | 13NM001 | |
| 1PCHNV845 | 13NM001 | |
| 1PCHNV848 | 13NM001 | C |
| 1PCHNV849 | 13NM001 | C |
| 1PCHNV855 | 13NM001 | |
| 1PCHNV856 | 13NM001 | C |
| 1PCHNV858 | 13NM001 | |
| 1PCHNV859 | 13NM001 | C |
| 1PCHNV860 | 13NM001 | C |
| 1PCHNV861 | 13NM001 | C |
| 1PCHNV866 | 13NM001 | |
| 1PCHNV867 | 13NM001 | |
| 1PCHNV868 | 13NM001 | |
| 1PCHNV869 | 13NM001 | |
| 1PCHNV900 | 13PM221A | |
| 1PCHNV909 | 13PM221A | |
| 1PCHNV911 | 13PM221A | |
| 1PCHNV915 | 13PM221A | |
| 1PCHNV917 | 13PM221A | |
| 1PCHNV925 | 13PM221A | |
| 1PCHNV928 | 13PM221A | |
| 1PCHNV934 | 13PM221A | |
| 1PCHNV936 | 13PM221A | |
| 1PCHNV946 | 13PM221A | |
| 1PCHNV948 | 13PM221A | |
| 1PCHNV952 | 13PM221A | |
| 1PCHNV953 | 13PM221A | |
| 1PCHNV963 | 13PM221A | |
| 1PCHNV964 | 13PM221A | |
| 1PCHNV965 | 13PM221A | |
| 1PCHNV969 | 13PM221A | |
| 1PCHNV976 | 13PM231 | |
| 1PCHNV993 | 13PM221A | |
| 1PCHNV994 | 13PM221A | |
| 1PCHNV997 | 13PM221A | |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 22 of 202)

04/19/82 15:38:46 EQUIPMENT-"O" CLASS PAGE 7 CONTAINMENT LEAK TEST (CL-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MCLEU58 | PENETRATION-TEST CONN | 13MM500 |
| 1MCLEU62B | FLOW VERIFICATION PENETRATION | 13MM500 |
| 1MCLEU62C | PRESSURE SENSING PENETRATION | 13MM500 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 23 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 14 (CL-2)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PCLEV002 | 13PM221C0 |
| 1PCLEV003 | 13PM221C |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 24 of 202)

04/19/82 15:38:46 EQUIPMENT-"0" CLASS PAGE 9 CONTAINMENT PURGE (CP-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MCPE1125 | PENETRATION-AIR SAMPLING | 13MM500 |
| 1MCPE1156 | MECH PENETRATION, CP SUPPLY | 13CM152 |
| 1MCPE1157 | MECH PENETRATION, CP EXHAUST | 13CM152 |
| 1MCPE1178 | MECH PENETRATION, CP SUPPLY | 13CM152 |
| 1MCPE1179 | MECH PENETRATION, CP EXHAUST | 13CM152 |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 25 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 10 (CP-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JCPAHS 0002 | CONTM PRG RFL MODE IV | J-200 |
| 1JCPAUV 0002A | CONTM PRG RFL MODE IV | J-605 |
| 1JCPAUV 0002B | CONTM PRG RFL MODE IV | J-605 |
| 1JCPBHS 0003 | CONTM PRG RFL MODE IV | J-200 |
| 1JCPBUV 0003A | CONTM PRG RFL MODE IV | J-605 |
| 1JCPBUV 0003B | CONTM PRG RFL MODE IV | J-605 |
| 1JCPAHS 0004 | CONTM PRG PWR-ACCESS MODE IV | J-200 |
| 1JCPAUV 0004A | CONTM PRG PWR-ACCESS MODE IV | J-605 |
| 1JCPAUV 0004B | CONTM PRG PWR-ACCESS MODE IV | J-605 |
| 1JCPBHS 0005 | CONTM PRG PWR-ACCESS MODE IV | J-200 |
| 1JCPBUV 0005A | CONTM PRG PWR-ACCESS MODE IV | J-605 |
| 1JCPBUV 0005B | CONTM PRG PWR-ACCESS MODE IV | J-605 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 26 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 16 (CP-3)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PCPNV001 | 13PM221A |
| 1PCPNV002 | 13PM221A |
| 1PCPNV003 | 13PM221A |
| 1PCPNV004 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 27 of 202)

04/19/82 15:38:46 EQUIPMENT-MOM CLASS PAGE 11 CONDENSATE TRANSFER AND STORAGE (CT-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MCTAF01 | TEMPORARY-STARTUP-STRAINER | 13PM407 |
| 1MCTAP01 | CONDENSATE TRANSFER PUMP | 13MM093 |
| 1MCTBF01 | TEMPORARY-STARTUP-STRAINER | 13PM407 |
| 1MCTBP01 | CONDENSATE TRANSFER PUMP | 13MM093 |
| 1MCTET01 | CONDENSATE STORAGE TANK | 13CM220 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 28 of 202)

12/17/82 02:28:02 — U INSTRUMENTS BY SYSTEM — PAGE 12 (CT-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JCTAHS 0001 | CNDS TK TO AUX FW PP IV CONT | J-200 |
| 1JCTAHV 0001 | CNDS TK TO AUX FW PP IV | J-605 |
| 1JCTAHS 0004 | CNDS TK TO AUX FW PP IV CONT | J-200 |
| 1JCTAHV 0004 | CNDS TK TO AUX FW PP IV | J-200 |
| 1JCTETH 0014 | CNDS TK TEMP | J-356 |
| 1JCTAHS 0015 | CNDS TRANSFER PP-A CONT | J-200 |
| 1JCTBHS 0016 | CNDS TRANSFER PP-B CONT | J-200 |
| 1JCTAXCV 0017 | EXC FLOW CHK VLV FOR PI-17 | J-705 |
| 1JCTAXCV 0018 | EXC FLOW CHK VLV FOR PI-18 | J-705 |
| 1JCTNFO 0019 | CNDS TRANSFER PP-A RECIRC | M-093 |
| 1JCTNFO 0020 | CNDS TRANSFER PP-B RECIRC | M-093 |
| 1JCTAFE 0024 | CNDS TRANSFER PP-A TEST | J-425 |
| 1JCTBFE 0029 | CNDS TRANSFER PP-B TEST | J-425 |
| 1JCTALR 0035 | CNDS TK LEVEL 7 RMT LEVEL | J-111 |
| 1JCTALSHL0035 | CNDS TK NORM UPER LEVELS | J-111 |
| 1JCTALT 0035 | CNDS TK LEVEL | J-111 |
| 1JCTALY 0035 | I/E CONVERTOR | J-111 |
| 1JCTALI 0035A | CNDS TK LEVEL | J-111 |
| 1JCTALT 0035B | CNDS TK LEVEL | J-111 |
| 1JCTBLSHH0036 | CNDS TK MAX UPER LEVEL | J-111 |
| 1JCTBLT 0036 | CNDS TK LEVEL | J-111 |
| 1JCTBLY 0036 | I/E CONVERTOR | J-111 |
| 1JCTBLI 0036A | CNDS TK LEVEL | J-111 |
| 1JCTBLSLL0036A | CNDS TK MIN UPER LEVEL | J-111 |
| 1JCTBLT 0036B | CNDS TK LEVEL | J-111 |
| 1JCTBLSLL0036B | CNDS TK EMPTY | J-111 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 29 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 18 (CT-3)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PCTAV015 | 13PM221B |
| 1PCTAV016 | 13PM221B |
| 1PCTAV017 | 13PM221B |
| 1PCTAV018 | 13PM221B |
| 1PCTAV023 | 13PM221B |
| 1PCTAV028 | 13PM221A |
| 1PCTAV030 | 13PM221A |
| 1PCTAV033 | 13PM221B |
| 1PCTAV037 | 13PM221B |
| 1PCTAV043 | 13PM221A |
| 1PCTAV044 | 13PM221A |
| 1PCTAV050 | 13PM221A |
| 1PCTAV051 | 13PM221A |
| 1PCTAV053 | 13PM221A |
| 1PCTAV056 | 13PM221A |
| 1PCTAV059 | 13PM221A |
| 1PCTAV060 | 13PM221A |
| 1PCTAV061 | 13PM221A |
| 1PCTAV062 | 13PM221A |
| 1PCTAV063 | 13PM221A |
| 1PCTAV068 | 13PM221A |
| 1PCTAV070 | 13PM221A |
| 1PCTAV071 | 13PM221A |
| 1PCTAV080 | 13PM221A |
| 1PCTAV086 | 13PM221A |
| 1PCTAV090 | 13PM221A |
| 1PCTAV091 | 13PM221A |
| 1PCTAV092 | 13PM221A |
| 1PCTAV093 | 13PM221 A |
| 1PCTBV014 | 13PM221B |
| 1PCTBV019 | 13PM221B |
| 1PCTBV020 | 13PM221B |
| 1PCTBV021 | 13PM221B |
| 1PCTBV022 | 13PM221B |
| 1PCTAV024 | 13PM221B |
| 1PCTBV029 | 13PM221A |
| 1PCTBV031 | 13PM221A |
| 1PCTBV032 | 13PM221A |
| 1PCTBV034 | 13PM221B |
| 1PCTBV038 | 13PM221B |
| 1PCTBV042 | 13PM221B |
| 1PCTBV045 | 13PM221A |
| 1PCTBV046 | 13PM221A |
| 1PCTBV048 | 13PM221A |
| 1PCTBV049 | 13PM221A |
| 1PCTAV054 | 13PM221A |
| 1PCTBV057 | 13PM221A |
| 1PCTBV058 | 13PM221A |
| 1PCTBV064 | 13PM221A |
| 1PCTBV065 | 13PM221A |
| 1PCTBV066 | 13PM221A |
| 1PCTBV072 | 13PM221A |
| 1PCTBV081 | 13PM221A |
| 1PCTBV088 | 13PM221A |
| 1PCTBV095 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 30 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 19 (CT-4)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PCTEV009 | 13PM221B |
| 1PCTEV013 | 13PM221A |
| 1PCTEV025 | 13PM221A |
| 1PCTEV035 | 13PM221A |
| 1PCTEV036 | 13PM221A |
| 1PCTEV055 | 13PM221B |
| 1PCTEV111 | 13PM221C |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 31 of 202)

04/19/82 15:38:46 EQUIPMENT-"Q" CLASS PAGE 13 DIESEL FUEL OIL AND TRANSFER (DF-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| AMDFEP01 | SPARE DL GEN FL OIL XFER PUMP | 13MM098 |
| 1MDFAF01 | DSL GEN A FUEL OIL BSKT STRNR | 13MM210 |
| 1MDFAF01A | DSL GEN A FUEL OIL BSKT STRNR | 13MM210 |
| 1MDFAF01B | DSL GEN A FUEL OIL BSKT STRNR | 13MM210 |
| 1MDFAP01 | DIESEL GEN FUEL OIL XFER PUMP | 13MM098 |
| 1MDFAT01 | DIESEL GEN FUEL OIL STG TANK | 13MM105 |
| 1MDFAT02 | DSL GEN A FUEL OIL DAY TNK | 13MM018 |
| 1MDFBF01A | DSL GEN B FUEL OIL BSKT STRNR | 13MM210 |
| 1MDFBF01B | DSL GEN B FUEL OIL BSKT STRNR | 13MM210 |
| 1MDFBP01 | DIESEL GEN FUEL OIL XFER PUMP | 13MM098 |
| 1MDFBT01 | DIESEL GEN FUEL OIL STG TANK | 13MM105 |
| 1MDFBT02 | DSL GEN B FUEL OIL DAY TNK | 13MM018 |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 32 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 14 (DF-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JDFAFE 0009 | DG A FU FLOW TO DAY TANK | J-425 |
| 1JDF8FE 0010 | DG B FU FLOW TO DAY TANK | J-425 |
| 1JDFAXCV 0013A | EXC FLOW CHK VLV FOR PDIS-13 | J-705 |
| 1JDF8XCV 0013B | EXC FLOW CHK VLV FOR PDIS-13 | J-705 |
| 1JDFAXCV 0014A | EXC FLOW CHK VLV FOR PDIS-14 | J-705 |
| 1JDF8XCV 0014B | EXC FLOW CHK VLV FOR PDIS-14 | J-705 |
| 1JDFAXCV 0017 | EXC FLOW CHK VLV FOR PI-17 | J-705 |
| 1JDF8XCV 0018 | EXC FLOW CHK VLV FOR PI-18 | J-705 |
| 1JDFAHS 0021A | DG A FU PUMP PDI(LOCAL PNL) | A-018 |
| 1JDFAHS 0021B | DG A FU PUMP PDI(CONTROL RM) | J-200 |
| 1JDF8HS 0022A | DG B FU PUMP PDI(LOCAL PNL) | A-018 |
| 1JDF8HS 0022B | DG B FU PUMP PDI(CONTROL RM) | J-200 |
| 1JDF8HS 0022C | DG B FU PUMP PDI(SWITCH) | J-200 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 33 of 202)

(DF-3)

04/19/82 15:50:39 VALVE-MOV CLASS PAGE 21

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PDFAV003 | 13PM221A |
| 1PDFAV007 | 13PM221A |
| 1PDFAV008 | 13PM221A |
| 1PDFAV009 | 13PM221A |
| 1PDFAV012 | 13PM221A |
| 1PDFAV013 | 13PM221A |
| 1PDFAV014 | 13PM221A |
| 1PDFAV015 | 13PM221A |
| 1PDFAV041 | 13PM221A |
| 1PDFAV042 | 13PM221A |
| 1PDFAV044 | 13PM221A |
| 1PDFAV045 | 13PM221A |
| 1PDFAV062 | 13PM221A |
| 1PDFAV067 | 13PM221A |
| 1PDFAV078 | 13PM221B |
| 1PDFAV081 | 13PM221A |
| 1PDFAV082 | 13PM221A |
| 1PDFAV083 | 13PM221A |
| 1PDFAV084 | 13PM221A |
| 1PDFAV089 | 13PM221A |
| 1PDFAV093 | 13PM221A |
| 1PDFAV094 | 13PM221A |
| 1PDFAV095 | 13PM221A |
| 1PDFAV096 | 13PM221A |
| 1PDFAV097 | 13PM221A |
| 1PDFAV098 | 13PM221A |
| 1PDFAV103 | 13PM221A |
| 1PDFRV018 | 13PM221A |
| 1PDFRV019 | 13PM221A |
| 1PDFRV020 | 13PM221A |
| 1PDFRV021 | 13PM221A |
| 1PDFRV028 | 13PM221A |
| 1PDFRV029 | 13PM221A |
| 1PDFRV030 | 13PM221A |
| 1PDFRV032 | 13PM221A |
| 1PDFRV051 | 13PM221A |
| 1PDFRV052 | 13PM221A |
| 1PDFRV054 | 13PM221B |
| 1PDFRV058 | 13PM221A |
| 1PDFRV059 | 13PM221A |
| 1PDFRV064 | 13PM221A |
| 1PDFRV068 | 13PM221A |
| 1PDFRV069 | 13PM221A |
| 1PDFRV077 | 13PM221A |
| 1PDFRV079 | 13PM221B |
| 1PDFRV085 | 13PM221A |
| 1PDFRV086 | 13PM221A |
| 1PDFRV087 | 13PM221A |
| 1PDFAV088 | 13PM221A |
| 1PDFRV090 | 13PM221A |
| 1PDFAV091 | 13PM221A |
| 1PDFAV092 | 13PM221A |
| 1PDFRV099 | 13PM221A |
| 1PDFRV100 | 13PM221A |
| 1PDFRV101 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 34 of 202)

| 04/19/82 15:50:39 | VALVE-"ON" CLASS | PAGE 22 | (DF-4) |
|---|---|---|---|
| TAG NUMBER | B/SPEC/ | | |
| 1PDFRV102 | 13PM221A | | |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 35 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 15 DIESEL GENERATOR SYSTEM (DG-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JDGAB01 | ENG CNTL PNL-DSL GEN A | 13MM018 |
| 1JDGAB02 | GEN CNTL PNL-DSL GEN A | 13MM018 |
| 1JDGAB03 | HIGH VLTG CNTL PNL-DSL GEN-A | 13MM018 |
| 1JDGAB04 | RATIO/RELAY PANEL-DSL GEN A | 13MM018 |
| 1JDGBB01 | ENG CNTL PNL-DSL GEN B | 13MM018 |
| 1JDGBB02 | GEN CNTL PNL-DSL GEN B | 13MM018 |
| 1JDGBB03 | HIGH VLTG CNTL PNL-DSL GEN B | 13MM018 |
| 1JDGBB04 | RATIO/RELAY PANEL-DSL GEN B | 13MM018 |
| 1MDGAC03 | TURBOCHARGER | 13MM018 |
| 1MDGAE01A | AIR INTERCOOLERS/HEATERS | 13MM018 |
| 1MDGAE01B | AIR INTERCOOLERS/HEATERS | 13MM018 |
| 1MDGAE02 | GOVERNOR OIL COOLER | 13MM018 |
| 1MDGAE03 | FUEL OIL COOLER | 13MM018 |
| 1MDGAE04 | LUBE OIL COOLER | 13MM018 |
| 1MDGAE05 | JACKET WATER COOLER | 13MM018 |
| 1MDGAF03 | DSL GEN A AIR INTAKE FILTER | 13MM018 |
| 1MDGAF04 | DSL GEN A AIR INTAKE SILENCER | 13MM018 |
| 1MDGAF05 | DSL GEN A EXHAUST SILENCER | 13MM018 |
| 1MDGAF06A | DSL GEN A STARTING AIR FLTR A | 13MM018 |
| 1MDGAF06B | DSL GEN A STARTING AIR FLTR B | 13MM018 |
| 1MDGAF07 | DSL GEN A L.O. SUMP STRAINER | 13MM018 |
| 1MDGAF08 | DEL GEN A LO FILTER | 13MM018 |
| 1MDGAF09A | DEL GEN A LO STRAINER A | 13MM018 |
| 1MDGAF09B | DEL GEN A LO STRAINER B | 13MM018 |
| 1MDGAF10A | DEL GEN A TURBO BRGS LO FLTR A | 13MM018 |
| 1MDGAF10B | DEL GEN A TURBO BRGS LO FLTR B | 13MM018 |
| 1MDGAF11A | DEL GEN A FO SUCT STRAINER A | 13MM018 |
| 1MDGAF11B | DEL GEN A FO SUCT STRAINER B | 13MM018 |
| 1MDGAF12A | DEL GEN A FO DISCH FILTER A | 13MM018 |
| 1MDGAF12B | DEL GEN A FO DISCH FILTER B | 13MM018 |
| 1MDGAH01 | DIESEL GENERATOR A | 13MM018 |
| 1MDGAM01 | DSL GEN A JACKET WTR CIRC HTR | 13MM018 |
| 1MDGAM02 | DSL GEN A LO CIRC HEATER | 13MM018 |
| 1MDGAP01 | DSL GEN A JACKET WTR CIRC PUMP | 13MM018 |
| 1MDGAP02 | DEL GEN ENG DR JACKET WTR PUMP | 13MM018 |
| 1MDGAP03 | DEL GEN ENG DR LO PUMP | 13MM018 |
| 1MDGAP04 | DSL GEN A LO CIRC PUMP | 13MM018 |
| 1MDGAP05 | DEL GEN ENG DR FO BOOSTER PUMP | 13MM018 |
| 1MDGAX01A | DSL GEN A STARTING AIR RCVR A | 13MM018 |
| 1MDGAX01B | DSL GEN A STARTING AIR RCVR B | 13MM018 |
| 1MDGAY01 | COMB AIR INTAKE EXPANSION JT | 13MM018 |
| 1MDGAY02 | EXHAUST EXP JNT ENGINE MOUNTED | 13MM018 |
| 1MDGAY03 | EXP JNT ENGINE EXHAUST | 13MM018 |
| 1MDGAY04 | EXHAUST EXP JNT | 13MM018 |
| 1MDGAY11 | EXP JNT ENGINE CLNG WTR RETURN | 13MM018 |
| 1MDGAY12 | EXP JNT CLNG WTR PUMP SUCTION | 13MM018 |
| 1MDGAY13 | EXP JNT CLNG WTR PMP DISCHARGE | 13MM018 |
| 1MDGAY14 | EXP JNT ENGINE CLNG WTR SUPPLY | 13MM018 |
| 1MDGAY15 | EXP JNT WARMUP PMP DISCHARGE | 13MM018 |
| 1MDGAY18 | EXP JOINT TURBO CLR OUTLET HDR | 13MM018 |
| 1MDGAY19 | EXP JOINT TURBO COOLER SUPPLY | 13MM018 |
| 1MDGAY20 | EXP JNT ENGINE LUBE OIL SUPPLY | 13MM018 |
| 1MDGAY21 | EXP JNT LUBE OIL PMP DISCHARGE | 13MM018 |
| 1MDGAY22 | EXP JNT OIL WARMUP PMP SUCTION | 13MM018 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 36 of 202)

(DG-2)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 16

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MDGAY23 | EXP JNT LUBE OIL PUMP SUCTION | 13MM018 |
| 1MDGAY24 | EXP JOINT TURBO COOLER OUTLET | 13MM018 |
| 1MDGAY25 | FLEX METAL HOSE TURNING GEAR | 13MM018 |
| 1MDGBC03 | TURBOCHARGER | 13MM018 |
| 1MDGBE01A | AIR INTERCOOLERS/HEATERS | 13MM018 |
| 1MDGBE01B | AIR INTERCOOLERS/HEATERS | 13MM018 |
| 1MDGBE02 | GOVERNOR OIL COOLER | 13MM018 |
| 1MDGBE03 | FUEL OIL COOLER | 13MM018 |
| 1MDGBE04 | LUBE OIL COOLER | 13MM018 |
| 1MDGBE05 | JACKET WATER COOLER | 13MM018 |
| 1MDGBF03 | DSL GEN B AIR INTAKE FILTER | 13MM018 |
| 1MDGBF04 | DSL GEN B AIR INTAKE SILENCER | 13MM018 |
| 1MDGBF05 | DSL GEN B EXHAUST SILENCER | 13MM018 |
| 1MDGBF06A | DSL GEN B STARTING AIR FLTR A | 13MM018 |
| 1MDGBF06B | DSL GEN B STARTING AIR FLTR B | 13MM018 |
| 1MDGBF07 | DSL GEN B L.O. SUMP STRAINER | 13MM018 |
| 1MDGBF08 | DEL GEN B LO FILTER | 13MM018 |
| 1MDGBF09A | DEL GEN B LO STRAINER A | 13MM018 |
| 1MDGBF09B | DEL GEN B LO STRAINER B | 13MM018 |
| 1MDGBF10A | DEL GEN B TURBO BRGS LO FLTR A | 13MM018 |
| 1MDGBF10B | DEL GEN B TURBO BRGS LO FLTR B | 13MM018 |
| 1MDGBF11A | DEL GEN B FO SUCT STRAINER A | 13MM018 |
| 1MDGBF11B | DEL GEN B FO SUCT STRAINER B | 13MM018 |
| 1MDGBF12A | DEL GEN B FO DISCH FILTER A | 13MM018 |
| 1MDGBF12B | DEL GEN B FO DISCH FILTER B | 13MM018 |
| 1MDGBH01 | DIESEL GENERATOR B | 13MM018 |
| 1MDGBM01 | DSL GEN B JACKET WTR CIRC HTR | 13MM018 |
| 1MDGBM02 | DSL GEN B LO CIRC HEATER | 13MM018 |
| 1MDGBP01 | DSL GEN B JACKET WTR CIRC PUMP | 13MM018 |
| 1MDGBP02 | DEL GEN ENG DR JACKET WTR PUMP | 13MM018 |
| 1MDGBP03 | DEL GEN ENG DR LO PUMP | 13MM018 |
| 1MDGBP04 | DSL GEN B LO CIRC PUMP | 13MM018 |
| 1MDGBP05 | DEL GEN ENG DR FO BOOSTER PUMP | 13MM018 |
| 1MDGBX01A | DSL GEN A STARTING AIR RCVR A | 13MM018 |
| 1MDGBX01B | DSL GEN A STARTING AIR RCVR B | 13MM018 |
| 1MDGBY01 | COMB AIR INTAKE EXPANSION JT | 13MM018 |
| 1MDGBY02 | EXHAUST EXP JNT ENGINE MOUNTED | 13MM018 |
| 1MDGBY03 | EXP JNT ENGINE EXHAUST | 13MM018 |
| 1MDGBY04 | EXHAUST EXP JNT | 13MM018 |
| 1MDGBY11 | EXP JNT ENGINE CLNG WTR RETURN | 13MM018 |
| 1MDGBY12 | EXP JNT CLNG WTR PMP SUCTION | 13MM018 |
| 1MDGBY13 | EXP JNT CLNG WTR PMP DISCHARGE | 13MM018 |
| 1MDGBY14 | EXP JNT ENGINE CLNG WTR SUPPLY | 13MM018 |
| 1MDGBY15 | EXP JNT WARMUP PMP DISCHARGE | 13MM018 |
| 1MDGBY18 | EXP JOINT TURBO CLR OUTLET HDR | 13MM018 |
| 1MDGBY19 | EXP JOINT TURBO COOLER SUPPLY | 13MM018 |
| 1MDGBY20 | EXP JNT ENGINE LUBE OIL SUPPLY | 13MM018 |
| 1MDGBY21 | EXP JNT LUBE OIL PMP DISCHARGE | 13MM018 |
| 1MDGBY22 | EXP JNT OIL WARMUP PMP SUCTION | 13MM018 |
| 1MDGBY23 | EXP JNT LUBE OIL PUMP SUCTION | 13MM018 |
| 1MDGBY24 | EXP JOINT TURBO COOLER OUTLET | 13MM018 |
| 1MDGBY25 | FLEX METAL HOSE TURNING GEAR | 13MM018 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 37 of 202)

04/19/82 16:06:57 INSTRUMENT "MOM CLASS PAGE 16 (DG-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JDGAFV 0013 | DG A CRANKING AIR VLV LEFT BK | M-018 |
| 1JDGAFV 0015 | DG A CRANKING AIR VLV RIGHT BK | M-018 |
| 1JDGAHCV 0009 | DG A STARTING AIR RECR A OUT | M-018 |
| 1JDGAHCV 0011 | DG A STARTING AIR RECR B OUT | M-018 |
| 1JDGAHS 0001 | DG A AIR START/STOP CONTL RM | J-200 |
| 1JDGAHS 0003 | DG A AIR START LOCAL PANEL | M-018 |
| 1JDGAHS 0007 | DG A MODE CONTROL LOCAL PANEL | M-018 |
| 1JDGAHS 0017 | DG A LUBE OIL CIRC PUMP | M-018 |
| 1JDGAHS 0019 | DG A LUBE OIL WARM UP HTR | M-018 |
| 1JDGAHS 0021 | DG A JACKET WTR CIRC PUMP | M-018 |
| 1JDGAHS 0027 | DG A JACKET WTR HEATER | M-018 |
| 1JDGAHS 0029 | DG A EMERG STOP PB(LOCAL PNL) | M-018 |
| 1JDGALC 0007 | DG A FO DAY TK LEVEL CONTROL | M-018 |
| 1JDGAPSL 0003 | DG A LUBE OIL LO PRESS TRIP | M-018 |
| 1JDGAPSL 0005 | DG A LUBE OIL LO PRESS TRIP | M-018 |
| 1JDGAPSL 0009 | DG A LUBE OIL LO PRESS TRIP | M-018 |
| 1JDGAPSV 0005 | DG A START AIR RECEIVER A | M-018 |
| 1JDGAPSV 0007 | DG A START AIR RECEIVER B | M-018 |
| 1JDGAPY 0001 | DG A ENGINE LUBE OIL PRESS | M-018 |
| 1JDGAPY 0003 | DG A FUEL OIL PRES AFTER FLTR | M-018 |
| 1JDGAPY 0005 | DG A TURBO LUBE OIL PRESS | M-018 |
| 1JDGAPY 0007 | DG A JACKET WTR PRES ENG INLT | M-018 |
| 1JDGASC 0001 | DG A GOV ACTUATOR EL SPEED CTL | M-018 |
| 1JDGASI 0031 | DG A ENGINE SPEED(LOCAL PANEL) | M-018 |
| 1JDGASSH 0003 | DG A OVSD COMB AIR TRIP IND 1 | M-018 |
| 1JDGASSH 0005 | DG A OVSD COMB AIR TRIP IND 2 | M-018 |
| 1JDGAST 0001 | DG A ENG SPEED MAG PICKUP # 1 | M-018 |
| 1JDGAST 0003 | DG A ENG SPEED MAG PICKUP # 2 | M-018 |
| 1JDGAUV 0001 | DG A COOL WTR SURGE TK | J-603 |
| 1JDGAUV 0003 | DG A STARTING AIR RIGHT BK # 2 | M-018 |
| 1JDGAUV 0005 | DG A STARTING AIR LEFT BK # 1 | M-018 |
| 1JDGAUV 0007 | DG A STARTING AIR LEFT BK # 2 | M-018 |
| 1JDGAUV 0009 | DG A EMERG MODE FUEL CNTR # 1 | M-018 |
| 1JDGAUV 0011 | DG A EMERG MODE FUEL CNTR # 2 | M-018 |
| 1JDGAUV 0015 | DG A STARTING AIR RIGHT BK # 1 | M-018 |
| 1JDGAUV 0285 | VOID | M-018 |
| 1JDGAXCV 0029A | EXC FLOW CHK VLV FOR PI-29 | J-705 |
| 1JDGAXCV 0029B | EXC FLOW CHK VLV FOR PI-29 | J-705 |
| 1JDGAZSH 0289 | DG A FO DAY TANK SHUT OFF | P-221A |
| 1JDGBFV 0014 | DG B CRANKING AIR VLV LEFT BK | M-018 |
| 1JDGBFV 0016 | DG B CRANKING AIR VLV RIGHT BK | M-018 |
| 1JDGBHCV 0010 | DG B STARTING AIR RECR A OUT | M-018 |
| 1JDGBHCV 0012 | DG B STARTING AIR RECR B OUT | M-018 |
| 1JDGBHS 0002 | DG B AIR START/STOP CONTL RM | J-200 |
| 1JDGBHS 0004 | DG B AIR START LOCAL PANEL | M-018 |
| 1JDGBHS 0008 | DG B MODE CONTROL LOCAL PANEL | M-018 |
| 1JDGBHS 0018 | DG B LUBE OIL CIRC PUMP | M-018 |
| 1JDGBHS 0070 | DG B LUBE OIL WARM UP HTR | M-018 |
| 1JDGBHS 0022 | DG B JACKET WTR CIRC PUMP | M-018 |
| 1JDGBHS 0028 | DG B JACKET WTR HEATER | M-018 |
| 1JDGBHS 0030 | DG B EMERG STOP PB(LOCAL PNL) | M-018 |
| 1JDGBLC 0008 | DG B FO DAY TK LEVEL CONTROL | M-018 |
| 1JDGBPSL 0004 | DG B LUBE OIL LO PRESS TRIP | M-018 |
| 1JDGBPSL 0006 | DG B LUBE OIL LO PRESS TRIP | M-018 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 38 of 202)

12/1//82 02128102 — Q INSTRUMENTS BY SYSTEM — PAGE 10

(DG-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JDGAHS 0001 | DG A AIR START/STOP CONTL RM | J-200 |
| 1JDGALC 0001 | DG A CUOL WTR SURGE TK | A-018 |
| 1JDGAPY 0001 | DG A ENGINE CUBE OIL PRESS | M-018 |
| 1JDGASC 0001 | DG A GOV ACTUATOR EL SPEED CTL | M-018 |
| 1JDGAST 0001 | DG A ENG SPEED MAG PICKUP # 1 | M-018 |
| 1JDGAUV 0001 | DG A CUOL WTR SURGE TK | J-603 |
| 1JDGBHS 0002 | DG B AIR START/STOP CONTL RM | J-200 |
| 1JDGBLC 0002 | DG B CUOL WTR SURGE TK | A-018 |
| 1JDGBPY 0002 | DG B ENGINE CUBE OIL PRESS | M-018 |
| 1JDGBSC 0002 | DG B GOV ACTUATOR EL SPEED CTL | M-018 |
| 1JDGBST 0002 | DG B ENG SPEED MAG PICKUP # 1 | M-018 |
| 1JDGBUV 0002 | DG B CUOL WTR SURGE TK | J-603 |
| 1JDGBHS 0002A | DG B AIR START/STOP DISCONNECT | J-200 |
| 1JDGBHS 0002B | DG B AIR START/STOP DISCONNECT | J-200 |
| 1JDGAHS 0003 | DG A AIR START LOCAL PANEL | M-018 |
| 1JDGAPSL 0003 | DG A CUBE OIL LO PRESS TRIP | M-018 |
| 1JDGAPY 0003 | DG A FUEL OIL PRES AFTER FLTR | M-018 |
| 1JDGASSH 0003 | DG A OVSD CUMB AIR TRIP IND 1 | M-018 |
| 1JDGAST 0003 | DG A ENG SPEED MAG PICKUP # 2 | M-018 |
| 1JDGAUV 0003 | DG A STARTING AIR RIGHT BK # 2 | M-018 |
| 1JDGBHS 0004 | DG B AIR START LOCAL PANEL | M-018 |
| 1JDGBPSL 0004 | DG B CUBE OIL LO PRESS TRIP | M-018 |
| 1JDGBPY 0004 | DG B FUEL OIL PRES AFTER FLTR | M-018 |
| 1JDGBSSH 0004 | DG B OVSD CUMB AIR TRIP IND 1 | M-018 |
| 1JDGBST 0004 | DG B ENG SPEED MAG PICKUP # 2 | M-018 |
| 1JDGBUV 0004 | DG B STARTING AIR RIGHT BK # 2 | M-018 |
| 1JDGAPSL 0005 | DG A CUBE OIL LO PRESS TRIP | M-018 |
| 1JDGAPSV 0005 | DG A START AIR RECEIVER A | M-018 |
| 1JDGAPY 0005 | DG A TURBO CUBE OIL PRESS | M-018 |
| 1JDGASSH 0005 | DG A OVSD CUMB AIR TRIP IND 2 | M-018 |
| 1JDGAUV 0005 | DG A STARTING AIR LEFT BK # 1 | M-018 |
| 1JDGBPSL 0006 | DG B CUBE OIL LO PRESS TRIP | M-018 |
| 1JDGBPSV 0006 | DG B START AIR RECEIVER A | M-018 |
| 1JDGBPY 0006 | DG B TURBO CUBE PRESS | M-018 |
| 1JDGBSSH 0006 | DG B OVSD CUMB AIR TRIP IND 2 | M-018 |
| 1JDGBUV 0006 | DG B STARTING AIR LEFT BK # 1 | M-018 |
| 1JDGAHS 0007 | DG A MODE CONTROL LOCAL PANEL | M-018 |
| 1JDGALC 0007 | DG A FU DAY TK LEVEL CONTROL | M-018 |
| 1JDGAPSL 0007 | DG A CUBE OIL LO PRESS TRIP | M-018 |
| 1JDGAPSV 0007 | DG A START AIR RECEIVER B | M-018 |
| 1JDGAPY 0007 | DG A JACKET WTR PRES ENG INLT | M-018 |
| 1JDGAUV 0007 | DG A STARTING AIR CENT BK # 2 | M-018 |
| 1JDGBHS 0008 | DG B MODE CONTROL LOCAL PANEL | M-018 |
| 1JDGBLC 0008 | DG B FU DAY TK LEVEL CONTROL | M-018 |
| 1JDGBPSL 0008 | DG B CUBE OIL LO PRESS TRIP | M-018 |
| 1JDGBPSV 0008 | DG B START AIR RECEIVER B | M-018 |
| 1JDGBPY 0008 | DG B JACKET WTR PRES ENG INLT | M-018 |
| 1JDGBUV 0008 | DG B STARTING AIR CENT BK # 2 | M-018 |
| 1JDGAHCV 0009 | DG A STARTING AIR RECR A OUT | M-018 |
| 1JDGAPSL 0009 | DG A CUBE OIL LO PRESS TRIP | M-018 |
| 1JDGAUV 0009 | DG A EMERG MODE FUEL CNTR # 1 | M-018 |
| 1JDGBHCV 0010 | DG B STARTING AIR RECR A OUT | M-018 |
| 1JDGBPSL 0010 | DG B CUBE OIL LO PRESS TRIP | M-018 |
| 1JDGBUV 0010 | DG B EMERG MODE FUEL CNTR # 1 | M-018 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 39 of 202)

12/11/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 17 (DG-5)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JDGAHCV 0011 | DG A STARTING AIR RECR B 001 | M-018 |
| 1JDGACSLL0011 | DG A COOL WTR SURGE TK | M-018 |
| 1JDGAUV 0011 | DG A EMERG MODE FUEL CNTK # 2 | M-018 |
| 1JDGBHCV 0012 | DG B STARTING AIR RECR B 001 | M-018 |
| 1JDGBCSLL0012 | DG B COOL WTR SURGE TK | M-018 |
| 1JDGBUV 0012 | DG B EMERG MODE FUEL CNTK # 2 | M-018 |
| 1JDGAAV 0013 | DG A CRANKING AIR VLV LEFT BK | M-018 |
| 1JDGBAV 0014 | DG B CRANKING AIR VLV LEFT BK | M-018 |
| 1JDGAAV 0015 | DG A CRANKING AIR VLV RIGHT BK | M-018 |
| 1JDGAUV 0015 | DG A STARTING AIR RIGHT BR # 1 | M-018 |
| 1JDGBAV 0016 | DG B CRANKING AIR VLV RIGHT BK | M-018 |
| 1JDGBUV 0016 | DG B STARTING AIR RIGHT BR # 1 | M-018 |
| 1JDGAHS 0017 | DG A LOBE OIL CIRC PUMP | M-018 |
| 1JDGBAS 0016 | DG B LUBE OIL CIRC PUMP | M-018 |
| 1JDGAAS 0019 | DG A LUBE OIL WARM UP AIR | M-018 |
| 1JDGBHS 0020 | DG B LOBE OIL WARM UP AIR | M-018 |
| 1JDGAHS 0021 | DG A JACKET WTR CIRC PUMP | M-018 |
| 1JDGBHS 0022 | DG B JACKET WTR CIRC PUMP | M-018 |
| 1JDGAHS 0027 | DG A JACKET WTR HEATER | M-018 |
| 1JDGBHS 0028 | DG B JACKET WTR HEATER | M-018 |
| 1JDGAHS 0029 | DG A EMERG STOP PB(LOCAL PNL) | M-018 |
| 1JDGATW 0029 | THERMOWELL FOR TE-29 DG A JW | J-556 |
| 1JDGAXCV 0029A | EXC FLOW CHK VLV FOR PI-29 | J-705 |
| 1JDGAXCV 0029B | EXC FLOW CHK VLV FOR PI-29 | J-705 |
| 1JDGBHS 0030 | DG B EMERG STOP PB(LOCAL PNL) | M-018 |
| 1JDGBTW 0030 | THERMOWELL FOR TE-30 DG B JW | J-556 |
| 1JDGBXCV 0030A | EXC FLOW CHK VLV FOR PI-30 | J-705 |
| 1JDGBXCV 0030B | EXC FLOW CHK VLV FOR PI-30 | J-705 |
| 1JDGASI 0031 | DG A ENGINE SPEED(LOCAL PANEL) | M-018 |
| 1JDGATW 0031 | THERMOWELL FOR TE-31 DG A JW | J-556 |
| 1JDGBTW 0032 | THERMOWELL FOR TE-32 DG B JW | J-556 |
| 1JDGATCL 0037 | DG A JACKET WTR TEMP TO ENGINE | M-018 |
| 1JDGBTCL 0038 | DG B JACKET WTR TEMP TO ENGINE | M-018 |
| 1JDGATW 0039 | THERMOWELL FOR TI-39 DG A JW | J-556 |
| 1JDGBTW 0040 | THERMOWELL FOR TI-40 DG B JW | J-556 |
| 1JDGATW 0041 | THERMOWELL FOR TI-41 DG A JW | J-556 |
| 1JDGBTW 0042 | THERMOWELL FOR TI-42 DG B JW | J-556 |
| 1JDGATW 0043 | THERMOWELL FOR TI-43 DG A JW | J-556 |
| 1JDGBTW 0044 | THERMOWELL FOR TI-44 DG B JW | J-556 |
| 1JDGATW 0045 | THERMOWELL FOR TI-45 DG A JW | J-556 |
| 1JDGBTW 0046 | THERMOWELL FOR TI-46 DG B JW | J-556 |
| 1JDGATW 0047 | SPARE | J-556 |
| 1JDGBTW 0048 | SPARE | J-556 |
| 1JDGATW 0049 | DG A TEST WELL JAC WTR FR ENG | M-018 |
| 1JDGBTW 0050 | DG B TEST WELL JAC WTR FR ENG | M-018 |
| 1JDGNPI 0051 | DG A JACKET WTR ENGINE PMP DIS | M-018 |
| 1JDGNPI 0061 | DG A JACKET WTR CIRC PMP SUCTI | M-018 |
| 1JDGAPCV 0067 | DG A TURBO BRG OIL PRESS CNTR | M-018 |
| 1JDGBPCV 0068 | DG B TURBO BRG OIL PRESS CNTR | M-018 |
| 1JDGAPSV 0081 | DG A ENG DRIVEN L.O. PP RELIEF | M-018 |
| 1JDGBPSV 0082 | DG B ENG DRIVEN L.O. PP RELIEF | M-018 |
| 1JDGAPSV 0083 | DG A L.O. CIRC. PP RELIEF | M-018 |
| 1JDGBPSV 0084 | DG B L.O. CIRC. PP RELIEF | M-018 |
| 1JDGAPSV 0085 | DG A TURBO FILTER INLET RELIEF | M-018 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 40 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 18 (DG-6)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JDGBPSV 0086 | DG B TURBO FILTER INLET RELIEF | M-018 |
| 1JDGATW 0089 | TEST WELL DG A L.O. TO COOLER | J-556 |
| 1JDGBTW 0090 | TEST WELL DG B L.O. TO COOLER | J-556 |
| 1JDGATW 0091 | THERMOWELL FOR TI-91 DG A L.O. | J-556 |
| 1JDGBTW 0092 | THERMOWELL FOR TI-92 DG B L.O. | J-556 |
| 1JDGATW 0095 | THERMOWELL FOR TE-95 DG A L.O. | J-556 |
| 1JDGBTW 0096 | THERMOWELL FOR TE-96 DG B L.O. | J-556 |
| 1JDGATCV 0097 | DG A LUBE OIL TEMP CONTROL VLV | M-018 |
| 1JDGBTCV 0098 | DG B LUBE OIL TEMP CONTROL VLV | M-018 |
| 1JDGATW 0099 | THERMOWELL FOR TI-99 DG A L.O. | J-556 |
| 1JDGBTW 0100 | THERMOWELL FOR TI-100 DG B LO | J-556 |
| 1JDGATW 0101 | DG A LO TO ENG BRG TEST WELL | J-556 |
| 1JDGBTW 0102 | DG B LO TO ENG BRG TEST WELL | J-556 |
| 1JDGATW 0103 | THERMOWELL FOR TE-103 DG A L/O | J-556 |
| 1JDGBTW 0104 | THERMOWELL FOR TE-104 DG B L/O | J-556 |
| 1JDGATCL 0105 | DG A L.O. TEMP TO ENGINE BRGS | M-018 |
| 1JDGBTCL 0106 | DG B L.O. TEMP TO ENGINE BRGS | M-018 |
| 1JDGATW 0109 | THERMOWELL FOR TI-109 DG A LO | J-556 |
| 1JDGBTW 0110 | THERMOWELL FOR TI-110 DG B LO | J-556 |
| 1JDGATCV 0269 | DG A JACKET WTR TO ENG TP CNTR | M-018 |
| 1JDGBTCV 0270 | DG B JACKET WTR TO ENG TP CNTR | M-018 |
| 1JDGATV 0271 | DG A AIR INTERCLR HEATER A | M-018 |
| 1JDGBTV 0272 | DG B AIR INTERCLR HEATER A | M-018 |
| 1JDGATV 0273 | DG A AIR INTERCLR HEATER B | M-018 |
| 1JDGBTV 0274 | DG B AIR INTERCLR HEATER B | M-018 |
| 1JDGAUV 0285 | VOID | M-018 |
| 1JDGNUV 0285 | DG A ENGINE VIBRATION TRIP | M-018 |
| 1JDGBUV 0286 | VOID | M-018 |
| 1JDGNUV 0286 | DG B ENGINE VIBRATION TRIP | M-018 |
| 1JDGAUY 0329 | DG A START AIR DISTRIBUTOR | M-018 |
| 1JDGBUY 0330 | DG B START AIR DISTRIBUTOR | M-018 |
| 1JDGAUY 0331 | DG A START AIR DISTRIBUTOR | M-018 |
| 1JDGBUY 0332 | DG B START AIR DISTRIBUTOR | M-018 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 41 of 202)

(DG-7)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 24

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PDGAV001 | 13PM221A |
| 1PDGAV002 | 13PM221A |
| 1PDGAV003 | 13PM221A |
| 1PDGAV004 | 13PM221A |
| 1PDGAV006 | 13PM221A |
| 1PDGAV007 | 13PM221A |
| 1PDGAV019 | 13PM221A |
| 1PDGAV024 | 13PM221A |
| 1PDGAV038 | 13PM221B |
| 1PDGAV041 | 13PM221B |
| 1PDGAV046 | 13PM221A |
| 1PDGAV048 | 13PM221A |
| 1PDGAV054 | 13PM221A |
| 1PDGAV057 | 13PM221A |
| 1PDGAV058 | 13PM221A |
| 1PDGAV061 | 13PM221A |
| 1PDGAV063 | 13PM221A |
| 1PDGAV066 | 13PM221A |
| 1PDGAV067 | 13PM221A |
| 1PDGAV070 | 13PM221A |
| 1PDGAV071 | 13PM221A |
| 1PDGAV074 | 13PM221A |
| 1PDGAV075 | 13PM221A |
| 1PDGAV078 | 13PM221A |
| 1PDGAV084 | 13PM221A |
| 1PDGAV317 | 13MM018 |
| 1PDGAV318 | 13MM018 |
| 1PDGAV356 | 13MM018 |
| 1PDGAV357 | 13MM018 |
| 1PDGAV358 | 13MM018 |
| 1PDGAV359 | 13MM018 |
| 1PDGAV362 | 13MM018 |
| 1PDGAV363 | 13MM018 |
| 1PDGAV364 | 13MM018 |
| 1PDGAV369 | 13MM018 |
| 1PDGAV370 | 13MM018 |
| 1PDGAV371 | 13MM018 |
| 1PDGAV374 | 13MM018 |
| 1PDGAV384 | 13MM018 |
| 1PDGAV385 | 13MM018 |
| 1PDGAV394 | 13MM018 |
| 1PDGAV395 | 13MM018 |
| 1PDGAV010 | 13PM221A |
| 1PDGAV011 | 13PM221A |
| 1PDGAV012 | 13PM221A |
| 1PDGAV013 | 13PM221A |
| 1PDGAV015 | 13PM221A |
| 1PDGAV016 | 13PM221A |
| 1PDGAV018 | 13PM221A |
| 1PDGAV025 | 13PM221A |
| 1PDGAV047 | 13PM221A |
| 1PDGAV049 | 13PM221A |
| 1PDGAV050 | 13PM221B |
| 1PDGAV051 | 13PM221B |
| 1PDGAV053 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 42 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 25 (DG-8)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PDGAV055 | 13PM221A |
| 1PDGAV056 | 13PM221A |
| 1PDGAV059 | 13PM221A |
| 1PDGAV062 | 13PM221A |
| 1PDGAV064 | 13PM221A |
| 1PDGAV065 | 13PM221A |
| 1PDGAV068 | 13PM221A |
| 1PDGAV069 | 13PM221A |
| 1PDGAV072 | 13PM221A |
| 1PDGAV073 | 13PM221A |
| 1PDGAV076 | 13PM221A |
| 1PDGAV077 | 13PM221A |
| 1PDGAV079 | 13PM221A |
| 1PDGAV085 | 13PM221A |
| 1PDGAV417 | 13MM018 |
| 1PDGAV418 | 13MM018 |
| 1PDGAV457 | 13MM018 |
| 1PDGAV458 | 13MM018 |
| 1PDGAV459 | 13MM018 |
| 1PDGAV460 | 13MM018 |
| 1PDGAV462 | 13MM018 |
| 1PDGAV463 | 13MM018 |
| 1PDGAV464 | 13MM018 |
| 1PDGAV465 | 13MM018 |
| 1PDGAV469 | 13MM018 |
| 1PDGAV470 | 13MM018 |
| 1PDGAV471 | 13MM018 |
| 1PDGAV474 | 13MM018 |
| 1PDGAV484 | 13MM018 |
| 1PDGAV485 | 13MM018 |
| 1PDGAV494 | 13MM018 |
| 1PDGAV495 | 13MM018 |
| 1PDGAV499 | 13MM018 |
| 1PDGNV052 | 13PM221A |
| 1PDGNV053 | 13PM221A |
| 1PDGNV054 | 13PM221A |
| 1PDGNV057 | 13PM221A |
| 1PDGNV374 | 13MM018 |
| 1PDGNV384 | 13MM018 |
| 1PDGNV385 | 13MM018 |
| 1PDGNV394 | 13MM018 |
| 1PDGNV395 | 13MM018 |
| 1PDGNV474 | 13MM018 |
| 1PDGNV484 | 13MM018 |
| 1PDGNV485 | 13MM018 |
| 1PDGNV494 | 13MM018 |
| 1PDGNV495 | 13MM018 |
| 1PDGNV500 | 13MM018 |
| 1PDGNV502 | 13MM018 |
| 1PDGNV600 | 13MM018 |
| 1PDGNV602 | 13MM018 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 43 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 27 DEMINERALIZED WATER (DW-1)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PDWEV061 | 13PM221A |
| 1PDWEV062 | 13PM221A |
| 1PDWEV135 | 13PM221A |
| 1PDWNV133 | 13PM221A |
| 1PDWNV134 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 44 of 202)

(DW-2)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 18

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MDWEU06 | PENETRATION-DEMIN WATER | 13MM500 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 45 of 202)

04/19/82 15:38:46 EQUIPMENT-"QH" CLASS PAGE 20 ESSENTIAL CHILLED WATER (EC-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JECAF01 | AUX PWR PNL FOR ECA-E01 | 13HM723 |
| 1JECAF03 | CONTROL PNL FOR ECA-E01 | 13HM723 |
| 1JECBF02 | AUX PWR PNL FOR ECB-E01 | 13HM723 |
| 1JECBF04 | CONTROL PNL FOR ECB-E01 | 13HM723 |
| 1MECAE01 | ESSENTIAL CHILLER | 13HM723 |
| 1MECAF01 | ESS CHILL WTR STRTUP STRAINER | 13HM093 |
| 1MECAP01 | ESSEN CHILLED WTR CIRC PUMP | 13HM093 |
| 1MECAT01 | ESSENTIAL CHILLED WTR EXP TNK | 13HM105 |
| 1MECBE01 | ESSENTIAL CHILLER | 13HM723 |
| 1MECBF01 | ESS CHILL WTR STRTUP STRAINER | 13HM093 |
| 1MECBP01 | ESSEN CHILLED WTR CIRC PUMP | 13HM093 |
| 1MECBT01 | ESSENTIAL CHILLED WTR EXP TNK | 13HM105 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 46 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 20 (EC-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JECAHS 0001A | ESS CHW PP & CHLR-A CONT | J-200 |
| 1JECBHS 0002A | ESS CHW PP & CHLR-B CONT | J-200 |
| 1JECAXCV 0003 | EXC FLOW CHK VLV FOR PI-03 | J-705 |
| 1JECBXCV 0004 | EXC FLOW CHK VLV FOR PI-04 | J-705 |
| 1JECATW 0005 | ESS CHLR-A I/L TEMP | J-556 |
| 1JECBTW 0006 | ESS CHLR-B I/L TEMP | J-556 |
| 1JECATW 0007 | ESS CHLR-A OUT TEMP | J-556 |
| 1JECBTW 0008 | ESS CHLR-B OUT TEMP | J-556 |
| 1JECATW 0011 | ESS CHLR-A DISCH TEMP | J-556 |
| 1JECBTW 0012 | ESS CHLR-B DISCH TEMP | J-556 |
| 1JECALC 0015 | ESS CHW-A EXP TK LEVEL CONT | J-111 |
| 1JECALSLL0015 | ESS CHW-A EXP TK LEVEL CONT | J-111 |
| 1JECALT 0015 | ESS CHLD WTR SURGE TK A LEVEL | J-311 |
| 1JECALV 0015 | ESS CHW-A EXP TK LEVEL CONT | J-603 |
| 1JECALY 0015A | I/E CONVERTER | J-111 |
| 1JECAXCV 0015A | EXC FLOW CHK VLV FOR BRIDLE | J-705 |
| 1JECALY 0015B | I/E CONVERTER | J-111 |
| 1JECAXCV 0015B | EXC FLOW CHK VLV FOR BRIDLE | J-705 |
| 1JECBLC 0016 | ESS CHW-B EXP TK LEVEL CONT | J-111 |
| 1JECBLSLL0016 | ESS CHW-B EXP TK LEVEL CONT | J-111 |
| 1JECBLT 0016 | ESS CHLD WTR SURGE TK B LEVEL | J-311 |
| 1JECBLV 0016 | ESS CHW-B EXP TK LEVEL CONT | J-603 |
| 1JECBLY 0016A | I/E CONVERTER | J-111 |
| 1JECBXCV 0016A | EXC FLOW CHK VLV FOR BRIDLE | J-705 |
| 1JECBLY 0016B | I/E CONVERTER | J-111 |
| 1JECBXCV 0016B | EXC FLOW CHK VLV FOR BRIDLE | J-705 |
| 1JECATW 0025 | THERMOWELL FOR TI-25 | J-556 |
| 1JECBTW 0026 | THERMOWELL FOR TI-26 | J-556 |
| 1JECATW 0027 | THERMOWELL FOR TI-27 | J-556 |
| 1JECBTW 0028 | THERMOWELL FOR TI-28 | J-556 |
| 1JECATV 0029 | CON RM ESS AHU-A CHW TEMP CONT | J-601B |
| 1JECBTV 0030 | CON RM ESS AHU-B CHW TEMP CONT | J-601B |
| 1JECATW 0031 | THERMOWELL FOR TI-31 | J-556 |
| 1JECBTW 0032 | THERMOWELL FOR TI-32 | J-556 |
| 1JECATW 0033 | THERMOWELL FOR TI-33 | J-556 |
| 1JECBTW 0034 | ESF SWGR RM AHU-B CHW OUT TEMP | J-556 |
| 1JECAHCV 0035 | ESF SWGR RM AHU-A BYPASS VLV | J-601B |
| 1JECBHCV 0036 | ESF SWGR RM AHU-B BYPASS VLV | J-601B |
| 1JECATW 0037 | ELEC PEN RM ACU-A CHW I/L TEMP | J-556 |
| 1JECBTW 0038 | ELEC PEN RM ACU-B CHW I/L TEMP | J-556 |
| 1JECATW 0039 | ELEC PEN RM ACU-A CHW OUT TEMP | J-556 |
| 1JECBTW 0040 | ELEC PEN RM ACU-B CHW OUT TEMP | J-556 |
| 1JECAHCV 0041 | ELEC PEN RM ACU-A BYPASS VLV | J-601B |
| 1JECBHCV 0042 | ELEC PEN RM ACU-B BYPASS VLV | J-601B |
| 1JECBTW 0044 | AUX FW PP RM ACU-B CHW I/L TEM | J-556 |
| 1JECBTW 0046 | AUX FW PP RM ACU-B CHW OUT TEM | J-556 |
| 1JECBHCV 0048 | AUX FW PP RM ACU-B BYPASS VLV | J-601B |
| 1JECATW 0049 | ECW PP RM ACU-A CHW I/L TEMP | J-556 |
| 1JECBTW 0050 | ECW PP RM ACU-B CHW I/L TEMP | J-556 |
| 1JECATW 0051 | ECW PP RM ACU-A CHW OUT TEMP | J-556 |
| 1JECBTW 0052 | ECW PP RM ACU-B CHW OUT TEMP | J-556 |
| 1JECAHCV 0053 | ECW PP RM ACU-A BYPASS VLV | J-601B |
| 1JECBHCV 0054 | ECW PP RM ACU-B BYPASS VLV | J-601B |
| 1JECATW 0055 | LPSI PP RM ACU-A CHW I/L TEMP | J-556 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 47 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 21 (EC-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JECBTW 0056 | LPSI PP RM ACU-B CHW I/L TEMP | J-556 |
| 1JECATW 0057 | LPSI PP RM ACU-A CHW OUT TEMP | J-556 |
| 1JECBTW 0058 | LPSI PP RM ACU-B CHW OUT TEMP | J-556 |
| 1JECAHCV 0059 | LPSI PP RM ACU-A BYPASS VLV | J-601B |
| 1JECBHCV 0060 | LPSI PP RM ACU-B BYPASS VLV | J-601B |
| 1JECATW 0061 | HPSI PP RM ACU-A CHW I/L TEMP | J-556 |
| 1JECBTW 0062 | HPSI PP RM ACU-B CHW I/L TEMP | J-556 |
| 1JECATW 0063 | HPSI PP RM ACU-A CHW OUT TEMP | J-556 |
| 1JECBTW 0064 | HPSI PP RM ACU-B CHW OUT TEMP | J-556 |
| 1JECAHCV 0065 | HPSI PP RM ACU-A BYPASS VLV | J-601B |
| 1JECBHCV 0066 | HPSI PP RM ACU-B BYPASS VLV | J-601B |
| 1JECATW 0067 | CS PP RM ACU-A CHW I/L TEMP | J-556 |
| 1JECBTW 0068 | CS PP RM ACU-B CHW I/L TEMP | J-556 |
| 1JECATW 0069 | CS PP RM ACU-A CHW OUT TEMP | J-556 |
| 1JECBTW 0070 | CS PP RM ACU-B CHW OUT TEMP | J-556 |
| 1JECAHCV 0071 | CS PP RM ACU-A BYPASS VLV | J-601B |
| 1JECBHCV 0072 | CS PP RM ACU-B BYPASS VLV | J-601B |
| 1JECAPSV 0075 | ESS CHW-A EXP TK RELIEF VLV | J-691 |
| 1JECBPSV 0076 | ESS CHW-B EXP TK RELIEF VLV | J-691 |
| 1JECAPSV 0095 | ESF SWGR RM ESS AHU A O/L | J-691 |
| 1JECBPSV 0096 | ESF SWGR RM ESS AHU B O/L | J-691 |
| 1JECAPSV 0097 | CONT RM ESS AHU A O/L | J-691 |
| 1JECBPSV 0098 | CONT RM ESS AHU B O/L | J-691 |
| 1JECAPSV 0099 | ELEC PENET RM WEST ESS ACU O/L | J-691 |
| 1JECBPSV 0100 | ELEC PENET RM EAST ESS ACU O/L | J-691 |
| 1JECAPSV 0101 | ECH PP RM ESS ACU A O/L | J-691 |
| 1JECBPSV 0102 | ECH PP RM ESS ACU B O/L | J-691 |
| 1JECAPSV 0103 | CS RM ESS ACU A O/L | J-691 |
| 1JECBPSV 0104 | CS RM ESS ACU B O/L | J-691 |
| 1JECAPSV 0105 | HPSI PP RM ESS ACU A O/L | J-691 |
| 1JECBPSV 0106 | HPSI PP RM ESS ACU B O/L | J-691 |
| 1JECAPSV 0107 | LPSI PP RM ESS ACU A O/L | J-691 |
| 1JECBPSV 0108 | LPSI PP RM ESS ACU B O/L | J-691 |
| 1JECBPSV 0109 | AUX FEED WTR PP RM ESS ACU B | J-691 |
| 1JECATW 0111 | AUX FW PP RM A ESS ACU I/L | J-556 |
| 1JECATW 0113 | AUX FW PP RM A ESS ACU O/L | J-556 |
| 1JECAHCV 0115 | AUX FW PP RM A ESS ACU | J-601B |
| 1JECAPSV 0117 | AUX FW PP RM A ESS ACU | J-691 |
| 1JECBHCV 0118 | CHAN B EQUIP RM ESS ACU | J-601B |
| 1JECAHCV 0119 | CHAN B EQUIP RM ESS ACU | J-601B |
| 1JECBPSV 0120 | CHAN B EQUIP RM ESS ACU | J-691 |
| 1JECAPSV 0121 | CHAN A EQUIP RM ESS ACU | J-691 |
| 1JECBTW 0122 | CHAN B EQUIP RM ESS ACU O/L | J-556 |
| 1JECATW 0123 | CHAN A EQUIP RM ESS ACU O/L | J-556 |
| 1JECBTW 0124 | CHAN B EQUIP RM ESS ACU I/L | J-556 |
| 1JECATW 0125 | CHAN A EQUIP RM ESS ACU I/L | J-556 |
| 1JECAPDSL0501 | ESS CHLR A COMPR OIL | M-723 |
| 1JECBPDSL0502 | ESS CHLR B COMPR OIL | M-723 |
| 1JECATSH 0503 | ESS CHLR A COMPR MOTOR | M-723 |
| 1JECATE 0503A | ESS CHLR A COMPR MOTOR | M-723 |
| 1JECATE 0503B | ESS CHLR A COMPR MOTOR | M-723 |
| 1JECBTSH 0504 | ESS CHLR B COMPR MOTOR | M-723 |
| 1JECBTE 0504A | ESS CHLR B COMPR MOTOR | M-723 |
| 1JECBTE 0504B | ESS CHLR B COMPR MOTOR | M-723 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 48 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 22 (EC-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JECATE 0505 | ESS CHLR A COMPR BRG OIL | M-723 |
| 1JECATSH 0505 | ESS CHLR A COMPR BRG OIL | M-723 |
| 1JECAZS 0505 | ESS CHLR A COMPR IMP DISPL | M-723 |
| 1JECBTE 0506 | ESS CHLR B COMPR BRG OIL | M-723 |
| 1JECBTSH 0506 | ESS CHLR B COMPR BRG OIL | M-723 |
| 1JECBZS 0506 | ESS CHLR B COMPR IMP DISPL | M-723 |
| 1JECAPV 0507 | ESS CHLR A COMPR GUIDE VANE | M-723 |
| 1JECAZS 0507 | ESS CHLR A COMPR GUIDE VANE | M-723 |
| 1JECBPV 0508 | ESS CHLR B COMPR GUIDE VANE | M-723 |
| 1JECBZS 0508 | ESS CHLR B COMPR GUIDE VANE | M-723 |
| 1JECAPDI 0509 | ESS CHLR A COMPR OIL | M-723 |
| 1JECBPDI 0510 | ESS CHLR B COMP OIL DIFF PRESS | M-723 |
| 1JECATI 0511 | ESS CHLR A COMPR OIL RSVR | M-723 |
| 1JECBTI 0512 | ESS CHLR B COMPR OIL RSVR | M-723 |
| 1JECATI 0513 | ESS CHLR A COMPR THRUST BRG | M-723 |
| 1JECBTI 0514 | ESS CHLR B COMPR THRUST BRG | M-723 |
| 1JECALG 0515 | ESS CHLR A COMPR OIL | M-723 |
| 1JECBLG 0516 | ESS CHLR B COMPR OIL | M-723 |
| 1JECATSH 0517 | ESS CHLR A COMPR OIL HTR | M-723 |
| 1JECBTSH 0518 | ESS CHLR B COMPR OIL HTR | M-723 |
| 1JECATSH 0519 | ESS CHLR A COOLER HGBP | M-723 |
| 1JECATV 0519 | ESS CHLR A HOT GAS BYPASS | M-723 |
| 1JECBTSH 0520 | ESS CHLR B COOLER HGBP | M-723 |
| 1JECBTV 0520 | ESS CHLR B HOT GAS BYPASS | M-723 |
| 1JECAPCV 0523 | ESS CHLR A COMPR ECON GAS | M-723 |
| 1JECBPCV 0524 | ESS CHLR B COMPR ECON GAS | M-723 |
| 1JECAPDCV0525 | ESS CHLR A COMPR MAIN OIL | M-723 |
| 1JECBPDCV0526 | ESS CHLR B COMPR MAIN OIL | M-723 |
| 1JECAHS 0527 | ESS CHLR A OIL PP START | M-723 |
| 1JECBHS 0528 | ESS CHLR B OIL PP START | M-723 |
| 1JECATSL 0529 | ESS CHLR A COOLER REFRIG | M-723 |
| 1JECBTSL 0530 | ESS CHLR B COOLER REFRIG | M-723 |
| 1JECATSL 0531 | ESS CHLR A COOLER WATER | M-723 |
| 1JECBTSL 0532 | ESS CHLR B COOLER WATER | M-723 |
| 1JECAFE 0533 | ESS CHLR A CHW OIL | J-425 |
| 1JECAFSL 0533 | ESS CHW A MINIMUM FLOW | J-111 |
| 1JECAFT 0533 | ESS CHW A FLOW | J-311 |
| 1JECAFY 0533A | I/E CONVERTOR | J-111 |
| 1JECAFY 0533C | OUTPUT ISOLATOR | J-111 |
| 1JECBFE 0534 | ESS CHLR B CHW O/L | J-425 |
| 1JECBFSL 0534 | ESS CHW B MINIMUM FLOW | J-111 |
| 1JECBFT 0534 | ESS CHW B FLOW | J-311 |
| 1JECBFY 0534A | I/E CONVERTOR | J-111 |
| 1JECBFY 0534C | OUTPUT CONVERTOR | J-111 |
| 1JECAPI 0535 | ESS CHLR A COOLER REFRIG | M-723 |
| 1JECBPI 0536 | ESS CHLR B COOLER REFRIG | M-723 |
| 1JECATW 0539 | ESS CHLR A COOLER REFRIG | M-723 |
| 1JECBTW 0540 | ESS CHLR B COOLER REFRIG | M-723 |
| 1JECATI 0541A | ESS CHLR A COOLER LVG WATER | M-723 |
| 1JECATW 0541A | ESS CHLR A COOLER LVG WATER | M-723 |
| 1JECATI 0541B | ESS CHLR A COOLER ENTG WATER | M-723 |
| 1JECATW 0541B | ESS CHLR A COOLER ENTG WATER | M-723 |
| 1JECBTI 0542A | ESS CHLR B COOLER LVG WATER | M-723 |
| 1JECBTW 0542A | ESS CHLR B COOLER LVG WATER | M-723 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 49 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 29 (EC-5)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JECBTI 0542B | ESS CHLR B COOLER ENTG WATER | M-723 |
| 1JECBTW 0542B | ESS CHLR B COOLER ENTG WATER | M-723 |
| 1JECALG 0543 | ESS CHLR A COOLER REFRIG | M-723 |
| 1JECBLG 0544 | ESS CHLR B COOLER REFRIG | M-723 |
| 1JECAFG 0545 | ESS CHLR A EVAP FILTER-DRYER | M-723 |
| 1JECBFG 0546 | ESS CHLR B EVAP FIRYER-DRYER | M-723 |
| 1JECATC 0547 | ESS CHLR A COOLER BRINE | M-723 |
| 1JECATE 0547 | ESS CHLR A COOLER BRINE | M-723 |
| 1JECATW 0547 | ESS CHLR A COOLER BRINE | M-723 |
| 1JECBTC 0548 | ESS CHLR B COOLER BRINE | M-723 |
| 1JECBTE 0548 | ESS CHLR B COOLER BRINE | M-723 |
| 1JECBTW 0548 | ESS CHLR B COOLER BRINE | M-723 |
| 1JECAPSV 0549A | ESS CHLR A COOLER | M-723 |
| 1JECAPSV 0549B | ESS CHLR A COOLER | M-723 |
| 1JECBPSV 0550A | ESS CHLR B COOLER | M-723 |
| 1JECBPSV 0550B | ESS CHLR B COOLER | M-723 |
| 1JECAPSH 0551 | ESS CHLR A COND REFRIG | M-723 |
| 1JECBPSH 0552 | ESS CHLR B COND REFRIG | M-723 |
| 1JECAPI 0555 | ESS CHLR A COND REFRIG | M-723 |
| 1JECBPI 0556 | ESS CHLR B COND REFRIG | M-723 |
| 1JECATW 0559 | ESS CHLR A COND LIQUID | M-723 |
| 1JECBTW 0560 | ESS CHLR B COND LIQUID | M-723 |
| 1JECATI 0561A | ESS CHLR A COND LVG WATER | M-723 |
| 1JECATW 0561A | ESS CHLR A COND LVG WATER | M-723 |
| 1JECATI 0561B | ESS CHLR A COND ENTG WATER | M-723 |
| 1JECATW 0561B | ESS CHLR A COND ENTG WATER | M-723 |
| 1JECBTI 0562A | ESS CHLR B COND LVG WATER | M-723 |
| 1JECBTW 0562A | ESS CHLR B COND LVG WATER | M-723 |
| 1JECBTI 0562B | ESS CHLR B COND ENTG WATER | M-723 |
| 1JECBTW 0562B | ESS CHLR B COND ENTG WATER | M-723 |
| 1JECALCV 0563A | ESS CHLR A ECONOM REFRIG | M-723 |
| 1JECALCV 0563B | ESS CHLR A ECONOM REFRIG | M-723 |
| 1JECBLCV 0564A | ESS CHLR B ECONOM REFRIG | M-723 |
| 1JECBLCV 0564B | ESS CHLR B ECONOM REFRIG | M-723 |
| 1JECAPSV 0565A | ESS CHLR A STOR TK | M-723 |
| 1JECAPSV 0565B | ESS CHLR A STOR TK | M-723 |
| 1JECBPSV 0566A | ESS CHLR B STOR TK | M-723 |
| 1JECBPSV 0566B | ESS CHLR B STOR TK | M-723 |
| 1JECAPDSH0569 | ESS CHLR A PURGE SAFETY | M-723 |
| 1JECBPDSH0570 | ESS CHLR B PURGE SAFETY | M-723 |
| 1JECAPDSH0571 | ESS CHLR A PURGE OPERATING | M-723 |
| 1JECBPDSH0572 | ESS CHLR B PURGE OPERATING | M-723 |
| 1JECAPI 0573 | ESS CHLR A PURGE SEPARATOR | M-723 |
| 1JECBPI 0574 | ESS CHLR B PURGE SEPARATOR | M-723 |
| 1JECALI 0575 | ESS CHLR A PURGE WATER | M-723 |
| 1JECBLI 0576 | ESS CHLR B PURGE WATER | M-723 |
| 1JECALI 0577 | ESS CHLR A PURGE REFRIG | M-723 |
| 1JECBLI 0578 | ESS CHLR B PURGE REFRIG | M-723 |
| 1JECAPV 0579 | ESS CHLR A PURGE AIR DISCH | M-723 |
| 1JECBPV 0580 | ESS CHLR B PURGE AIR DISCH | M-723 |
| 1JECATE 0593 | ESS CHLR A COMPR REFRIG DISCH | M-723 |
| 1JECATSH 0593 | ESS CHLR A COMPR REFRIG DISCH | M-723 |
| 1JECBTE 0594 | ESS CHLR B COMPR REFRIG DISCH | M-723 |
| 1JECBTSH 0594 | ESS CHLR B COMPR REFRIG DISCH | M-723 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 50 of 202)

12/17/82 02:28:02 Q INSTRUMENTS BY SYSTEM PAGE 24

(EC-6)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JECAPSE 0595 | ESS CHLR A COOLER | M-723 |
| 1JECBPSE 0596 | ESS CHLR B COOLER | M-723 |
| 1JECAPI 0597 | ESS CHLR A NITROGEN CHARGE | M-723 |
| 1JECBPI 0598 | ESS CHLR B NITROGEN CHARGE | M-723 |
| 1JECAPI 0599 | ESS CHLR A COND | M-723 |
| 1JECAKI 0600 | ESS CHLR A ELAPSED TIME | M-723 |
| 1JECBPI 0600 | ESS CHLR B COND | M-723 |
| 1JECAKC 0601 | ESS CHLR A PROGRAM TIMER | M-723 |
| 1JECBKI 0601 | ESS CHLR B ELAPSED TIME | M-723 |
| 1JECAKC 0602 | ESS CHLR A CYCLE TIMER | M-723 |
| 1JECBKC 0603 | ESS CHLR B PROGRAM TIMER | M-723 |
| 1JECBKC 0604 | ESS CHLR B CYCLE TIMER | M-723 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 51 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 29 (EC-7)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PECAV001 | 13PM221A |
| 1PECAV002 | 13PM221B |
| 1PECAV004 | 13PM221A |
| 1PECAV005 | 13PM221A |
| 1PECAV006 | 13PM221A |
| 1PECAV007 | 13PM221A |
| 1PECAV008 | 13PM221B |
| 1PECAV009 | 13PM221A |
| 1PECAV010 | 13PM221A |
| 1PECAV011 | 13PM221B |
| 1PECAV012 | 13PM221A |
| 1PECAV013 | 13PM221A |
| 1PECAV015 | 13PM221A |
| 1PECAV016 | 13PM221A |
| 1PECAV017 | 13PM221A |
| 1PECAV018 | 13PM221A |
| 1PECAV019 | 13PM221B |
| 1PECAV020 | 13PM221A |
| 1PECAV021 | 13PM221A |
| 1PECAV022 | 13PM221A |
| 1PECAV023 | 13PM221A |
| 1PECAV025 | 13PM221A |
| 1PECAV026 | 13PM221A |
| 1PECAV027 | 13PM221A |
| 1PECAV031 | 13PM221A |
| 1PECAV033 | 13PM221A |
| 1PECAV034 | 13PM221A |
| 1PECAV035 | 13PM221A |
| 1PECAV037 | 13PM221A |
| 1PECAV038 | 13PM221A |
| 1PECAV039 | 13PM221A |
| 1PECAV040 | 13PM221A |
| 1PECAV041 | 13PM221A |
| 1PECAV042 | 13PM221A |
| 1PECAV043 | 13PM221A |
| 1PECAV082 | 13PM221A |
| 1PECAV084 | 13PM221A |
| 1PECAV085 | 13PM221A |
| 1PECAV090 | 13PM221A |
| 1PECAV091 | 13PM221A |
| 1PECAV092 | 13PM221A |
| 1PECAV098 | 13PM221A |
| 1PECAV099 | 13PM221A |
| 1PECAV105 | 13PM221A |
| 1PECAV106 | 13PM221A |
| 1PECAV107 | 13PM221A |
| 1PECAV108 | 13PM221A |
| 1PECAV109 | 13PM221A |
| 1PECAV112 | 13PM221A |
| 1PECAV122 | 13PM221A |
| 1PECAV123 | 13PM221A |
| 1PECAV124 | 13PM221A |
| 1PECAV125 | 13PM221A |
| 1PECAV134 | 13PM221A |
| 1PECAV140 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 52 of 202)

(EC-8)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 30

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PECAV141 | 13PM221A |
| 1PECAV142 | 13PM221A |
| 1PECAV144 | 13PM221A |
| 1PECAV145 | 13PM221A |
| 1PECAV146 | 13PM221A |
| 1PECAV152 | 13PM221A |
| 1PECAV162 | 13PM221A |
| 1PECAV163 | 13PM221A |
| 1PECAV166 | 13PM221A |
| 1PECAV171 | 13PM221A |
| 1PECAV172 | 13PM221A |
| 1PECAV173 | 13PM221A |
| 1PECAV174 | 13PM221A |
| 1PECAV184 | 13PM221A |
| 1PECAV185 | 13PM221A |
| 1PECAV186 | 13PM221A |
| 1PECAV187 | 13PM221A |
| 1PECAV188 | 13PM221A |
| 1PECAV189 | 13PM221A |
| 1PECAV192 | 13PM221A |
| 1PECAV193 | 13PM221A |
| 1PECAV198 | 13PM221A |
| 1PECAV199 | 13PM221A |
| 1PECAV200 | 13PM221A |
| 1PECAV201 | 13PM221B |
| 1PECAV202 | 13PM221B |
| 1PECAV203 | 13PM221A |
| 1PECAV204 | 13PM221A |
| 1PECAV205 | 13PM221A |
| 1PECAV206 | 13PM221A |
| 1PECAV207 | 13PM221A |
| 1PECAV209 | 13PM221A |
| 1PECAV210 | 13PM221A |
| 1PECAV211 | 13PM221A |
| 1PECAV212 | 13PM221A |
| 1PECAV218 | 13PM221C |
| 1PECAV219 | 13PM221C |
| 1PECAV220 | 13PM221C |
| 1PECAV230 | 13PM221C |
| 1PECAV231 | 13PM221C |
| 1PECAV300 | |
| 1PECAV301 | |
| 1PECAV302 | |
| 1PECAV303 | |
| 1PECAV304 | |
| 1PECAV305 | |
| 1PECAV306 | |
| 1PECAV307 | |
| 1PECAV308 | |
| 1PECAV309 | |
| 1PECAV310 | |
| 1PECAV311 | |
| 1PECAV312 | |
| 1PECAV313 | |
| 1PECAV314 | |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 53 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 31 (EC-9)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PECAV315 | |
| 1PECAV316 | |
| 1PECAV317 | |
| 1PECAV318 | |
| 1PECAV319 | |
| 1PECAV320 | |
| 1PECAV321 | |
| 1PECAV322 | |
| 1PECAV323 | |
| 1PECAV324 | |
| 1PECAV325 | |
| 1PECAV326 | |
| 1PECAV028 | 13PM221A |
| 1PECAV029 | 13PM221A |
| 1PECAV030 | 13PM221A |
| 1PECAV032 | 13PM221A |
| 1PECAV045 | 13PM221B |
| 1PECAV046 | 13PM221B |
| 1PECAV047 | 13PM221A |
| 1PECAV048 | 13PM221A |
| 1PECAV049 | 13PM221A |
| 1PECAV050 | 13PM221A |
| 1PECAV051 | 13PM221A |
| 1PECAV052 | 13PM221A |
| 1PECAV053 | 13PM221A |
| 1PECAV054 | 13PM221A |
| 1PECAV055 | 13PM221A |
| 1PECAV056 | 13PM221A |
| 1PECAV057 | 13PM221B |
| 1PECAV058 | 13PM221B |
| 1PECAV059 | 13PM221A |
| 1PECAV060 | 13PM221A |
| 1PECAV061 | 13PM221A |
| 1PECAV062 | 13PM221A |
| 1PECAV063 | 13PM221A |
| 1PECAV064 | 13PM221A |
| 1PECAV065 | 13PM221B |
| 1PECAV066 | 13PM221A |
| 1PECAV068 | 13PM221B |
| 1PECAV069 | 13PM221A |
| 1PECAV070 | 13PM221A |
| 1PECAV071 | 13PM221A |
| 1PECAV072 | 13PM221A |
| 1PECAV073 | 13PM221A |
| 1PECAV074 | 13PM221A |
| 1PECAV075 | 13PM221A |
| 1PECAV076 | 13PM221A |
| 1PECAV077 | 13PM221A |
| 1PECAV078 | 13PM221A |
| 1PECAV079 | 13PM221A |
| 1PECAV080 | 13PM221A |
| 1PECAV081 | 13PM221A |
| 1PECAV083 | 13PM221A |
| 1PECAV101 | 13PM221A |
| 1PECAV102 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 54 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 32 (EC-10)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PECAV104 | 13PM221A |
| 1PECAV113 | 13PM221A |
| 1PECAV114 | 13PM221A |
| 1PECAV115 | 13PM221A |
| 1PECAV116 | 13PM221A |
| 1PECAV117 | 13PM221A |
| 1PECAV118 | 13PM221A |
| 1PECAV121 | 13PM221A |
| 1PECAV126 | 13PM221A |
| 1PECAV127 | 13PM221A |
| 1PECAV128 | 13PM221A |
| 1PECAV129 | 13PM221A |
| 1PECAV130 | 13PM221A |
| 1PECAV131 | 13PM221A |
| 1PECAV135 | 13PM221A |
| 1PECAV143 | 13PM221A |
| 1PECAV147 | 13PM221A |
| 1PECAV148 | 13PM221A |
| 1PECAV149 | 13PM221A |
| 1PECAV155 | 13PM221A |
| 1PECAV161 | 13PM221A |
| 1PECAV165 | 13PM221A |
| 1PECAV167 | 13PM221A |
| 1PECAV168 | 13PM221A |
| 1PECAV169 | 13PM221A |
| 1PECAV175 | 13PM221A |
| 1PECAV176 | 13PM221A |
| 1PECAV177 | 13PM221A |
| 1PECAV194 | 13PM221A |
| 1PECAV195 | 13PM221A |
| 1PECAV208 | 13PM221C |
| 1PECAV213 | 13PM221A |
| 1PECAV214 | 13PM221C |
| 1PECAV215 | 13PM221A |
| 1PECAV216 | 13PM221A |
| 1PECAV217 | 13PM221A |
| 1PECAV221 | 13PM221C |
| 1PECAV222 | 13PM221C |
| 1PECAV223 | 13PM221C |
| 1PECAV228 | 13PM221C |
| 1PECAV229 | 13PM221C |
| 1PECAV232 | 13PM221C |
| 1PECAV233 | 13PM221C |
| 1PECAV400 | |
| 1PECAV401 | |
| 1PECAV402 | |
| 1PECAV403 | |
| 1PECAV404 | |
| 1PECAV405 | |
| 1PECAV406 | |
| 1PECAV407 | |
| 1PECAV408 | |
| 1PECAV409 | |
| 1PECAV410 | |
| 1PECAV411 | |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 55 of 202)

(EC-11)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 33

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PECAV412 | |
| 1PECAV413 | |
| 1PECAV414 | |
| 1PECAV415 | |
| 1PECAV416 | |
| 1PECAV417 | |
| 1PECAV418 | |
| 1PECAV419 | |
| 1PECAV420 | |
| 1PECAV421 | |
| 1PECAV422 | |
| 1PECAV423 | |
| 1PECAV424 | |
| 1PECAV425 | |
| 1PECAV426 | |
| 1PECNV226 | 13PM221C |
| 1PECNV227 | 13PM221C |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 56 of 202)

04/19/82 15:38:46 EQUIPMENT-"O" CLASS PAGE 22 ESSENTIAL COOLING WATER (EW-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MEWAE01 | ECWS HEAT EXCHANGER | 13MM071 |
| 1MEWAF01 | ECWS PUMP STARTUP STRAINER | 13MM093 |
| 1MEWAP01 | ECWS PUMP | 13MM093 |
| 1MEWAT01 | ECWS SURGE TANK | 13MM105 |
| 1MEWBE01 | ECWS HEAT EXCHANGER | 13MM071 |
| 1MEWBF01 | ECWS PUMP STARTUP STRAINER | 13MM093 |
| 1MEWBP01 | ECWS PUMP | 13MM093 |
| 1MEWBT01 | ECWS SURGE TANK | 13MM105 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 57 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 26 (EW-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JEWAHS 0001 | ECW PP A | J=200 |
| 1JEWBHS 0002 | ECW PP B | J=200 |
| 1JEWAHCV 0005 | ECW PP A SUCT | J=605 |
| 1JEWBHCV 0006 | ECW PP B SUCT | J=605 |
| 1JEWAFE 0013 | ECW PP A DISCH FLOW | J=425 |
| 1JEWAFT 0013 | ECW PP A DISCH FLOW | J=311 |
| 1JEWBFE 0014 | ECW PP B DISCH FLOW | J=425 |
| 1JEWBFT 0014 | ECW PP B DISCH FLOW | J=311 |
| 1JEWAHCV 0041 | CLG WTR INLET TO SHUTON HX A | J=605 |
| 1JEWBHCV 0042 | CLG WTR INLET TO SHUTON HX B | J=605 |
| 1JEWATW 0045 | CLG WTR INLET TO SHUTON HX A | J=556 |
| 1JEWBTW 0046 | CLG WTR INLET TO SHUTON HX B | J=556 |
| 1JEWAPSV 0047 | SHELL SIDE SHUTON HX A RELIEF | J=691 |
| 1JEWBPSV 0048 | SHELL SIDE SHUTON HX B RELIEF | J=691 |
| 1JEWATW 0049 | CLG WTR OUTLET FR SHUTON HX A | J=556 |
| 1JEWBTW 0050 | CLG WTR OUTLET FR SHUTON HX B | J=556 |
| 1JEWATW 0051 | CLG WTR O/L FR SHUTON HX A | J=556 |
| 1JEWBTW 0052 | CLG WTR O/L FR SHUTON HX B | J=556 |
| 1JEWAHCV 0053 | CLG WTR O/L FR SHUTON HX A | J=605 |
| 1JEWBHCV 0054 | CLG WTR O/L FR SHUTON HX B | J=605 |
| 1JEWATW 0057 | CLG WTR TO ESS CHILLER A | J=556 |
| 1JEWBTW 0058 | CLG WTR TO ESS CHILLER B | J=556 |
| 1JEWATW 0059 | CLG WTR FR ESS CHILLER A | J=556 |
| 1JEWBTW 0060 | CLG WTR FR ESS CHILLER B | J=556 |
| 1JEWAPSV 0061 | CLG WTR FR ESS CHILLER A | J=691 |
| 1JEWBPSV 0062 | CLG WTR FR ESS CHILLER B | J=691 |
| 1JEWAFE 0063 | CLG WTR O/L FR ESS CHILLER A | J=425 |
| 1JEWBFE 0064 | CLG WTR O/L FR ESS CHILLER B | J=425 |
| 1JEWAHS 0065 | CROSSTIE VLV FR NCWS | J=200 |
| 1JEWAUV 0065 | CROSSTIE VLV FR NCWS | J=605 |
| 1JEWBHCV 0066 | CROSSTIE VLV FROM NCWS | J=605 |
| 1JEWAHCV 0067 | CROSSTIE TO NCWS FR FP HX A | J=605 |
| 1JEWBHCV 0068 | CROSSTIE TO NCWS FR FP HX B | J=605 |
| 1JEWAHCV 0071 | ECWS HX A INLET | J=605 |
| 1JEWBHCV 0072 | ECWS HX B INLET | J=605 |
| 1JEWATW 0077 | ECWS HX A INLET | J=556 |
| 1JEWBTW 0078 | ECWS HX B INLET | J=556 |
| 1JEWAPSV 0079 | ECWS HX A SHELL SIDE RELIEF | M=071 |
| 1JEWBPSV 0080 | ECWS HX B SHELL SIDE RELIEF | M=071 |
| 1JEWATW 0081 | ECWS HX A OUTLET TEMP | J=556 |
| 1JEWBTW 0082 | ECWS HX B OUTLET TEMP | J=556 |
| 1JEWATE 0083 | ECW PP A DISCH TEMP | J=556 |
| 1JEWATW 0083 | ECWS PP A OUTLET TEMP | J=556 |
| 1JEWBTE 0084 | ECW PP B DISCH TEMP | J=556 |
| 1JEWBTW 0084 | ECWS PP B OUTLET TEMP | J=556 |
| 1JEWAXCV 0089A | EXC FLOW CHK VLV FOR BRIDLE | J=705 |
| 1JEWAXCV 0089B | EXC FLOW CHK VLV FOR BRIDLE | J=705 |
| 1JEWBXCV 0090A | EXC FLOW CHK VLV FOR BRIDLE | J=705 |
| 1JEWBXCV 0090B | EXC FLOW CHK VLV FOR BRIDLE | J=705 |
| 1JEWALC 0091 | ECWS SURGE TK A | J=111 |
| 1JEWALSL 0091 | ECWS SURGE TANK A | J=111 |
| 1JEWALSLL0091 | ECWS SURGE TK A | J=111 |
| 1JEWALT 0091 | ESS CLG WTR SURGE TK A LEVEL | J=311 |
| 1JEWALV 0091 | ECWS SURGE TANK A MAKEUP | J=603 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 58 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 27 (EW-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PD |
|---|---|---|
| 1JEWALY 0091A | ECWS SURGE TK A LEVEL | J-111 |
| 1JEWALY 0091B | ECWS SURGE TK A LEVEL | J-111 |
| 1JEWALY 0091C | ECWS SURGE TANK A | J-111 |
| 1JEWALY 0091D | ECW CLG WATER CROSS TIE VALVE | J-111 |
| 1JEWBLC 0092 | ECWS SURGE TK B | J-111 |
| 1JEWBLSLL0092 | ECWS SURGE TK B | J-111 |
| 1JEWBLT 0092 | ESS CLG WTR SURGE TK B LEVEL | J-311 |
| 1JEWBLV 0092 | ECWS SURGE TANK B MAKEUP | J-603 |
| 1JEWBLY 0092A | ECWS SURGE TK B LEVEL | J-111 |
| 1JEWBLY 0092B | ECWS SURGE TK B LEVEL | J-111 |
| 1JEWAPSV 0103 | ECWS SURGE TANK A RELIEF | J-691 |
| 1JEWBPSV 0104 | ECWS SURGE TANK B RELIEF | J-691 |
| 1JEWAPSV 0105 | ECWS SURGE TANK A VAC RELIEF | J-691 |
| 1JEWBPSV 0106 | ECWS SURGE TANK B VAC RELIEF | J-691 |
| 1JEWAHCV 0133 | ECWS I/L TO FP HX A | J-605 |
| 1JEWBHCV 0134 | ECWS I/L TO FP HX B | J-605 |
| 1JEWAHCV 0135 | ECWS PP A DISCH VALVE | J-605 |
| 1JEWBHCV 0136 | ECWS PP B DISCH VALVE | J-605 |
| 1JEWAHS 0145 | CROSSTIE VLV TO NCWS | J-200 |
| 1JEWAUV 0145 | CROSSTIE VLV TO NCWS | J-605 |
| 1JEWBHCV 0146 | CROSSTIE VALVE TO NCWS | J-605 |
| 1JEWAFSL 0151 | ESS CHILLER A O/L FLOW | J-111 |
| 1JEWAFT 0151 | ESS CHILLER A O/L FLOW | J-311 |
| 1JEWAFY 0151A | I/E CONVERTOR | J-111 |
| 1JEWAFY 0151C | OUTPUT ISOLATOR | J-111 |
| 1JEWBFSL 0152 | ESS CHILLER B O/L FLOW | J-111 |
| 1JEWBFT 0152 | ESS CHLR B O/L FLOW | J-311 |
| 1JEWBFY 0152A | I/E CONVERTOR | J-111 |
| 1JEWBFY 0152C | OUTPUT ISOLATOR | J-111 |
| 1JEWAFO 0161 | SHUTDOWN HTXR A OUTLET | J-425 |
| 1JEWBFO 0162 | SHUTDOWN HTXR B OUTLET | J-425 |
| 1JEWAFO 0163 | RADIATION MONITOR O/L | J-425 |
| 1JEWBFO 0164 | RADIATION MONITOR O/L | J-425 |
| 1JEWAFO 0165 | RADIATION MONITOR I/L | J-425 |
| 1JEWBFO 0166 | RADIATION MONITOR I/L | J-425 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 59 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 35 (EW-4)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PEHAV002 | 13PM221A |
| 1PEHAV005 | 13PM221A |
| 1PEHAV006 | 13PM221A |
| 1PEHAV007 | 13PM221A |
| 1PEHAV011 | 13PM221A |
| 1PEHAV015 | 13PM221A |
| 1PEHAV018 | 13PM221A |
| 1PEHAV020 | 13PM221A |
| 1PEHAV021 | 13PM221A |
| 1PEHAV022 | 13PM221A |
| 1PEHAV051 | 13PM221A |
| 1PEHAV052 | 13PM221A |
| 1PEHAV054 | 13PM221A |
| 1PEHAV071 | 13PM221A |
| 1PEHAV072 | 13PM221A |
| 1PEHAV073 | 13PM221A |
| 1PEHAV076 | 13PM221A |
| 1PEHAV079 | 13PM221A |
| 1PEHAV087 | 13PM221A |
| 1PEHAV088 | 13PM221A |
| 1PEHAV094 | 13PM221A |
| 1PEHAV095 | 13PM221A |
| 1PEHAV098 | 13PM221A |
| 1PEHAV099 | 13PM221A |
| 1PEHAV103 | 13PM221A |
| 1PEHAV104 | 13PM221A |
| 1PEHAV105 | 13PM221A |
| 1PEHAV107 | 13PM221A |
| 1PEHAV110 | 13PM221A |
| 1PEHAV111 | 13PM221A |
| 1PEHAV115 | 13PM221A |
| 1PEHAV117 | 13PM221A |
| 1PEHAV118 | 13PM221A |
| 1PEHAV133 | 13PM221A |
| 1PEHAV144 | 13PM221A |
| 1PEHAV145 | 13PM221A |
| 1PEHAV150 | 13PM221A |
| 1PEHAV154 | 13PM221A |
| 1PEHAV155 | 13PM221A |
| 1PEHAV156 | 13PM221A |
| 1PEHAV157 | 13PM221A |
| 1PEHAV158 | 13PM221A |
| 1PEHAV159 | 13PM221A |
| 1PEHAV160 | 13PM221A |
| 1PEHAV161 | 13PM221A |
| 1PEHAV162 | 13PM221A |
| 1PEHAV163 | 13PM221A |
| 1PEHAV164 | 13PM221A |
| 1PEHAV181 | 13PM221A |
| 1PEHAV204 | 13PM221A |
| 1PEHAV209 | 13PM221A |
| 1PEHAV210 | 13PM221A |
| 1PEHAV211 | 13PM221A |
| 1PEHAV212 | 13PM221A |
| 1PEHAV213 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 60 of 202)

(EW-5)

04/19/82 15:50:39 VALVE-NON CLASS PAGE 36

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PEWAV214 | 13PM221A |
| 1PEWAV215 | 13PM221A |
| 1PEWAV222 | 13PM221A |
| 1PEWAV223 | 13PM221A |
| 1PEWAV224 | 13PM221A |
| 1PEWAV231 | 13PM221A |
| 1PEWRV023 | 13PM221A |
| 1PEWRV024 | 13PM221B |
| 1PEWRV026 | 13PM221A |
| 1PEWRV027 | 13PM221A |
| 1PEWRV029 | 13PM221A |
| 1PEWRV031 | 13PM221A |
| 1PEWRV032 | 13PM221A |
| 1PEWRV034 | 13PM221A |
| 1PEWRV035 | 13PM221A |
| 1PEWRV036 | 13PM221A |
| 1PEWRV037 | 13PM221A |
| 1PEWRV038 | 13PM221A |
| 1PEWRV039 | 13PM221A |
| 1PEWRV040 | 13PM221A |
| 1PEWRV043 | 13PM221B |
| 1PEWRV044 | 13PM221B |
| 1PEWRV050 | 13PM221A |
| 1PEWRV069 | 13PM221A |
| 1PEWRV070 | 13PM221A |
| 1PEWRV077 | 13PM221A |
| 1PEWRV078 | 13PM221A |
| 1PEWRV080 | 13PM221A |
| 1PEWRV083 | 13PM221A |
| 1PEWRV084 | 13PM221A |
| 1PEWRV086 | 13PM221A |
| 1PEWRV093 | 13PM221A |
| 1PEWRV108 | 13PM221A |
| 1PEWRV109 | 13PM221A |
| 1PEWRV112 | 13PM221A |
| 1PEWRV116 | 13PM221A |
| 1PEWRV119 | 13PM221A |
| 1PEWRV120 | 13PM221A |
| 1PEWRV134 | 13PM221A |
| 1PEWRV147 | 13PM221A |
| 1PEWRV149 | 13PM221A |
| 1PEWRV152 | 13PM221A |
| 1PEWRV165 | 13PM221A |
| 1PEWRV166 | 13PM221A |
| 1PEWRV167 | 13PM221A |
| 1PEWRV168 | 13PM221A |
| 1PEWRV169 | 13PM221A |
| 1PEWRV170 | 13PM221A |
| 1PEWRV171 | 13PM221A |
| 1PEWRV172 | 13PM221A |
| 1PEWRV173 | 13PM221A |
| 1PEWRV174 | 13PM221A |
| 1PEWRV175 | 13PM221A |
| 1PEWRV185 | 13PM221A |
| 1PEWRV186 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 61 of 202)

(EW-6)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 37

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PEWBV187 | 13PM221A |
| 1PEWBV205 | 13PM221A |
| 1PEWBV206 | 13PM221A |
| 1PEWBV207 | 13PM221A |
| 1PEWBV208 | 13PM221A |
| 1PEWBV216 | 13PM221A |
| 1PEWBV217 | 13PM221A |
| 1PEWBV218 | 13PM221A |
| 1PEWBV219 | 13PM221A |
| 1PEWBV220 | 13PM221A |
| 1PEWBV221 | 13PM221A |
| 1PEWBV225 | 13PM221A |
| 1PEWBV226 | 13PM221A |
| 1PEWBV227 | 13PM221A |
| 1PEWNV228 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 62 of 202)

04/19/82 15:38:14A EQUIPMENT-NON CLASS PAGE 24

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1EFND280 | ELECT PENTRTN- | 13EM035 |
| | | |
| | | |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 63 of 202)

04/19/82 15:38:46 EQUIPMENT-"QH" CLASS PAGE 26 FIRE PROTECTION SYSTEM (FP-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MFPE1107 | PENETRATION-FIRE PROTECTION | 13HM500 |
| | | |
| | | |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 64 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 39 (FP-2)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PFPEV089 | 13PM2218 |
| 1PFPEV090 | 13PM2218 |
| 1PFPNV142 | 13PM221A |
| 1PFPNV199 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 65 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 28 SERVICE GASES ($N_2$, AND $H_2$) (GA-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MGAE1129 | PENETRATION-NIT SUPPLY | 13MM500 |
| 1MGAE1130 | PENETRATION-NIT SUPPLY | 13MM500 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 66 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 29

(GA-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JGAAHS 0001 | N2 TO SI TKS ISOL VLV | J-200 |
| 1JGAAUV 0001 | N2 TO SI TKS ISOL VLV | J-603C |
| 1JGAAUV 0001A | SPARE | J-603 |
| 1JGAAHS 0002 | N2 TO SG AND RDT ISOL VLV | J-200 |
| 1JGAAUV 0002 | N2 TO SG AND RDT ISOL VLV | J-603 |
| 1JGAAUV 0002A | SPARE | J-603 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 67 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 41 (GA-3)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PGAEV011 | 13PM221A |
| 1PGAEV015 | 13PM221A |
| 1PGANV026 | 13PM221A |
| 1PGANV027 | 13PM221A |
| 1PGANV057 | 13PM221A |
| 1PGANV061 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 68 of 202)

04/19/82 15:38:46 EQUIPMENT-"0" CLASS PAGE 30 GASEOUS RADWASTE (GR-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1HGRE1152 | PENETRATION-VENT HDR | 13HM500 |
| | | |
| | | |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 69 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 31 (GR-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JGRAHS 0001 | RDT/GAS SRGE HDR-INT CNTM ISOL | J-200 |
| 1JGRAUV 0001 | RDT/GAS SRGE HDR-INT CNTM ISOL | P-221A |
| 1JGRBHS 0002 | GAS SURGE HDR EXT CONTM ISOL | J-200 |
| 1JGRBUV 0002 | GAS SURGE HDR EXT CONTM ISOL | J-603C |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 70 of 202)

(GR-3)

04/19/82 15:50:39 · VALVE-MOM CLASS PAGE 43

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PGRNV097 | 13PM221A |
| 1PGRNV098 | 13PM221A |
| 1PGRNV099 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 71 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 32 HVAC - AUXILIARY BUILDING (HA-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MHAAM00 207 | FIRE DAMPER | 13MM598 |
| 1MHAAM00 208 | FIRE DAMPER | 13MM598 |
| 1MHAAM00 209 | FIRE DAMPER | 13MM598 |
| 1MHAAM00 210 | FIRE DAMPER | 13MM598 |
| 1MHAAM00 211 | FIRE DAMPER | 13MM598 |
| 1MHAAM00 212 | FIRE DAMPERS | 13MM598 |
| 1MHAAM00 213 | FIRE DAMPERS | 13MM598 |
| 1MHAAM00 214 | MOTORIZED DAMPER | 13MM598 |
| 1MHAAM00 214A | MOTORIZED DAMPER | 13MM598 |
| 1MHAAM01 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHAAM02 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHAAM03 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHAAM04 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHAAM05 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHAAM06 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHAAM37 | FIRE DAMPERS | 13MM598 |
| 1MHAAM39 | FIRE DAMPERS | 13MM598 |
| 1MHAAZ01 | HPSI PUMP ROOM ESSENTIAL ACU | 13MM721 |
| 1MHAAZ02 | LPSI PUMP ROOM ESSENTIAL ACU | 13MM721 |
| 1MHAAZ03 | CS PUMP ROOM ESSENTIAL ACU | 13MM721 |
| 1MHAAZ04 | ESF PUMP ROOM-AUXILIARY FW | 13MM721 |
| 1MHAAZ05 | ECW PUMP ROOM ESSEN ACU | 13MM721 |
| 1MHAAZ06 | ELEC PEN ROOM ESSEN ACU | 13MM721 |
| 1MHABM00 215 | MOTORIZED DAMPER | 13MM598 |
| 1MHABM00 217 | MOTORIZED DAMPER | 13MM598 |
| 1MHABM01 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHABM02 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHABM03 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHABM04 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHABM05 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHABM06 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHABM38 | FIRE DAMPERS | 13MM598 |
| 1MHABM40 | FIRE DAMPERS | 13MM598 |
| 1MHABZ01 | HPSI PUMP ROOM ESSENTIAL ACU | 13MM721 |
| 1MHABZ02 | LPSI PUMP ROOM ESSENTIAL ACU | 13MM721 |
| 1MHABZ03 | CS PUMP ROOM ESSENTIAL ACU | 13MM721 |
| 1MHABZ04 | AUX FW PUMP ROOM ESSEN ACU NO | 13MM721 |
| 1MHABZ05 | ECW PUMP ROOM ESSEN ACU | 13MM721 |
| 1MHABZ06 | ELEC PEN ROOM ESSEN ACU | 13MM721 |
| 1MHANM39 | FIRE DAMPER | 13MM598 |
| 1MHANM40 | FIRE DAMPER | 13MM598 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 72 of 202)

12/17/82 02:28:02 Q INSTRUMENTS BY SYSTEM PAGE 35 (HA-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JHAAH$ 0112 | AUX BLDG LWR LVL EXH ISOL DMPR | J-200 |
| 1JHAAUY 0112 | AUX BLDG LWR LVL EXH ISOL DMPR | M-598 |
| 1JHABH$ 0113 | AUX BLDG LWR LVL EXH ISOL DMPR | J-200 |
| 1JHABUY 0113 | AUX BLDG LWR LVL EXH ISOL DMPR | M-598 |
| 1JHAAH$ 0114 | AUX BLDG LWR LVL ISOL DAMPERS | J-200 |
| 1JHAAUY 0114 | AUX BLDG LWR LVL ISOL DAMPERS | M-598 |
| 1JHABH$ 0115 | AUX BLDG LWR LVL ISOL DAMPERS | J-200 |
| 1JHABUY 0115 | AUX BLDG LWR LVL ISOL DAMPERS | M-598 |
| 1JHAAH$ 0125 | AUX FEED WTR PP RM A FLOOD LVL | J-200 |
| 1JHAAUY 0125 | AUX FEED WTR PP RM A FLOOD LVL | M-598 |
| 1JHAALSH 0125A | AUX FEED WTR PP RM A FLOOD LVL | J-481 |
| 1JHAALSH 0125B | AUX FEED WTR PP RM B FLOOD LVL | J-481 |
| 1JHABH$ 0126 | AUX FEED WTR PP RM B FLOOD LVL | J-200 |
| 1JHABUY 0126 | AUX FEED WTR PP RM B FLOOD LVL | M-598 |
| 1JHABLSH 0126A | AUX FEED WTR PP RM A FLOOD LVL | J-481 |
| 1JHABLSH 0126B | AUX FEED WTR PP RM B FLOOD LVL | J-481 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 73 of 202)

04/19/82 15:38:14A EQUIPMENT-"Q" CLASS PAGE 34 HVAC - CONTAINMENT (HC-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1EHCNZ53 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1MHCEU25A | PENETRATION-CONT PRESS | 13MM500 |
| 1MHCEU25B | PENETRATION-CONT PRESS | 13MM500 |
| 1MHCEU32A | PENETRATION-CONT PRESS | 13MM500 |
| 1MHCEU32B | PENETRATION, SPARE-CONT PRESS | 13MM500 |
| 1MHCEU32C | PENETRATION, SPARE-CONT PRESS | 13MM500 |
| 1MHCEU54A | PENETRATION-CONT PRESS | 13MM500 |
| 1MHCEU54B | PENETRATION, SPARE-CONT PRESS | 13MM500 |
| 1MHCEU54C | PENETRATION, SPARE-CONT PRESS | 13MM500 |
| 1MHCEU55 | PENETRATION-CONT PRESS | 13MM500 |
| 1MHCEU62A | PENETRATION-CONT PRESS | 13MM500 |
| 1MHCEU62B | PENETRATION, SPARE-CONT PRESS | 13MM500 |
| 1MHCEU62C | PENETRATION, SPARE-CONT PRESS | 13MM500 |
| 1MHCNU01 | MAIN STEAM LINE PENETRATION | 13MM500 |
| 1MHCNU02 | MAIN STEAM LINE PENETRATION | 13MM500 |
| 1MHCNU03 | FEEDWATER LINE PENETRATION | 13MM500 |
| 1MHCNU04 | MAIN STEAM LINE PENETRATION | 13MM500 |
| 1MHCNU0B | MAIN STEAM LINE PENETRATION | 13MM500 |
| 1MHCNU1C | FEEDWATER LINE PENETRATION | 13MM500 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 74 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 35 (HC-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JHCNTE 0042A | CONTM TEMP-WEST WALL SG 1 | M-598 |
| 1JHCNTE 0042A1 | CONTM TEMP-WEST WALL SG 1 | M-598 |
| 1JHCNTE 0042B | CONTM TEMP-EAST WALL SG 1 | M-598 |
| 1JHCNTE 0042B1 | CONTM TEMP-EAST WALL SG 1 | M-598 |
| 1JHCNTE 0042C | CONTM TEMP-NORTHEAST WALL | M-598 |
| 1JHCNTE 0042C1 | CONTM TEMP-NORTHEAST WALL | M-598 |
| 1JHCNTE 0042D | CONTM TEMP-SOUTHEAST WALL | M-598 |
| 1JHCNTE 0042D1 | CONTM TEMP-SOUTHEAST WALL | M-598 |
| 1JHCNTE 0042E | CONTM TEMP-PRESSURIZER AREA | M-598 |
| 1JHCNTE 0042E1 | CONTM TEMP-PRESSURIZER AREA | M-598 |
| 1JHCBHS 0044 | CONTM ATM RAD MON IV CONT | J-200 |
| 1JHCBUV 0044 | CONTM ATM RAD MON IV | J-603 |
| 1JHCAHS 0045 | CONTM ATM RAD MON IV CONT | J-200 |
| 1JHCAUV 0045 | CONTM ATM RAD MON IV | J-603 |
| 1JHCAHS 0046 | CONTM ATM RAD MON IV CONT | J-200 |
| 1JHCAUV 0046 | CONTM ATM RAD MON IV | J-603 |
| 1JHCBHS 0047 | CONTM ATM RAD MON IV CONT | J-200 |
| 1JHCBUV 0047 | CONTM ATM RAD MON IV | J-603 |
| 1JHCAHS 0074 | CONTM PRESS TRANSMITTER-A | J-200 |
| 1JHCAHV 0074 | CONTM PRESSURE TRANSMITTER-A | J-603 |
| 1JHCBHS 0075 | CONTM PRESS TRANSMITTER-B | J-200 |
| 1JHCBHV 0075 | CONTM PRESSURE TRANSMITTER-B | J-603 |
| 1JHCCHS 0076 | CONTM PRESS TRANSMITTER-C | J-200 |
| 1JHCCHV 0076 | CONTM PRESSURE TRANSMITTER-C | J-603 |
| 1JHCDHS 0077 | CONTM PRESS TRANSMITTER-D | J-200 |
| 1JHCDHV 0077 | CONTM PRESSURE TRANSMITTER-D | J-603 |
| 1JHCAPI 0351A | CONTMT PRESS A | N-001 |
| 1JHCAPT 0351A | CONTMT PRESS A HI | J-311 |
| 1JHCBPI 0351B | CONTMT PRESS B | N-001 |
| 1JHCBPT 0351B | CONTMT PRESS B HI | J-311 |
| 1JHCCPI 0351C | CONTMT PRESS C | N-001 |
| 1JHCCPT 0351C | CONTMT PRESS C HI | J-311 |
| 1JHCDPI 0351D | CONTMT PRESS D | N-001 |
| 1JHCDPT 0351D | CONTMT PRESS D HI | J-311 |
| 1JHCAPI 0352A | CONTMT PRESS A | N-001 |
| 1JHCAPT 0352A | CONTMT PRESS A | J-311 |
| 1JHCBPI 0352B | CONTMT PRESS B | N-001 |
| 1JHCBPT 0352B | CONTMT PRESS B | J-311 |
| 1JHCCPI 0352C | CONTMT PRESS C | N-001 |
| 1JHCCPT 0352C | CONTMT PRESS C | J-311 |
| 1JHCDPI 0352D | CONTMT PRESS D | N-001 |
| 1JHCDPT 0352D | CONTMT PRESS D | J-311 |
| 1JHCAPI 0353A | CONTMT PRESS WIDE RANGE A | J-111 |
| 1JHCAPR 0353A | CONTMT PRESS WIDE RANGE A | N-001 |
| 1JHCAPT 0353A | CONTMT PRESS WIDE RANGE A | J-311 |
| 1JHCAPY 0353A | I/E CONVERTOR | J-111 |
| 1JHCBPI 0353B | CONTMT PRESS WIDE RANGE B | J-111 |
| 1JHCBPT 0353B | CONTMT PRESS WIDE RANGE B | J-311 |
| 1JHCBPY 0353B | I/E CONVERTOR | J-111 |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 75 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 45 (HC-3)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PHCNV001 | 13PM221A |
| 1PHCNV002 | 13PM221A |
| 1PHCNV003 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 76 of 202)

04/19/82 15:38:44 EQUIPMENT-NON CLASS PAGE 36 HVAC - DIESEL GENERATOR BUILDING (HD-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MHDAA01 | DIESEL GEN CONT RM ESSEN AHU | 13MM721 |
| 1MHDAJ01 | DIESEL GEN RM ESS EXHAUST FAN | 13MM598 |
| 1MHDAM01 | BACK DRAFT DAMPER | 13MM598 |
| 1MHDAM02 | FIRE DAMPER | 13MM598 |
| 1MHDAM03 | FIRE DAMPER | 13MM598 |
| 1MHDAM05 | FIRE DAMPER | 13MM598 |
| 1MHDBA01 | DIESEL GEN CONT RM ESSEN AHU | 13MM721 |
| 1MHDBJ01 | DIESEL GEN RM ESS EXHAUST FAN | 13MM598 |
| 1MHDBM02 | FIRE DAMPER | 13MM598 |
| 1MHDBM03 | FIRE DAMPER | 13MM598 |
| 1MHDBM05 | FIRE DAMPER | 13MM598 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 77 of 202)

12/17/82 02:28:02 Q INSTRUMENTS BY SYSTEM PAGE 37

(HD-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JHDAHS 0013 | D/G RM=A ESS EXHAUST FAN=A | M=018 |
| 1JHDBHS 0014 | D/G RM=B ESS EXHAUST FAN=A | M=018 |
| 1JHDBHS 0014A | D/G RM=B ESS EXHAUST FAN=A | M=018 |
| 1JHDATSL 0017 | D/G RM=A CONT EQUIP RM ESS FAN | M=598 |
| 1JHDBTSL 0018 | D/G RM=B CONT EQUIP RM ESS FAN | M=598 |
| 1JHDAPDI 0021 | D/G RM=A CONT EQUIP RM ESS FAN | M=598 |
| 1JHDBPDI 0022 | D/G RM=B CONT EQUIP RM ESS FAN | M=598 |
| 1JHDATSH 0029 | D/G RM=A TEMP CONT | M=598 |
| 1JHDBTSH 0030 | D/G RM=B TEMP CONT | M=598 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 78 of 202)

04/19/82 15:38:46 EQUIPMENT-"Q" CLASS PAGE 38 HVAC - FUEL BUILDING (HF-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MHFAE01 | FUEL BLDG ESSEN HEATER | 13MM721 |
| 1MHFAJ01 | FUEL AND AUX BLDG EXH ESS AFU | 13MM721 |
| 1MHFAM01 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHFAM02 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHFAM03 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHFAM04 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHFAM05 | ELECTRIC LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHFAM06 | ELECTRIC LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHFAM07 | BACK DRAFT DAMPER | 13MM598 |
| 1MHFBF01 | FUEL BLDG ESSEN HEATER | 13MM721 |
| 1MHFBJ01 | FUEL AND AUX BLDG EXH ESS AFU | 13MM721 |
| 1MHFBM01 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHFBM02 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHFBM03 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHFBM04 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHFBM05 | ELECTRIC LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHFBM06 | ELECTRIC LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHFBM07 | BACK DRAFT DAMPER | 13MM598 |
| 1MHFBM08 | FIRE DAMPER | 13MM598 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 79 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 39 (HF-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JHFBHS 0025 | NORMAL SUPPLY ISOL-TRAIN B | J-200 |
| 1JHFBUY 0025 | NORMAL SUPPLY ISOL-TRAIN B | M-598 |
| 1JHFAHS 0026 | NORMAL SUPPLY ISOL-TRAIN A | J-200 |
| 1JHFAUY 0026 | NORMAL SUPPLY ISOL-TRAIN A | M-598 |
| 1JHFAHS 0027 | NORMAL EXHAUST ISOL-TRAIN A | J-200 |
| 1JHFAUY 0027 | NORMAL EXHAUST ISOL-TRAIN A | M-598 |
| 1JHFBHS 0028 | NORMAL EXHAUST ISOL-TRAIN B | J-200 |
| 1JHFBUY 0028 | NORMAL EXHAUST ISOL-TRAIN B | M-598 |
| 1JHFAME 0052 | ESSENTIAL EXHAUST AFU A MSTRE | M-721B |
| 1JHFAMSH 0052 | ESSENTIAL EXHAUST AFU A MSTRE | M-721B |
| 1JHFBME 0053 | ESSENTIAL EXHAUST AFU B MSTRE | M-721B |
| 1JHFBMSH 0053 | ESSENTIAL EXHAUST AFU B MSTRE | M-721B |
| 1JHFAHS 0062 | ESS EXH AFU A-AUX BLDG EXH | J-200 |
| 1JHFBHS 0063 | ESS EXH AFU B-AUX BLDG EXH | J-200 |
| 1JHFAHS 0064 | ESS EXH AFU A-FUEL BLDG EXH | J-200 |
| 1JHFBHS 0065 | ESS EXH AFU B-FUEL BLDG EXH | J-200 |
| 1JHFAPDI 0070 | FB NEGATIVE PRES MONITOR | J-111 |
| 1JHFAPDSL0070 | FB NEGATIVE PRES MONITOR | J-111 |
| 1JHFAPDT 0070 | FB NEGATIVE PRES MONITOR | M-598 |
| 1JHFATDI 0073 | ESS EXH AFU A CHAR DIFF TEMP | J-111 |
| 1JHFATDSH0073 | ESS EXH AFU A CHAR DIFF TEMP | J-111 |
| 1JHFATDT 0073 | ESS EXH AFU A CHAR DIFF TEMP | M-721B |
| 1JHFATDY 0073 | I/E CONVERTER | J-111 |
| 1JHFBTDI 0074 | ESS EXH AFU B CHAR DIFF TEMP | J-111 |
| 1JHFBTDSH0074 | ESS EXH AFU B CHAR DIFF TEMP | J-111 |
| 1JHFBTDT 0074 | ESS EXH AFU B CHAR DIFF TEMP | M-721B |
| 1JHFBTDY 0074 | I/E CONVERTER | J-111 |
| 1JHFBPDSL0082 | ESS EXH AFU B HEPA FILT | M-721B |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 80 of 202)

| 04/19/82 15:50:39 | VALVE-MOM CLASS | PAGE 47 | HVAC - FUEL BUILDING | (HF-3) |
|---|---|---|---|---|
| TAG NUMBER | R/SPEC/ | | | |
| 1PHFBV005 | 13PM221A | | | |
| 1PHFBV006 | 13PM221A | | | |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 81 of 202)

04/19/82 15:38:46 EQUIPMENT-MOM CLASS PAGE 40 **HVAC - CONTROL BUILDING** (HJ-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JHJAE01 | CHLORINE DETECTOR PANEL | 13JM391 |
| 1JHJBE01 | CHLORINE DETECTOR PANEL | 13JM391 |
| 1MHJAF04 | CONTROL ROOM ESSENTIAL AHU | 13MM721 |
| 1MHJAF06 | SOUND ATTENUATOR | 13MM598 |
| 1MHJAF07 | SOUND ATTENUATOR | 13MM598 |
| 1MHJAF08 | SOUND ATTENUATOR | 13MM598 |
| 1MHJAF09 | SOUND ATTENUATOR | 13MM598 |
| 1MHJAJ01A | CTROL BLG BATT RM ESSEN EX FAN | 13MM598 |
| 1MHJAJ01B | CTROL BLG BATT RM ESSEN EX FAN | 13MM598 |
| 1MHJAM00 101 | FIRE DAMPER | 13MM598 |
| 1MHJAM00 120 | FIRE DAMPER | 13MM598 |
| 1MHJAM00 121 | FIRE DAMPER | 13MM598 |
| 1MHJAM00 122 | FIRE DAMPER | 13MM598 |
| 1MHJAM00 125 | FIRE DAMPER | 13MM598 |
| 1MHJAM00 131 | FIRE DAMPER | |
| 1MHJAM00 133 | FIRE DAMPER | 13MM598 |
| 1MHJAM00 134 | FIRE DAMPER | 13MM598 |
| 1MHJAM00 140 | FIRE DAMPER | 13MM598 |
| 1MHJAM00 150 | FIRE DAMPER | 13MM598 |
| 1MHJAM00 200 | FIRE DAMPER | 13MM598 |
| 1MHJAM01 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJAM02 | DAMPER-MOTOR | 13MM598 |
| 1MHJAM03 | DAMPER-MOTOR | 13MM598 |
| 1MHJAM04 | MANUEL VOLUME DAMPER | 13MM598 |
| 1MHJAM05 | FIRE DAMPER | 13MM598 |
| 1MHJAM06 | FIRE DAMPER | 13MM598 |
| 1MHJAM07 | FIRE DAMPER | 13MM598 |
| 1MHJAM08 | FIRE DAMPER | 13MM598 |
| 1MHJAM09 | FIRE DAMPER | 13MM598 |
| 1MHJAM10 | FIRE DAMPER | 13MM598 |
| 1MHJAM11 | FIRE DAMPER | 13MM598 |
| 1MHJAM12 | FIRE DAMPER | 13MM598 |
| 1MHJAM13 | FIRE DAMPER | 13MM598 |
| 1MHJAM14 | MANUEL VOLUME DAMPER | 13MM598 |
| 1MHJAM15 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJAM16 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJAM17 | BACK DRAFT DAMPER | 13MM598 |
| 1MHJAM18 | FIRE DAMPER | 13MM598 |
| 1MHJAM19 | FIRE DAMPER | 13MM598 |
| 1MHJAM20 | FIRE DAMPER | 13MM598 |
| 1MHJAM21 | FIRE DAMPER | 13MM598 |
| 1MHJAM22 | FIRE DAMPER | 13MM598 |
| 1MHJAM23 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHJAM24 | FIRE DAMPER | 13MM598 |
| 1MHJAM25 | PNEUM LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHJAM26 | FIRE DAMPER | 13MM598 |
| 1MHJAM28 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHJAM29 | FIRE DAMPER | 13MM598 |
| 1MHJAM30 | FIRE DAMPER | 13MM598 |
| 1MHJAM31 | FIRE DAMPER | 13MM598 |
| 1MHJAM32 | FIRE DAMPER | 13MM598 |
| 1MHJAM33 | FIRE DAMPER | 13MM598 |
| 1MHJAM34 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHJAM35 | FIRE DAMPER | 13MM598 |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 82 of 202)

04/19/82 15:38:46 EQUIPMENT-MOM CLASS PAGE 41 (HJ-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MHJAM36 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHJAM37 | FIRE DAMPER | 13MM598 |
| 1MHJAM38 | BACK DRAFT DAMPER | 13MM598 |
| 1MHJAM39 | MANUAL VOLUME DAMPER | 13MM598 |
| 1MHJAM40 | MANUAL VOLUME DAMPER | 13MM598 |
| 1MHJAM41 | BACK DRAFT DAMPERS | 13MM598 |
| 1MHJAM42 | FIRE DAMPER | 13MM598 |
| 1MHJAM43 | FIRE DAMPER | 13MM598 |
| 1MHJAM44 | FIRE DAMPER | 13MM598 |
| 1MHJAM45 | BACK DRAFT DAMPERS | 13MM598 |
| 1MHJAM46 | FIRE DAMPER | 13MM598 |
| 1MHJAM47 | FIRE DAMPER | 13MM598 |
| 1MHJAM48 | FIRE DAMPER | 13MM598 |
| 1MHJAM49 | FIRE DAMPER | 13MM598 |
| 1MHJAM50 | FIRE DAMPER | 13MM598 |
| 1MHJAM51 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHJAM52 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJAM53 | PNEUM LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHJAM54 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHJAM55 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHJAM56 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJAM57 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJAM58 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJAM59 | PNEUM BUBBLE-TIGHT DAMPER | 13MM098 |
| 1MHJAM60 | BACK DRAFT DAMPERS | 13MM598 |
| 1MHJAM61 | BACK DRAFT DAMPERS | 13MM598 |
| 1MHJAM62 | PNEUM LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHJAM63 | FIRE DAMPER | 13MM598 |
| 1MHJAM64 | FIRE DAMPER | 13MM598 |
| 1MHJAM65 | FIRE DAMPER | 13MM598 |
| 1MHJAM66 | PNEUM LOW-LEAKAGE MOTOR DAMPER | 13MM598 |
| 1MHJAM67 | FIRE DAMPER | 13MM598 |
| 1MHJAM68 | FIRE DAMPER | 13MM598 |
| 1MHJAM69 | FIRE DAMPER | 13MM598 |
| 1MHJAM70 | FIRE DAMPER | 13MM598 |
| 1MHJAM71 | FIRE DAMPER | 13MM598 |
| 1MHJAM73 | FIRE DAMPER | 13MM598 |
| 1MHJAZ03 | CTROL RLOG ESF SWGR RM ESS AHU | 13MM721 |
| 1MHJAZ04 | ESF EQUIPMENT CHANNEL "A" AHU | 13MM598 |
| 1MHJBF04 | CONTROL ROOM ESSENTIAL AHU | 13MM721 |
| 1MHJBF10 | SOUND ATTENUATOR | 13MM598 |
| 1MHJBF11 | SOUND ATTENUATOR | 13MM598 |
| 1MHJBF12 | SOUND ATTENUATOR | 13MM598 |
| 1MHJBF13 | SOUND ATTENUATOR | 13MM598 |
| 1MHJBF14 | SOUND ATTENUATOR | 13MM598 |
| 1MHJBJ01A | CTROL RLG BATT RM ESSEN EX FAN | 13MM598 |
| 1MHJBJ01B | CTROL RLG BATT RM ESSEN EX FAN | 13MM598 |
| 1MHJBM00 100 | FIRE DAMPER | 13MM598 |
| 1MHJBM00 103 | FIRE DAMPER | 13MM598 |
| 1MHJBM00 135 | FIRE DAMPER | 13MM598 |
| 1MHJBM01 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJBM02 | DAMPER-MOTOR | 13MM598 |
| 1MHJBM03 | DAMPER-MOTOR | 13MM598 |
| 1MHJBM04 | MANUEL VOLUME DAMPER | 13MM598 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 83 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 42 (HJ-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MHJBM05 | MANUEL VOLUME DAMPER | 13MM598 |
| 1MHJBM06 | BACK DRAFT DAMPER | 13MM598 |
| 1MHJBM07 | FIRE DAMPER | 13MM598 |
| 1MHJBM08 | FIRE DAMPER | 13MM598 |
| 1MHJBM10 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJBM11 | FIRE DAMPER | 13MM598 |
| 1MHJBM13 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJBM14 | FIRE DAMPER | 13MM598 |
| 1MHJBM15 | FIRE DAMPER | 13MM598 |
| 1MHJBM16 | FIRE DAMPER | 13MM598 |
| 1MHJBM17 | FIRE DAMPER | 13MM598 |
| 1MHJBM18 | FIRE DAMPER | 13MM598 |
| 1MHJBM19 | FIRE DAMPER | 13MM598 |
| 1MHJBM20 | FIRE DAMPER | 13MM598 |
| 1MHJBM21 | FIRE DAMPER | 13MM598 |
| 1MHJBM22 | FIRE DAMPER | 13MM598 |
| 1MHJBM23 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJBM24 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJBM25 | FIRE DAMPER | 13MM598 |
| 1MHJBM26 | FIRE DAMPER | 13MM598 |
| 1MHJBM27 | BACK DRAFT DAMPER | 13MM598 |
| 1MHJBM28 | PNEUM LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHJBM29 | FIRE DAMPER | 13MM598 |
| 1MHJBM30 | FIRE DAMPER | 13MM598 |
| 1MHJBM31 | PNEUM LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHJBM32 | PNEUM LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHJBM33 | FIRE DAMPER | 13MM598 |
| 1MHJBM34 | PNEUM LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHJBM35 | FIRE DAMPER | 13MM598 |
| 1MHJBM36 | FIRE DAMPER | 13MM598 |
| 1MHJBM38 | PNEUM LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHJBM39 | FIRE DAMPER | 13MM598 |
| 1MHJBM40 | FIRE DAMPER | 13MM598 |
| 1MHJBM41 | FIRE DAMPER | 13MM598 |
| 1MHJBM42 | BACK DRAFT DAMPER | 13MM598 |
| 1MHJBM43 | MANUAL VOLUME DAMPER | 13MM598 |
| 1MHJBM44 | MANUAL VOLUME DAMPER | 13MM598 |
| 1MHJBM45 | BACK DRAFT DAMPER | 13MM598 |
| 1MHJBM46 | FIRE DAMPER | 13MM598 |
| 1MHJBM47 | FIRE DAMPER | 13MM598 |
| 1MHJBM48 | BACK DRAFT DAMPER | 13MM598 |
| 1MHJBM49 | FIRE DAMPER | 13MM598 |
| 1MHJBM50 | FIRE DAMPER | 13MM598 |
| 1MHJBM51 | FIRE DAMPER | 13MM598 |
| 1MHJBM52 | PNEUM LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHJBM53 | FIRE DAMPER | 13MM598 |
| 1MHJBM54 | PNEUM LOW-LEAKAGE DAMPER MOTOR | 13MM598 |
| 1MHJBM55 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJBM56 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJBM57 | PNEUM BUBBLE-TIGHT DAMPER | 13MM598 |
| 1MHJBM58 | PNEUM LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHJBM60 | BACK DRAFT DAMPER | 13MM598 |
| 1MHJBM61 | BACK DRAFT DAMPER | 13MM598 |
| 1MHJBM62 | FIRE DAMPER | 13MM598 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 84 of 202)

04/19/82 15:38:46 EQUIPMENT-"ON" CLASS PAGE 43 (HJ-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MHJBM63 | FIRE DAMPER | 13MM598 |
| 1MHJBM64 | FIRE DAMPER | 13MM598 |
| 1MHJBM65 | FIRE DAMPER | 13MM598 |
| 1MHJBM66 | PNEUM LOW-LEAKAGE MOTOR DAMPER | 13MM598 |
| 1MHJBM67 | FIRE DAMPER | 13MM598 |
| 1MHJBM68 | FIRE DAMPER | 13MM598 |
| 1MHJBM69 | FIRE DAMPER | 13MM598 |
| 1MHJBM70 | FIRE DAMPER | 13MM598 |
| 1MHJBM71 | FIRE DAMPER | 13MM598 |
| 1MHJBM72 | FIRE DAMPER | 13MM598 |
| 1MHJBM75 | FIRE DAMPER | 13MM598 |
| 1MHJBZ03 | CTROL BLDG ESF SWGR RM ESS AHU | 13MM721 |
| 1MHJBZ04 | ESF ROOM CHANNEL "B" AHU | 13MM721 |
| 1MHJMS07 | SOUND ATTENUATOR | 13MM598 |
| 1MHJNM10 | FIRE DAMPER | 13MM598 |
| 1MHJNM45 | FIRE DAMPER | 13MM598 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 85 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 41 (HJ-5)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JHJAHS 0007 | CON RM NORM AHU ISOL VALVES | J=200 |
| 1JHJAUY 0007A | CON RM NORM AHU DSCH IV | M=598 |
| 1JHJAUY 0007B | CON RM NORM AHU RECIRC AIR IV | M=598 |
| 1JHJBHS 0008 | CON RM NORM AHU ISOL VALVES | J=200 |
| 1JHJBUY 0008A | CON RM NORM AHU DSCH IV | M=598 |
| 1JHJBUY 0008B | CON RM NORM AHU RECIRC AIR IV | M=598 |
| 1JHJAHS 0010 | CON RM CMCTN RM ISOL VALVES | J=200 |
| 1JHJAUY 0010A | CON RM CMCTN RM I/L AIR IV | M=598 |
| 1JHJAUY 0010B | CON RM CMCTN RM OUT AIR IV | M=598 |
| 1JHJBHS 0011 | CON RM CMCTN RM ISOL VALVES | J=200 |
| 1JHJBUY 0011A | CON RM CMCTN RM I/L AIR IV | M=598 |
| 1JHJBUY 0011B | CON RM CMCTN RM OUT AIR IV | M=598 |
| 1JHJAHS 0028 | CON RM ESS AHU=A | J=200 |
| 1JHJBHS 0029 | CON RM ESS AHU=B | J=200 |
| 1JHJBHS 0034 | CON RM ESS AHU=A OUTSIDE IV | J=200 |
| 1JHJBHS 0035 | CON RM ESS AHU=B OUTSIDE IV | J=200 |
| 1JHJAHS 0036 | CON RM ESS AHU=A OUTSIDE IV | J=200 |
| 1JHJAHS 0037 | CON RM ESS AHU=B OUTSIDE IV | J=200 |
| 1JHJBHS 0038 | CON RM SMOKE SUCT & MKU AIR IV | J=200 |
| 1JHJBUY 0038A | CON RM SMOKE EXH MKU AIR IV | M=598 |
| 1JHJBUY 0038B | CON RM SMOKE EXH FAN SUCT IV | M=598 |
| 1JHJAHS 0039 | CON RM SMOKE SUCT & MKU AIR IV | J=200 |
| 1JHJAUY 0039A | CON RM SMOKE EXH MKU AIR IV | M=598 |
| 1JHJAUY 0039B | CON RM SMOKE EXH FAN SUCT IV | M=598 |
| 1JHJBHS 0040 | CON RM TOILET & KITCHEN EXH IV | J=200 |
| 1JHJBUY 0040A | CON RM TOILET NORM EXH FAN IV | M=598 |
| 1JHJBUY 0040B | CON RM KITCHEN NORM EXH FAN IV | M=598 |
| 1JHJAHS 0041 | CON RM TOILET & KITCHEN EXH IV | J=200 |
| 1JHJAUY 0041A | CON RM TOILET NORM EXH FAN IV | M=598 |
| 1JHJAUY 0041B | CON RM KITCHEN NORM EXH FAN IV | M=598 |
| 1JHJAHS 0058 | ESF SWGR RM ESS TRAIN A IV | J=200 |
| 1JHJAUY 0058A | ESF SWGR RM ESS TRAIN A IV | M=598 |
| 1JHJAUY 0058B | ESF SWGR RM ESS TRAIN A IV | M=598 |
| 1JHJAUY 0058C | DC EQUIP RM CHAN A | M=598 |
| 1JHJAUY 0058D | ESF RMS A&C NORMAL SUPPLY ISOL | M=598 |
| 1JHJBHS 0060 | VOID | J=200 |
| 1JHJAHS 0061 | ESF SWGR RM ESS TRAIN=A IV | J=200 |
| 1JHJAUY 0061A | ESF SWGR RM ESS TRAIN=A IV | M=598 |
| 1JHJAUY 0061B | ESF SWGR RM ESS TRAIN=A IV | M=598 |
| 1JHJBHS 0062 | ESF SWGR RM ESS TRAIN=B IV | J=200 |
| 1JHJBUY 0062A | ESF SWGR RM ESS TRAIN=B IV | M=598 |
| 1JHJBUY 0062B | ESF SWGR RM ESS TRAIN=B IV | M=598 |
| 1JHJBUY 0062D | ESF SWGR RM ESS TRAIN=B IV | M=598 |
| 1JHJBUY 0062E | ESF RMS B&D NORM SUPPLY ISOL | M=598 |
| 1JHJAUY 0062F | TAG REVISED TO HJB=UY=62F | M=598 |
| 1JHJBUY 0062F | ESF RMS B&D ESS AHU DISCH ISOL | M=598 |
| 1JHJAHS 0067 | ESF SWGR RM ESS AHU=A | J=200 |
| 1JHJBHS 0068 | ESF SWGR RM ESS AHU=B | J=200 |
| 1JHJAHS 0081 | BATTERY RM=A ESS EXH FAN | J=200 |
| 1JHJAPDSH0081 | BATT RM A ESS EXH FAN | M=598 |
| 1JHJBHS 0082 | BATTERY RM=B ESS EXH FAN | J=200 |
| 1JHJBPDSH0082 | BATT RM B ESS EXH FAN | M=598 |
| 1JHJAHS 0083 | BATTERY RM=C ESS EXH FAN | J=200 |
| 1JHJAPDSH0083 | BATT RM C ESS EXH FAN | M=598 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 86 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 42 (HJ-6)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JHJBHS 0084 | BATTERY RM-D ESS EXH FAN | J-200 |
| 1JHJBPDSH0084 | BATT RM D ESS EXH FAN | M-598 |
| 1JHJAHS 0096 | ESF EQUIP RM SMK EXH IV | J-200 |
| 1JHJAUY 0096 | ESF EQUIP RM SMK EXH IV | M-598 |
| 1JHJAHS 0097 | ESF EQUIP RMS A&C SMK EXH IV | J-200 |
| 1JHJAUY 0097A | ESF EQUIP RMS A&C SMK EXH IV | M-598 |
| 1JHJAUY 0097B | ESF EQUIP RMS A&C SMK EXH IV | M-598 |
| 1JHJAUY 0097C | ESF EQUIP RMS A&C SMK EXH IV | M-598 |
| 1JHJBHS 0104 | ESF EQUIP RMS B&D SMK EXH IV | J-200 |
| 1JHJBUY 0104A | ESF EQUIP RMS B&D SMK EXH IV | M-598 |
| 1JHJBUY 0104B | ESF EQUIP RMS B&D SMK EXH IV | M-598 |
| 1JHJBUY 0104C | ESF EQUIP RMS B&D SMK EXH IV | M-598 |
| 1JHJAHS 0106 | ESF SWGR RM ESS TRAIN-A IV | J-200 |
| 1JHJAUY 0106 | ESF SWGR RM ESS TRAIN-A IV | M-598 |
| 1JHJATE 0123 | CR HVAC TRAIN-A CHW SUP | M-598 |
| 1JHJATIC 0123 | CR HVAC TRAIN-A CHW SUP | M-598 |
| 1JHJBTE 0124 | CR HVAC TRAIN-B CHW SUP | M-598 |
| 1JHJBTIC 0124 | CR HVAC TRAIN-B CHW SUP | M-598 |
| 1JHJAHS 0133 | ESF EQUIP RM ESS AHU A FAN DP | J-200 |
| 1JHJBHS 0136 | ESF EQUIP RM ESS AHU B FAN DP | J-200 |
| 1JHJNHS 0139 | ESF SWITCH GR RM NORMAL AHU | J-200 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 87 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 45 CONTAINMENT HYDROGEN CONTROL (HP-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| AJHPAE01 | H2 RECOMBINER CONTROL PANEL | 13NM993 |
| AJHPBE01 | H2 RECOMBINER CONTROL PANEL | 13NM993 |
| AJHPNC01 | INSTR CAB-HYDROGEN RECOMBINER | 13NM993 |
| ANHPAN01 | H2 RECOMBINER | 13NM993 |
| ANHPBN01 | H2 RECOMBINER | 13NM993 |
| 1JHPAE02 | CONT POST LOCA H2 MONITOR | 13JM359 |
| 1JHPAE03 | H2 RECOMB DAMPER PNL | 13JM200 |
| 1JHPBE02 | CONT POST LOCA H2 MONITOR | 13JM359 |
| 1JHPBE03 | H2 RECOMB DAMPER PNL | 13JM200 |
| 1MHPAM02 | ELECTRIC LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHPAU35 | PENETRATION-H RECOMBINER SUP | 13MM500 |
| 1MHPAU3R | PENETRATION-H RECOMBINER RET | 13MM500 |
| 1MHPBM01 | ELECTRIC LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHPBM02 | ELECTRIC LOW-LEAKAGE DAMPER | 13MM598 |
| 1MHPBU36 | PENETRATION-H RECOMBINER SUP | 13MM500 |
| 1MHPBU39 | PENETRATION-H RECOMBINER RET | 13MM500 |
| 1MHPNM02 | FIRE DAMPER | 13MM598 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 88 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 44 (HP-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JHPAHS 0001 | H2 CONT TR A UPSTM SUP ISOL | J-200 |
| 1JHPAUV 0001 | H2 CONT TR A UPSTM SUP ISOL | P-221A |
| 1JHPBHS 0002 | H2 CONT TR B UPSTM SUP ISOL | J-200 |
| 1JHPBUV 0002 | H2 CONT TR B UPSTM SUP ISOL | P-221A |
| 1JHPAHS 0003 | H2 CONT TR A DOWNSTM SUP ISOL | J-200 |
| 1JHPAUV 0003 | H2 CONT TR A DOWNSTM SUP ISOL | P-221A |
| 1JHPBHS 0004 | H2 CONT TR B DOWNSTM SUP ISOL | J-200 |
| 1JHPBUV 0004 | H2 CONT TR B DOWNSTM SUP ISOL | P-221A |
| 1JHPAHS 0005 | H2 CONT TR A RETURN ISOL | J-200 |
| 1JHPAUV 0005 | H2 CONT TR A RETURN ISOL | P-221A |
| 1JHPBHS 0006 | H2 CONT TR B RETURN ISOL | J-200 |
| 1JHPBUV 0006 | H2 CONT TR B RETURN ISOL | P-221A |
| 1JHPAHS 0007 | H2 ANALY A INLET VLV | J-200 |
| 1JHPAHV 0007A | H2 ANALY A INLET VLV | J-603 |
| 1JHPAHV 0007B | H2 ANALY A INLET VLV | J-603 |
| 1JHPBHS 0008 | H2 ANALY B INLET ISOL | J-200 |
| 1JHPBHV 0008A | H2 ANALY B INLET ISOL | J-603 |
| 1JHPBHV 0008B | H2 ANALY B INLET ISOL | J-603 |
| 1JHPAAE 0009 | CONTAINMENT H2 ANALY A | J-359 |
| 1JHPAAI 0009 | CONTAINMENT H2 ANALY A | J-111 |
| 1JHPAAIT 0009 | CONTAINMENT H2 ANALY A | J-359 |
| 1JHPAASH 0009 | CONTAINMENT H2 ANALY A | J-359 |
| 1JHPAAY 0009 | I/E CONVERTER | J-111 |
| 1JHPAUIC 0009 | H2 ANALY CH A CONT RM SUBPANEL | J-359 |
| 1JHPAUR 0009 | CNMT H2/CNMT WATER LVL ANALY A | J-111 |
| 1JHPAFIC 0009A | H2 ANALY CALIBRATION GAS | J-359 |
| 1JHPAHS 0009A | H2 ANALY CH A OFF/STBY/ANALYZE | J-359 |
| 1JHPAHV 0009A | H2 ANALY CALIBRATION GAS | J-359 |
| 1JHPAFIC 0009B | H2 ANALY REAGENT GAS | J-359 |
| 1JHPAHS 0009B | H2 ANALY CH A SAMPLE/ZERO/SPAN | J-359 |
| 1JHPAHV 0009B | H2 ANALY REAGENT GAS | J-359 |
| 1JHPAHS 0009C | H2 ANALY CH A REMOTE SELECT | J-359 |
| 1JHPAHS 0009D | H2 ANAL CH A SMPL/ZERO/SPAN | J-359 |
| 1JHPAHS 0009E | H2 ANAL CH A LOCAL/REMOTE SEL | J-359 |
| 1JHPBAE 0010 | CONTAINMENT H2 ANALY B | J-359 |
| 1JHPBAI 0010 | CONTAINMENT H2 ANALY B | J-111 |
| 1JHPBAIT 0010 | CONTAINMENT H2 ANALY B | J-359 |
| 1JHPBASH 0010 | CONTAINMENT H2 ANALY B | J-359 |
| 1JHPBAY 0010 | I/E CONVERTER | J-111 |
| 1JHPBUIC 0010 | H2 ANALY CH B CONT RM SUBPANEL | J-359 |
| 1JHPBFIC 0010A | H2 ANALY CALIBRATION GAS | J-359 |
| 1JHPBHS 0010A | H2 ANALY CH B OFF/STBY/ANALYZE | J-359 |
| 1JHPBHV 0010A | H2 ANALY CALIBRATION GAS | J-359 |
| 1JHPBFIC 0010B | H2 ANALY REAGENT GAS | J-359 |
| 1JHPBHS 0010B | H2 ANALY CH B SAMPLE/ZERO/SPAN | J-359 |
| 1JHPBHV 0010B | H2 ANALY REAGENT GAS | J-359 |
| 1JHPBHS 0010C | H2 ANALY CH B REMOTE SELECT | J-359 |
| 1JHPBHS 0010D | H2 ANAL CH B SMPL/ZERO/SPAN | J-359 |
| 1JHPBHS 0010E | H2 ANAL CH B LOCAL/REMOTE SEL | J-359 |
| 1JHPATSHL0013 | CONT H2 ANAL A CHAMBER TEMP | J-359 |
| 1JHPBTSHL0014 | CONT H2 ANAL B CHAMBER TEMP | J-359 |
| 1JHPAPE 0015 | H2 ANALY OUTLET | J-359 |
| 1JHPAPI 0015 | H2 ANALY OUTLET | J-359 |
| 1JHPAPDSL0015 | H2 ANAL OUTLET | J-359 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 89 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 45 (HP-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JHPBFE 0016 | H2 ANALY OUTLET | J=359 |
| 1JHPBFI 0016 | H2 ANALY OUTLET | J=359 |
| 1JHPBPDSL0016 | H2 ANAL OUTLET | J=359 |
| 1JHPAHS 0017 | CONT H2 ANAL A ON=STBY=OFF | J=359 |
| 1JHPBHS 0018 | CONT H2 ANAL B ON=STBY=OFF | J=359 |
| 1JHPAPSL 0019 | H2 ANALY CALIBRATION GAS | J=359 |
| 1JHPBPSL 0020 | H2 ANALY CALIBRATION GAS | J=359 |
| 1JHPAPSL 0021 | H2 ANALY REAGENT GAS | J=359 |
| 1JHPBPSL 0022 | H2 ANALY REAGENT GAS | J=359 |
| 1JHPAHS 0023 | SAMPLING SYSTEM RETURN ISL VLV | J=200 |
| 1JHPAUV 0023 | SAMPLING SYSTEM RETURN ISL VLV | J=603 |
| 1JHPAHS 0024 | SAMPLING SYSTEM SUP ISL VLV | J=200 |
| 1JHPAUV 0024 | SAMPLING SYSTEM SUP ISL VLV | J=603 |
| 1JHPAHS 0027 | H2 ANAL CH A ALARM RESET | J=359 |
| 1JHPBHS 0028 | H2 ANAL CH B ALARM RESET | J=359 |
| 1JHPAPCV 0041 | H2 ANALY CALIBRATION GAS | J=359 |
| 1JHPBPCV 0042 | H2 ANALY CALIBRATION GAS | J=359 |
| 1JHPAPCV 0043 | H2 ANALY REAGENT GAS | J=359 |
| 1JHPBPCV 0044 | H2 ANALY REAGENT GAS | J=359 |
| 1JHPAPCV 0045 | H2 ANALY INLET | J=359 |
| 1JHPBPCV 0046 | H2 ANALY INLET | J=359 |
| 1JHPAPCV 0047 | H2 ANALY BYPASS | J=359 |
| 1JHPBPCV 0048 | H2 ANALY BYPASS | J=359 |
| 1JHPAPCV 0049 | H2 ANALY OUTLET | J=359 |
| 1JHPBPCV 0050 | H2 ANALY OUTLET | J=359 |
| 1JHPAFI 0051 | H2 ANALY BYPASS | J=359 |
| 1JHPBFI 0052 | H2 ANALY BYPASS | J=359 |
| 1JHPAPSH 0053 | H2 ANALY SAMPLE CYLINDER | J=359 |
| 1JHPAPSL 0053 | H2 ANALY SAMPLE CYLINDER | J=359 |
| 1JHPBPSH 0054 | H2 ANALY SAMPLE CYLINDER | J=359 |
| 1JHPBPSL 0054 | H2 ANALY SAMPLE CYLINDER | J=359 |
| 1JHPAPI 0055 | H2 ANALY INLET | J=359 |
| 1JHPBPI 0056 | H2 ANALY INLET | J=359 |
| 1JHPAHS 0061 | H2 RECOMBINER VENT DAMPER | J=200 |
| 1JHPBHS 0062 | H2 RECOMBINER VENT DAMPER | J=200 |
| 1JHPAFIC 0063 | H2 ANALY SAMPLE BYPASS | J=359 |
| 1JHPBFIC 0064 | H2 ANALY SAMPLE BYPASS | J=359 |
| AJHPAFE 0501 | H2 RECOMB I/L GAS FLOW | N=993 |
| AJHPAFI 0501 | H2 RECOMB I/L GAS FLOW | N=993 |
| AJHPAFSL 0501 | H2 RECOMB I/L GAS FLOW LOW | N=993 |
| AJHPAFT 0501 | H2 RECOMB I/L GAS FLOW | N=993 |
| AJHPAFY 0501 | H2 RECOMB I/L GAS FLOW | N=993 |
| AJHPBFE 0502 | H2 RECOMB I/L GAS FLOW | N=993 |
| AJHPBFI 0502 | H2 RECOMB I/L GAS FLOW | N=993 |
| AJHPBFSL 0502 | H2 RECOMB I/L GAS FLOW LOW | N=993 |
| AJHPBFT 0502 | H2 RECOMB I/L GAS FLOW | N=993 |
| AJHPBFY 0502 | H2 RECOMB I/L GAS FLOW | N=993 |
| AJHPATE 0503 | H2 RECOMB BLOWER OUT TEMP | N=993 |
| AJHPATSH 0503 | H2 RECOMB BLOWER OUT TEMP HI | N=993 |
| AJHPBTE 0504 | H2 RECOMB BLOWER OUT TEMP | N=993 |
| AJHPBTSH 0504 | H2 RECOMB BLOWER OUT TEMP HI | N=993 |
| AJHPATE 0505 | H2 RECOMB HEATER TEMP | N=993 |
| AJHPATSH 0505 | H2 RECOMB HEATER TEMP HI | N=993 |
| AJHPBTE 0506 | H2 RECOMB HEATER TEMP | N=993 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 90 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 46 (HP-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| AJHPBTSH 0506 | H2 RECOMB HEATER TEMP HI | N=993 |
| AJHPATE 0507 | H2 RECOMB HEATER TEMP | N=993 |
| AJHPBTE 0508 | H2 RECOMB HEATER TEMP | N=993 |
| AJHPATE 0509 | H2 RECOMB HEATER GAS TEMP | N=993 |
| AJHPATSH 0509 | H2 RECOMB HEATER GAS TEMP | N=993 |
| AJHPATSHH0509 | H2 RECOMB HEATER GAS TEMP | N=993 |
| AJHPBTE 0510 | H2 RECOMB HEATER GAS TEMP | N=993 |
| AJHPBTSH 0510 | H2 RECOMB HEATER GAS TEMP | N=993 |
| AJHPBTSHH0510 | H2 RECOMB HEATER GAS TEMP | N=993 |
| AJHPATE 0511 | H2 RECOMB HEATER GAS TEMP | N=993 |
| AJHPBTE 0512 | H2 RECOMB HEATER GAS TEMP | N=993 |
| AJHPATE 0513 | H2 RECOMB REACTION CHMB | N=993 |
| AJHPATIC 0513 | H2 RECOMB REACTION CHMB TEMP | N=993 |
| AJHPBTE 0514 | H2 RECOMB REACTION CHMB | N=993 |
| AJHPBTIC 0514 | H2 RECOMB REACTION CHMB TEMP | N=993 |
| AJHPATE 0515 | H2 RECOMB REACTION CHMB | N=993 |
| AJHPATSH 0515 | H2 RECOMB REACTION CHMB TEMP | N=993 |
| AJHPATSL 0515 | H2 RECOMB REACTION CHMB TEMP | N=993 |
| AJHPBTE 0516 | H2 RECOMB REACTION CHMB | N=993 |
| AJHPBTSH 0516 | H2 RECOMB REACTION CHMB TEMP | N=993 |
| AJHPBTSL 0516 | H2 RECOMB REACTION CHMB TEMP | N=993 |
| AJHPATE 0517 | H2 RECOMB HE I/L TEMP | N=993 |
| AJHPATISH0517 | H2 RECOMB HE I/L TEMP HI | N=993 |
| AJHPBTE 0518 | H2 RECOMB HE I/L TEMP | N=993 |
| AJHPBTISH0518 | H2 RECOMB HE I/L TEMP HI | N=993 |
| AJHPATE 0519 | H2 RECOMB HE I/L TEMP | N=993 |
| AJHPBTE 0520 | H2 RECOMB HE I/L TEMP | N=993 |
| AJHPATE 0521 | H2 RECOMB GAS RETURN TEMP | N=993 |
| AJHPATISH0521 | H2 RECOMB GAS RETURN TEMP HI | N=993 |
| AJHPBTE 0522 | H2 RECOMB GAS RETURN TEMP | N=993 |
| AJHPBTISH0522 | H2 RECOMB GAS RETURN TEMP HI | N=993 |
| AJHPATE 0523 | H2 RECOMB GAS RETURN TEMP | N=993 |
| AJHPBTE 0524 | H2 RECOMB GAS RETURN TEMP | N=993 |
| AJHPAHS 0527 | H2 RECOMB START-STOP SWITCH | N=993 |
| AJHPBHS 0528 | H2 RECOMB START-STOP SWITCH | N=993 |
| AJHPAHS 0529 | H2 RECOMB TEST SWITCH | N=993 |
| AJHPBHS 0530 | H2 RECOMB TEST SWITCH | N=993 |
| AJHPAHS 0531 | H2 RECOMB ACK SWITCH | N=993 |
| AJHPBHS 0532 | H2 RECOMB ACK SWITCH | N=993 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 91 of 202)

(HP-5)

04/19/82 15:50:39 VALVE-"O" CLASS PAGE 49

| TAG NUMBER | P/SPEC/ |
|---|---|
| 1PHPAV001 | 13PM221A |
| 1PHPAV002 | 13PM221A |
| 1PHPAV005 | 13PM221A |
| 1PHPAV010 | 13PM221A |
| 1PHPAV013 | 13PM221A |
| 1PHPAV014 | 13PM221A |
| 1PHPAV015 | 13PM221A |
| 1PHPAV016 | 13PM221A |
| 1PHPAV017 | 13PM221A |
| 1PHPAV018 | 13PM221A |
| 1PHPAV025 | 13PM221A |
| 1PHPAV026 | 13PM221A |
| 1PHPAV027 | 13PM221A |
| 1PHPAV028 | 13PM221A |
| 1PHPAV029 | 13PM221A |
| 1PHPAV030 | 13PM221A |
| 1PHPAV031 | 13PM221A |
| 1PHPAV032 | 13PM221A |
| 1PHPAV035 | 13PM221A |
| 1PHPBV003 | 13PM221A |
| 1PHPBV004 | 13PM221A |
| 1PHPBV006 | 13PM221A |
| 1PHPBV011 | 13PM221A |
| 1PHPBV012 | 13PM221A |
| 1PHPBV019 | 13PM221A |
| 1PHPBV020 | 13PM221A |
| 1PHPBV021 | 13PM221A |
| 1PHPBV022 | 13PM221A |
| 1PHPBV023 | 13PM221A |
| 1PHPBV034 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 92 of 202)

04/19/82 15:38:46 EQUIPMENT-"QN" CLASS PAGE 47 HVAC - MISCELLANEOUS SITE STRUCTURES

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MHSAJ01 | VANEAXIAL FAN, 20000 ACFM | 13MM598 |
| 1MHSBJ01 | VANEAXIAL FAN, 20000 ACFM | 13MM598 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 93 of 202)

04/19/82 15:38:46 EQUIPMENT-"ON" CLASS PAGE 49 INSTRUMENT AND SERVICE AIR (IA-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MIAEU31 | PENETRATION-INST AIR | 13MM500 |
| 1MIAEU59 | PENETRATION-SERVICE AIR | 13MM500 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 94 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 48 (IA-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JIAAHS 0002 | INST AIR CTMT ISO VLV | J-200 |
| 1JIAAUV 0002 | INST AIR CTMT ISO VLV | J-603 |
| 1JIAAUV 0002A | SPARE | J-603 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 95 of 202)

04/19/82 15:50:39 VALVE-"O" CLASS PAGE 51 INSTRUMENT SERVICE AIR (IA-3)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PIAEV021 | 13PM221A |
| 1PIAEV072 | 13PM221B |
| 1PIAEV073 | 13PM221B |
| 1PIAEV291 | 13PM221A |
| 1PIAEV296 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 96 of 202)

04/19/82 15:38:46 EQUIPMENT-"QM" CLASS PAGE 53 13.8-KV POWER

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1ENANZ31 | ELECT PENTRTN-15KV PWR(RCP 2B) | 13EM035 |
| 1ENANZ33 | ELECT PENTRTN | 13EM035 |
| 1ENANZ44 | ELECT PENTRTN-15KV PWR(RCP 1B) | 13EM035 |
| 1ENANZ45 | ELECT PENTRTN-15KV PWR(RCP 1A) | 13EM035 |
| 1ENANZ70 | ELECT PENTRTN-15KV PWR(RCP 2A) | 13EM035 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 97 of 202)

04/19/82 15:38:46 EQUIPMENT-"0" CLASS PAGE 55 NUCLEAR COOLING WATER (NC-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1HNCEU33 | PENETRATION-NC WTR SUPPLY | 13HM500 |
| 1HNCEU34 | PENETRATION-NC WTR RETURN | 13HM500 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 98 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 50 (NC-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JNCAHCV 0244 | FUEL POOL HX A NCWS I/L ISOL | J-605 |
| 1JNCBHCV 0245 | FUEL POOL HX B NCWS I/L ISOL | J-605 |
| 1JNCATW 0246 | FUEL POOL HX A NCWS I/L | J-556 |
| 1JNCBTW 0247 | FUEL POOL HX B NCWS I/L | J-556 |
| 1JNCAPSV 0250 | FUEL POOL HX A NCWS RELIEF | M-071 |
| 1JNCBPSV 0251 | FUEL POOL HX B NCWS RELIEF | M-071 |
| 1JNCATW 0254 | FUEL POOL HX A NCWS OUT | J-556 |
| 1JNCBTW 0255 | FUEL POOL HX A NCWS OUT | J-556 |
| 1JNCAFE 0256 | FUEL POOL HX A NCWS OUT | J-425 |
| 1JNCBFE 0257 | FUEL POOL HX B NCWS OUT | J-425 |
| 1JNCAHCV 0258 | FUEL POOL HX A NCWS OUT | J-605 |
| 1JNCBHCV 0259 | FUEL POOL HX B NCWS OUT | J-605 |
| 1JNCAHCV 0262 | FUEL POOL HX A NCWS I/L | J-605 |
| 1JNCBHCV 0263 | FUEL POOL HX B NCWS I/L | J-605 |
| 1JNCAHCV 0264 | FUEL POOL HX A NCWS OUT | J-605 |
| 1JNCBHCV 0265 | FUEL POOL HX B NCWS OUT | J-605 |
| 1JNCBHS 0401 | NCWS SUP EXT CONT ISOL VLV | J-200 |
| 1JNCBUV 0401 | NCWS SUP EXT CONT ISOL VLV | J-605 |
| 1JNCAHS 0402 | NCWS RET EXT CONT ISOL VLV | J-200 |
| 1JNCAUV 0402 | NCWS RET EXT CONT ISOL VLV | J-605 |
| 1JNCBHS 0403 | NCWS RET INT CONT ISOL VLV | J-200 |
| 1JNCBUV 0403 | NCWS RET INT CONT ISOL VLV | J-605 |
| 1JNCAFSL 0474 | RCP 1B CLR OUT | J-111 |
| 1JNCAFT 0474 | RCP 1B CLR OUT | J-311 |
| 1JNCAFY 0474A | RCP 1B CLR OUT | J-111 |
| 1JNCAFY 0474B | RCP 1B CLR OUT | J-111 |
| 1JNCAFY 0474C | RCP 1B CLR OUT | J-111 |
| 1JNCAFY 0474D | RCP 1B CLR OUT | J-111 |
| 1JNCAFY 0474E | RCP 1B CLR OUT | J-111 |
| 1JNCAFSL 0475 | RCP 1A CLR OUT | J-111 |
| 1JNCAFT 0475 | RCP 1A CLR OUT | J-311 |
| 1JNCAFY 0475A | RCP 1A CLR OUT | J-111 |
| 1JNCAFY 0475B | RCP 1A CLR OUT | J-111 |
| 1JNCAFY 0475C | RCP 1A CLR OUT | J-111 |
| 1JNCAFY 0475D | RCP 1A CLR OUT | J-111 |
| 1JNCAFY 0475E | RCP 1A CLR OUT | J-111 |
| 1JNCAFSL 0476 | RCP 2B CLR OUT | J-111 |
| 1JNCAFT 0476 | RCP 2B CLR OUT | J-311 |
| 1JNCAFY 0476A | RCP 2B CLR OUT | J-111 |
| 1JNCAFY 0476B | RCP 2B CLR OUT | J-111 |
| 1JNCAFY 0476C | RCP 2B CLR OUT | J-111 |
| 1JNCAFY 0476D | RCP 2B CLR OUT | J-111 |
| 1JNCAFY 0476E | RCP 2B CLR OUT | J-111 |
| 1JNCAFSL 0477 | RCP 2A CLR OUT | J-111 |
| 1JNCAFT 0477 | RCP 2A CLR OUT | J-311 |
| 1JNCAFY 0477A | RCP 2A CLR OUT | J-111 |
| 1JNCAFY 0477B | RCP 2A CLR OUT | J-111 |
| 1JNCAFY 0477C | RCP 2A CLR OUT | J-111 |
| 1JNCAFY 0477D | RCP 2A CLR OUT | J-111 |
| 1JNCAFY 0477E | RCP 2A CLR OUT | J-111 |
| 1JNCBFSL 0494 | RCP 1B CLR OUTLET | J-111 |
| 1JNCBFT 0494 | RCP 1B CLR OUTLET | J-311 |
| 1JNCBFY 0494A | RCP 1B CLR OUTLET | J-111 |
| 1JNCBFSL 0495 | RCP 1A CLR OUTLET | J-111 |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 99 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 51 (NC-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JNC8FT 0495 | RCP 1A CLR OUTLET | J-311 |
| 1JNC8FY 0495A | RCP 1A CLR OUTLET | J-111 |
| 1JNC8FSL 0496 | RCP 2B CLR OUTLET | J-111 |
| 1JNC8FT 0496 | RCP 2B CLR OUTLET | J-311 |
| 1JNC8FY 0496A | RCP 2B CLR OUTLET | J-111 |
| 1JNC8ESL 0497 | RCP 2A CLR OUTLET | J-111 |
| 1JNC8FT 0497 | RCP 2A CLR OUTLET | J-311 |
| 1JNC8FY 0497A | RCP 2A CLR OUTLET | J-111 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 100 of 202)

04/19/82 15:50:39. VALVE-NON CLASS PAGE 53 (NC-4)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PNCAV102 | 13PM221A |
| 1PNCAV107 | 13PM221A |
| 1PNCAV108 | 13PM221A |
| 1PNCAV109 | 13PM221A |
| 1PNCAV110 | 13PM221A |
| 1PNCAV191 | 13PM221A |
| 1PNCAV202 | 13PM221A |
| 1PNCAV203 | 13PM221A |
| 1PNCAV204 | 13PM221A |
| 1PNCAV205 | 13PM221A |
| 1PNCAV300 | 13PM221A |
| 1PNCAV301 | 13PM221A |
| 1PNCBV104 | 13PM221A |
| 1PNCBV111 | 13PM221A |
| 1PNCBV112 | 13PM221A |
| 1PNCBV113 | 13PM221A |
| 1PNCBV114 | 13PM221A |
| 1PNCBV192 | 13PM221A |
| 1PNCBV200 | 13PM221A |
| 1PNCBV201 | 13PM221A |
| 1PNCBV206 | 13PM221A |
| 1PNCBV207 | 13PM221A |
| 1PNCBV208 | 13PM221A |
| 1PNCBV209 | 13PM221A |
| 1PNCBV298 | 13PM221A |
| 1PNCBV299 | 13PM221A |
| 1PNCEV118 | 13PM221B |
| 1PNCNV210 | 13PM221A |
| 1PNCNV211 | 13PM221A |
| 1PNCNV215 | 13PM221A |
| 1PNCNV284 | 13PM221A |
| 1PNCNV285 | 13PM221A |
| 1PNCNV286 | 13PM221A |
| 1PNCNV287 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 101 of 202)

04/19/82 15:38:46 EQUIPMENT-"ON" CLASS PAGE 57 480V POWER SWITCHGEAR

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1ENGNZ01 | ELECT PENTRTN-600V PWR | 13EM035 |
| 1ENGNZ03 | ELECT PENTRTN-600V PWR | 13EM035 |
| 1ENGNZ07 | ELECT PENTRTN-600V PWR | 13EM035 |
| 1ENGNZ11 | ELECT PENTRTN-600V PWR | 13EM035 |
| 1ENGNZ13 | ELECT PENTRTN-600V PWR | 13EM035 |
| 1ENGNZ32 | ELECT PENTRTN-600V PWR | 13EM035 |
| 1ENGNZ68 | ELECT PENTRTN-600V PWR | 13EM035 |
| 1ENGNZ69 | ELECT PENTRTN-600V PWR CONST | 13EM035 |
| 1ENGNZ71 | ELECT PENTRTN-600V PWR | 13EM035 |
| 1ENGNZ88 | ELECT PENTRTN-600V PWR | 13EM035 |
| 1ENGNZ90 | ELECT PENTRTN-600V PWR | 13EM035 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 102 of 202)

04/19/82 15:38:46 EQUIPMENT-"O" CLASS PAGE 59 480V POWER, MCC

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1ENHNZ06 | ELECT PENTRTN | 13EM035 |
| 1ENHNZ08 | ELECT PENTRTN-600V PWR & CNTL | 13EM035 |
| 1ENHNZ09 | ELECT PENTRTN | 13EM035 |
| 1ENHNZ10 | ELECT PENTRTN-600V PWR & CNTL | 13EM035 |
| 1ENHNZ12 | ELECT PENTRTN-600V PWR & CNTL | 13EM035 |
| 1ENHNZ15 | ELECT PENTRTN-600VOLT PWR&CNTL | 13EM035 |
| 1ENHNZ17 | ELECT PENTRTN-600V PWR & CNTL | 13EM035 |
| 1ENHNZ19 | ELECT PENTRTN-600V PWR & CNTL | 13EM035 |
| 1ENHNZ20 | ELECT PENTRTN | 13EM035 |
| 1ENHNZ21 | ELECT PENTRTN | 13EM035 |
| 1ENHNZ63 | ELECT PENTRTN | 13EM035 |
| 1ENHNZ73 | ELECT PENTRTN | 13EM035 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 103 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 61

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1ENNAV13 | 480-120V CLASS IE VOLT RGLTR | 13EM105 |
| 1ENN8V14 | 480-120V CLASS IE VOLT RGLTR | 13EM105 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 104 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 55 13.8 KV POWER SYSTEM

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PNSNV106 | 13NM001 |
| 1PNSNV107 | 13NM001 |
| 1PNSNV108 | 13NM001 |
| 1PNSNV109 | 13NM001 |
| 1PNSNV110 | 13NM001 |
| 1PNSNV111 | 13NM001 |
| 1PNSNV116 | 13NM001 |
| 1PNSNV118 | 13NM001 |
| 1PNSNV120 | 13NM001 |
| 1PNSNV122 | 13NM001 |
| 1PNSNV129 | 13NM001 |
| 1PNSNV130 | 13NM001 |
| 1PNSNV131 | 13NM001 |
| 1PNSNV132 | 13NM001 |
| 1PNSVV200 | |
| 1PNSVV201 | |
| 1PNSVV202 | |
| 1PNSVV203 | |
| 1PNSVV204 | |
| 1PNSVV205 | |
| 1PNSVV206 | |
| 1PNSVV207 | |
| 1PNSVV208 | |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 105 of 202)

04/19/82 15:38:46 EQUIPMENT="QM" CLASS PAGE 63 4.16-KV POWER

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1EPRAS03 | 4.16KV CLASS IE INDOOR SWGR | 13EM009 |
| 1EPBBS04 | 4.16KV CLASS IE INDOOR SWGR | 13EM009 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 106 of 202)

04/19/82 15:38:46 EQUIPMENT-"ON" CLASS PAGE 65 FUEL POOL COOLING AND CLEANUP (PC-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JPCNE01 | VOID | 13NM001 |
| 1MPCAE01 | FUEL POOL COOLING HEAT EXCHNG. | 13MM071 |
| 1MPCAP01 | FUEL POOL COOLING PUMP | 13MM093 |
| 1MPCRF01 | FUEL POOL COOLING HEAT EXCHNG. | 13MM071 |
| 1MPCBP01 | FUEL POOL COOLING PUMP | 13MM093 |
| 1MPCEM01 | FUEL TRANSFER TUBE ASSEMBLY | 13NM001 |
| 1MPCEM01A | TRANSFER TUBE BLIND FLANGE | 13NM001 |
| 1MPCEM01R | TRANSFER TUBE RAILS | 13NM001 |
| 1MPCEM02 | TRANSFER TUBE SUPPORT STAND | 13NM001 |
| 1MPCEU50 | PENETRATION-REF POOL | 13MM500 |
| 1MPCEU51 | PENETRATION-REF POOL | 13MM500 |
| 1MPCEU53 | PENETRATION-REFUELING POOL | 13CM152 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 107 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 53 — (PC-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JPCAHS 0007 | FL PD CLG PP 1 | J=200 |
| 1JPCBHS 0008 | FL PD CLG PP 2 | J=200 |
| 1JPCAPT 0009 | FL PD CLG PP 1 DSCH | J=311 |
| 1JPCBPT 0010 | FL PD CLG PP 2 DSCH | J=311 |
| 1JPCATW 0013 | FL PD HE 1 I/L | J=556 |
| 1JPCBTW 0014 | FL PD HE 2 I/L | J=556 |
| 1JPCATW 0015 | FL PD COOLING HX A OUTLET | J=556 |
| 1JPCBTW 0016 | FL PD COOLING HX B OUTLET | J=556 |
| 1JPCAPSV 0035 | FL PD HE A | H=071 |
| 1JPCBPSV 0036 | FL PD HE B | H=071 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 108 of 202)

04/19/82 15:50:39. VALVE-"O" CLASS PAGE 57 (PC-3)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PPCAV011 | 13PM231 |
| 1PPCAV012 | 13PM221A |
| 1PPCAV013 | 13PM221B |
| 1PPCAV014 | 13PM231 |
| 1PPCAV015 | 13PM231 |
| 1PPCAV027 | 13PM231 |
| 1PPCAV029 | 13PM221A |
| 1PPCAV031 | 13PM221A |
| 1PPCAV032 | 13PM221A |
| 1PPCAV034 | 13PM221A |
| 1PPCAV129 | 13PM221A |
| 1PPCAV139 | 13PM221A |
| 1PPCAV140 | 13PM221A |
| 1PPCAV143 | 13PM221A |
| 1PPCAV220 | 13PM221C |
| 1PPCRV007 | 13PM221A |
| 1PPCRV016 | 13PM221A |
| 1PPCRV017 | 13PM221B |
| 1PPCRV018 | 13PM231 |
| 1PPCRV019 | 13PM231 |
| 1PPCRV020 | 13PM221A |
| 1PPCRV025 | 13PM221A |
| 1PPCRV026 | 13PM231 |
| 1PPCRV030 | 13PM221A |
| 1PPCRV069 | 13PM231 |
| 1PPCRV131 | 13PM221A |
| 1PPCRV141 | 13PM221A |
| 1PPCRV142 | 13PM221A |
| 1PPCRV144 | 13PM221A |
| 1PPCRV219 | 13PM221C |
| 1PPCEV028 | 13PM231 |
| 1PPCEV070 | 13PM221B |
| 1PPCEV071 | 13PM221B |
| 1PPCEV074 | 13PM221B |
| 1PPCEV075 | 13PM221B |
| 1PPCEV076 | 13PM221B |
| 1PPCEV081 | 13PM221B |
| 1PPCEV110 | 13PM221B |
| 1PPCEV121 | 13PM221B |
| 1PPCEV122 | 13PM221A |
| 1PPCEV123 | 13PM221B |
| 1PPCEV124 | 13PM221B |
| 1PPCEV125 | 13PM221B |
| 1PPCEV126 | 13PM221A |
| 1PPCEV137 | 13PM221A |
| 1PPCEV138 | 13PM221A |
| 1PPCEV145 | 13PM221A |
| 1PPCEV148 | 13PM221A |
| 1PPCEV157 | 13PM221A |
| 1PPCEV159 | 13PM221A |
| 1PPCEV171 | 13PM221A |
| 1PPCEV172 | 13PM221A |
| 1PPCEV202 | 13PM221A |
| 1PPCEV208 | 13PM221A |
| 1PPCNV024 | 13PM231 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 109 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 58 (PC-4)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PPCNV036 | 13PM231 |
| 1PPCNV118 | 13NM001 |
| 1PPCNV207 | 13PM221A |
| 1PPCNV215 | 13PM231 |
| 1PPCNV217 | 13PM221C |
| 1PPCNV218 | 13PM221C |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 110 of 202)

| 04/19/82 15:38:46 | EQUIPMENT-"OM" CLASS | PAGE 67 |
|---|---|---|
| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
| 1EPEAG01 | DIESEL GENERATOR | 13MM018 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 111 of 202)

04/19/82 15:38:44 EQUIPMENT-NON CLASS PAGE 69 480V POWER, SWITCHGEAR

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| AEPGAX31 | SPARE LC CL 1E XFMR (DRY TYPE) | 13EM117 |
| AEPGAX35 | SPARE LC CL 1E XFMR (DRY TYPE) | 13EM117 |
| 1EPGAL31 | 480V CLASS 1E LOAD CENTER | 13EM017 |
| 1EPGAL33 | 480V CLASS 1E LOAD CENTER | 13EM017 |
| 1EPGAL35 | 480V CLASS 1E LOAD CENTER | 13EM017 |
| 1EPGBL32 | 480V CLASS 1E LOAD CENTER | 13EM017 |
| 1EPGBL34 | 480V CLASS 1E LOAD CENTER | 13EM017 |
| 1EPGBL36 | 480V CLASS 1E LOAD CENTER | 13EM017 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 112 of 202)

04/19/82 15:38:46 EQUIPMENT-"0" CLASS PAGE 71 480V POWER, MCC

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1EPHAM31 | 480V CLASS IE MCC | 13EM018 |
| 1EPHAM33 | 480V CLASS IE MCC | 13EM018 |
| 1EPHAM35 | 480V CLASS IE MCC | 13EM018 |
| 1EPHAM37 | 480V CLASS 1E MCC | 13EM018 |
| 1EPHAZ46 | ELECT PENTRTN-600V PWR&CNTL | 13EM035 |
| 1EPHAZ48 | ELECT PENTRTN | 13EM035 |
| 1EPHAZ52 | ELECT PENTRTN | 13EM035 |
| 1EPHBM32 | 480V CLASS IE MCC | 13EM018 |
| 1EPHBM34 | 480V CLASS IE MCC | 13EM018 |
| 1EPHBM36 | 480V CLASS IE MCC | 13EM018 |
| 1EPHBM38 | 480V CLASS 1E MCC | 13EM018 |
| 1EPHBZ34 | ELECT PENTRTN | 13EM035 |
| 1EPHBZ35 | ELECT PENTRTN-600V PWR&CNTL | 13EM035 |
| 1EPHBZ39 | ELECT PENTRTN | 13EM035 |
| 1EPHBZ40 | ELEC PENTRTN- | 13EM035 |
| 1EPHBZ41 | ELECT PENTRTN | 13EM035 |
| 1EPHCN53 | ELEC PENTRTN-SHLD INSTR | 13EM035 |
| 1EPHCZ23 | ELECT PENTRTN BLANK | 13EM035 |
| 1EPHCZ24 | ELECT PENTRTN BLANK | 13EM035 |
| 1EPHCZ29 | ELECT PENTRTN-600V PWR&CNTL | 13EM035 |
| 1EPHNZ43 | ELECT PENTRTN-600V PWR&CNTL | 13EM035 |
| 1EPHNZ84 | ELECT PENTRTN-600V PWR&CNTL | 13EM035 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 113 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 73 125V-DC POWER

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1EPKAD21 | 125VDC CLASS IE DISTR PNL | 13EM021 |
| 1EPKAD23 | 125VDC CLASS IE DISTR PNL | 13EM021 |
| 1EPKAF11 | 125VDC CL 1E BATT, A | 13EM050 |
| 1EPKAF11R | 125VDC CL 1E BATT RACK, A | 13EM050 |
| 1EPKAH11 | 125 VDC BATT CHGR, A | 13EM051 |
| 1EPKAH14 | 125 VDC BATT CHGR, AC | 13EM051 |
| 1EPKAM41 | 125VDC CLASS IE CNTL CTR | 13EM021 |
| 1EPKBD22 | 125VDC CLASS IE DISTR PNL | 13EM021 |
| 1EPKBD24 | 125VDC CLASS IE DISTR PNL | 13EM021 |
| 1EPKBF12 | 125VDC CL 1E BATT, B | 13EM050 |
| 1EPKBF12R | 125VDC CL 1E BATT RACK, B | 13EM050 |
| 1EPKBH12 | 125 VDC BATT CHGR, B | 13EM051 |
| 1EPKBH16 | 125 VDC BATT CHGR, BD | 13EM051 |
| 1EPKBM42 | 125VDC CLASS IE CNTL CTR | 13EM021 |
| 1EPKCB43 | CL 1E 480V NEMA TY 1 STARTER | 13EM018 |
| 1EPKCD23 | 125VDC CLASS IE DISTR PNL | 13EM021 |
| 1EPKCD24 | 125VDC CLASS IE DISTR PNL | 13EM021 |
| 1EPKCF13R | 125VDC CL 1E BATT RACK, C | 13EM050 |
| 1EPKCH13 | 125 VDC BATT CHGR, C | 13EM051 |
| 1EPKCM43 | 125VDC CLASS IE CNTL CTR | 13EM021 |
| 1EPKCN43 | 120V AC CLASS 1E INVERTOR | 13EM054 |
| 1EPKDB44 | CL 1E 480V NEMA TY 1 STARTER | 13EM018 |
| 1EPKDF14 | 125VDC CL 1E BATT, D | 13EM050 |
| 1EPKDF14R | 125VDC CL 1E BATT RACK, D | 13EM050 |
| 1EPKDH14 | 125 VDC BATT CHGR, D | 13EM051 |
| 1EPKDM44 | 125VDC CLASS IE CNTL CTR | 13EM021 |
| 1EPKDN44 | 120V AC CLASS 1E INVERTOR | 13EM054 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 114 of 202)

04/19/82 15:38:46 EQUIPMENT-"Q" CLASS PAGE 75

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1EPMCZ23 | BLANK | 13EM035 |
| 1EPMCZ24 | BLANK | 13EM035 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 115 of 202)

04/19/82 15:38:46 EQUIPMENT-"OM" CLASS PAGE 77 INSTRUMENT AC POWER

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1EPNAD25 | 120VAC CLASS IE DISTR PNL | 13EM020 |
| 1EPNAN11 | 120VAC CLASS IE INVERTER | 13EM054 |
| 1EPNAV25 | 480-120VAC CLASS IE VOLT RGLTR | 13EM105 |
| 1EPNBD26 | 120VAC CLASS IE DISTR PNL | 13EM020 |
| 1EPNBN12 | 120VAC CLASS IE INVERTER | 13EM054 |
| 1EPNBV26 | 480-120VAC CLASS IE VOLT RGLTR | 13EM105 |
| 1EPNCD27 | 120VAC CLASS IE DISTR PNL | 13EM020 |
| 1EPNCN13 | 120VAC CLASS IE INVERTER | 13EM054 |
| 1EPNCV27 | 480-120VAC CLASS IE VOLT RGLTR | 13EM105 |
| 1EPNDD28 | 120VAC CLASS IE DISTR PNL | 13EM020 |
| 1EPNDN14 | 120VAC CLASS IE INVERTER | 13EM054 |
| 1EPNDV28 | 480-120VAC CLASS IE VOLT RGLTR | 13EM105 |
| 1EPNNV29 | 480-120V CL IE VOLT RGLTR | 13EM105 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 116 of 202)

04/19/82 15:38:46 EQUIPMENT-"Q" CLASS PAGE 79 ESSENTIAL LIGHTING

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1FQBAV01 | LINE REGULATORS WITH XFMR | 13EM105 |
| 1FQBAV02 | 480V-120 VAC CLASS IE VOLT REG | 13EM105 |
| 1FQB8V02 | LINE REGULATORS WITH XFMR | 13EM105 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 117 of 202)

04/19/82 15:38:44 EQUIPMENT-NON CLASS PAGE 81 IN-PLANT COMMUNICATIONS

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1EQFN757 | ELECT PENTRTN-COMM&SHLD INSTR | 13EM035 |
| | | |
| | | |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 118 of 202)

04/19/82 15:38:46 EQUIPMENT-"QD" CLASS PAGE 83 REACTOR COOLANT (RC-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRCEA01A | RCP 1A XMITTER RACK | 13NM001 |
| 1JRCEA01B | RCP 1B XMITTER RACK | 13NM001 |
| 1JRCEA01C | RCP 2A XMITTER RACK | 13NM001 |
| 1JRCEA01D | RCP 2B XMITTER RACK | 13NM001 |
| 1JRCEA02A | RCP 1A XMITTER RACK | 13NM001 |
| 1JRCEA02B | RCP 1B XMITTER RACK | 13NM001 |
| 1JRCEA02C | RCP 2A XMITTER RACK | 13NM001 |
| 1JRCEA02D | RCP 2B XMITTER RACK | 13NM001 |
| 1JRCEA03 | PRESSURIZER XMITTER RACK | 13NM001 |
| 1MRCAP02A | RCP OIL LIFT PUMP (1A) | 13NM001 |
| 1MRCAP02B | RCP OIL LIFT PUMP (2A) | 13NM001 |
| 1MRCBP02A | RCP OIL LIFT PUMP (1B) | 13NM001 |
| 1MRCBP02B | RCP OIL LIFT PUMP (2B) | 13NM001 |
| 1MRCEF01A | STEAM GENERATOR (1) | 13NM001 |
| 1MRCEF01B | STEAM GENERATOR (2) | 13NM001 |
| 1MRCEF01H | SG. SLIDING BEARINGS AND SHIMS | 13NM001 |
| 1MRCEF01I | INSULATION ,STEAM GENERATOR | 13NM001 |
| 1MRCEF01K | KEYWAY BEARINGS STEAM GENERTOR | 13NM001 |
| 1MRCEE01L | STM. GEN. UPPER SUPPORT LEVERS | 13NM001 |
| 1MRCEF01P | NOZZLE PLUGS STEAM GENERATOR | 13NM001 |
| 1MRCEF01S | SNUBBERS ,STEAM GENERATOR | 13NM001 |
| 1MRCEE01V | STM. GEN. BASE CIRCULAR SHIM | 13NM001 |
| 1MRCEE01W | STM. GEN. BASE WASHERS | 13NM001 |
| 1MRCEF01X | SLIDING BASE ,STEAM GENERATOR | 13NM001 |
| 1MRCEF04A | RC PUMP SEAL COOLER (1A) | 13NM001 |
| 1MRCEF04B | RC PUMP SEAL COOLER (1A) | 13NM001 |
| 1MRCEF04C | RC PUMP SEAL COOLER (1B) | 13NM001 |
| 1MRCEE04D | RC PUMP SEAL COOLER (1B) | 13NM001 |
| 1MRCEF04E | RC PUMP SEAL COOLER (2A) | 13NM001 |
| 1MRCEE04F | RC PUMP SEAL COOLER (2A) | 13NM001 |
| 1MRCEE04G | RC PUMP SEAL COOLER (2B) | 13NM001 |
| 1MRCEF04H | RC PUMP SEAL COOLER (2B) | 13NM001 |
| 1MRCEF05A | RC PUMP HP COOLER (1A) | 13NM001 |
| 1MRCEF05B | RC PUMP HP COOLER (1B) | 13NM001 |
| 1MRCEF05C | RC PUMP HP COOLER (2A) | 13NM001 |
| 1MRCEE05D | RC PUMP HP COOLER (2B) | 13NM001 |
| 1MRCEF02A | RC PUMP HP COOLER FILTER (1A) | 13NM001 |
| 1MRCEF02B | RC PUMP HP COOLER FILTER (1B) | 13NM001 |
| 1MRCEF02C | RC PUMP HP COOLER FILTER (2A) | 13NM001 |
| 1MRCEF02D | RC PUMP HP COOLER FILTER (2B) | 13NM001 |
| 1MRCEP01A | R.C. PUMP (1A)-INTERNALS | 13NM001 |
| 1MRCEP01B | R.C. PUMP (1B)-INTERNALS | 13NM001 |
| 1MRCEP01C | R.C. PUMP (2A)-INTERNALS | 13NM001 |
| 1MRCEP01D | R.C. PUMP (2A)-INTERNALS | 13NM001 |
| 1MRCEP01EH | RCP UPPER HORIZ. COLUMNS | 13NM001 |
| 1MRCEP01EL | RCP LOWER HORIZ. COLUMNS | 13NM001 |
| 1MRCEP01FP | RCP COOLING WATER PIPING | 13NM001 |
| 1MRCEP01GS | RCP SEAL LIFT RIG | 13NM001 |
| 1MRCEP01HR | RCP COUPLING REMOVAL TOOL | 13NM001 |
| 1MRCEP01I | R. C. PUMP (1A) - BOWL | 13NM001 |
| 1MRCEP01IN | INSULATION , R.C. PUMP | 13NM001 |
| 1MRCEP01J | R. C. PUMP (1B) - BOWL | 13NM001 |
| 1MRCEP01JC | RCP CASING AND SKIRT | 13NM001 |
| 1MRCEP01K | R. C. PUMP (2A) - BOWL | 13NM001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 119 of 202)

(RC-2)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 84

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MRCEP01L | R. C. PUMP (2B) - BOWL | 13NM001 |
| 1MRCEP01LV | RCP VERTICAL COLUMNS ,CLEVISES | 13NM001 |
| 1MRCEP01Q | RCP MOTOR WATER PIPE (4) | 13NM001 |
| 1MRCEP01R | RCP MOTOR MISC INSTRUMENT (4) | 13NM001 |
| 1MRCEP01S | RCP SNUBBERS | 13NM001 |
| 1MRCEP01T | RCP TENSTONERS | 13NM001 |
| 1MRCEP01U | ROTATING ELEMENT,RCP | 13NM001 |
| 1MRCEP01V | DIFFUSER ,RCP | 13NM001 |
| 1MRCEP01W | SEAL HOUSING AND COVER,RCP | 13NM001 |
| 1MRCEP01X | LUBE OIL SYSTEM , RCP | 13NM001 |
| 1MRCEP01Y | HP COOLER AND VALVES ,RCP | 13NM001 |
| 1MRCEP01Z | SEAL PIPING ,RCP | 13NM001 |
| 1MRCEV02I | INSULATION ,PIPE | 13NM001 |
| 1MRCEX01 | REACTOR VESSEL | 13NM001 |
| 1MRCEX01H | CEDM CUTTER | 13NM001 |
| 1MRCEX01C | COLUMNS ,REACTOR VESSEL | 13NM001 |
| 1MRCEX01F | REACTOR VESSEL FLOW SKIRT | 13NM001 |
| 1MRCEX01H | REACTOR VESSEL SHIMS | 13NM001 |
| 1MRCEX01I | INSULATION ,REACTOR VESSEL | 13NM001 |
| 1MRCEX01K | CEDM BLANKS | 13NM001 |
| 1MRCEX01N | RV STUD AND NUT TOOLS | 13NM001 |
| 1MRCEX01P | REACTOR COOLANT PIPING | 13NM001 |
| 1MRCEX01R | RV AND SG FASTENERS | 13NM001 |
| 1MRCEX02 | PRESSURIZER | 13NM001 |
| 1MRCFP01K | | 13NM001 |
| 1MRCNF03A | OIL COOLER (1A) | 13NM001 |
| 1MRCNF03B | OIL COOLER (1B) | 13NM001 |
| 1MRCNF03C | OIL COOLER (2A) | 13NM001 |
| 1MRCNF03D | OIL COOLER (2B) | 13NM001 |
| 1MRCNF01A | OIL LIFT PUMP FILTER 1A | 13NM001 |
| 1MRCNF01B | OIL LIFT PUMP FILTER 1B | 13NM001 |
| 1MRCNF01C | OIL LIFT PUMP FILTER 2A | 13NM001 |
| 1MRCNF01D | OIL LIFT PUMP FILTER 2B | 13NM001 |
| 1MRCNP02AI | RCP INSTRUMENT, JUNCTION BOX | 13NM001 |
| 1MRCNP02AP | RCP POWER JUNCTION BOX | 13NM001 |
| 1MRCNP02BI | RCP INSTRUMENT, JUNCTION BOX | 13NM001 |
| 1MRCNP02BP | RCP POWER JUNCTION BOX | 13NM001 |
| 1MRCNP02CI | RCP INSTRUMENT, JUNCTION BOX | 13NM001 |
| 1MRCNP02CP | RCP POWER JUNCTION BOX | 13NM001 |
| 1MRCNP02DI | RCP INSTRUMENT, JUNCTION BOX | 13NM001 |
| 1MRCNP02DP | RCP POWER JUNCTION BOX | 13NM001 |
| 1MRCNT01A | OIL LIFT TANK (1) | 13NM001 |
| 1MRCNT01B | OIL LIFT TANK (2) | 13NM001 |
| 1MRCNT01C | OIL LIFT TANK (3) | 13NM001 |
| 1MRCNT01D | OIL LIFT TANK (4) | 13NM001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 120 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 55 (RC-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRCAHS 0100=4 | PRZR BACKUP HTR BRKR A | J=200 |
| 1JRCBHS 0100=5 | PRZR BACKUP HTR BRKR B | J=200 |
| 1JRCEPV 0100E | PRZR SPRAY CONT SYS | N=001 |
| 1JRCEPV 0100F | PRZR SPRAY CONT SYS | N=001 |
| 1JRCEPT 0100X | PRESSURIZER PRESS CONT SYS | N=001 |
| 1JRCEPT 0100Y | PRESSURIZER PRESS CONT SYS | N=001 |
| 1JRCAHS 010041 | PRZR BACKUP HTR=-RS | N=001 |
| 1JRCBHS 010051 | PRZR BACKUP HTR=-RS | N=001 |
| 1JRCBHS 010052 | PRZR BACKUP HTR DISCONNECT | N=001 |
| 1JRCAHS 0101 | REACTOR VESSEL HEAD VENT | J=200 |
| 1JRCAHV 0101 | REACTOR VESSEL HEAD VENT | J=603 |
| 1JRCETW 0101 | PRESURIZER SURGE LINE | N=001 |
| 1JRCAPI 0101A | PRZR PRESS | N=001 |
| 1JRCAPT 0101A | PRZR PRESS=PPS HI/CPC | N=001 |
| 1JRCAPY 0101A | I/E CONVERTOR | N=001 |
| 1JRCBPI 0101B | PRZR PRESS | N=001 |
| 1JRCBPT 0101B | PRZR PRESS=PPS HI/CPC | N=001 |
| 1JRCBPY 0101B | I/E CONVERTOR | N=001 |
| 1JRCCPI 0101C | PRZR PRESS | N=001 |
| 1JRCCPT 0101C | PRZR PRESS=PPS HI/CPC | N=001 |
| 1JRCCPY 0101C | I/E CONVERTOR | N=001 |
| 1JRCDPI 0101D | PRZR PRESS | N=001 |
| 1JRCDPT 0101D | PRZR PRESS=PPS HI/CPC | N=001 |
| 1JRCDPY 0101D | I/E CONVERTOR | N=001 |
| 1JRCBHS 0102 | REACTOR VESSEL HEAD VENT | J=200 |
| 1JRCBHV 0102 | REACTOR VESSEL HEAD VENT | J=603 |
| 1JRCAPI 0102A | PRZR PRESS/VAR SETPOINT | N=001 |
| 1JRCAPI 0102A1 | PRZR PRESS=-RS | N=001 |
| 1JRCAPR 0102A | PRZR PRESS | N=001 |
| 1JRCAPT 0102A | PRZR PRESS=PPS LO/BYPASS | N=001 |
| 1JRCAPY 0102A | I/E CONVERTOR | N=001 |
| 1JRCBPI 0102B | PRZR PRESS/VAR SETPOINT | N=001 |
| 1JRCBPI 0102B1 | PRZR PRESS=-RS | N=001 |
| 1JRCBPT 0102B | PRZR PRESS=PPS LO/BYPASS | N=001 |
| 1JRCBPY 0102B | I/E CONVERTOR | N=001 |
| 1JRCCPI 0102C | PRZR PRESS/VAR SETPOINT | N=001 |
| 1JRCCPT 0102C | PRZR PRESS=PPS LO/BYPASS | N=001 |
| 1JRCCPY 0102C | I/E CONVERTOR | N=001 |
| 1JRCDPI 0102D | PRZR PRESS/VAR SETPOINT | N=001 |
| 1JRCDPT 0102D | PRZR PRESS=PPS LO/BYPASS | N=001 |
| 1JRCDPY 0102D | I/E CONVERTOR | N=001 |
| 1JRCAHS 0103 | PRESSURIZER VENT | J=200 |
| 1JRCAHV 0103 | PRESSURIZER VENT | J=603 |
| 1JRCAPC 0103 | PRZR PRESS S/D CLG INTERLOCK | N=001 |
| 1JRCAPI 0103 | PRZR PRESS | N=001 |
| 1JRCAPSH 0103 | PZR PRESS | N=001 |
| 1JRCAPT 0103 | PRZR PRESS | N=001 |
| 1JRCAPY 0103 | I/E CONVERTOR | N=001 |
| 1JRCEFO 0103 | PRESSURIZER VENT | N=001 |
| 1JRCETW 0103 | SPRAY FROM COLD LEG 1A | N=001 |
| 1JRCAPSH 0103=1 | PRZR PRESS | N=001 |
| 1JRCASY 0103A | RC PUMPS 1A/1B/2A/2B F(X) | N=001 |
| 1JRCBSY 0103B | RC PUMPS 1A/1B/2A/2B F(X) | N=001 |
| 1JRCCSY 0103C | RC PUMPS 1A/1B/2A/2B F(X) | N=001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 121 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 56 (RC-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRCDSY 0103D | RC PUMPS 1A/1B/2A/2B F(X) | N-001 |
| 1JRCBPC 0104 | PRZR PRESS S/D CLG INTERLOCK | N-001 |
| 1JRCBPI 0104 | PRZR PRESS | N-001 |
| 1JRCBPSH 0104 | PZR PRESS | N-001 |
| 1JRCBPT 0104 | PRZR PRESS | N-001 |
| 1JRCBPY 0104 | I/E CONVERTOR | N-001 |
| 1JRCETW 0104 | SPRAY FROM COLD LEG 1B | N-001 |
| 1JRCBPSH 0104-1 | PRZR PRESS | N-001 |
| 1JRCBHS 0105 | PRESSURIZER/RV HD VENT TO RDT | J-200 |
| 1JRCBHV 0105 | PRESSURIZER/RV HD VENT TO RDT | J-603 |
| 1JRCCPC 0105 | PRZR PRESS S/D CLG INTERLOCK | N-001 |
| 1JRCCPI 0105 | PRZR PRESS | N-001 |
| 1JRCCPT 0105 | PRZR PRESS | N-001 |
| 1JRCCPY 0105 | I/E CONVERTOR | N-001 |
| 1JRCETW 0105 | PRESURIZER SURGE LINE | N-001 |
| 1JRCAHS 0106 | PRESSURIZER/RV HD VENT TO CONT | J-200 |
| 1JRCAHV 0106 | PRESSURIZER/RV HD VENT TO CONT | J-603 |
| 1JRCDPC 0106 | PRZR PRESS S/D CLG INTERLOCK | N-001 |
| 1JRCDPI 0106 | PRZR PRESS LO | N-001 |
| 1JRCDPT 0106 | PRZR PRESS LO | N-001 |
| 1JRCDPY 0106 | I/E CONVERTOR | N-001 |
| 1JRCBHS 0108 | PRESSURIZER VENT | J-200 |
| 1JRCBHV 0108 | PRESSURIZER VENT | N-001 |
| 1JRCBHS 0109 | PRESSURIZER VENT | J-200 |
| 1JRCBHV 0109 | PRESSURIZER VENT | N-001 |
| 1JRCALI 0110X | PRZR LEVEL | N-001 |
| 1JRCALI 0110X1 | PRZR LEVEL--RS | N-001 |
| 1JRCALR 0110X | PRZR LEVEL | N-001 |
| 1JRCALT 0110X | PRZR LEVEL CONT SYS | N-001 |
| 1JRCALY 0110X | I/E CONVERTOR | N-001 |
| 1JRCALY 0110X1 | E/E CONVERTOR | N-001 |
| 1JRCBLI 0110Y | PRZR LEVEL | N-001 |
| 1JRCBLI 0110Y1 | PRZR LEVEL--RS | N-001 |
| 1JRCBLT 0110Y | PRZR LEVEL CONT SYS | N-001 |
| 1JRCBLY 0110Y | E/E CONVERTOR | N-001 |
| 1JRCBLY 0110Y1 | I/E CONVERTOR | N-001 |
| 1JRCETW 0111HA | RC HOT LEG TO SG 1 TEMP STRAT | N-001 |
| 1JRCETW 0111HB | RC HOT LEG TO SG 1 TEMP STRAT | N-001 |
| 1JRCETW 0111HC | RC HOT LEG TO SG 1 TEMP STRAT | N-001 |
| 1JRCETW 0111HD | RC HOT LEG TO SG 1 TEMP STRAT | N-001 |
| 1JRCETW 0111X | RC HOT LEG TO SG1 | N-001 |
| 1JRCETW 0111Y | RC COLD LEG 1B | N-001 |
| 1JRCATR 0112 | RC HOT/COLD - LEGS 1/1A | N-001 |
| 1JRCATE 0112CA | RC COLD LEG 1A | N-001 |
| 1JRCATE 0112C1 | RC COLD LEG 1A | N-001 |
| 1JRCATI 0112CA | RC COLD LEGS 1A/2A | N-001 |
| 1JRCATT 0112CA | R/E CONVERTER RC COLD LEG 1A | N-001 |
| 1JRCATT 0112C1 | RC COLD LEG 1A | N-001 |
| 1JRCATW 0112CA | RC HOT LEG 1A | N-001 |
| 1JRCBTE 0112CB | RC COLD LEG 1B | N-001 |
| 1JRCBTE 0112C2 | RC COLD LEG 1B | N-001 |
| 1JRCBTI 0112CB | RC COLD LEGS 1B/2B | N-001 |
| 1JRCBTT 0112CB | R/E CONVERTER RC COLD LEG 1B | N-001 |
| 1JRCBTT 0112C2 | RC COLD LEG 1B | N-001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 122 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 57 (RC-5)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRCBTW 0112CB | RC COLD LEG 1B | N=001 |
| 1JRCCTE 0112CC | RC COLD LEG 1A | N=001 |
| 1JRCCTI 0112CC | RC COLD LEGS 1A/2A | N=001 |
| 1JRCCTT 0112CC | R/E CONVERTER RC COLD LEG 1A | N=001 |
| 1JRCCTW 0112CC | RC HOT LEG 1A | N=001 |
| 1JRCDTE 0112CD | RC COLD LEG 1B | N=001 |
| 1JRCDTI 0112CD | RC COLD LEGS 1B/2B | N=001 |
| 1JRCDTT 0112CD | R/E CONVERTER RC COLD LEG 1B | N=001 |
| 1JRCDTW 0112CD | RC COLD LEG 1B | N=001 |
| 1JRCATE 0112HA | RC HOT LEG TO SG 1 | N=001 |
| 1JRCATE 0112H1 | RC HOT LEG TO SG 1 | N=001 |
| 1JRCATI 0112HA | RC HOT LEGS 1/2 | N=001 |
| 1JRCATI 0112H1 | RC HOT LEG TO SG 1==RS | N=001 |
| 1JRCATT 0112HA | RC HOT LEG TO SG 1 | N=001 |
| 1JRCATT 0112H1 | RC HOT LEG TO SG 1 | N=001 |
| 1JRCATW 0112HA | RC HOT LEG TO SG 1 | N=001 |
| 1JRCBTE 0112HB | RC HOT LEG TO SG 1 | N=001 |
| 1JRCBTE 0112H2 | RC HOT LEG TO SG 1 | N=001 |
| 1JRCBTI 0112HB | RC HOT LEGS 1/2 | N=001 |
| 1JRCBTT 0112HB | RC HOT LEG TO SG 1 | N=001 |
| 1JRCBTT 0112H2 | RC HOT LEG TO SG 1 | N=001 |
| 1JRCBTW 0112HB | RC HOT LEG TO SG 1 | N=001 |
| 1JRCCTE 0112HC | RC HOT LEG TO SG 1 | N=001 |
| 1JRCCTI 0112HC | RC HOT LEGS 1/2 | N=001 |
| 1JRCCTT 0112HC | RC HOT LEG TO SG 1 | N=001 |
| 1JRCCTW 0112HC | RC HOT LEG TO SG 1 | N=001 |
| 1JRCDTE 0112HD | RC HOT LEG TO SG 1 | N=001 |
| 1JRCDTI 0112HD | RC HOT LEGS 1/2 | N=001 |
| 1JRCDTT 0112HD | RC HOT LEG TO SG 1 | N=001 |
| 1JRCDTW 0112HD | RC HOT LEG TO SG 1 | N=001 |
| 1JRCASE 0113A | RC PUMP 1A | N=001 |
| 1JRCAST 0113A | RC PUMP 1A | N=001 |
| 1JRCBSE 0113B | RC PUMP 1A | N=001 |
| 1JRCBST 0113B | RC PUMP 1A | N=001 |
| 1JRCCSE 0113C | RC PUMP 1A | N=001 |
| 1JRCCST 0113C | RC PUMP 1A | N=001 |
| 1JRCDSE 0113D | RC PUMP 1A | N=001 |
| 1JRCDST 0113D | RC PUMP 1A | N=001 |
| 1JRCATE 0115 | RC COLD LEG 1A | N=001 |
| 1JRCATI 0115 | RC COLD LEG 1A | N=001 |
| 1JRCATSL 0115 | RC TEMP | N=001 |
| 1JRCATT 0115 | RC COLD LEG 1A | N=001 |
| 1JRCATW 0115 | RC COLD LEG 1A | N=001 |
| 1JRCATY 0115 | I/E CONVERTOR | N=001 |
| 1JRCAPDI 0115A | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCAPDT 0115A | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCAPDY 0115A | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCBPDI 0115B | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCBPDT 0115B | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCBPDY 0115B | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCCPDI 0115C | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCCPDT 0115C | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCCPDY 0115C | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCDPDI 0115D | STM GEN 1 PRIMARY LOOP | N=001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 123 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 58 (RC-6)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRCDPDT 0115D | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCDPDY 0115D | STM GEN 1 PRIMARY LOOP | N=001 |
| 1JRCETW 0121HA | RC HOT LEG TO SG 2 TEMP STRAT | N=001 |
| 1JRCETW 0121HB | RC HOT LEG TO SG 2 TEMP STRAT | N=001 |
| 1JRCETW 0121HC | RC HOT LEG TO SG 2 TEMP STRAT | N=001 |
| 1JRCETW 0121HD | RC HOT LEG TO SG 2 TEMP STRAT | N=001 |
| 1JRCETW 0121X | RC HOT LEG 2 | N=001 |
| 1JRCETW 0121Y | RC COLD LEG 2A | N=001 |
| 1JRCATR 0122 | RC HOT/COLD = LEGS 2/2A | N=001 |
| 1JRCATE 0122CA | RC COLD LEG 2A | N=001 |
| 1JRCATE 0122C1 | RC COLD LEG 2A | N=001 |
| 1JRCATT 0122CA | R/E CONVERTER RC COLD LEG 2A | N=001 |
| 1JRCATT 0122C1 | RC COLD LEG 2A | N=001 |
| 1JRCATW 0122CA | RC COLD LEG 2A | N=001 |
| 1JRCBTE 0122CB | RC COLD LEG 2B | N=001 |
| 1JRCBTE 0122C2 | RC COLD LEG 2B | N=001 |
| 1JRCBTT 0122CB | R/E CONVERTER RC COLD LEG 2B | N=001 |
| 1JRCBTT 0122C2 | RC COLD LEG 2B | N=001 |
| 1JRCBTW 0122CB | RC COLD LEG 2B | N=001 |
| 1JRCCTE 0122CC | RC COLD LEG 2A | N=001 |
| 1JRCCTT 0122CC | R/E CONVERTER RC COLD LEG 2A | N=001 |
| 1JRCCTW 0122CC | RC COLD LEG 2A | N=001 |
| 1JRCDTE 0122CD | RC COLD LEG 2B | N=001 |
| 1JRCDTT 0122CD | R/E CONVERTER RC COLD LEG 2B | N=001 |
| 1JRCDTW 0122CD | RC COLD LEG 2B | N=001 |
| 1JRCATE 0122HA | RC HOT LEG TO SG 2 | N=001 |
| 1JRCATE 0122H1 | RC HOT LEG TO SG 2 | N=001 |
| 1JRCATT 0122HA | RC HOT LEG TO SG 2 | N=001 |
| 1JRCATT 0122H1 | RC HOT LEG TO SG 2 | N=001 |
| 1JRCATW 0122HA | RC HOT LEG TO SG2 | N=001 |
| 1JRCBTE 0122HB | RC HOT LEG TO SG 2 | N=001 |
| 1JRCBTE 0122H2 | RC HOT LEG TO SG 2 | N=001 |
| 1JRCBTI 0122H1 | RC HOT LEG TO SG 2--RS | N=001 |
| 1JRCBTT 0122HB | RC HOT LEG TO SG 2 | N=001 |
| 1JRCBTT 0122H2 | RC HOT LEG TO SG 2 | N=001 |
| 1JRCBTW 0122HB | RC HOT LEG TO SG 2 | N=001 |
| 1JRCCTE 0122HC | RC HOT LEG TO SG 2 | N=001 |
| 1JRCCTT 0122HC | RC HOT LEG TO SG 2 | N=001 |
| 1JRCCTW 0122HC | RC HOT LEG TO SG 2 | N=001 |
| 1JRCDTE 0122HD | RC HOT LEG TO SG 2 | N=001 |
| 1JRCDTT 0122HD | RC HOT LEG TO SG 2 | N=001 |
| 1JRCDTW 0122HD | RC HOT LEG TO SG 2 | N=001 |
| 1JRCASE 0123A | RC PUMP 1B | N=001 |
| 1JRCAST 0123A | RC PUMP 1B | N=001 |
| 1JRCBSE 0123B | RC PUMP 1B | N=001 |
| 1JRCBST 0123B | RC PUMP 1B | N=001 |
| 1JRCCSE 0123C | RC PUMP 1B | N=001 |
| 1JRCCST 0123C | RC PUMP 1B | N=001 |
| 1JRCDSE 0123D | RC PUMP 1B | N=001 |
| 1JRCDST 0123D | RC PUMP 1B | N=001 |
| 1JRCBTE 0125 | RC COLD LEG 2B | N=001 |
| 1JRCBTI 0125 | RC COLD LEG 2B | N=001 |
| 1JRCBTSL 0125 | RC TEMP | N=001 |
| 1JRCBTT 0125 | RC COLD LEG 2B | N=001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 124 of 202)

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| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRCBTW 0125 | RC COLD LEG 2B | N=001 |
| 1JRCBTY 0125 | I/E CONVERTOR | N=001 |
| 1JRCAPDT 0125A | STM GEN 2 PRIMARY LOOP | N=001 |
| 1JRCAPDY 0125A | STM GEN 2 PRIMARY LOOP | N=001 |
| 1JRCBPDT 0125B | STM GEN 2 PRIMARY LOOP | N=001 |
| 1JRCBPDY 0125B | STM GEN 2 PRIMARY LOOP | N=001 |
| 1JRCCPDT 0125C | STM GEN 2 PRIMARY LOOP | N=001 |
| 1JRCCPDY 0125C | STM GEN 2 PRIMARY LOOP | N=001 |
| 1JRCDPDT 0125D | STM GEN 2 PRIMARY LOOP | N=001 |
| 1JRCDPDY 0125D | STM GEN 2 PRIMARY LOOP | N=001 |
| 1JRCASE 0133A | RC PUMP 2A | N=001 |
| 1JRCAST 0133A | RC PUMP 2A | N=001 |
| 1JRCBSE 0133B | RC PUMP 2A | N=001 |
| 1JRCBST 0133B | RC PUMP 2A | N=001 |
| 1JRCCSE 0133C | RC PUMP 2A | N=001 |
| 1JRCCST 0133C | RC PUMP 2A | N=001 |
| 1JRCDSE 0133D | RC PUMP 2A | N=001 |
| 1JRCDST 0133D | RC PUMP 2A | N=001 |
| 1JRCEPT 0138 | PRESSURIZER/RV HEAD VENT LEAK | J=311 |
| 1JRCASE 0143A | RC PUMP 2B | N=001 |
| 1JRCAST 0143A | RC PUMP 2B | N=001 |
| 1JRCBSE 0143B | RC PUMP 2B | N=001 |
| 1JRCBST 0143B | RC PUMP 2B | N=001 |
| 1JRCCSE 0143C | RC PUMP 2B | N=001 |
| 1JRCCST 0143C | RC PUMP 2B | N=001 |
| 1JRCDSE 0143D | RC PUMP 2B | N=001 |
| 1JRCDST 0143D | RC PUMP 2B | N=001 |
| 1JRCEFT 0156 | RCP 1A CONTROLLED BLEEDOFF | N=001 |
| 1JRCEFT 0166 | RCP 1B CONTROLLED BLEEDOFF | N=001 |
| 1JRCEFT 0176 | RCP 2A CONTROLLED BLEEDOFF | N=001 |
| 1JRCEFT 0186 | RCP 2B CONTROLLED BLEEDOFF | N=001 |
| 1JRCAPR 0190A | RCS PRESSURE WIDE RANGE | N=001 |
| 1JRCAPT 0190A | RCS PRESSURE WIDE RANGE | N=001 |
| 1JRCAPY 0190A | I/E CONVERTOR | N=001 |
| 1JRCBPT 0190B | RCS PRESSURE WIDE RANGE | N=001 |
| 1JRCBPY 0190B | I/E CONVERTOR | N=001 |
| 1JRCAPI 0199A | PZR OVER PRESS TRIP TO SPS | N=001 |
| 1JRCAPT 0199A | PRZR OVER PRESS TRIP TO SPS | N=001 |
| 1JRCBPI 0199B | PZR OVER PRESS TRIP TO SPS | N=001 |
| 1JRCBPT 0199B | PRZR OVER PRESS TRIP TO SPS | N=001 |
| 1JRCCPI 0199C | PZR OVER PRESS TRIP TO SPS | N=001 |
| 1JRCCPT 0199C | PRZR OVER PRESS TRIP TO SPS | N=001 |
| 1JRCDPI 0199D | PZR OVER PRESS TRIP TO SPS | N=001 |
| 1JRCDPT 0199D | PRZR OVER PRESS TRIP TO SPS | N=001 |
| 1JRCEPSV 0200 | PRESSURIZER SAFETY VALVE | N=001 |
| 1JRCEPSV 0201 | PRESSURIZER SAFETY VALVE | N=001 |
| 1JRCEPSV 0202 | PRESSURIZER SAFETY VALVE | N=001 |
| 1JRCEPSV 0203 | PRESSURIZER SAFETY VALVE | N=001 |
| 1JRCEHV 0403 | REACTOR VSL SEAL DRAIN TO RDT | N=001 |
| 1JRCEHV 0430 | RCP 1A CONTROLLED BLEEDOFF | N=001 |
| 1JRCEHV 0431 | RCP 1B CONTROLLED BLEEDOFF | N=001 |
| 1JRCEHV 0432 | RCP 2A CONTROLLED BLEEDOFF | N=001 |
| 1JRCEHV 0433 | RCP 2B CONTROLLED BLEEDOFF | N=001 |
| 1JRCNHV 0446 | RCP 1A HP COOLER INLET | N=001 |

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CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 125 of 202)

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| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRCNHV 0447 | RCP 1B HP COOLER INLET | N-001 |
| 1JRCNHV 0448 | RCP 2A HP COOLER INLET | N-001 |
| 1JRCNHV 0449 | RCP 2B HP COOLER INLET | N-001 |
| 1JRCNHV 0450 | RCP 1A HP COOLER OUTLET | N-001 |
| 1JRCNHV 0451 | RCP 1B HP COOLER OUTLET | N-001 |
| 1JRCNHV 0452 | RCP 2A HP COOLER OUTLET | N-001 |
| 1JRCNHV 0453 | RCP 2B HP COOLER OUTLET | N-001 |
| 1JRCEFO 0724 | PRZR SAMPLE HEAT EXCH NO 3 | J-425 |
| 1JRCEFO 0725 | PRZR SAMPLE HEAT EXCH NO 2 | J-425 |
| 1JRCEZE 0726 | PRESR RELIEF VLV | J-366 |
| 1JRCEZY 0726 | PRESR RELIEF VLV | J-366 |
| 1JRCEZE 0727 | PRESR RELIEF VLV | J-366 |
| 1JRCEZY 0727 | PRESR RELIEF VLV | J-366 |
| 1JRCEZE 0728 | PRESR RELIEF VLV | J-366 |
| 1JRCEZY 0728 | PRESR RELIEF VLV | J-366 |
| 1JRCEZE 0729 | PRESR RELIEF VLV | J-366 |
| 1JRCEZY 0729 | PRESR RELIEF VLV | J-366 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 126 of 202)

(RC-9)

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| TAG NUMBER | R/SPEC/ | |
|---|---|---|
| 1PRCAV206 | 13NM001 | |
| 1PRCAV208 | 13NM001 | |
| 1PRCAV276 | 13NM001 | |
| 1PRCAV277 | 13NM001 | |
| 1PRCAV284 | 13NM001 | |
| 1PRCAV285 | 13NM001 | |
| 1PRCAV297 | 13NM001 | |
| 1PRCAV298 | 13NM001 | |
| 1PRCRV274 | 13NM001 | |
| 1PRCRV275 | 13NM001 | |
| 1PRCCV204 | 13NM001 | |
| 1PRCCV272 | 13NM001 | |
| 1PRCCV273 | 13NM001 | |
| 1PRCCV280 | 13NM001 | |
| 1PRCCV281 | 13NM001 | |
| 1PRCDV205 | 13NM001 | |
| 1PRCDV270 | 13NM001 | |
| 1PRCDV271 | 13NM001 | |
| 1PRCDV278 | 13NM001 | |
| 1PRCDV279 | 13NM001 | |
| 1PRCEV001 | 13PM221A | |
| 1PRCEV056 | 13PM221A | |
| 1PRCEV057 | 13PM221A | |
| 1PRCEV058 | 13PM221A | |
| 1PRCEV059 | 13PM221A | |
| 1PRCEV060 | 13PM221A | |
| 1PRCEV061 | 13PM221A | |
| 1PRCEV062 | 13PM221A | |
| 1PRCEV090 | 13PM221C | |
| 1PRCEV200 | 13PM221C | |
| 1PRCEV207 | 13NM001 | |
| 1PRCEV209 | 13NM001 | |
| 1PRCEV210 | 13NM001 | |
| 1PRCEV211 | 13NM001 | |
| 1PRCEV212 | 13NM001 | |
| 1PRCEV213 | 13NM001 | |
| 1PRCEV214 | 13NM001 | C |
| 1PRCEV215 | 13NM001 | C |
| 1PRCEV216 | 13NM001 | C |
| 1PRCEV217 | 13NM001 | |
| 1PRCEV232 | 13NM001 | C |
| 1PRCEV233 | 13NM001 | C |
| 1PRCEV234 | 13NM001 | C |
| 1PRCEV235 | 13NM001 | C |
| 1PRCEV236 | 13NM001 | C |
| 1PRCEV237 | 13NM001 | C |
| 1PRCEV238 | 13NM001 | C |
| 1PRCEV240 | 13NM001 | C |
| 1PRCEV241 | 13NM001 | C |
| 1PRCEV242 | 13NM001 | C |
| 1PRCEV243 | 13NM001 | C |
| 1PRCEV244 | 13NM001 | C |
| 1PRCEV248 | 13NM001 | |
| 1PRCEV249 | 13NM001 | |
| 1PRCEV252 | 13NM001 | |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 127 of 202)

04/19/82 15:50:39 VALVE-"Q" CLASS PAGE 61 (RC-10)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PRCEV253 | 13NM001 |
| 1PRCEV256 | 13NM001 |
| 1PRCEV257 | 13NM001 |
| 1PRCEV260 | 13NM001 |
| 1PRCEV261 | 13NM001 |
| 1PRCEV282 | 13NM001 |
| 1PRCEV283 | 13NM001 |
| 1PRCEV292 | 13NM001 |
| 1PRCEV293 | 13NM001 |
| 1PRCEV294 | 13NM001 |
| 1PRCEV295 | 13NM001 |
| 1PRCEV296 | 13NM001 |
| 1PRCEV299 | 13NM001 |
| 1PRCEV332 | 13NM001 C |
| 1PRCEV333 | 13NM001 C |
| 1PRCEV334 | 13NM001 C |
| 1PRCEV335 | 13NM001 C |
| 1PRCEV872 | 13PM221C |
| 1PRCEV873 | 13PM221C |
| 1PRCEV874 | 13PM221C |
| 1PRCEV875 | 13PM221C |
| 1PRCEV876 | 13PM221C |
| 1PRCNV015 | 13PM221A |
| 1PRCNV063 | 13PM221A |
| 1PRCNV067 | 13PM221A |
| 1PRCNV068 | 13PM221A |
| 1PRCNV069 | 13PM221A |
| 1PRCNV070 | 13PM221A |
| 1PRCNV071 | 13PM221A |
| 1PRCNV072 | 13PM221A |
| 1PRCNV073 | 13PM221A |
| 1PRCNV074 | 13PM221A |
| 1PRCNV075 | 13PM221A |
| 1PRCNV076 | 13PM221A |
| 1PRCNV077 | 13PM221A |
| 1PRCNV078 | 13PM221A |
| 1PRCNV112 | 13NM001 |
| 1PRCNV113 | 13NM001 |
| 1PRCNV114 | 13NM001 |
| 1PRCNV115 | 13NM001 |
| 1PRCNV320 | 13NM001 |
| 1PRCNV321 | 13NM001 |
| 1PRCNV322 | 13NM001 |
| 1PRCNV323 | 13NM001 |
| 1PRCNV344 | 13NM001 |
| 1PRCNV345 | 13NM001 |
| 1PRCNV346 | 13NM001 |
| 1PRCNV347 | 13NM001 |
| 1PRCNV367 | 13NM001 |
| 1PRCNV368 | 13NM001 |
| 1PRCNV369 | 13NM001 |
| 1PRCNV370 | 13NM001 |
| 1PRCNV380 | 13NM001 |
| 1PRCNV381 | 13NM001 |
| 1PRCNV382 | 13NM001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 128 of 202)

04/19/82 15:50:39 VALVE-"QM" CLASS PAGE 62 (RC-11)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PRCNV383 | 13NM001 |
| 1PRCNV481 | 13NM001 |
| 1PRCNV482 | 13NM001 |
| 1PRCNV700 | 13NM001 |
| 1PRCNV701 | 13NM001 |
| 1PRCNV702 | 13NM001 |
| 1PRCNV703 | 13NM001 |
| 1PRCNV712 | 13NM001 |
| 1PRCNV713 | 13NM001 |
| 1PRCNV714 | 13NM001 |
| 1PRCNV715 | 13NM001 |
| 1PRCNV716 | 13NM001 |
| 1PRCNV717 | 13NM001 |
| 1PRCNV718 | 13NM001 |
| 1PRCNV719 | 13NM001 |
| 1PRCNV724 | 13NM001 |
| 1PRCNV725 | 13NM001 |
| 1PRCNV726 | 13NM001 |
| 1PRCNV727 | 13NM001 |
| 1PRCNV736 | 13NM001 |
| 1PRCNV737 | 13NM001 |
| 1PRCNV738 | 13NM001 |
| 1PRCNV739 | 13NM001 |
| 1PRCNV740 | 13NM001 |
| 1PRCNV741 | 13NM001 |
| 1PRCNV742 | 13NM001 |
| 1PRCNV743 | 13NM001 |
| 1PRCNV752 | 13NM001 |
| 1PRCNV753 | 13NM001 |
| 1PRCNV754 | 13NM001 |
| 1PRCNV755 | 13NM001 |
| 1PRCNV772 | 13NM001 |
| 1PRCNV773 | 13NM001 |
| 1PRCNV774 | 13NM001 |
| 1PRCNV775 | 13NM001 |
| 1PRCNV796 | 13NM001 |
| 1PRCNV797 | 13NM001 |
| 1PRCNV798 | 13NM001 |
| 1PRCNV799 | 13NM001 |
| 1PRCNVA00 | 13NM001 |
| 1PRCNVA01 | 13NM001 |
| 1PRCNVA02 | 13NM001 |
| 1PRCNVA03 | 13NM001 |
| 1PRCNVA68 | 13NM001 |
| 1PRCNVA70 | 13NM001 |
| 1PRCNVA71 | 13NM001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 129 of 202)

04/19/82 15:38:46 EQUIPMENT-"ON" CLASS PAGE 86 RADIOACTIVE WASTE DRAINS (RD-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1HRDE1109 | PENETRATION-RAD SUMP SUMPS | 13MM500 |
| | | |
| | | |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 130 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 62 (RD-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRDAHS 0023 | INT CONT ISOL VLV FR RW SUMP | J-200 |
| 1JRDAUV 0023 | INT CONT ISOL VLV FR RW SUMP | P-221B |
| 1JRDBHS 0024 | EXT CONT ISOL VLV FR RW SUMP | J-200 |
| 1JRDBUV 0024 | EXT CONT ISOL VLV FR RW SUMP | P-221B |
| 1JRDBUY 0024 | EXT CONT ISOL VLV FR RW SUMP | P-221B |
| 1JRDALSH 0147 | CONT SPRAY PMP RM A | J-481 |
| 1JRDBLSH 0148 | CONT SPRAY PMP RM B | J-481 |
| 1JRDALSH 0149 | HI PR SI PMP RM A | J-481 |
| 1JRDBLSH 0150 | HI PR SI PMP RM B | J-481 |
| 1JRDALSH 0151 | LO PR SI PMP RM A | J-481 |
| 1JRDBLSH 0152 | LO PR SI PMP RM B | J-481 |
| 1JRDBHS 0407 | CONT SUMPS O/L FOR PASS | J-603 |
| 1JRDBUV 0407 | CONT SUMPS O/L FOR PASS | J-603 |
| 1JRDELE 0410 | CONT RW SUMP (EAST) | J-475 |
| 1JRDELT 0410 | CONT RW SUMP (EAST) | J-475 |
| 1JRDELE 0411 | CONT RW SUMP (WEST) | J-475 |
| 1JRDELT 0411 | CONT RW SUMP (WEST) | J-475 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 131 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 64 (RD-3)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PRDAV018 | 13PM221B |
| 1PRDAV020 | 13PM221B |
| 1PRDAV021 | 13PM221B |
| 1PRDAV022 | 13PM221B |
| 1PRDAV023 | 13PM221B |
| 1PRDAV049 | 13PM221A |
| 1PRDAV050 | 13PM221B |
| 1PRDRV040 | 13PM221B |
| 1PRDRV041 | 13PM221B |
| 1PRDRV042 | 13PM221B |
| 1PRDRV043 | 13PM221B |
| 1PRDRV048 | 13PM221B |
| 1PRDRV051 | 13PM221A |
| 1PRDRV052 | 13PM221B |
| 1PRDNV090 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 132 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 88

IN-CORE REACTOR INSTRUMENTATION (RI-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1ERIAZ49 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ERIBZ35 | ELEC PENTRTN-SHLD INSTR | 13EM035 |
| 1ERICZ30 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ERIDZ79 | ELECT PENTRTN-SHLD INSTR | 13EM035 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 133 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 64 (RI-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRICNE 0001 | IN-CORE DETECTOR J-9 | N-001 |
| 1JRICTE 0001 | IN-CORE T/C (CORE EXIT)-J-9 | N-001 |
| 1JRIALE 0001A | REACTOR VESSEL | N-001 |
| 1JRIBLE 0001B | REACTOR VESSEL | N-001 |
| 1JRIDNE 0002 | IN-CORE DETECTOR H-9 | N-001 |
| 1JRIDTE 0002 | IN-CORE T/C (CORE EXIT)-H-9 | N-001 |
| 1JRIALE 0002A | REACTOR VESSEL | N-001 |
| 1JRIBLE 0002B | REACTOR VESSEL | N-001 |
| 1JRIBNE 0003 | IN-CORE DETECTOR K-10 | N-001 |
| 1JRIBTE 0003 | IN-CORE T/C (CORE EXIT)-K-10 | N-001 |
| 1JRIALE 0003A | REACTOR VESSEL | N-001 |
| 1JRIBLE 0003B | REACTOR VESSEL | N-001 |
| 1JRIBNE 0004 | IN-CORE DETECTOR J-7 | N-001 |
| 1JRIBTE 0004 | IN-CORE T/C (CORE EXIT)-J-7 | N-001 |
| 1JRIALE 0004A | REACTOR VESSEL | N-001 |
| 1JRIBLE 0004B | REACTOR VESSEL | N-001 |
| 1JRIANE 0005 | IN-CORE DETECTOR G-8 | N-001 |
| 1JRIATE 0005 | IN-CORE T/C (CORE EXIT)-G-8 | N-001 |
| 1JRIALE 0005A | REACTOR VESSEL | N-001 |
| 1JRIBLE 0005B | REACTOR VESSEL | N-001 |
| 1JRIANE 0006 | IN-CORE DETECTOR L-7 | N-001 |
| 1JRIATE 0006 | IN-CORE T/C (CORE EXIT)-L-7 | N-001 |
| 1JRIALE 0006A | REACTOR VESSEL | N-001 |
| 1JRIBLE 0006B | REACTOR VESSEL | N-001 |
| 1JRIDNE 0007 | IN-CORE DETECTOR J-12 | N-001 |
| 1JRIDTE 0007 | IN-CORE T/C (CORE EXIT)-J-12 | N-001 |
| 1JRIALE 0007A | REACTOR VESSEL | N-001 |
| 1JRIBLE 0007B | REACTOR VESSEL | N-001 |
| 1JRIANE 0008 | IN-CORE DETECTOR F-10 | N-001 |
| 1JRIATE 0008 | IN-CORE T/C (CORE EXIT)-F-10 | N-001 |
| 1JRIALE 0008A | REACTOR VESSEL | N-001 |
| 1JRIBLE 0008B | REACTOR VESSEL | N-001 |
| 1JRIANE 0009 | IN-CORE DETECTOR H-8 | N-001 |
| 1JRIATE 0009 | IN-CORE T/C (CORE EXIT)-H-8 | N-001 |
| 1JRIBNE 0010 | IN-CORE DETECTOR F-7 | N-001 |
| 1JRIBTE 0010 | IN-CORE T/C (CORE EXIT)-F-7 | N-001 |
| 1JRIANE 0011 | IN-CORE DETECTOR H-11 | N-001 |
| 1JRIATE 0011 | IN-CORE T/C (CORE EXIT)-H-11 | N-001 |
| 1JRIBNE 0012 | IN-CORE DETECTOR N-9 | N-001 |
| 1JRIBTE 0012 | IN-CORE T/C (CORE EXIT)-N-9 | N-001 |
| 1JRIANE 0013 | IN-CORE DETECTOR H-5 | N-001 |
| 1JRIATE 0013 | IN-CORE T/C (CORE-EXIT)-H-5 | N-001 |
| 1JRIANE 0014 | IN-CORE DETECTOR K-13 | N-001 |
| 1JRIATE 0014 | IN-CORE T/C (CORE EXIT)-K-13 | N-001 |
| 1JRIBNE 0015 | IN-CORE DETECTOR F-12 | N-001 |
| 1JRIBTE 0015 | IN-CORE T/C (CORE EXIT)-F-12 | N-001 |
| 1JRICNE 0016 | IN-CORE DETECTOR G-13 | N-001 |
| 1JRICTE 0016 | IN-CORE T/C (CORE EXIT)-G-13 | N-001 |
| 1JRICNE 0017 | IN-CORE DETECTOR L-5 | N-001 |
| 1JRICTE 0017 | IN-CORE T/C (CORE EXIT)-L-5 | N-001 |
| 1JRICNE 0018 | IN-CORE DETECTOR F-5 | N-001 |
| 1JRICTE 0018 | IN-CORE T/C (CORE EXIT)-F-5 | N-001 |
| 1JRICNE 0019 | IN-CORE DETECTOR J-4 | N-001 |
| 1JRICTE 0019 | IN-CORE T/C (CORE EXIT)-J-4 | N-001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 134 of 202)

12/17/82 02128102 — Q INSTRUMENTS BY SYSTEM — PAGE 65 (RI-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRICNE 0020 | IN-CORE DETECTOR M-13 | N-001 |
| 1JRICTE 0020 | IN-CORE T/C (CORE EXIT)-M-13 | N-001 |
| 1JRIDNE 0021 | IN-CORE DETECTOR Q-8 | N-001 |
| 1JRIDTE 0021 | IN-CORE T/C (CORE EXIT)-Q-8 | N-001 |
| 1JRIDNE 0022 | IN-CORE DETECTOR P-10 | N-001 |
| 1JRIDTE 0022 | IN-CORE T/C (CORE EXIT)-P-10 | N-001 |
| 1JRIBNE 0023 | IN-CORE DETECTOR Q-11 | N-001 |
| 1JRIBTE 0023 | IN-CORE T/C (CORE EXIT)-Q-11 | N-001 |
| 1JRIBNE 0024 | IN-CORE DETECTOR P-7 | N-001 |
| 1JRIBTE 0024 | IN-CORE T/C (CORE EXIT)-P-7 | N-001 |
| 1JRIDNE 0025 | IN-CORE DETECTOR N-5 | N-001 |
| 1JRIDTE 0025 | IN-CORE T/C (CORE EXIT)-N-5 | N-001 |
| 1JRICNE 0026 | IN-CORE DETECTOR Q-6 | N-001 |
| 1JRICTE 0026 | IN-CORE T/C (CORE EXIT)-Q-6 | N-001 |
| 1JRICNE 0027 | IN-CORE DETECTOR P-12 | N-001 |
| 1JRICTE 0027 | IN-CORE T/C (CORE EXIT)-P-12 | N-001 |
| 1JRIANE 0028 | IN-CORE DETECTOR R-9 | N-001 |
| 1JRIATE 0028 | IN-CORE T/C (CORE EXIT)-R-9 | N-001 |
| 1JRIBNE 0029 | IN-CORE DETECTOR H-3 | N-001 |
| 1JRIBTE 0029 | IN-CORE T/C (CORE EXIT)-H-3 | N-001 |
| 1JRIBNE 0030 | IN-CORE DETECTOR K-15 | N-001 |
| 1JRIBTE 0030 | IN-CORE T/C (CORE EXIT)-K-15 | N-001 |
| 1JRIANE 0031 | IN-CORE DETECTOR G-15 | N-001 |
| 1JRIATE 0031 | IN-CORE T/C (CORE EXIT)-G-15 | N-001 |
| 1JRIANE 0032 | IN-CORE DETECTOR C-7 | N-001 |
| 1JRIATE 0032 | IN-CORE T/C (CORE EXIT)-C-7 | N-001 |
| 1JRIANE 0033 | IN-CORE DETECTOR L-3 | N-001 |
| 1JRIATE 0033 | IN-CORE T/C (CORE EXIT)-L-3 | N-001 |
| 1JRIANE 0034 | IN-CORE DETECTOR R-11 | N-001 |
| 1JRIATE 0034 | IN-CORE T/C (CORE EXIT)-R-11 | N-001 |
| 1JRIDNE 0035 | IN-CORE DETECTOR E-4 | N-001 |
| 1JRIDTE 0035 | IN-CORE T/C (CORE EXIT)-E-4 | N-001 |
| 1JRIDNE 0036 | IN-CORE DETECTOR N-14 | N-001 |
| 1JRIDTE 0036 | IN-CORE T/C (CORE EXIT)-N-14 | N-001 |
| 1JRIBNE 0037 | IN-CORE DETECTOR C-12 | N-001 |
| 1JRIBTE 0037 | IN-CORE T/C (CORE EXIT)-C-12 | N-001 |
| 1JRIBNE 0038 | IN-CORE DETECTOR F-3 | N-001 |
| 1JRIBTE 0038 | IN-CORE T/C (CORE EXIT)-F-3 | N-001 |
| 1JRIBNE 0039 | IN-CORE DETECTOR R-6 | N-001 |
| 1JRIBTE 0039 | IN-CORE T/C (CORE EXIT)-R-6 | N-001 |
| 1JRIBNE 0040 | IN-CORE DETECTOR M-15 | N-001 |
| 1JRIBTE 0040 | IN-CORE T/C B(CORE EXIT)-M-15 | N-001 |
| 1JRICNE 0041 | IN-CORE DETECTOR B-9 | N-001 |
| 1JRICTE 0041 | IN-CORE T/C (CORE EXIT)-B-9 | N-001 |
| 1JRIDNE 0042 | IN-CORE DETECTOR H-16 | N-001 |
| 1JRIDTE 0042 | IN-CORE T/C (CORE EXIT)-H-16 | N-001 |
| 1JRIANE 0043 | IN-CORE DETECTOR D-14 | N-001 |
| 1JRIATE 0043 | IN-CORE T/C (CORE EXIT)-D-14 | N-001 |
| 1JRIDNE 0044 | IN-CORE DETECTOR K-2 | N-001 |
| 1JRIDTE 0044 | IN-CORE T/C (CORE EXIT)-K-2 | N-001 |
| 1JRIDNE 0045 | IN-CORE DETECTOR E-15 | N-001 |
| 1JRIDTE 0045 | IN-CORE T/C (CORE EXIT)-E-15 | N-001 |
| 1JRIDNE 0046 | IN-CORE DETECTOR N-3 | N-001 |
| 1JRIDTE 0046 | IN-CORE T/C (CORE EXIT)-N-3 | N-001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 135 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 66 (RI-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRIDNE 0047 | IN-CORE DETECTOR G-2 | N-001 |
| 1JRIDTE 0047 | IN-CORE T/C (CORE EXIT)-G-2 | N-001 |
| 1JRICNE 0048 | IN-CORE DETECTOR L-16 | N-001 |
| 1JRICTE 0048 | IN-CORE T/C (CORE EXIT)-L-16 | N-001 |
| 1JRICNE 0049 | IN-CORE DETECTOR B-6 | N-001 |
| 1JRICTE 0049 | IN-CORE T/C (CORE EXIT)-B-6 | N-001 |
| 1JRICNE 0050 | IN-CORE DETECTOR S-12 | N-001 |
| 1JRICTE 0050 | IN-CORE T/C (CORE EXIT)-S-12 | N-001 |
| 1JRIBNE 0051 | IN-CORE DETECTOR C-4 | N-001 |
| 1JRIBTE 0051 | IN-CORE T/C (CORE EXIT)-C-4 | N-001 |
| 1JRIANE 0052 | IN-CORE DETECTOR R-14 | N-001 |
| 1JRIATE 0052 | IN-CORE T/C (CORE EXIT)-R-14 | N-001 |
| 1JRIBNE 0053 | IN-CORE DETECTOR T-9 | N-001 |
| 1JRIBTE 0053 | IN-CORE T/C (CORE EXIT)-T-9 | N-001 |
| 1JRICNE 0054 | IN-CORE DETECTOR B-13 | N-001 |
| 1JRICTE 0054 | IN-CORE T/C (CORE EXIT)-B-13 | N-001 |
| 1JRIDNE 0055 | IN-CORE DETECTOR A-10 | N-001 |
| 1JRIDTE 0055 | IN-CORE T/C (CORE EXIT)-A-10 | N-001 |
| 1JRIANE 0056 | IN-CORE DETECTOR T-7 | N-001 |
| 1JRIATE 0056 | IN-CORE T/C (CORE EXIT) T-7 | N-001 |
| 1JRICNE 0057 | IN-CORE DETECTOR R-3 | N-001 |
| 1JRICTE 0057 | IN-CORE T/C (CORE EXIT)-R-3 | N-001 |
| 1JRICNE 0058 | IN-CORE DETECTOR F-17 | N-001 |
| 1JRICTE 0058 | IN-CORE T/C (CORE EXIT)-F-17 | N-001 |
| 1JRICNE 0059 | IN-CORE DETECTOR M-1 | N-001 |
| 1JRICTE 0059 | IN-CORE T/C (CORE EXIT)-M-1 | N-001 |
| 1JRIDNE 0060 | IN-CORE DETECTOR D-2 | N-001 |
| 1JRIDTE 0060 | IN-CORE T/C (CORE EXIT)-D-2 | N-001 |
| 1JRIDNE 0061 | IN-CORE DETECTOR P-16 | N-001 |
| 1JRIDTE 0061 | IN-CORE T/C (CORE EXIT)-P-16 | N-001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 136 of 202)

12/17/82 02:28:02 Q INSTRUMENTS BY SYSTEM PAGE 68

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRKAUA 0002C | IE ANNUNCIATOR | J-108 |
| 1JRKBUA 0002D | IE ANNUNCIATOR | J-108 |
| 1JRKAUA 0004D | IE ANNUNCIATOR | J-108 |
| 1JRKBUA 0004E | IE ANNUNCIATOR | J-108 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 137 of 202)

04/19/82 15:38:46 EQUIPMENT="O" CLASS PAGE 90 MAIN CONTROL BOARD

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JRMAR01 | CONTROL BOARD-ELECT MIMIC BUS | 13JM200 |
| 1JRMAR02 | CONTROL BOARD-ESF SYSTEM | 13JM200 |
| 1JRMAR03 | CONTROL BOARD-CVCS MIMIC | 13JM200 |
| 1JRMAR04 | CONTROL BOARD-RRS | 13JM200 |
| 1JRMAR05 | CONTROL BOARD-PPS COND SYSTEM | 13JM200 |
| 1JRMAR06 | CONTROL BOARD-MS/TG | 13JM200 |
| 1JRMAR07 | CONTROL BOARD-AUX SYSTEMS | 13JM200 |
| 1JRMBR01 | CONTROL BOARD-ELECT MIMIC BUS | 13JM200 |
| 1JRMBR02 | CONTROL BOARD-ESF SYSTEM | 13JM200 |
| 1JRMBR03 | CONTROL BOARD-CVCS MIMIC | 13JM200 |
| 1JRMBR04 | CONTROL BOARD-RRS | 13JM200 |
| 1JRMBR05 | CONTROL BOARD-PPS COND SYSTEM | 13JM200 |
| 1JRMBR06 | CONTROL BOARD-MS/TG | 13JM200 |
| 1JRMBR07 | CONTROL BOARD-AUX SYSTEMS | 13JM200 |
| 1JRMCR02 | CONTROL BOARD-ESF SYSTEM | 13JM200 |
| 1JRMCR04 | CONTROL BOARD-RRS | 13JM200 |
| 1JRMCR05 | CONTROL BOARD-PPS COND SYSTEM | 13JM200 |
| 1JRMDR02 | CONTROL BOARD-ESF SYSTEM | 13JM200 |
| 1JRMDR04 | CONTROL BOARD-RRS | 13JM200 |
| 1JRMDR05 | CONTROL BOARD-PPS COND SYSTEM | 13JM200 |
| 1JRMNR01 | CONTROL BOARD-ELECT MIMIC BUS | 13JM200 |
| 1JRMNR02 | CONTROL BOARD-ESF SYSTEM | 13JM200 |
| 1JRMNR03 | CONTROL BOARD-CVCS MIMIC | 13JM200 |
| 1JRMNR04 | CONTROL BOARD-RRS | 13JM200 |
| 1JRMNR05 | CONTROL BOARD-PPS COND SYSTEM | 13JM200 |
| 1JRMNR06 | CONTROL BOARD-MS/TG | 13JM200 |
| 1JRMNR07 | CONTROL BOARD-AUX SYSTEMS | 13JM200 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 138 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 92 ENGINEERED SAFETY FEATURES ACTUATION (SA-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1ESAAZ47 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESABZ37 | ELEC PENTRTN-SHLD INSTR | 13EM035 |
| 1ESACZ28 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESADZ81 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESADZ85 | ELECT PENTRTN- | 13EM035 |
| 1JSAAC01 | ESFAS AUX RELAY CABINET A | 13NM001 |
| 1JSAAC02 | BOP ESFAS CABINET | 13JM104 |
| 1JSAAC02A | BOP ESFAS CABINET | 13JM104 |
| 1JSAAC02B | BOP ESFAS CARINET | 13JM104 |
| 1JSAAC03 | AUXILIARY PROTECTIVE CABINET A | 13NM001 |
| 1JSAAC04 | ELECTRONIC ISOL SYS CAB A | 13JM108 |
| 1JSABC01 | ESFAS AUX RELAY CABINET B | 13NM001 |
| 1JSABC02 | BOP ESFAS CABINET | 13JM104 |
| 1JSABC02A | BOP ESFAS CABINET | 13JM104 |
| 1JSABC02B | BOP ESFAS CARINET | 13JM104 |
| 1JSABC03 | AUXILIARY PROTECTIVE CABINET B | 13NM001 |
| 1JSABC04 | ELECTRONIC ISOL SYS CAB B | 13JM108 |
| 1JSACC03 | AUXILIARY PROTECTIVE CABINET C | 13NM001 |
| 1JSACC04 | ELECTRONIC ISOL SYS CAB C | 13JM108 |
| 1JSADC03 | AUXILIARY PROTECTIVE CABINET D | 13NM001 |
| 1JSADC04 | ELECTRONIC ISOL SYS CAB D | 13JM108 |
| 1JSANC02A | BOP ESFAS CARINET | 13JM104 |
| 1JSANC02B | BOP ESFAS CARINET | 13JM104 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 139 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 70 (SA-2)

| TAG NUMBER | DESCRIPTION | RECHTEL SPEC/PO |
|---|---|---|
| 1JSAAHS 0001 | SIAS MANUAL ACTUATION A | J=200 |
| 1JSABHS 0002 | SIAS MANUAL ACTUATION B | J=200 |
| 1JSACHS 0003 | SIAS MANUAL ACTUATION C | J=200 |
| 1JSADHS 0004 | SIAS MANUAL ACTUATION D | J=200 |
| 1JSAAHS 0005 | CIAS MANUAL ACTUATION A | J=200 |
| 1JSABHS 0006 | CIAS MANUAL ACTUATION B | J=200 |
| 1JSACHS 0007 | CIAS MANUAL ACTUATION C | J=200 |
| 1JSADHS 0008 | CIAS MANUAL ACTUATION D | J=200 |
| 1JSAAHS 0009A | MSIS MANUAL ACTUATION A | J=200 |
| 1JSAAHS 0009B | MSIS MANUAL ACTUATION A | N=001 |
| 1JSABHS 0010A | MSIS MANUAL ACTUATION B | J=200 |
| 1JSABHS 0010B | MSIS MANUAL ACTUATION B | N=001 |
| 1JSACHS 0011A | MSIS MANUAL ACTUATION C | J=200 |
| 1JSACHS 0011B | MSIS MANUAL ACTUATION C | N=001 |
| 1JSADHS 0012A | MSIS MANUAL ACTUATION D | J=200 |
| 1JSADHS 0012B | MSIS MANUAL ACTUATION D | N=001 |
| 1JSAAHS 0013 | CSAS MANUAL ACTUATION A | J=200 |
| 1JSABHS 0014 | CSAS MANUAL ACTUATION B | J=200 |
| 1JSACHS 0015 | CSAS MANUAL ACTUATION C | J=200 |
| 1JSADHS 0016 | CSAS MANUAL ACTUATION D | J=200 |
| 1JSAAHS 0017 | AFAS-1 MANUAL ACTUATION A | J=200 |
| 1JSABHS 0018 | AFAS-1 MANUAL ACTUATION B | J=200 |
| 1JSACHS 0019 | AFAS-1 MANUAL ACTUATION C | J=200 |
| 1JSADHS 0020 | AFAS-1 MANUAL ACTUATION D | J=200 |
| 1JSAAHS 0021 | AFAS-2 MANUAL ACTUATION A | J=200 |
| 1JSABHS 0022 | AFAS-2 MANUAL ACTUATION B | J=200 |
| 1JSACHS 0023 | AFAS-2 MANUAL ACTUATION C | J=200 |
| 1JSADHS 0024 | AFAS-2 MANUAL ACTUATION D | J=200 |
| 1JSAAHS 0025 | CPIAS MANUAL ACTUATION A | J=200 |
| 1JSABHS 0026 | CPIAS MANUAL ACTUATION B | J=200 |
| 1JSAAHS 0027 | CREFAS MANUAL ACTUATION A | J=200 |
| 1JSABHS 0028 | CREFAS MANUAL ACTUATION B | J=200 |
| 1JSAAHS 0029 | FBEVAS MANUAL ACTUATION A | J=200 |
| 1JSABHS 0030 | FBEVAS MANUAL ACTUATION B | J=200 |
| 1JSAAHS 0031 | CRVIAS MANUAL ACTUATION A | J=200 |
| 1JSABHS 0032 | CRVIAS MANUAL ACTUATION B | J=200 |
| 1JSAAUIC 0033 | CORE PROTECTION CALC OP MOD A | N=001 |
| 1JSABUIC 0034 | CORE PROTECTION CALC OP MOD B | N=001 |
| 1JSACUIC 0035 | CORE PROTECTION CALC OP MOD C | N=001 |
| 1JSADUIC 0036 | CORE PROTECTION CALC OP MOD D | N=001 |
| 1JSAAUIC 0037 | PPS REMOTE OPER MODULE A | N=001 |
| 1JSABUIC 0038 | PPS REMOTE OPER MODULE B | N=001 |
| 1JSACUIC 0039 | PPS REMOTE OPER MODULE C | N=001 |
| 1JSADUIC 0040 | PPS REMOTE OPER MODULE D | N=001 |
| 1JSAAHS 0043 | RAS MANUAL ACTUATION A | J=200 |
| 1JSABHS 0044 | RAS MANUAL ACTUATION B | J=200 |
| 1JSACHS 0045 | RAS MANUAL ACTUATION C | J=200 |
| 1JSADHS 0046 | RAS MANUAL ACTUATION D | J=200 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 140 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 94 REACTOR PROTECTION SYSTEM (RB-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSRAA01 | PRESSURIZER XMITTER RACK-PPS | 13NM001 |
| 1JSRAA02 | SG 1/RCP 1B XMITTER RACK-PPS | 13NM001 |
| 1JSRAA03 | SI TK/RCP 1A XMITTER RACK-PPS | 13NM001 |
| 1JSRAA04 | SG 1/SI TK 1B XMITTER RACK-PPS | 13NM001 |
| 1JSRAA05 | SG 2/RCP 2A XMITTER RACK-PPS | 13NM001 |
| 1JSRAA06 | SG 2/RCP 2B XMITTER RACK-PPS | 13NM001 |
| 1JSRAC01 | PLANT PROTECTION SYSTEM CAB | 13NM001 |
| 1JSRAC02A | PROCESS PROTECTIVE CABINET A1 | 13NM001 |
| 1JSRAC02B | PROCESS PROTECTIVE CABINET A2 | 13NM001 |
| 1JSRAC03 | REACTOR TRIP SWITCHGEAR A | 13NM001 |
| 1JSRAC04 | SUPPLEMENTARY PROTECTION A | 13NM001 |
| 1JSRBA01 | PRESSURIZER XMITTER RACK-PPS | 13NM001 |
| 1JSRBA02 | SG 1/RCP 1B XMITTER RACK-PPS | 13NM001 |
| 1JSRBA03 | SG 1/RCP 1A XMITTER RACK-PPS | 13NM001 |
| 1JSRBA04 | SI TK/RCP 2A XMITTER RACK-PPS | 13NM001 |
| 1JSRBA05 | SG 2/SI TK 2B XMITTER RACK-PPS | 13NM001 |
| 1JSRBA06 | SG 2/RCP 2B XMITTER RACK-PPS | 13NM001 |
| 1JSRBC01 | PLANT PROTECTION SYSTEM CAB | 13NM001 |
| 1JSRBC02A | PROCESS PROTECTIVE CABINET B1 | 13NM001 |
| 1JSRBC02B | PROCESS PROTECTIVE CABINET B2 | 13NM001 |
| 1JSRBC03 | REACTOR TRIP SWITCHGEAR B | 13NM001 |
| 1JSRBC04 | SUPPLEMENTARY PROTECTION B | 13NM001 |
| 1JSRCA01 | PRESSURIZER XMITTER RACK-PPS | 13NM001 |
| 1JSRCA02 | SG 1/RCP 1B XMITTER RACK-PPS | 13NM001 |
| 1JSRCA03 | SG 1/RCP 1A XMITTER RACK-PPS | 13NM001 |
| 1JSRCA04 | SG 2/RCP 2B XMITTER RACK-PPS | 13NM001 |
| 1JSRCA05 | SG 2/RCP 2A XMITTER RACK-PPS | 13NM001 |
| 1JSRCC01 | PLANT PROTECTION SYSTEM CAB | 13NM001 |
| 1JSRCC02A | PROCESS PROTECTIVE CABINET C | 13NM001 |
| 1JSRCC03 | REACTOR TRIP SWITCHGEAR C | 13NM001 |
| 1JSRCC04 | SUPPLEMENTARY PROTECTION C | 13NM001 |
| 1JSRDA01 | PRESSURIZER XMITTER RACK-PPS | 13NM001 |
| 1JSRDA02 | SG 1/RCP 1B XMITTER RACK-PPS | 13NM001 |
| 1JSRDA03 | SG 1/RCP 1A XMITTER RACK-PPS | 13NM001 |
| 1JSRDA04 | SG 2/RCP 2B XMITTER RACK-PPS | 13NM001 |
| 1JSRDA05 | SG 2/RCP 2A XMITTER RACK-PPS | 13NM001 |
| 1JSRDC01 | PLANT PROTECTION SYSTEM CAB | 13NM001 |
| 1JSRDC02A | PROCESS PROTECTIVE CABINET D | 13NM001 |
| 1JSRDC03 | REACTOR TRIP SWITCHGEAR D | 13NM001 |
| 1JSRDC04 | SUPPLEMENTARY PROTECTION D | 13NM001 |
| 1JSRNC03A | REACTOR TRIP SWITCHGEAR | 13NM001 |
| 1JSRNC03B | REACTOR TRIP SWITCHGEAR | 13NM001 |
| 1JSRNC03C | REACTOR TRIP SWITCHGEAR | 13NM001 |
| 1JSRNC03D | REACTOR TRIP SWITCHGEAR | 13NM001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 141 of 202)

12/17/82 02:28:02 Q INSTRUMENTS BY SYSTEM PAGE 72

(RB-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSBAHS 0001 | MANUAL REACTOR TRIP CH A | J-200 |
| 1JSBBHS 0002 | MANUAL REACTOR TRIP CH B | J-200 |
| 1JSBCHS 0003 | MANUAL REACTOR TRIP CH C | J-200 |
| 1JSBDHS 0004 | MANUAL REACTOR TRIP CH D | J-200 |
| 1JSBAHS 0005 | SG PRESS VAR SETPOINT RESET | N-001 |
| 1JSBBHS 0006 | SG PRESS VAR SETPOINT RESET | N-001 |
| 1JSBCHS 0007 | SG PRESS VAR SETPOINT RESET | N-001 |
| 1JSBDHS 0008 | SG PRESS VAR SETPOINT RESET | N-001 |
| 1JSBAHS 0009 | PZR PRESS VAR SETPOINT RESET | N-001 |
| 1JSBBHS 0010 | PZR PRESS VAR SETPOINT RESET | N-001 |
| 1JSBCHS 0011 | PZR PRESS VAR SETPOINT RESET | N-001 |
| 1JSBDHS 0012 | PZR PRESS VAR SETPOINT RESET | N-001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 142 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 98

EX-CORE NEUTRON MONITORING
(SE-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1ESEA751 | ELECT PENTRTN-SHLD INSTR&COAX | 13EM035 |
| 1ESEB736 | ELECT PENTRTN-SHLD INSTR&COAX | 13EM035 |
| 1FSEN776 | ELECT PENTRTN-SHLD INSTR&COAX | 13EM035 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 143 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 74 (SE-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSEAJI 0001A | NEUTRON FLX LOG POWER CH A | N-001 |
| 1JSEAJI 0001A1 | EX-CORE LOG POWER CH A - RS | N-001 |
| 1JSEAJKI 0001A | POWER RATE OF CHANGE CH A | N-001 |
| 1JSEAJR 0001A | LINEAR/CALIB LINEAR POWER A | N-001 |
| 1JSEAJSHL0001A | LINEAR/CALIB LINEAR PWR DEV A | N-001 |
| 1JSEAJY 0001A | E/E CONVERTOR | N-001 |
| 1JSEAJY 0001A1 | E/E CONVERTOR | N-001 |
| 1JSEAJY 0001A2 | E/E CONVERTOR | N-001 |
| 1JSEAJY 0001A3 | E/E CONVERTOR | N-001 |
| 1JSEANE 0001A | EX-CORE DETECTOR SAFETY CH A | N-001 |
| 1JSEANT 0001A | PRE-AMP | N-001 |
| 1JSEBJI 0001B | NEUTRON FLX LOG POWER CH B | N-001 |
| 1JSEBJI 0001B1 | EX-CORE LOG POWER CH B - RS | N-001 |
| 1JSEBJKI 0001B | POWER RATE OF CHANGE CH B | N-001 |
| 1JSEBJR 0001B | LINEAR/CALIB LINEAR POWER B | N-001 |
| 1JSEBJSHL0001B | LINEAR/CALIB LINEAR PWR DEV B | N-001 |
| 1JSEBJY 0001B | E/E CONVERTOR | N-001 |
| 1JSEBJY 0001B1 | E/E CONVERTOR | N-001 |
| 1JSEBJY 0001B2 | E/E CONVERTOR | N-001 |
| 1JSEBJY 0001B3 | E/E CONVERTOR | N-001 |
| 1JSEBNE 0001B | EX-CORE DETECTOR SAFETY CH B | N-001 |
| 1JSEBNT 0001B | PRE-AMP | N-001 |
| 1JSECJI 0001C | NEUTRON FLX LOG POWER C | N-001 |
| 1JSECJKI 0001C | POWER RATE OF CHANGE CH C | N-001 |
| 1JSECJR 0001C | LINEAR/CALIB LINEAR POWER C | N-001 |
| 1JSECJSHL0001C | LINEAR/CALIB LINEAR PWR DEV C | N-001 |
| 1JSECJY 0001C | E/E CONVERTOR | N-001 |
| 1JSECJY 0001C1 | E/E CONVERTOR | N-001 |
| 1JSECJY 0001C2 | E/E CONVERTOR | N-001 |
| 1JSECJY 0001C3 | E/E CONVERTOR | N-001 |
| 1JSECNE 0001C | EX-CORE DETECTOR SAFETY CH C | N-001 |
| 1JSECNT 0001C | PRE-AMP | N-001 |
| 1JSEDJI 0001D | NEUTRON FLX LOG POWER CH D | N-001 |
| 1JSEDJKI 0001D | POWER RATE OF CHANGE CH D | N-001 |
| 1JSEDJR 0001D | LINEAR/CALIB LINEAR POWER D | N-001 |
| 1JSEDJSHL0001D | LINEAR/CALIB LINEAR PWR DEV D | N-001 |
| 1JSEDJY 0001D | E/E CONVERTOR | N-001 |
| 1JSEDJY 0001D1 | E/E CONVERTOR | N-001 |
| 1JSEDJY 0001D2 | E/E CONVERTOR | N-001 |
| 1JSEDJY 0001D3 | E/E CONVERTOR | N-001 |
| 1JSEDNE 0001D | EX-CORE DETECTOR SAFETY CH D | N-001 |
| 1JSEDNT 0001D | PRE-AMP | N-001 |
| 1JSEAJI 0003A | LOCAL POWER DENSITY MARGIN A | N-001 |
| 1JSEBJI 0003B | LOCAL POWER DENSITY MARGIN B | N-001 |
| 1JSECJI 0003C | LOCAL POWER DENSITY MARGIN C | N-001 |
| 1JSEDJI 0003D | LOCAL POWER DENSITY MARGIN D | N-001 |
| 1JSEAJI 0004A | DNBR MARGIN CH A | N-001 |
| 1JSEBJI 0004B | DNBR MARGIN CH B | N-001 |
| 1JSECJI 0004C | DNBR MARGIN CH C | N-001 |
| 1JSEDJI 0004D | DNBR MARGIN CH D | N-001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 144 of 202)

04/19/82 15:38:46 EQUIPMENT-"0" CLASS PAGE 100 REACTOR CONTROL (SF-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1ESFA750 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFB738 | ELEC PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFB742 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFC722 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFC725 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFC726 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFC727 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFD777 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFD778 | ELECT PENTRTN-600V PWR | 13EM035 |
| 1ESFD783 | ELECT PENTRTN-SHLD INSTR&COAX | 13EM035 |
| 1ESFN202 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFN218 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFN758 | ELECT PENTRTN-600V PWR(CEDMS) | 13EM035 |
| 1ESFN764 | ELECT PENTRTN-600V PWR(CEDMS) | 13EM035 |
| 1ESFN765 | ELECT PENTRTN-600V PWR(CEDMS) | 13EM035 |
| 1ESFN766 | ELECT PENTRTN-600V PWR(CEDMS) | 13EM035 |
| 1ESFN772 | ELECT PENTRTN-600V PWR(CEDMS) | 13EM035 |
| 1ESFN774 | ELECT PENTRTN-600V PWR(CEDMS) | 13EM035 |
| 1ESFN776 | ELECT PENTRTN-600V PWR(CEDMS) | 13EM035 |
| 1ESFN780 | ELECT PENTRTN | 13EM035 |
| 1ESFN782 | ELECT PENTRTN-600V PWR(CEDMS) | 13EM035 |
| 1ESFN784 | ELECT PENTRTN-600V PWR(CEDMS) | 13EM035 |
| 1ESFN787 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFN789 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1ESFN791 | ELECT PENTRTN-SHLD INSTR | 13EM035 |
| 1JSFNC03 | NSSS CONTROL SYSTEMS CABINET | 13NM001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 145 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 76 SF-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSFBZT 0001A | CEA 1 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0001B | CEA 1 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEBZT 0002A | CEA 2 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0002B | CEA 2 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0003A | CEA 3 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0003B | CEA 3 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0004A | CEA 4 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0004B | CEA 4 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEBZT 0005A | CEA 5 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0005B | CEA 5 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0006A | CEA 6 REED SWITCH POS TRANS 1 | N-001 |
| 1JSEDZT 0006B | CEA 6 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0007A | CEA 7 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0007B | CEA 7 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEBZT 0008A | CEA 8 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0008B | CEA 8 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0009A | CEA 9 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0009B | CEA 9 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0010A | CEA 10 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0010B | CEA 10 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEAZT 0011A | CEA 11 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0011B | CEA 11 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0012A | CEA 12 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0012B | CEA 12 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0013A | CEA 13 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0013B | CEA 13 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEBZT 0014A | CEA 14 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0014B | CEA 14 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0015A | CEA 15 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0015B | CEA 15 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0016A | CEA 16 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0016B | CEA 16 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEBZT 0017A | CEA 17 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0017B | CEA 17 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0018A | CEA 18 REED SWITCH POS TRANS 1 | N-001 |
| 1JSEDZT 0018B | CEA 18 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0019A | CEA 19 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0019B | CEA 19 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEAZT 0020A | CEA 20 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0020B | CEA 20 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0021A | CEA 21 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0021B | CEA 21 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0022A | CEA 22 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0022B | CEA 22 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEBZT 0023A | CEA 23 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0023B | CEA 23 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0024A | CEA 24 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0024B | CEA 24 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0025A | CEA 25 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0025B | CEA 25 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEAZT 0026A | CEA 26 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0026B | CEA 26 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0027A | CEA 27 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0027B | CEA 27 REED SWITCH POS TRANS 2 | N-001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 146 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 11 (SF-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSFBZT 0028A | CEA 28 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0028B | CEA 28 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0029A | CEA 29 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0029B | CEA 29 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0030A | CEA 30 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFDZT 0030B | CEA 30 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0031A | CEA 31 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0031B | CEA 31 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFAZT 0032A | CEA 32 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0032B | CEA 32 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0033A | CEA 33 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0033B | CEA 33 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0034A | CEA 34 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFDZT 0034B | CEA 34 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0035A | CEA 35 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFDZT 0035B | CEA 35 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0036A | CEA 36 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0036B | CEA 36 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0037A | CEA 37 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0037B | CEA 37 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFAZT 0038A | CEA 38 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0038B | CEA 38 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFAZT 0039A | CEA 39 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0039B | CEA 39 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0040A | CEA 40 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0040B | CEA 40 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0041A | CEA 41 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0041B | CEA 41 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0042A | CEA 42 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFDZT 0042B | CEA 42 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0043A | CEA 43 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0043B | CEA 43 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFAZT 0044A | CEA 44 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0044B | CEA 44 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0045A | CEA 45 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFDZT 0045B | CEA 45 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0046A | CEA 46 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFDZT 0046B | CEA 46 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0047A | CEA 47 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFDZT 0047B | CEA 47 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0048A | CEA 48 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFDZT 0048B | CEA 48 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0049A | CEA 49 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0049B | CEA 49 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFAZT 0050A | CEA 50 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0050B | CEA 50 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFAZT 0051A | CEA 51 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0051B | CEA 51 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0052A | CEA 52 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0052B | CEA 52 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0053A | CEA 53 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFCZT 0053B | CEA 53 REED SWITCH POS TRANS 2 | N=001 |
| 1JSFBZT 0054A | CEA 54 REED SWITCH POS TRANS 1 | N=001 |
| 1JSFDZT 0054B | CEA 54 REED SWITCH POS TRANS 2 | N=001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 147 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 78 — (SF-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSFBZT 0055A | CEA 55 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0055B | CEA 55 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0056A | CEA 56 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0056B | CEA 56 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0057A | CEA 57 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0057B | CEA 57 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0058A | CEA 58 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0058B | CEA 58 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0059A | CEA 59 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0059B | CEA 59 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0060A | CEA 60 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0060B | CEA 60 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0061A | CEA 61 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0061B | CEA 61 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEAZT 0062A | CEA 62 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0062B | CEA 62 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0063A | CEA 63 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0063B | CEA 63 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0064A | CEA 64 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0064B | CEA 64 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEBZT 0065A | CEA 65 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0065B | CEA 65 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0066A | CEA 66 REED SWITCH POS TRANS 1 | N-001 |
| 1JSEDZT 0066B | CEA 66 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0067A | CEA 67 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0067B | CEA 67 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0068A | CEA 68 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0068B | CEA 68 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0069A | CEA 69 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0069B | CEA 69 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0070A | CEA 70 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0070B | CEA 70 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEAZT 0071A | CEA 71 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0071B | CEA 71 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0072A | CEA 72 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0072B | CEA 72 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0073A | CEA 73 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0073B | CEA 73 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEBZT 0074A | CEA 74 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0074B | CEA 74 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0075A | CEA 75 REED SWITCH POS TRANS 1 | N-001 |
| 1JSEDZT 0075B | CEA 75 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0076A | CEA 76 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0076B | CEA 76 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0077A | CEA 77 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0077B | CEA 77 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0078A | CEA 78 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0078B | CEA 78 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0079A | CEA 79 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0079B | CEA 79 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEBZT 0080A | CEA 80 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0080B | CEA 80 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0081A | CEA 81 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0081B | CEA 81 REED SWITCH POS TRANS 2 | N-001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 148 of 202)

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(SF-5)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSFBZT 0082A | CEA 82 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0082B | CEA 82 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0083A | CEA 83 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0083B | CEA 83 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0084A | CEA 84 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0084B | CEA 84 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0085A | CEA 85 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0085B | CEA 85 REED SWITCH POS TRANS 2 | N-001 |
| 1JSEBZT 0086A | CEA 86 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFDZT 0086B | CEA 86 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0087A | CEA 87 REED SWITCH POS TRANS 1 | N-001 |
| 1JSECZT 0087B | CEA 87 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFAZT 0088A | CEA 88 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0088B | CEA 88 REED SWITCH POS TRANS 2 | N-001 |
| 1JSFBZT 0089A | CEA 89 REED SWITCH POS TRANS 1 | N-001 |
| 1JSFCZT 0089B | CEA 89 REED SWITCH POS TRANS 2 | N-001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 149 of 202)

04/19/82 15:38:46 EQUIPMENT-NOM CLASS PAGE 102 MAIN STEAM (SG-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSGAC01 | MSFIS LOGIC CAB TRAIN A | 13JM105 |
| 1JSGBC01 | MSFIS LOGIC CAB TRAIN B | 13JM105 |
| 1JSGEA01 | MAIN STEAM FLOW XMITTER RACK | 13NM001 |
| 1JSGNC01 | VOID | 13NM001 |
| 1JSGNC01A | MSFIS LOGIC CAB TRAIN A | 13JM105 |
| 1JSGNC01B | MSFIS LOGIC CAB TRAIN B | 13JM105 |
| 1MSGAX01A | ATM DUMP VALVE ACCUMULATORS | 13MM105 |
| 1MSGAX01B | ATM DUMP VALVE ACCUMULATORS | 13MM105 |
| 1MSGHY01A | ATM DUMP VALVE ACCUMULATORS | 13MM105 |
| 1MSGAX01B | ATM DUMP VALVE ACCUMULATORS | 13MM105 |
| 1MSGEU01 | PENETRATION-MAIN STEAM LINE | 13MM500 |
| 1MSGEU02 | PENETRATION-MAIN STEAM LINE | 13MM500 |
| 1MSGEU03 | PENETRATION-MAIN STEAM LINE | 13MM500 |
| 1MSGEU04 | PENETRATION-MAIN STEAM LINE | 13MM500 |
| 1MSGEU08 | PENETRATION-MAIN FEED LINE | 13MM500 |
| 1MSGEU10 | PENETRATION-FEEDWATER | 13MM500 |
| 1MSGEU12 | PENETRATION-FEEDWATER | 13MM500 |
| 1MSGEU46 | PENETRATION-SG BLOWDOWN | 13MM500 |
| 1MSGEU47 | PENETRATION-SG BLOWDOWN | 13MM500 |
| 1MSGEU48 | PENETRATION-SG SAMPLE | 13MM500 |
| 1MSGEU49 | PENETRATION-SG SAMPLE | 13MM500 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 150 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 81 (SG-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSGEHV 0041 | SG 1 COLD LEG BLDWN ISOL | P-221B |
| 1JSGNHS 0041 | SG 1 COLD LEG BLDWN ISOL | J-200 |
| 1JSGEHV 0042 | SG 2 HOT LEG BLDWN ISOL | P-221B |
| 1JSGNHS 0042 | SG 2 HOT LEG BLDWN ISOL | J-200 |
| 1JSGEHV 0043 | SG 1 HOT LEG BLDWN ISOL | P-221B |
| 1JSGNHS 0043 | SG 1 HOT LEG BLDWN ISOL | J-200 |
| 1JSGEHV 0044 | SG 2 COLD LEG BLDWN ISOL | P-221B |
| 1JSGNHS 0044 | SG 2 COLD LEG BLDWN ISOL | J-200 |
| 1JSGBHS 0130 | SG 1 DOWNCOMER FW DWNSTR ISOL | J-200 |
| 1JSGBUV 0130 | SG 1 DOWNCOMER FW DWNSTR ISOL | P-221B |
| 1JSGBUY 0130A | SG 1 DOWNCOMER FW DWNSTR ISOL | P-221B |
| 1JSGBUY 0130B | SG 1 DOWNCOMER FW DWNSTR ISOL | P-221B |
| 1JSGBUV 0132 | SG 1 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGBHS 0132A | SG 1 ECONOMIZER FW DWNSTR ISO | J-200 |
| 1JSGBUY 0132A | SG 1 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGBHS 0132B | SG 1 ECONOMIZER FW DWNSTR ISO | J-200 |
| 1JSGBUY 0132B | SG 1 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGBHS 0132C | SG 1 ECONOMIZER FW DWNSTR ISO | J-200 |
| 1JSGBUY 0132C | SG 1 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGBUY 0132D | SG 1 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGAUV 0134 | SG 1 STM SUPPLY TO AF PP TURB | P-221B |
| 1JSGAHS 0134A | SG 1 STM SUPPLY TO AF PP TURB | J-200 |
| 1JSGAHS 0134B | SG 1 STM SUPPLY TO AF PP TURB | N-001 |
| 1JSGBHS 0135 | MAIN FW ISOL VLV 2 SG 2 UPPER | J-200 |
| 1JSGBUV 0135 | SG 2 DOWNCOMER FW DWNSTR ISOL | P-221B |
| 1JSGBUY 0135A | SG 2 DOWNCOMER FW DWNSTR ISOL | P-221B |
| 1JSGBUY 0135B | SG 2 DOWNCOMER FW DWNSTR ISOL | P-221B |
| 1JSGBUV 0137 | SG 2 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGBHS 0137A | SG 2 ECONOMIZER FW DWNSTR ISO | J-200 |
| 1JSGBUY 0137A | SG 2 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGBHS 0137B | SG 2 ECONOMIZER FW DWNSTR ISO | J-200 |
| 1JSGBUY 0137B | SG 2 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGBHS 0137C | SG 2 ECONOMIZER FW DWNSTR ISO | J-200 |
| 1JSGBUY 0137C | SG 2 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGBUY 0137D | SG 2 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGAUV 0138 | SG 2 STM SUPPLY TO AF PP TURB | P-221B |
| 1JSGAHS 0138A | SG 2 STM SUPPLY TO AF PP TURB | J-200 |
| 1JSGAHS 0138B | SG 2 STM SPLY TO AF PP TURB-RS | N-001 |
| 1JSGAHS 0138C | SG 2 STM TO AF PP TURB OVRD | J-200 |
| 1JSGAHS 0138D | SG 2 STM TO AF PP TURB OVRD-RS | N-001 |
| 1JSGEUV 0169 | SG 1 MSIV BYPASS | P-221B |
| 1JSGAHS 0169A | SG 1 MSIV BYPASS | J-200 |
| 1JSGAUY 0169A | SG 1 MSIV BYPASS | P-221B |
| 1JSGBHS 0169B | SG 1 MSIV BYPASS | J-200 |
| 1JSGBUY 0169B | SG 1 MSIV BYPASS | P-221B |
| 1JSGEUV 0170 | SG 1 LN 1 MSIV | M-234 |
| 1JSGAHS 0170A | SG 1 LN 1 MSIV | J-200 |
| 1JSGAUY 0170A | SG 1 LN 1 MSIV | M-234A |
| 1JSGAUY 0170B | SG 1 LN 1 MSIV | M-234A |
| 1JSGBHS 0170B | SG 1 LN 1 MSIV | J-200 |
| 1JSGAHS 0170C | SG 1 LN 1 MSIV | J-200 |
| 1JSGAUY 0170C | SG 1 LN 1 MSIV | M-234A |
| 1JSGAUY 0170D | SG 1 LN 1 MSIV | M-234A |
| 1JSGBHS 0170D | SG 1 LN 1 MSIV | J-200 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 151 of 202)

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| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSGBUY 0170E | SG 1 LN 1 MSIV | M-234A |
| 1JSGBUY 0170F | SG 1 LN 1 MSIV | M-234A |
| 1JSGBUY 0170G | SG 1 LN 1 MSIV | M-234A |
| 1JSGBUY 0170H | SG 1 LN 1 MSIV | M-234A |
| 1JSGEUV 0171 | SG 2 LN 1 MSIV | M-234A |
| 1JSGAHS 0171A | SG 2 LN 1 MSIV | J-200 |
| 1JSGAUY 0171A | SG 2 LN 1 MSIV | M-234A |
| 1JSGAUY 0171B | SG 2 LN 1 MSIV | M-234A |
| 1JSGBHS 0171B | SG 2 LN 1 MSIV | J-200 |
| 1JSGAHS 0171C | SG 2 LN 1 MSIV | J-200 |
| 1JSGAUY 0171C | SG 2 LN 1 MSIV | M-234A |
| 1JSGAUY 0171D | SG 2 LN 1 MSIV | M-234A |
| 1JSGBHS 0171D | SG 2 LN 1 MSIV | J-200 |
| 1JSGBUY 0171E | SG 2 LN 1 MSIV | M-234A |
| 1JSGBUY 0171F | SG 2 LN 1 MSIV | M-234A |
| 1JSGBUY 0171G | SG 2 LN 1 MSIV | M-234A |
| 1JSGBUY 0171H | SG 2 LN 1 MSIV | M-234A |
| 1JSGAHS 0172 | SG 1 DOWNCOMER FW UPSTR ISOL | J-200 |
| 1JSGAUV 0172 | SG 1 DOWNCOMER FW UPSTR ISOL | P-221B |
| 1JSGAUV 0172A | SG 1 DOWNCOMER FW UPSTR ISOL | P-221B |
| 1JSGAUY 0172B | SG 1 DOWN COMER FW UPSTR ISOL | P-221B |
| 1JSGAUV 0174 | SG 1 ECONOMIZER FW UPSTR ISOL | M-234A |
| 1JSGAHS 0174A | SG 1 ECONOMIZER FW UPSTR ISO | J-200 |
| 1JSGAUY 0174A | SG 1 ECONOMIZER FW UPSTR ISOL | M-234A |
| 1JSGAHS 0174B | SG 1 ECONOMIZER FW UPSTR ISO | J-200 |
| 1JSGAUY 0174B | SG 1 ECONOMIZER FW UPSTR ISOL | M-234A |
| 1JSGAHS 0174C | SG 1 ECONOMIZER FW UPSTR ISO | J-200 |
| 1JSGAUY 0174C | SG 1 ECONOMIZER FW UPSTR ISOL | M-234A |
| 1JSGAUY 0174D | SG 1 ECONOMIZER FW UPSTR ISOL | M-234A |
| 1JSGAHS 0175 | SG 2 DOWNCOMER FW UPSTR ISOL | J-200 |
| 1JSGAUV 0175 | SG 2 DOWNCOMER FW UPSTR ISOL | P-221B |
| 1JSGAUY 0175A | SG 2 DOWNCOMER FW UPSTR ISOL | P-221B |
| 1JSGAUY 0175B | SG 2 DOWNCOMER FW UPSTR ISOL | P-221B |
| 1JSGAHS 0177 | VOIDED | J-200 |
| 1JSGAUV 0177 | SG 2 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGAHS 0177A | SG 2 ECONOMIZER FW UPSTR ISO | J-200 |
| 1JSGAUY 0177A | SG 2 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGAHS 0177B | SG 2 ECONOMIZER FW UPSTR ISO | J-200 |
| 1JSGAUY 0177B | SG 2 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGAHS 0177C | SG 2 ECONOMIZER FW UPSTR ISO | J-200 |
| 1JSGAUY 0177C | SG 2 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGAUY 0177D | SG 2 ECONOMIZER FW DWNSTR ISOL | M-234A |
| 1JSGBHV 0178 | SG 1 LN 2 ATM DMP VLV | J-601A |
| 1JSGBZE 0178 | SG 1 LN 2 ATM DMP VLV | J-601A |
| 1JSGBZT 0178 | SG 1 LN 2 ATM DMP VLV | J-601A |
| 1JSGEFX 0178 | STRIP RESISTOR SG 1 | J-601A |
| 1JSGBHIC 0178A | SG 1 LN 2 ATM DMP VLV CR | J-111 |
| 1JSGBHS 0178A | SG 1 LN 2 ATM DMP VLV | J-200 |
| 1JSGBHY 0178A | SG 1 LN 2 ATM DMP VLV | J-601A |
| 1JSGBHIC 0178B | SG 1 LN 2 ATM DMP VLV RS | J-111 |
| 1JSGDHS 0178B | SG 1 LN 2 ATM DMP VLV | J-200 |
| 1JSGDHY 0178B | SG 1 LN 2 ATM DMP VLV | J-601A |
| 1JSGBHS 0178C | SG 1 LN 2 ATM DMP VLV RS | N-001 |
| 1JSGBHY 0178C | I/P CONVERTER | J-312A |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 152 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 83 (SG-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSGBHY 0178D | I/E CONVERTER | J-111 |
| 1JSGDHS 0178D | SG 1 LN 2 ATM DMP VLV RS | N-001 |
| 1JSGBHS 0178E | VOIDED | J-111 |
| 1JSGBHY 0178E | CONTROL MODULE | J-111 |
| 1JSGBHY 0178F | E/I CONVERTER | J-111 |
| 1JSGBHY 0178G | MAIN STEAM SYSTEM | J-111 |
| 1JSGBHY 0178H | E/I CONVERTER | N-001 |
| 1JSGBHY 0178J | I/E CONVERTER | N-001 |
| 1JSGDHS 0178J | SG 1 LN 2 ADV DISCONNECT RS | N-001 |
| 1JSGBHY 0178K | I/E CONVERTER | J-111 |
| 1JSGBHY 0178L | E/I CONVERTER | J-111 |
| 1JSGBHY 0178M | E/I CONVERTER | J-366 |
| 1JSGAHV 0179 | SG 2 LN 2 ATM DMP VLV | J-601A |
| 1JSGAZE 0179 | SG 2 LN 2 ATM DMP VLV | J-601A |
| 1JSGAZT 0179 | SG 2 LN 2 ATM DMP VLV | J-601A |
| 1JSGEFX 0179 | STRIP RESISTOR SG 2 | J-601A |
| 1JSGAHIC 0179A | SG 2 LN 2 ATM DMP VLV CR | J-111 |
| 1JSGAHS 0179A | SG 2 LN 2 ATM DMP VLV | J-200 |
| 1JSGAHY 0179A | SG 2 LN 2 ATM DMP VLV | J-601A |
| 1JSGAHIC 0179B | SG 2 LN 2 ATM DMP VLV RS | J-111 |
| 1JSGCHS 0179B | SG 2 LN 2 ATM DMP VLV | J-200 |
| 1JSGCHY 0179B | SG 2 LN 2 ATM DMP VLV | J-601A |
| 1JSGAHS 0179C | SG 2 LN 2 ATM DMP VLV RS | N-001 |
| 1JSGAHY 0179C | I/P CONVERTER | J-312A |
| 1JSGAHY 0179D | I/E CONVERTER | J-111 |
| 1JSGCHS 0179D | SG 2 LN 2 ATM DMP VLV RS | N-001 |
| 1JSGAHS 0179E | VOIDED | J-111 |
| 1JSGAHY 0179E | CONTROL MODULE | J-111 |
| 1JSGAHY 0179F | E/I CONVERTER | J-111 |
| 1JSGAHY 0179G | CONTROL MODULE | J-111 |
| 1JSGAHY 0179H | E/I CONVERTER | J-366 |
| 1JSGEUV 0180 | SG 1 LN 2 MSIV | M-234A |
| 1JSGAHS 0180A | SG 1 LN 2 MSIV | J-200 |
| 1JSGAUY 0180A | SG 1 LN 2 MSIV | M-234A |
| 1JSGAUY 0180B | SG 1 LN 2 MSIV | M-234A |
| 1JSGBHS 0180B | SG 1 LN 2 MSIV | J-200 |
| 1JSGAHS 0180C | SG 1 LN 2 MSIV | J-200 |
| 1JSGAUY 0180C | SG 1 LN 2 MSIV | M-234A |
| 1JSGAUY 0180D | SG 1 LN 2 MSIV | M-234A |
| 1JSGBHS 0180D | SG 1 LN 2 MSIV | J-200 |
| 1JSGBUY 0180E | SG 1 LN 2 MSIV | M-234A |
| 1JSGBUY 0180F | SG 1 LN 2 MSIV | M-234A |
| 1JSGBUY 0180G | SG 1 LN 2 MSIV | M-234A |
| 1JSGBUY 0180H | SG 1 LN 2 MSIV | M-234A |
| 1JSGEUV 0181 | SG 2 LN 2 MSIV | M-234A |
| 1JSGAHS 0181A | SG 2 LN 2 MSIV | J-200 |
| 1JSGAUY 0181A | SG 2 LN 2 MSIV | M-234A |
| 1JSGAUY 0181B | SG 2 LN 2 MSIV | M-234A |
| 1JSGBHS 0181B | SG 2 LN 2 MSIV | J-200 |
| 1JSGBUY 0181B | VOIDED | M-234A |
| 1JSGAHS 0181C | SG 2 LN 2 MFIV | J-200 |
| 1JSGAUY 0181C | SG 2 LN 2 MSIV | M-234A |
| 1JSGAUY 0181D | SG 2 LN 2 MSIV | M-234A |
| 1JSGBHS 0181D | SG 2 LN 2 MFIV | J-200 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 153 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 84

(SG-5)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PD |
|---|---|---|
| 1JSGBUY 0181E | SG 2 LN 2 MSIV | M=234A |
| 1JSGBUY 0181F | SG 2 LN 2 MSIV | M=234A |
| 1JSGBUY 0181G | SG 2 LN 2 MSIV | M=234A |
| 1JSGBUY 0181H | SG 2 LN 2 MSIV | M=234A |
| 1JSGEUV 0183 | SG 2 MSIV BYPASS | P=221B |
| 1JSGAHS 0183A | SG 2 MSIV BYPASS | J=200 |
| 1JSGAUY 0183A | SG 2 MSIV BYPASS | P=221B |
| 1JSGBHS 0183B | SG 2 MSIV BYPASS | J=200 |
| 1JSGBUY 0183B | SG 2 MSIV BYPASS | P=221B |
| 1JSGAHV 0184 | SG 1 LN 1 ATM DMP VLV | J=601A |
| 1JSGAZE 0184 | SG 1 LN 1 ATM DMP VLV | J=601A |
| 1JSGAZT 0184 | SG 1 LN 1 ATM DMP VLV | J=601A |
| 1JSGAHIC 0184A | SG 1 LN 1 ATM DMP VLV CR | J=111 |
| 1JSGAHS 0184A | SG 1 LN 1 ATM DMP VLV CR | J=200 |
| 1JSGAHV 0184A | SG 1 LN 1 ATM DMP VLV | J=601A |
| 1JSGAHIC 0184B | SG 1 LN 1 ATM DMP VLV | J=111 |
| 1JSGCHS 0184B | SG 1 LN 1 ATM DMP VLV CR | J=200 |
| 1JSGCHV 0184B | SG 1 LN 1 ATM DMP VLV | J=601A |
| 1JSGAHS 0184C | SG 1 LN 1 ATM DMP VLV RS | N=001 |
| 1JSGAHV 0184C | I/P CONVERTER | J=312A |
| 1JSGCHS 0184D | SG 1 LN 1 ATM DMP VLV RS | N=001 |
| 1JSGAHV 0184H | E/I CONVERTER | J=366 |
| 1JSGBHV 0185 | SG 2 LN 1 ATM DMP VLV | J=601A |
| 1JSGBZE 0185 | SG 2 LN 1 ATM DMP VLV | J=601A |
| 1JSGBZT 0185 | SG 2 LN 1 ATM DMP VLV | J=601A |
| 1JSGBHIC 0185A | SG 2 LN 2 ATM DMP VLV CR | J=111 |
| 1JSGBHS 0185A | SG 2 LN 1 ATM DMP VLV CR | J=200 |
| 1JSGBHV 0185A | SG 2 LN 1 ATM DMP VLV | J=601A |
| 1JSGBHIC 0185B | SG 2 LN 1 ATM DMP VLV--RS | J=111 |
| 1JSGQHS 0185B | SG 2 LN 1 ATM DMP VLV CR | J=200 |
| 1JSGDHV 0185B | SG 2 LN 1 ATM DMP VLV | J=601A |
| 1JSGBHS 0185C | SG 2 LN 1 ATM DMP VLV RS | J=200 |
| 1JSGBHV 0185C | I/P CONVERTER | J=312A |
| 1JSGBHV 0185D | I/E CONVERTER | J=111 |
| 1JSGDHS 0185D | SG 2 LN 1 ATM DMP VLV RS | N=001 |
| 1JSGBHV 0185E | CONTROL MODULE | J=111 |
| 1JSGBHV 0185F | E/I CONVERTER | J=111 |
| 1JSGBHV 0185G | MAIN STEAM SYSTEM | J=111 |
| 1JSGBHV 0185H | E/I CONVERTER | N=001 |
| 1JSGBHV 0185J | I/E CONVERTER | N=001 |
| 1JSGDHS 0185J | SG 2 LN 1 ADV DISCONNECT RS | N=001 |
| 1JSGBHV 0185K | I/E CONVERTER | J=111 |
| 1JSGBHV 0185L | E/I CONVERTER | J=111 |
| 1JSGBHV 0185M | E/I CONVERTER | J=366 |
| 1JSGBHS 0200 | SG 1 CHEM INJ | J=200 |
| 1JSGBHV 0200 | SG 1 CHEM INJ | N=001 |
| 1JSGBHS 0201 | SG 2 CHEM INJ | J=200 |
| 1JSGBHV 0201 | SG 2 CHEM INJ | N=001 |
| 1JSGAHS 0204 | SG 1 COLD LEG BLDWN SMPL ISOL | J=200 |
| 1JSGAUV 0204 | SG 1 COLD LEG BLDWN SMPL ISOL | N=001 |
| 1JSGAHS 0211 | SG 1 HOT LEG BLDWN SMPL ISOL | J=200 |
| 1JSGAUV 0211 | SG 1 HOT LEG BLDWN SMPL ISOL | N=001 |
| 1JSGBHS 0219 | SG 1 COLD LEG BLDWN SMPL ISOL | J=200 |
| 1JSGBUV 0219 | SG 1 COLD LEG BLDWN SMPL ISOL | N=001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 154 of 202)

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| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSGAHS 0220 | SG 1 DOWNCOMER BLDWN SMPL ISOL | J=200 |
| 1JSGAUV 0220 | SG 1 DOWNCOMER BLDWN SMPL ISOL | N=001 |
| 1JSGBHS 0221 | SG 1 DOWNCOMER BLDWN SMPL ISOL | J=200 |
| 1JSGBUV 0221 | SG 1 DOWNCOMER BLDWN SMPL ISOL | N=001 |
| 1JSGBHS 0222 | SG 2 COLD LEG BLDWN SMPL ISOL | J=200 |
| 1JSGBUV 0222 | SG 2 COLD LEG BLDWN SMPL ISOL | N=001 |
| 1JSGAHS 0223 | SG 2 COLD LEG BLDWN SMPL ISOL | J=200 |
| 1JSGAUV 0223 | SG 2 COLD LEG BLDWN SMPL ISOL | N=001 |
| 1JSGBHS 0224 | SG 2 HOT LEG BLDWN SMPL ISOL | J=200 |
| 1JSGBUV 0224 | SG 2 HOT LEG BLDWN SMPL ISOL | N=001 |
| 1JSGAHS 0225 | SG 2 HOT LEG BLDWN SMPL ISOL | J=200 |
| 1JSGAUV 0225 | SG 2 HOT LEG BLDWN SMPL ISOL | N=001 |
| 1JSGBHS 0226 | SG 2 DOWNCOMER BLDWN SMPL ISOL | J=200 |
| 1JSGBUV 0226 | SG 2 DOWNCOMER BLDWN SMPL ISOL | N=001 |
| 1JSGBUV 0226 | DELETED | N=001 |
| 1JSGAHS 0227 | SG 2 DOWNCOMER BLDWN SMPL ISOL | J=200 |
| 1JSGAUV 0227 | SG 2 DOWNCOMER BLDWN SMPL ISOL | N=001 |
| 1JSGBHS 0228 | SG 1 HOT LEG BLDWN SMPL ISOL | J=200 |
| 1JSGBUV 0228 | SG 1 HOT LEG BLDWN SMPL ISOL | N=001 |
| 1JSGAHJS 0229 | MSIV & FWIV SELECTOR SW TR A | J=200 |
| 1JSGAPI 0229 | MSIV & FWIV ACCUM PRESS TR A | J=111 |
| 1JSGAPSL 0229 | SG 1 LN 1 MSIV 170 | J=111 |
| 1JSGAPT 0229 | MSIV ACCUM NO 1 FOR 170 | M=234A |
| 1JSGAPY 0229 | I/E CONVERTOR | J=111 |
| 1JSGBHJS 0230 | MSIV & FWIV SELECTOR SW TR B | J=200 |
| 1JSGBPI 0230 | MSIV & FWIV ACCUM PRESS TR B | J=111 |
| 1JSGBPSL 0230 | SG 1 LN 1 MSIV 170 | J=111 |
| 1JSGBPT 0230 | MSIV ACCUM NO 2 FOR 170 | M=234A |
| 1JSGBPY 0230 | I/E CONVERTOR | J=111 |
| 1JSGAPSL 0231 | SG 1 LN 1 MSIV 170 | J=111 |
| 1JSGAPT 0231 | MSIV ACCUM NO 1 FOR 180 | M=234A |
| 1JSGAPY 0231 | I/E CONVERTOR | J=111 |
| 1JSGBPSL 0232 | SG 2 LN 1 MSIV 171 | J=111 |
| 1JSGBPT 0232 | MSIV ACCUM NO 2 FOR 180 | M=234A |
| 1JSGBPY 0232 | I/E CONVERTOR | J=111 |
| 1JSGAPSL 0233 | SG 2 LN 1 MSIV 171 | J=111 |
| 1JSGAPT 0233 | MSIV ACCUM 1 FOR 171 | M=234A |
| 1JSGAPY 0233 | I/E CONVERTOR | J=111 |
| 1JSGBPSL 0234 | SG 2 LN 1 MSIV 171 | J=111 |
| 1JSGBPT 0234 | MSIV ACCUM 2 FOR 171 | M=234A |
| 1JSGBPY 0234 | I/E CONVERTOR | J=111 |
| 1JSGAPSL 0235 | SG 2 LN 1 MSIV 171 | J=111 |
| 1JSGAPT 0235 | MSIV ACCUM 1 FOR 181 | M=234A |
| 1JSGAPY 0235 | I/E CONVERTOR | J=111 |
| 1JSGBPSL 0236 | SG 2 LN 1 MSIV 171 | J=111 |
| 1JSGBPT 0236 | MSIV ACCUM 2 FOR 181 | M=234A |
| 1JSGBPY 0236 | I/E CONVERTOR | J=111 |
| 1JSGAPSL 0237A | SG 1 ECONOMIZER FW UPSTR ISOL | J=111 |
| 1JSGAPT 0237A | FWIV ACCUM FOR 174 | M=234A |
| 1JSGAPY 0237A | I/E CONVERTOR | J=111 |
| 1JSGAPSL 0237B | SG 1 ECONOMIZER FW UPSTR ISOL | J=111 |
| 1JSGAPT 0237B | FWIV ACCUM FOR 174 | M=234A |
| 1JSGAPY 0237B | I/E CONVERTOR | J=111 |
| 1JSGAPSL 0238A | SG 2 ECONOMIZER FW DWNSTR ISOL | J=111 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 155 of 202)

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| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSGAPT 0238A | FWIV ACCUM FOR 177 | M-234A |
| 1JSGAPY 0238A | I/E CONVERTOR | J-111 |
| 1JSGAPSL 0238B | SG 2 ECONOMIZER FW DWNSTR ISOL | J-111 |
| 1JSGAPT 0238B | FWIV ACCUM FOR 177 | M-234A |
| 1JSGAPY 0238B | I/E CONVERTOR | J-111 |
| 1JSGBPSL 0239A | SG 1 ECONOMIZER FW DWNSTR ISOL | J-111 |
| 1JSGBPT 0239A | FWIV ACCUM FOR 132 | M-234A |
| 1JSGBPY 0239A | I/E CONVERTOR | J-111 |
| 1JSGBPSL 0239B | SG 1 ECONOMIZER FW DWNSTR ISOL | J-111 |
| 1JSGBPT 0239B | FWIV ACCUM FOR 132 | M-234A |
| 1JSGBPY 0239B | I/E CONVERTOR | J-111 |
| 1JSGBPSL 0240A | SG 2 ECONOMIZER FW DWNSTR ISOL | J-111 |
| 1JSGBPT 0240A | FWIV ACCUM FOR 137 | M-234A |
| 1JSGBPY 0240A | I/E CONVERTOR | J-111 |
| 1JSGBPSL 0240B | SG 2 ECONOMIZER FW DWNSTR ISOL | J-111 |
| 1JSGBPT 0240B | FWIV ACCUM FOR 137 | M-234A |
| 1JSGBPY 0240B | I/E CONVERTOR | J-111 |
| 1JSGEPSH 0241 | UV-170 MSIV HYD | M-234A |
| 1JSGEPSH 0242 | UV-180 MSIV HYD | M-234A |
| 1JSGEPSH 0243 | UV-171 MSIV HYD | M-234A |
| 1JSGEPSH 0244 | UV-181 MSIV HYD | M-234A |
| 1JSGAPSH 0245 | UV-174 MSIV HYD | M-234A |
| 1JSGAPSH 0246 | UV-177 MSIV HYD | M-234A |
| 1JSGBPSH 0247 | UV-132 MSIV HYD | M-234A |
| 1JSGBPSH 0248 | UV-137 MSIV HYD | M-234A |
| 1JSGAHS 0250 | MSIV FAST CLOSE SG NO 1 | J-200 |
| 1JSGAHS 0251 | MSIV FAST CLOSE SG NO 2 | J-200 |
| 1JSGBHS 0252 | MSIV FAST CLOSE SG NO 1 | J-200 |
| 1JSGBHS 0253 | MSIV FAST CLOSE SG NO 2 | J-200 |
| 1JSGAPSL 0260 | AIR RESVR FOR 170 | M-234A |
| 1JSGBPSL 0261 | AIR RESVR FOR 170 | M-234A |
| 1JSGAPSL 0262 | AIR RESVR FOR 180 | M-234A |
| 1JSGBPSL 0263 | AIR RESVR FOR 180 | M-234A |
| 1JSGAPSL 0264 | AIR RESVR FOR 171 | M-234A |
| 1JSGBPSL 0265 | AIR RESVR FOR 171 | M-234A |
| 1JSGAPSL 0266 | AIR RESVR FOR 181 | M-234A |
| 1JSGBPSL 0267 | AIR RESVR FOR 181 | M-234A |
| 1JSGAPSL 0268 | AIR RESVR FOR 174 | M-234A |
| 1JSGAPSL 0269 | AIR RESVR FOR 177 | M-234A |
| 1JSGBPSL 0270 | AIR RESVR FOR 132 | M-234A |
| 1JSGBPSL 0271 | AIR RESVR FOR 137 | M-234A |
| 1JSGAHS 0275 | SG 1 LN 1 MAIN STEAM ISOL | J-200 |
| 1JSGBHS 0276 | SG 1 LN 1 MAIN STEAM ISOL | J-200 |
| 1JSGAHS 0277 | SG 2 LN 1 MAIN STEAM ISOL | J-200 |
| 1JSGBHS 0278 | SG 2 LN 1 MAIN STEAM ISOL | J-200 |
| 1JSGAHS 0279 | SG 1 LN 2 MAIN STEAM ISOL | J-200 |
| 1JSGBHS 0280 | SG 1 LN 2 MAIN STEAM ISOL | J-200 |
| 1JSGAHS 0281 | SG 2 LN 2 MAIN STEAM ISOL | J-200 |
| 1JSGBHS 0282 | SG 2 LN 2 MAIN STEAM ISOL | J-200 |
| 1JSGAHS 0283 | SG 2 ECONOMIZER FW ISOL | J-200 |
| 1JSGAHS 0284 | SG 1 ECONOMIZER FW ISOL | J-200 |
| 1JSGBHS 0285 | SG 2 ECONOMIZER FW ISOL | J-200 |
| 1JSGBHS 0286 | SG 1 ECONOMIZER FW ISOL | J-200 |
| 1JSGBPT 0301 | SG 1 LN 2 ATM DMP N2 TANK | J-311 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 156 of 202)

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| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSGBPSV 0302 | SG 1 LN 2 ATM DMP N2 TANK | J-691 |
| 1JSGBPCV 0303 | SG 1 LN 2 ATM DMP N2 SUPPLY | J-691 |
| 1JSGBPSV 0305 | SG 1 LN 2 ATM DMP N2 SUPPLY | J-691 |
| 1JSGBPSL 0306 | SG1 LN2 SG2 LN1 DUMP AIR SPPLY | J-111 |
| 1JSGBPT 0306 | SG1 LN2 SG2 LN1 DUMP AIR SPPLY | J-311 |
| 1JSGBPV 0306A | SG 1 LN 2 ATM DMP N2 SUPPLY | J-603 |
| 1JSGBPY 0306A | I/E CONVERTOR | J-111 |
| 1JSGBPV 0306B | SG 2 LN 1 ATM DMP N2 SUPPLY | J-603 |
| 1JSGBPY 0306B | SG1 LN2 SG2 LN1 DUMP AIR SPPLY | J-111 |
| 1JSGAPT 0308 | SG 2 LN 2 ATM DUMP N2 TANK | J-311 |
| 1JSGAPSV 0309 | SG 2 LN 2 ATM DUMP N2 TANK | J-691 |
| 1JSGAPCV 0310 | SG 2 LN 2 ATM DUMP N2 SUPPLY | J-691 |
| 1JSGAPSV 0312 | SG 2 LN 2 ATM DUMP N2 SUPPLY | J-691 |
| 1JSGAPSL 0313 | SG2 LN2 SG1 LN1 DUMP AIR SPPLY | J-111 |
| 1JSGAPT 0313 | SG2 LN2 SG1 LN1 DUMP AIR SPPLY | J-311 |
| 1JSGAPV 0313A | SG 2 LN 2 ATM DMP N2 SUPPLY | J-603 |
| 1JSGAPY 0313A | I/E CONVERTOR | J-111 |
| 1JSGAPV 0313B | SG 1 LN 1 ATM DMP N2 SUPPLY | J-603 |
| 1JSGAPY 0313B | SG2 LN2 SG1 LN1 DUMP AIR SUPPY | J-111 |
| 1JSGAPT 0315 | SG 1 LN 1 ATM DMP N2 TANK | J-311 |
| 1JSGAPSV 0316 | SG 1 LN 1 ATM DMP N2 TANK | J-691 |
| 1JSGAPCV 0317 | SG 1 LN 1 ATM DMP N2 SUPPLY | J-691 |
| 1JSGAPSV 0319 | SG 1 LN 1 ATM DMP N2 SUPPLY | J-691 |
| 1JSGBPT 0321 | SG2 LN 1 ATM DMP N2 TANK | J-311 |
| 1JSGBPSV 0322 | SG2 LN 1 ATM DMP N2 TANK | J-691 |
| 1JSGBPCV 0323 | SG2 LN 1 ATM DMP N2 SUPPLY | J-691 |
| 1JSGBPSV 0325 | SG2 LN 1 ATM DMP N2 SUPPLY | J-691 |
| 1JSGAHS 0500P | SG 1 UPSTM BLDWN ISOL | J-200 |
| 1JSGAUV 0500P | SG 1 UPSTM BLDWN ISOL | P-2218 |
| 1JSGAUY 0500P | SG 1 UPSTM BLDWN ISOL | P-2218 |
| 1JSGBHS 0500Q | SG 1 DWNSTM BLDWN ISOL | J-200 |
| 1JSGBUV 0500Q | SG 1 DWNSTM BLDWN ISOL | P-2218 |
| 1JSGBUY 0500Q | SG 1 DWNSTM BLDWN ISOL | P-2218 |
| 1JSGBHS 0500R | SG 2 UPSTM BLDWN ISOL | J-200 |
| 1JSGBUV 0500R | SG 2 UPSTM BLDWN ISOL | P-2218 |
| 1JSGBUY 0500R | SG 2 UPSTM BLDWN ISOL | P-2218 |
| 1JSGAHS 0500S | SG 2 DWNSTM BLDWN ISOL | J-200 |
| 1JSGAUV 0500S | SG 2 DWNSTM BLDWN ISOL | P-2218 |
| 1JSGAUY 0500S | SG 2 DWNSTM BLDWN ISOL | P-2218 |
| 1JSGEPSV 0554 | SG 2 MAIN STM LN 1 | N-001 |
| 1JSGEPSV 0555 | SG 2 MAIN STM LN 1 | N-001 |
| 1JSGEPSV 0556 | SG 2 MAIN STM LN 1 | N-001 |
| 1JSGEPSV 0557 | SG 2 MAIN STM LN 1 | N-001 |
| 1JSGEPSV 0558 | SG 2 MAIN STM LN 2 | N-001 |
| 1JSGEPSV 0559 | SG 2 MAIN STM LN 2 | N-001 |
| 1JSGEPSV 0560 | SG 2 MAIN STM LN 2 | N-001 |
| 1JSGEPSV 0561 | SG 2 MAIN STM LN 2 | N-001 |
| 1JSGEPSV 0572 | SG 1 MAIN STM LN 1 | N-001 |
| 1JSGEPSV 0573 | SG 1 MAIN STM LN 1 | N-001 |
| 1JSGEPSV 0574 | SG 1 MAIN STM LN 1 | N-001 |
| 1JSGEPSV 0575 | SG 1 MAIN STM LN 1 | N-001 |
| 1JSGEPSV 0576 | SG 1 MAIN STM LN 2 | N-001 |
| 1JSGEPSV 0577 | SG 1 MAIN STM LN 2 | N-001 |
| 1JSGEPSV 0578 | SG 1 MAIN STM LN 2 | N-001 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 157 of 202)

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(SG-9)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSGEPSV 0579 | SG 1 MAIN STM LN 2 | N-001 |
| 1JSGEPSV 0691 | SG 1 MAIN STM LN 2 | N-001 |
| 1JSGEPSV 0692 | SG 1 MAIN STM LN 1 | N-001 |
| 1JSGEPSV 0694 | SG 2 MAIN STM LN 2 | N-001 |
| 1JSGEPSV 0695 | SG 2 MAIN STM LN 1 | N-001 |
| 1JSGEZE 0696 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0696 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0697 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0697 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0698 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0698 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0699 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0699 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0700 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0700 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0701 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0701 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0702 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0702 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0703 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0703 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0704 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0704 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0705 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0705 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0706 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0706 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0707 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0707 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0708 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0708 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0709 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0709 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0710 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0710 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0711 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0711 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0712 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0712 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0713 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0713 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0714 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0714 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEZE 0715 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGNZY 0715 | MAIN STEAM RELIEF VLV | J-366 |
| 1JSGEFE 1011 | SG 1 LN 1 | N-001 |
| 1JSGEFE 1012 | SG 1 LN 2 | N-001 |
| 1JSGAPI 1013A | SG 1 | N-001 |
| 1JSGAPI 1013A1 | SG 1 - REMOTE SHUTDOWN | N-001 |
| 1JSGAPR 1013A | SG 1 / SG 2 | N-001 |
| 1JSGAPT 1013A | SG 1 | N-001 |
| 1JSGAPY 1013A | I/E CONVERTOR | N-001 |
| 1JSGBPI 1013B | SG 1 | N-001 |
| 1JSGBPI 1013B1 | SG 1 - REMOTE SHUTDOWN | N-001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 158 of 202)

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(SG-10)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSGBPT 1013B | SG 1 | N-001 |
| 1JSGBPY 1013B | I/E CONVERTOR | N-001 |
| 1JSGCPI 1013C | SG 1 | N-001 |
| 1JSGCPT 1013C | SG 1 | N-001 |
| 1JSGCPY 1013C | I/E CONVERTOR | N-001 |
| 1JSGDPI 1013D | SG 1 | N-001 |
| 1JSGDPT 1013D | SG 1 | N-001 |
| 1JSGDPY 1013D | I/E CONVERTOR | N-001 |
| 1JSGAPI 1023A | SG 2 | N-001 |
| 1JSGAPT 1023A | SG 2 | N-001 |
| 1JSGAPY 1023A | I/E CONVERTOR | N-001 |
| 1JSGBPI 1023B | SG 2 | N-001 |
| 1JSGBPT 1023B | SG 2 | N-001 |
| 1JSGBPY 1023B | I/E CONVERTOR | N-001 |
| 1JSGCPI 1023C | SG 2 | N-001 |
| 1JSGCPT 1023C | SG 2 | N-001 |
| 1JSGCPY 1023C | I/E CONVERTOR | N-001 |
| 1JSGDPI 1023D | SG 2 | N-001 |
| 1JSGDPT 1023D | SG 2 | N-001 |
| 1JSGDPY 1023D | I/E CONVERTOR | N-001 |
| 1JSGALI 1113A | SG 1 / SG 2 WIDE RANGE | N-001 |
| 1JSGALI 1113A1 | SG 1 - REMOTE SHUTDOWN | J-111 |
| 1JSGALI 1113A2 | SG 1/SG 2 WIDE RANGE | J-111 |
| 1JSGALR 1113A | SG 1 / SG 2 WIDE RANGE | N-001 |
| 1JSGALT 1113A | SG 1 WIDE RANGE | N-001 |
| 1JSGALY 1113A | I/E CONVERTOR | N-001 |
| 1JSGBLI 1113B | SG 1 / SG 2 WIDE RANGE | N-001 |
| 1JSGBLI 1113B1 | SG 1 - REMOTE SHUTDOWN | J-111 |
| 1JSGBLI 1113B2 | SG 1 / SG 2 WIDE RANGE | J-111 |
| 1JSGBLT 1113B | SG 1 WIDE RANGE | N-001 |
| 1JSGBLY 1113B | I/E CONVERTOR | N-001 |
| 1JSGCLI 1113C | SG 1 / SG 2 WIDE RANGE | N-001 |
| 1JSGCLT 1113C | SG 1 WIDE RANGE | N-001 |
| 1JSGCLY 1113C | I/E CONVERTOR | N-001 |
| 1JSGDLI 1113D | SG 1 / SG 2 WIDE RANGE | N-001 |
| 1JSGDLT 1113D | SG 1 WIDE RANGE | N-001 |
| 1JSGDLY 1113D | I/E CONVERTOR | N-001 |
| 1JSGALI 1114A | SG 1 / SG 2 NARROW RANGE | N-001 |
| 1JSGALT 1114A | SG 1 NARROW RANGE | N-001 |
| 1JSGALY 1114A | I/E CONVERTOR | N-001 |
| 1JSGBLI 1114B | SG 1 / SG 2 NARROW RANGE | N-001 |
| 1JSGBLT 1114B | SG 1 NARROW RANGE | N-001 |
| 1JSGBLY 1114B | I/E CONVERTOR | N-001 |
| 1JSGCLI 1114C | SG 1 / SG 2 NARROW RANGE | N-001 |
| 1JSGCLT 1114C | SG 1 NARROW RANGE | N-001 |
| 1JSGCLY 1114C | I/E CONVERTOR | N-001 |
| 1JSGDLI 1114D | SG 1 / SG 2 NARROW RANGE | N-001 |
| 1JSGDLT 1114D | SG 1 NARROW RANGE | N-001 |
| 1JSGDLY 1114D | I/E CONVERTOR | N-001 |
| 1JSGALT 1123A | SG 2 WIDE RANGE | N-001 |
| 1JSGALY 1123A | I/E CONVERTOR | N-001 |
| 1JSGBLT 1123B | SG 2 WIDE RANGE | N-001 |
| 1JSGBLY 1123B | I/E CONVERTOR | N-001 |
| 1JSGCLT 1123C | SG 2 WIDE RANGE | N-001 |

Table D-1

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(SG-11)

| TAG NUMBER | DESCRIPTION | RECHTEL SPEC/PO |
|---|---|---|
| 1JSGCLY 1123C | I/E CONVERTOR | N-001 |
| 1JSGDLT 1123D | SG 2 WIDE RANGE | N-001 |
| 1JSGDLY 1123D | I/E CONVERTOR | N-001 |
| 1JSGALT 1124A | SG 2 NARROW RANGE | N-001 |
| 1JSGALY 1124A | I/E CONVERTER | N-001 |
| 1JSGBLT 1124B | SG 2 NARROW RANGE | N-001 |
| 1JSGBLY 1124B | I/E CONVERTER | N-001 |
| 1JSGCLT 1124C | SG 2 NARROW RANGE | N-001 |
| 1JSGCLY 1124C | I/E CONVERTER | N-001 |
| 1JSGDLT 1124D | SG 2 NARROW RANGE | N-001 |
| 1JSGDLY 1124D | I/E CONVERTER | N-001 |
| 1JSGAHS 1133 | STM TRAP SGN-H23 ISOL VLV | J-200 |
| 1JSGAUV 1133 | STM TRAP SGN-H23 ISOL VLV | J-603 |
| 1JSGAHS 1134 | STM TRAP SGN-H24 ISOL VLV | J-200 |
| 1JSGAUV 1134 | STM TRAP SGN-H24 ISOL VLV | J-603 |
| 1JSGBHS 1135 | STM TRAP SGN-H01,H02 ISOL VLVS | J-200 |
| 1JSGBUV 1135A | STM TRAP SGN-H01 ISOL VLV | J-603 |
| 1JSGBUV 1135B | STM TRAP SGN-H02 ISOL VLV | J-603 |
| 1JSGBHS 1136 | STM TRAP SGN-H03,H04 ISOL VLVS | J-200 |
| 1JSGAUV 1136A | STM TRAP SGN-H03 ISOL VLV | J-603 |
| 1JSGBUV 1136A | STM TRAP SGN-H03 ISOL VLV | J-603 |
| 1JSGBUV 1136B | STM TRAP SGN-H04 ISOL VLV | J-603 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 160 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 66 (SG-12)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PSGAV043 | 13PM221B |
| 1PSGAV044 | 13PM221B |
| 1PSGAV265 | 13PM221A |
| 1PSGAV266 | 13PM221A |
| 1PSGAV298 | 13PM221A |
| 1PSGAV301 | 13PM221A |
| 1PSGBV299 | 13PM221A |
| 1PSGBV300 | 13PM221A |
| 1PSGEV003 | 13PM221B |
| 1PSGEV005 | 13PM221B |
| 1PSGEV006 | 13PM221B |
| 1PSGEV007 | 13PM221B |
| 1PSGEV023 | 13PM221B |
| 1PSGEV026 | 13PM221C |
| 1PSGEV029 | 13PM221B |
| 1PSGEV032 | 13PM221C |
| 1PSGEV039 | A |
| 1PSGEV041 | 13PM221C0 |
| 1PSGEV048 | 13PM221B |
| 1PSGEV084 | 13PM221B |
| 1PSGEV092 | 13PM221A |
| 1PSGEV096 | 13PM221A |
| 1PSGEV100 | 13PM221A |
| 1PSGEV103 | 13PM221A |
| 1PSGEV104 | 13PM221A |
| 1PSGEV105 | 13PM221A |
| 1PSGEV106 | 13PM221A |
| 1PSGEV112 | 13PM221A |
| 1PSGEV113 | 13PM221A |
| 1PSGEV114 | 13PM221A |
| 1PSGEV127 | 13PM221A |
| 1PSGEV128 | 13PM221A |
| 1PSGEV133 | 13PM221A |
| 1PSGEV134 | 13PM221A |
| 1PSGEV139 | 13PM221A |
| 1PSGEV140 | 13PM221A |
| 1PSGEV145 | 13PM221A |
| 1PSGEV146 | 13PM221A |
| 1PSGEV167 | 13PM221C |
| 1PSGEV169 | 13PM221C |
| 1PSGEV263 | 13PM221A |
| 1PSGEV264 | 13PM221A |
| 1PSGEV289 | 13PM221B |
| 1PSGEV290 | 13PM221B |
| 1PSGEV291 | 13PM221A |
| 1PSGEV292 | 13PM221A |
| 1PSGEV293 | 13PM221C |
| 1PSGEV294 | 13PM221C |
| 1PSGEV295 | 13PM221C0 |
| 1PSGEV296 | 13NM001 0 |
| 1PSGEV304 | 13PM221A |
| 1PSGEV306 | 13PM221C |
| 1PSGEV308 | 13PM221A |
| 1PSGEV309 | 13PM221A |
| 1PSGEV310 | 13PM221A |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 161 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 67 (SG-13)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PSGEV311 | 13PM221A |
| 1PSGEV322 | 13PM221A |
| 1PSGEV334 | 13PM221A |
| 1PSGEV335 | 13PM221A |
| 1PSGEV336 | 13PM221A |
| 1PSGEV337 | 13PM221A |
| 1PSGEV338 | 13PM221A |
| 1PSGEV339 | 13PM221A |
| 1PSGEV341 | 13PM221A |
| 1PSGEV342 | 13PM221A |
| 1PSGEV343 | 13PM221A |
| 1PSGEV344 | 13PM221A |
| 1PSGEV345 | 13PM221A |
| 1PSGEV346 | 13PM221A |
| 1PSGEV348 | 13PM221A |
| 1PSGEV350 | 13PM221A |
| 1PSGEV351 | 13PM221A |
| 1PSGEV352 | 13PM221A |
| 1PSGEV353 | 13PM221A |
| 1PSGEV354 | 13PM221A |
| 1PSGEV355 | 13PM221A |
| 1PSGEV356 | 13PM221A |
| 1PSGEV357 | 13PM221A |
| 1PSGEV358 | 13PM221A |
| 1PSGEV360 | 13PM221A |
| 1PSGEV361 | 13PM221A |
| 1PSGEV362 | 13PM221A |
| 1PSGEV363 | 13PM221A |
| 1PSGEV364 | 13PM221A |
| 1PSGEV365 | 13PM221A |
| 1PSGEV367 | 13PM221C |
| 1PSGEV368 | 13PM221A |
| 1PSGEV369 | 13PM221A |
| 1PSGEV370 | 13PM221A |
| 1PSGEV371 | 13PM221A |
| 1PSGEV372 | 13PM221C |
| 1PSGEV373 | 13PM221A |
| 1PSGEV374 | 13PM221A |
| 1PSGEV375 | 13PM221A |
| 1PSGEV376 | 13PM221A |
| 1PSGEV377 | 13PM221A |
| 1PSGEV378 | 13PM221A |
| 1PSGEV379 | 13PM221A |
| 1PSGEV380 | 13PM221A |
| 1PSGEV382 | 13PM221A |
| 1PSGEV384 | 13PM221A |
| 1PSGEV415 | 13PM221A |
| 1PSGEV416 | 13PM221A |
| 1PSGEV418 | 13PM221C |
| 1PSGEV420 | 13PM221C |
| 1PSGEV524 | 13PM221C |
| 1PSGEV525 | 13PM221C |
| 1PSGEV552 | 13PM221C |
| 1PSGEV553 | 13PM221C |
| 1PSGEV586 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 162 of 202)

04/19/82 15:50:39 VALVE-"MOV" CLASS PAGE 68 (SG-14)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PSGEV590 | 13PM221C |
| 1PSGEV603 | 13PM221A |
| 1PSGEV608 | 13PM221A |
| 1PSGEV609 | 13PM221A |
| 1PSGEV610 | 13PM221C |
| 1PSGEV611 | 13PM221A |
| 1PSGEV613 | 13PM221C |
| 1PSGEV614 | 13PM221C |
| 1PSGEV615 | 13PM221C |
| 1PSGEV616 | 13PM221C |
| 1PSGEV617 | 13PM221C |
| 1PSGEV618 | 13PM221C |
| 1PSGEV619 | 13PM221C |
| 1PSGEV620 | 13PM221C |
| 1PSGEV621 | 13PM221C |
| 1PSGEV622 | 13PM221C |
| 1PSGEV623 | 13PM221C |
| 1PSGEV624 | 13PM221C |
| 1PSGEV625 | 13PM221C |
| 1PSGEV626 | 13PM221C |
| 1PSGEV627 | 13PM221C |
| 1PSGEV628 | 13PM221C |
| 1PSGEV629 | 13PM221C |
| 1PSGEV630 | 13PM221C |
| 1PSGEV631 | 13PM221C |
| 1PSGEV632 | 13PM221C |
| 1PSGEV633 | 13PM221C |
| 1PSGEV634 | 13PM221C |
| 1PSGEV635 | 13PM221C |
| 1PSGEV636 | 13PM221C |
| 1PSGEV637 | 13PM221C |
| 1PSGEV638 | 13PM221C |
| 1PSGEV639 | 13PM221C |
| 1PSGEV640 | 13PM221C |
| 1PSGEV642 | 13PM221B |
| 1PSGEV644 | 13PM221A |
| 1PSGEV652 | 13PM221B |
| 1PSGEV653 | 13PM221B |
| 1PSGEV658 | 13PM221C |
| 1PSGEV659 | 13PM221C |
| 1PSGEV660 | 13PM221A |
| 1PSGEV661 | 13PM221A |
| 1PSGEV662 | 13PM221C |
| 1PSGEV663 | 13PM221C |
| 1PSGEV665 | 13PM221A |
| 1PSGEV666 | 13PM221A |
| 1PSGEV693 | 13PM221B |
| 1PSGNV267 | 13PM221A |
| 1PSGNV268 | 13PM221A |
| 1PSGNV432 | 13PM221B |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 163 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 104 SAFETY PARAMETER DISPLAY (SH-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSHAC01 | QSPDS CH. A PROCESSOR | 13NM001 |
| 1JSHAC02 | QSPDS ISOLATION CABINET | 13NM001 |
| 1JSHBC01 | QSPDS CH B PROCESSOR | 13NM001 |
| 1JSHBC02 | QSPDS ISOLATION CABINET | 13NM001 |
| 1JSHCC02 | QSPDS ISOLATION CABINET | 13NM001 |
| 1JSHDC02 | QSPDS ISOLATION CABINET | 13NM001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 164 of 202)

12/17/82 02:28:02 Q INSTRUMENTS BY SYSTEM PAGE 92 (SH-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSHAUC 0001 | QUAL SAFETY PARA DIS CHA KEYBD | N=001 |
| 1JSHAUI 0001 | QUAL SAFETY PARA DIS CH A | N=001 |
| 1JSHBUC 0002 | QUAL SAFETY PARA DIS CHB KEYBD | N=001 |
| 1JSHBUI 0002 | QUAL SAFETY PARA DIS CH B | N=001 |
| 1JSHATR 0003 | TEMP SAT MAR=RCS/REAC VES LVL | J=111 |
| 1JSHATR 0004 | CORE EXT TEMP/TEMP SAT MAR=CET | J=111 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 165 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 106 SAFETY INJECTION (SI-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIEA01A | SI TK 2A XMITTER RACK | 13NM001 |
| 1JSIEA01B | SI TK 2B XMITTER RACK | 13NM001 |
| 1JSIEA01C | SI TK 1A XMITTER RACK | 13NM001 |
| 1JSIEA01D | SI TK 1B XMITTER RACK | 13NM001 |
| 1MSIAE01 | SHUTDOWN COOLING HEAT EXCHNGER | 13NM001 |
| 1MSIAF01 | LPSI PP 1 STARTUP STRAINER | 13PM201 |
| 1MSIAF02 | HPSI PP 1 STARTUP STRAINER | 13PM201 |
| 1MSIAF03 | CS PP 1 STARTUP STRAINER | 13PM201 |
| 1MSIAF04 | CONT. RECIRC. SUMP 1 SCREEN | 13CM069 |
| 1MSIAF05 | SPRAY CHEM ADD PP1 ST-UP STRNR | 13PM407 |
| 1MSIAM03 | CONTAINMENT SPRAY NOZZLES | 13NM001 |
| 1MSIAM04 | CONTAINMENT SPRAY NOZZLES | 13NM001 |
| 1MSIAP01 | LPSI PUMP 1 | 13NM001 |
| 1MSIAP02 | HPSI PUMP 1 | 13NM001 |
| 1MSIAP03 | CONTAINMENT SPRAY PUMP 1 | 13NM001 |
| 1MSIAP05 | SPRAY CHEM ADD PUMP 1 | 13NM001 |
| 1MSIAU21 | PENETRATION-CONT SPRAY | 13MM500 |
| 1MSIAU23 | PENETRATION-RECIRCULATION | 13MM500 |
| 1MSIAU26 | PENETRATION-SHUTDOWN COOLING | 13MM500 |
| 1MSIBE01 | SHUTDOWN COOLING HEAT EXCHNGER | 13NM001 |
| 1MSIBF01 | LPSI PP 2 STARTUP STRAINER | 13PM201 |
| 1MSIBF02 | HPSI PP 2 STARTUP STRAINER | 13PM201 |
| 1MSIBF03 | CS PP 2 STARTUP STRAINER | 13PM201 |
| 1MSIBF04 | CONT. RECIRC. SUMP 2 SCREEN | 13CM069 |
| 1MSIBF05 | SPRAY CHEM ADD PP2 ST-UP STRNR | 13PM407 |
| 1MSIBM03 | CONTAINMENT SPRAY NOZZLES | 13NM001 |
| 1MSIBM04 | CONTAINMENT SPRAY NOZZLES | 13NM001 |
| 1MSIBP01 | LPSI PUMP 2 | 13NM001 |
| 1MSIBP02 | HPSI PUMP 2 | 13NM001 |
| 1MSIBP03 | CONTAINMENT SPRAY PUMP 2 | 13NM001 |
| 1MSIBP05 | SPRAY CHEM ADD PUMP 2 | 13NM001 |
| 1MSIBU22 | PENETRATION-CONT SPRAY | 13MM500 |
| 1MSIBU24 | PENETRATION-RECIRCULATION | 13MM500 |
| 1MSIBU27 | PENETRATION-SHUTDOWN COOLING | 13MM500 |
| 1MSIEM01 | TRISODIUM PHOSPHATE BASKETS | |
| 1MSIEU13 | PENETRATION-HP SI | 13MM500 |
| 1MSIEU14 | PENETRATION-HP SI | 13MM500 |
| 1MSIEU15 | PENETRATION-HP SI | 13MM500 |
| 1MSIEU16 | PENETRATION-HP SI | 13MM500 |
| 1MSIEU17 | PENETRATION-LP SI | 13MM500 |
| 1MSIEU18 | PENETRATION-LP SI | 13MM500 |
| 1MSIEU19 | PENETRATION-LP SI | 13MM500 |
| 1MSIEU20 | PENETRATION-LP SI | 13MM500 |
| 1MSIEU28 | PENETRATION-SI TANK DRAIN | 13MM500 |
| 1MSIEU67 | PENTRTN-LONG TERM RECIRC 1 | 13MM500 |
| 1MSIEU77 | PENTRTN-LONG TERM RECIRC 2 | 13MM500 |
| 1MSIEX01A | SAFETY INJECTION TANK (2A) | 13NM001 |
| 1MSIEX01B | SAFETY INJECTION TANK (2B) | 13NM001 |
| 1MSIEX01C | SAFETY INJECTION TANK (1A) | 13NM001 |
| 1MSIEX01D | SAFETY INJECTION TANK (1B) | 13NM001 |
| 1MSIEX03 | SPRAY CHEMICAL STORAGE TANK | 13NM001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 166 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 94 (SI-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIAHS 0001 | HPSI PP A | J=200 |
| 1JSIBHS 0002 | HPSI PP B | J=200 |
| 1JSIAHS 0003 | LPSI PP A | J=200 |
| 1JSIBHS 0004 | LPSI PP B | J=200 |
| 1JSIAHS 0005 | CNTMT SPRAY PP A | J=200 |
| 1JSIBHS 0006 | CNTMT SPRAY PP B | J=200 |
| 1JSIAHS 0017A | SI TK VENT VLVS A PWR DISC | J=200 |
| 1JSIAHS 0017B | SI TK VENT VLVS A PWR DISC=RS | N=001 |
| 1JSIBHS 0018A | SI TK VENT VLVS B PWR DISC | J=200 |
| 1JSIBHS 0018B | SI TK VENT VLVS B PWR DISC=RS | N=001 |
| 1JSIBHS 0018C | SI TK VENT VLVS PWR DISC=DISC | N=001 |
| 1JSIAFO 0019 | LPSI PP A RECIRC | N=001 |
| 1JSIBFO 0020 | LPSI PP B RECIRC | N=001 |
| 1JSIAFO 0021 | CS PP A RECIRC | N=001 |
| 1JSIBFO 0022 | CS PP B RECIRC | N=001 |
| 1JSIAFO 0023 | HOT LEG INJ A BYPASS | J=425 |
| 1JSIBFO 0024 | HOT LEG INJ B BYPASS | J=425 |
| 1JSIAFO 0025 | HPSI A RECIRC TO RWT | N=001 |
| 1JSIBFO 0026 | HPSI B RECIRC TO RWT | N=001 |
| 1JSIEFO 0027 | SI LOOP 2A RELIEF | J=425 |
| 1JSIEFO 0028 | SI LOOP 2B RELIEF | J=425 |
| 1JSIEFO 0029 | SI LOOP 1A RELIEF | J=425 |
| 1JSIEFO 0030 | SI LOOP 1B RELIEF | J=425 |
| 1JSIAFO 0031 | CNTMT SPRAY HDR NO 1 AUX SPRAY | J=425 |
| 1JSIBFO 0032 | CNTMT SPRAY HDR NO 2 AUX SPRAY | J=425 |
| 1JSIAFO 0033 | CNTMT SPRAY HDR NO 1 AUX SPRAY | J=425 |
| 1JSIBFO 0034 | CNTMT SPRAY HDR NO 2 AUX SPRAY | J=425 |
| 1JSIAFO 0039 | LPSI DSCH HDR 1A | J=425 |
| 1JSIBFO 0040 | LPSI DSCH HDR 2A | J=425 |
| 1JSIAFO 0041 | LPSI DSCH HDR 1B | J=425 |
| 1JSIBFO 0042 | LPSI DSCH HDR 2B | J=425 |
| 1JSIAFO 0043 | HPSI A DSCH HDR 1B | J=425 |
| 1JSIBFO 0044 | HPSI B DSCH HDR 1B | J=425 |
| 1JSIAFO 0045 | HPSI A DSCH HDR 1A | J=425 |
| 1JSIBFO 0046 | HPSI B DSCH HDR 1A | J=425 |
| 1JSIAFO 0047 | HPSI A DSCH HDR 2B | J=425 |
| 1JSIBFO 0048 | HPSI B DSCH HDR 2B | J=425 |
| 1JSIAFO 0049 | HPSI A DSCH HDR 2A | J=425 |
| 1JSIBFO 0050 | HPSI B DSCH HDR 2A | J=425 |
| 1JSIAFO 0051 | CONT SPRAY HDR | J=425 |
| 1JSIAFO 0052 | CONT SPRAY HDR | J=425 |
| 1JSIAFO 0053 | CONT SPRAY HDR | J=425 |
| 1JSIAFO 0054 | CONT SPRAY HDR | J=425 |
| 1JSIBFO 0055 | CONT SPRAY HDR | J=425 |
| 1JSIBFO 0056 | CONT SPRAY HDR | J=425 |
| 1JSIBFO 0057 | CONT SPRAY HDR | J=425 |
| 1JSIBFO 0058 | CONT SPRAY HDR | J=425 |
| 1JSIAHS 0060 | SI SPRAY CHEM ADDITION PP A | J=200 |
| 1JSIBHS 0061 | SI SPRAY CHEM ADDITION PP B | J=200 |
| 1JSIEXCV 0066 | EXC FLOW CHK VLV FOR PI=66 | J=705 |
| 1JSIEFO 0087 | SI DRAIN TO RDT | J=425 |
| 1JSIEFO 0090 | S/D COOLING LINE NO 1 | J=425 |
| 1JSIEFO 0091 | S/D COOLING LINE NO 2 | J=425 |
| 1JSIEPSV 0100 | SPRAY CHEM STOR TK | N=001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 167 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 95 (SI-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIEPSV 0118 | SPRAY CHEM STOR TK | N=001 |
| 1JSIBPSV 0140 | CONTMT RECIRC SUMP B RELIEF | N=001 |
| 1JSIBPSV 0141 | FUEL POOL CLG B RELIEF TO EDT | N=001 |
| 1JSIAPSV 0150 | FUEL POOL CLG A RELIEF TO EDT | N=001 |
| 1JSIAPSV 0151 | CONTMT RECIRC SUMP A RELIEF | N=001 |
| 1JSIAPSV 0159 | SPRAY CHEM PP A SUCTION | N=001 |
| 1JSIBPSV 0160 | SPRAY CHEM PP B SUCTION | N=001 |
| 1JSIAPSV 0161 | LPSI A TO FUEL POOL CLG RELIEF | N=001 |
| 1JSIAPSV 0162 | LPSI A TO FUEL POOL CLG RELIEF | N=001 |
| 1JSIBPSV 0166 | HPSI PP B LONG TERM CLG | N=001 |
| 1JSIBPSV 0169 | S/D CLG TRAIN B | N=001 |
| 1JSIAPSV 0178 | SPRAY CHEM PP A RELIEF | N=001 |
| 1JSIAPSV 0179 | S/D CLG TRAIN A RETURN RELIEF | N=001 |
| 1JSIBPSV 0187 | SPRAY CHEM PP B RELIEF | N=001 |
| 1JSIBPSV 0189 | S/D CLG TRAIN B RETURN RELIEF | N=001 |
| 1JSIBPSV 0191 | S/D CLG HE OUT TRAIN B TO EDT | N=001 |
| 1JSIBPSV 0192 | LPSI B TO FUEL POOL CLG RELIEF | N=001 |
| 1JSIBPSV 0193 | LPSI B TO FUEL POOL CLG RELIEF | N=001 |
| 1JSIAPSV 0194 | S/D CLG HE OUT TRAIN A TO EDT | N=001 |
| 1JSIEPSV 0211 | SI TK 1 | N=001 |
| 1JSIEPSV 0221 | SI TK 2 | N=001 |
| 1JSIEPSV 0231 | SI TK 3 | N=001 |
| 1JSIEPSV 0241 | SI TK 4 | N=001 |
| 1JSIEPSV 0250 | SPRAY CHEM STORAGE TANK | N=001 |
| 1JSIAPSV 0285 | TRAIN A RECIRC THERMAL RELIEF | N=001 |
| 1JSIBPSV 0286 | TRAIN B RECIRC THERMAL RELIEF | N=001 |
| 1JSIBPSV 0287 | S/D CLG THERMAL RELIEF TRAIN B | N=001 |
| 1JSIEPSV 0288 | SI DRN HDR RELIEF TO EDT | N=001 |
| 1JSIAPSV 0289 | S/D CLG THERMAL RELIEF TRAIN A | N=001 |
| 1JSIATE 0303X | S/D CLG HE OUT TRAIN A | N=001 |
| 1JSIATI 0303X | S/D CLG HE OUT TRAIN A | N=001 |
| 1JSIATT 0303X | R/E CONVERTOR | N=001 |
| 1JSIATW 0303X | S/D CLG HE OUT TRAIN A | N=001 |
| 1JSIBTE 0303Y | S/D CLG HE OUT TRAIN B | N=001 |
| 1JSIBTI 0303Y | S/D CLG HE OUT TRAIN B | N=001 |
| 1JSIBTT 0303Y | R/E CONVERTOR | N=001 |
| 1JSIBTW 0303Y | S/D CLG HE OUT TRAIN B | N=001 |
| 1JSIAFE 0306 | LPSI PP A HDR DSCH | N=001 |
| 1JSIAFI 0306 | LPSI PP A HDR DSCH | N=001 |
| 1JSIAFT 0306 | LPSI PP A HDR DSCH | N=001 |
| 1JSIAFY 0306 | I/E CONVERTOR | N=001 |
| 1JSIAHS 0306 | LPSI PP A HDR DSCH | J=200 |
| 1JSIAHV 0306 | LPSI PP A HDR DSCH | N=001 |
| 1JSIAZI 0306 | LPSI PP A HDR DSCH | J=200 |
| 1JSIAZT 0306 | LPSI PP A HDR DSCH | N=001 |
| 1JSIAFI 0306=1 | LPSI PP A HDR DSCH=RS | N=001 |
| 1JSIAFY 0306=1 | SQ. ROOT CONVERTOR | N=001 |
| 1JSIBEE 0307 | LPSI PP B HDR DSCH | N=001 |
| 1JSIBFI 0307 | LPSI PP B HDR DSCH | N=001 |
| 1JSIBFT 0307 | LPSI PP B HDR DSCH | N=001 |
| 1JSIBFY 0307 | I/E CONVERTOR | N=001 |
| 1JSIBHS 0307 | LPSI PP B HDR DSCH | J=200 |
| 1JSIBHV 0307 | LPSI PP B HDR DSCH | N=001 |
| 1JSIBZI 0307 | LPSI PP B HDR DSCH | J=200 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 168 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 96 (SI-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIBZT 0307 | LPSI PP B HDR DSCH | N-001 |
| 1JSIBFI 0307-1 | LPSI PP B HDR DSCH--RS | N-001 |
| 1JSIBEY 0307-1 | SQ. ROOT CONVERTOR | N-001 |
| 1JSIAFE 0308 | SPRAY CHEM PP A DISCH | N-001 |
| 1JSIAFI 0308 | SPRAY CHEM PP A DISCH | N-001 |
| 1JSIAFT 0308 | SPRAY CHEM PP A DISCH. | N-001 |
| 1JSIAFY 0308 | I/E CONVERTOR | N-001 |
| 1JSIAFY 0308-1 | SQ. ROOT CONVERTOR | N-001 |
| 1JSIBFE 0309 | SPRAY CHEM PP B DISCH | N-001 |
| 1JSIBFI 0309 | SPRAY CHEM PP B DISCH | N-001 |
| 1JSIBFT 0309 | SPRAY CHEM PP B DISCH | N-001 |
| 1JSIBEY 0309 | I/E CONVERTOR | N-001 |
| 1JSIBFY 0309-1 | SQ. ROOT CONVERTOR | N-001 |
| 1JSIBFE 0311 | HPSI FLOW TO RC 2A | N-001 |
| 1JSIBFI 0311 | HPSI FLOW TO RC 2A/2B | N-001 |
| 1JSIBFT 0311 | HPSI FLOW TO RC 2A | N-001 |
| 1JSIBFY 0311 | I/E CONVERTOR. | N-001 |
| 1JSIBLI 0311 | SI TKS 1/2 | N-001 |
| 1JSIBLT 0311 | SI TK 1 | N-001 |
| 1JSIBLY 0311 | I/E CONVERTOR | N-001 |
| 1JSIBPI 0311 | SI TKS 1/2 | N-001 |
| 1JSIBPT 0311 | SI TK 1 | N-001 |
| 1JSIBPY 0311 | I/E CONVERTOR | N-001 |
| 1JSIBFI 0311-1 | HPSI FLOW TO RC 2A/2B | J-111 |
| 1JSIBFY 0311-1 | SQ. ROOT CONVERTOR | N-001 |
| 1JSIBPI 0311-1 | SI TK 1--RS | N-001 |
| 1JSIBPI 0313 | SI TKS 1/2 | N-001 |
| 1JSIBPSLL0313 | SI TK 1 | N-001 |
| 1JSIBPT 0313 | SI TK 1 | N-001 |
| 1JSIBPY 0313 | I/E CONVERTOR | N-001 |
| 1JSIBPSL 0313-1 | SI TK 1--1E ALARM | N-001 |
| 1JSIBFE 0321 | HPSI FLOW TO RC 2B | N-001 |
| 1JSIBFT 0321 | HPSI FLOW TO RC 2B | N-001 |
| 1JSIBFY 0321 | I/E CONVERTOR | N-001 |
| 1JSIBLT 0321 | SI TK 2 | N-001 |
| 1JSIBLY 0321 | I/E CONVERTOR | N-001 |
| 1JSIBPT 0321 | SI TK 2 | N-001 |
| 1JSIBPY 0321 | I/E CONVERTOR | N-001 |
| 1JSICHS 0321 | HPSI PP A LONG TERM CLG | J-200 |
| 1JSICHV 0321 | HPSI PP A LONG TERM CLG | N-001 |
| 1JSICZI 0321 | HPSI PP A LONG TERM CLG | J-200 |
| 1JSICZT 0321 | HPSI PP A LONG TERM CLG | N-001 |
| 1JSIBFY 0321-1 | SQ. ROOT CONVERTOR | N-001 |
| 1JSIBPI 0321-1 | SI TK 2--RS | N-001 |
| 1JSIBHS 0322 | HOT LEG INJ CHK VLV LEAK ISOL | J-200 |
| 1JSIBUV 0322 | HOT LEG INJ CHK VLV LEAK ISOL | N-001 |
| 1JSIBUY 0322 | HOT LEG INJ CHK VLV LEAK ISOL | N-001 |
| 1JSIBPSHH0323 | SI TK 2 | N-001 |
| 1JSIBPSLL0323 | SI TK 2 | N-001 |
| 1JSIBPT 0323 | SI TK 2 | N-001 |
| 1JSIBPY 0323 | I/E CONVERTOR | N-001 |
| 1JSIBPSL 0323-1 | SI TK 2--1E ALARM | N-001 |
| 1JSIAFE 0331 | HPSI FLOW TO RC 1A | N-001 |
| 1JSIAFI 0331 | HPSI FLOW TO RC 1A/1B | N-001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 169 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 97 (SI-5)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIAFT 0331 | HPSI FLOW TO RC 1A | N-001 |
| 1JSIAFY 0331 | I/E CONVERTOR | N-001 |
| 1JSIALI 0331 | SI TKS 3/4 | N-001 |
| 1JSIALT 0331 | SI TK 3 | N-001 |
| 1JSIALY 0331 | I/E CONVERTOR | N-001 |
| 1JSIAPI 0331 | SI TKS 3/4 | N-001 |
| 1JSIAPT 0331 | SI TK 3 | N-001 |
| 1JSIAPY 0331 | I/E CONVERTOR | N-001 |
| 1JSIDHS 0331 | HPSI PP B LONG TERM CLG | J-200 |
| 1JSIDHV 0331 | HPSI PP B LONG TERM CLG | N-001 |
| 1JSIDZI 0331 | HPSI PP B LONG TERM CLG | J-200 |
| 1JSIDZT 0331 | HPSI PP B LONG TERM CLG | N-001 |
| 1JSIAFI 0331-1 | HPSI FLOW TO RC 1A/1B | J-111 |
| 1JSIAFY 0331-1 | SQ. ROOT CONVERTOR | N-001 |
| 1JSIAPI 0331-1 | SI TK 3--RS | N-001 |
| 1JSIBHS 0332 | HOT LEG INJ CHK VLV LEAK ISOL | J-200 |
| 1JSIBUV 0332 | HOT LEG INJ CHK VLV LEAK ISOL | N-001 |
| 1JSIBUY 0332 | HOT LEG INJ CHK VLV LEAK ISOL | N-001 |
| 1JSIAPI 0333 | SI TKS 3/4 | N-001 |
| 1JSIAPSHH0333 | SI TK 3 | N-001 |
| 1JSIAPSLL0333 | SI TK 3 | N-001 |
| 1JSIAPT 0333 | SI TK 3 | N-001 |
| 1JSIAPY 0333 | I/E CONVERTOR | N-001 |
| 1JSIAPSL 0333-1 | SI TK 3--1E ALARM | N-001 |
| 1JSIAPE 0338 | CONT SPRAY PP A DSCH | N-001 |
| 1JSIAFI 0338 | CONT SPRAY PP A DSCH | N-001 |
| 1JSIAFT 0338 | CONT SPRAY PP A DSCH | N-001 |
| 1JSIAFY 0338 | I/E CONVERTOR | N-001 |
| 1JSIAFY 0338-1 | SQ. ROOT CONVERTOR | N-001 |
| 1JSIAPE 0341 | HPSI FLOW TO RC 1B | N-001 |
| 1JSIAFT 0341 | HPSI FLOW TO RC 1B | N-001 |
| 1JSIAFY 0341 | I/E CONVERTOR | N-001 |
| 1JSIALT 0341 | SI TK 4 | N-001 |
| 1JSIALY 0341 | I/E CONVERTOR | N-001 |
| 1JSIAPT 0341 | SI TK 4 | N-001 |
| 1JSIAPY 0341 | I/E CONVERTOR | N-001 |
| 1JSIAFY 0341-1 | SQ. ROOT CONVERTOR | N-001 |
| 1JSIAPI 0341-1 | SI TK 4--RS | N-001 |
| 1JSIAPSHH0343 | SI TK 4 | N-001 |
| 1JSIAPSLL0343 | SI TK 4 | N-001 |
| 1JSIAPT 0343 | SI TK 4 | N-001 |
| 1JSIAPY 0343 | I/E CONVERTOR | N-001 |
| 1JSIAPSL 0343-1 | SI TK 4--1E ALARM | N-001 |
| 1JSIBLI 0344 | VOIDED | N-001 |
| 1JSIBLSLL0344 | SPRAY CHEM STORAGE TANK | N-001 |
| 1JSIBLT 0344 | SPRAY CHEM STORAGE TANK | N-001 |
| 1JSIBLY 0344 | I/E CONVERTOR | N-001 |
| 1JSIALI 0345 | SPRAY CHEM STORAGE TANK | N-001 |
| 1JSIALSLL0345 | SPRAY CHEM STORAGE TANK | N-001 |
| 1JSIALT 0345 | SPRAY CHEM STORAGE TANK | N-001 |
| 1JSIALY 0345 | I/E CONVERTOR | N-001 |
| 1JSIAXCV 0346 | EXC FLOW CHK VLV FOR PI-346 | J-705 |
| 1JSIBXCV 0347 | EXC FLOW CHK VLV FOR PI-347 | J-705 |
| 1JSIBFE 0348 | CONT SPRAY PP B DSCH | N-001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 170 of 202)

12/17/82 02:28:02 Q INSTRUMENTS BY SYSTEM PAGE 98 (SI-6)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIBFI 0348 | CONT SPRAY PP B DSCH | N=001 |
| 1JSIBFT 0348 | CONT SPRAY PP B DSCH | N=001 |
| 1JSIBFY 0348 | I/E CONVERTOR | N=001 |
| 1JSIBLI 0348 | SPRAY CHEM STORAGE TANK | N=001 |
| 1JSIBLSL 0348 | SPRAY CHEM STORAGE TANK | N=001 |
| 1JSIBLT 0348 | SPRAY CHEM STORAGE TANK | N=001 |
| 1JSIBLY 0348 | I/E CONVERTOR | N=001 |
| 1JSIBFY 0348=1 | SQ. ROOT CONVERTOR | N=001 |
| 1JSIALI 0349 | SPRAY CHEM STORAGE TANK | N=001 |
| 1JSIALSL 0349 | SPRAY CHEM STORAGE TANK | N=001 |
| 1JSIALT 0349 | SPRAY CHEM STORAGE TANK | N=001 |
| 1JSIALY 0349 | I/E CONVERTOR | N=001 |
| 1JSIATR 0351 | S/D CLG TRAIN A | N=001 |
| 1JSIATE 0351X | S/D CLG TRAIN A | N=001 |
| 1JSIATI 0351X | S/D CLG TRAIN A==RS | N=001 |
| 1JSIATT 0351X | R/E CONVERTOR | N=001 |
| 1JSIATW 0351X | S/D CLG TRAIN A | N=001 |
| 1JSIATE 0351Y | S/D CLG TRAIN A | N=001 |
| 1JSIATI 0351Y | S/D CLG TRAIN A==RS | N=001 |
| 1JSIATT 0351Y | R/E CONVERTOR | N=001 |
| 1JSIATW 0351Y | S/D CLG TRAIN A | N=001 |
| 1JSIBTR 0352 | S/D CLG TRAIN B | N=001 |
| 1JSIBTE 0352X | S/D CLG TRAIN B | N=001 |
| 1JSIBTI 0352X | S/D CLG TRAIN B==RS | N=001 |
| 1JSIBTT 0352X | R/E CONVERTOR | N=001 |
| 1JSIBTW 0352X | S/D CLG TRAIN B | N=001 |
| 1JSIBTE 0352Y | S/D CLG TRAIN B | N=001 |
| 1JSIBTI 0352Y | S/D CLG TRAIN B==RS | N=001 |
| 1JSIBTT 0352Y | R/E CONVERTOR | N=001 |
| 1JSIBTW 0352Y | S/D CLG TRAIN B | N=001 |
| 1JSIAFE 0390 | HPSI PP A LONG TERM CLG | N=001 |
| 1JSIAFI 0390 | HPSI PP A LONG TERM CLG | N=001 |
| 1JSIAFT 0390 | HPSI PP A LONG TERM CLG | N=001 |
| 1JSIAFY 0390 | I/E CONVERTOR | N=001 |
| 1JSIAFY 0390=1 | SQ. ROOT CONVERTOR | N=001 |
| 1JSIBFE 0391 | HPSI PP B LONG TERM CLG | N=001 |
| 1JSIBFI 0391 | HPSI PP B LONG TERM CLG | N=001 |
| 1JSIBFT 0391 | HPSI PP B LONG TERM CLG | N=001 |
| 1JSIBFY 0391 | I/E CONVERTOR | N=001 |
| 1JSIBFY 0391=1 | SQ. ROOT CONVERTOR | N=001 |
| 1JSIEPSV 0407 | SI DRN RELIEF TO EDT | N=001 |
| 1JSIBPSV 0409 | HPSI B THERMAL RELIEF TO EDT | N=001 |
| 1JSIAPSV 0417 | HPSI A THERMAL RELIEF TO EDT | N=001 |
| 1JSIAPSV 0439 | LPSI A THERMAL RELIEF TO EDT | N=001 |
| 1JSIBPSV 0449 | LPSI B THERMAL RELIEF TO EDT | N=001 |
| 1JSIAPSV 0468 | HPSI PP A LONG TERM CLG | N=001 |
| 1JSIAPSV 0469 | S/D CLG TRAIN A | N=001 |
| 1JSIEPSV 0473 | SI DRN VENT TO RDT | N=001 |
| 1JSIEPSV 0474 | SI DRN RELIEF TO RDT | N=001 |
| 1JSIBHS 0602 | SPRAY CHEM PP B | J=200 |
| 1JSIBUV 0602 | SPRAY CHEM PP B SUCTION | N=001 |
| 1JSIAHS 0603 | SPRAY CHEM PP A | J=200 |
| 1JSIAUV 0603 | SPRAY CHEM PP A SUCTION | N=001 |
| 1JSIAHS 0604 | HPSI PP A LONG TERM CLG | J=200 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 171 of 202)

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(SI-7)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIAHV 0604 | HPSI PP A LONG TERM CLG | N-001 |
| 1JSIAZI 0604 | HPSI PP A LONG TERM CLG | J-200 |
| 1JSIAZT 0604 | HPSI PP A LONG TERM CLG | N-001 |
| 1JSIAHV 0605 | SI TK 1 VENT | N-001 |
| 1JSIAHS 0605A | SI TK 1 VENT--CR | J-200 |
| 1JSIAHS 0605B | SI TK 1 VENT--RS | N-001 |
| 1JSIAHV 0606 | SI TK 2 VENT | N-001 |
| 1JSIAHS 0606A | SI TK 2 VENT--CR | J-200 |
| 1JSIAHS 0606B | SI TK 2 VENT--RS | N-001 |
| 1JSIAHV 0607 | SI TK 3 VENT | N-001 |
| 1JSIAHS 0607A | SI TK 3 VENT--CR | J-200 |
| 1JSIAHS 0607B | SI TK 3 VENT--RS | N-001 |
| 1JSIAHV 0608 | SI TK 4 VENT | N-001 |
| 1JSIAHS 0608A | SI TK 4 VENT--CR | J-200 |
| 1JSIAHS 0608B | SI TK 4 VENT--RS | N-001 |
| 1JSIBHS 0609 | HPSI PP B LONG TERM CLG | J-200 |
| 1JSIBHV 0609 | HPSI PP B LONG TERM CLG | N-001 |
| 1JSIBZI 0609 | HPSI PP B LONG TERM CLG | J-200 |
| 1JSIBZT 0609 | HPSI PP B LONG TERM CLG | N-001 |
| 1JSIBHS 0611 | SI TK 1 FILL/DRN | J-200 |
| 1JSIBUV 0611 | SI TK 1 FILL/DRN | N-001 |
| 1JSIBUY 0611 | SI TK 1 FILL/DRN | N-001 |
| 1JSIBHS 0612 | N2 SUPPLY SI TK 1 | J-200 |
| 1JSIBHV 0612 | N2 SUPPLY SI TK 1 | N-001 |
| 1JSIBHY 0612 | N2 SUPPLY SI TK 1 | N-001 |
| 1JSIBHV 0613 | SI TK 1 VENT | N-001 |
| 1JSIBHS 0613A | SI TK 1 VENT--CR | J-200 |
| 1JSIBHS 0613B | SI TK 1 VENT--RS | N-001 |
| 1JSIBHS 0613C | SI TK 1 VENT DISCONNECT (RS) | N-001 |
| 1JSIBHS 0614 | SI TK 1 ISOL | J-200 |
| 1JSIBUV 0614 | SI TK 1 ISOL | N-001 |
| 1JSIBZI 0614 | SI TK 1 ISOL | J-200 |
| 1JSIBZT 0614 | SI TK 1 ISOL | N-001 |
| 1JSIBHS 0615 | LPSI FLOW CONTROL TO RC 2A | J-200 |
| 1JSIBUV 0615 | LPSI FLOW CONTROL TO RC 2A | N-001 |
| 1JSIBZI 0615 | LPSI FLOW CONTROL TO RC 2A | J-200 |
| 1JSIBZT 0615 | LPSI FLOW CONTROL TO RC 2A | N-001 |
| 1JSIBHS 0616 | HPSI 2 FLOW CONTROL TO RC 2A | J-200 |
| 1JSIBUV 0616 | HPSI 2 FLOW CONTROL TO RC 2A | N-001 |
| 1JSIBZI 0616 | HPSI 2 FLOW CONTROL TO RC 2A | J-200 |
| 1JSIBZT 0616 | HPSI 2 FLOW CONTROL TO RC 2A | N-001 |
| 1JSIAHS 0617 | HPSI 1 FLOW CONTROL TO RC 2A | J-200 |
| 1JSIAUV 0617 | HPSI 1 FLOW CONTROL TO RC 2A | N-001 |
| 1JSIAZI 0617 | HPSI 1 FLOW CONTROL TO RC 2A | J-200 |
| 1JSIAZT 0617 | HPSI 1 FLOW CONTROL TO RC 2A | N-001 |
| 1JSIBHS 0618 | SI TK 1 CHECK VLV LEAK LN ISOL | J-200 |
| 1JSIBUV 0618 | SI TK 1 CHECK VLV LEAK LN ISOL | N-001 |
| 1JSIBUY 0618 | SI TK 1 CHECK VLV LEAK LN ISOL | N-001 |
| 1JSIAHS 0619 | N2 STOP SI TK 1 | J-200 |
| 1JSIAHV 0619 | N2 STOP SI TK 1 | N-001 |
| 1JSIAHY 0619 | N2 STOP SI TK 1 | N-001 |
| 1JSIBHS 0621 | SI TK 2 FILL/DRN | J-200 |
| 1JSIBUV 0621 | SI TK 2 FILL/ DRN | N-001 |
| 1JSIBUY 0621 | SI TK 2 FILL/ DRN | N-001 |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 172 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 100 — (SI-8)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIBHS 0622 | N2 SUPPLY SI TK 2 | J-200 |
| 1JSIBHV 0622 | N2 SUPPLY SI TK 2 | N-001 |
| 1JSIBHY 0622 | N2 SUPPLY SI TK 2 | N-001 |
| 1JSIBHV 0623 | SI TK 2 VENT | N-001 |
| 1JSIBHS 0623A | SI TK 2 VENT--CR | J-200 |
| 1JSIBHS 0623B | SI TK 2 VENT--RS | N-001 |
| 1JSIBHS 0623C | SI TK 2 VENT DISCONNECT (RS) | N-001 |
| 1JSIBHS 0624 | SI TK 2 ISOL | J-200 |
| 1JSIBUV 0624 | SI TK 2 ISOL | N-001 |
| 1JSIBZI 0624 | SI TK 2 ISOL | J-200 |
| 1JSIBZT 0624 | SI TK 2 ISOL | N-001 |
| 1JSIBHS 0625 | LPSI FLOW CONTROL TO RC 2B | J-200 |
| 1JSIBUV 0625 | LPSI FLOW CONTROL TO RC 2B | N-001 |
| 1JSIBZI 0625 | LPSI FLOW CONTROL TO RC 2B | J-200 |
| 1JSIBZT 0625 | LPSI FLOW CONTROL TO RC 2B | N-001 |
| 1JSIBHS 0626 | HPSI 2 FLOW CONTROL TO RC 2B | J-200 |
| 1JSIBUV 0626 | HPSI 2 FLOW CONTROL TO RC 2B | N-001 |
| 1JSIBZI 0626 | HPSI 2 FLOW CONTROL TO RC 2B | J-200 |
| 1JSIBZT 0626 | HPSI 2 FLOW CONTROL TO RC 2B | N-001 |
| 1JSIAHS 0627 | HPSI 1 FLOW CONTROL TO RC 2B | J-200 |
| 1JSIAUV 0627 | HPSI 1 FLOW CONTROL TO RC 2B | N-001 |
| 1JSIAZI 0627 | HPSI 1 FLOW CONTROL TO RC 2B | J-200 |
| 1JSIAZT 0627 | HPSI 1 FLOW CONTROL TO RC 2B | N-001 |
| 1JSIBHS 0628 | SI TK 2 CHECK VLV LEAK LN ISOL | J-200 |
| 1JSIBUV 0628 | SI TK 2 CHECK VLV LEAK LN ISOL | N-001 |
| 1JSIBUY 0628 | SI TK 2 CHECK VLV LEAK LN ISOL | N-001 |
| 1JSIAHS 0629 | N2 SUPPLY SI TK 2 | J-200 |
| 1JSIAHV 0629 | N2 SUPPLY SI TK 2 | N-001 |
| 1JSIAHY 0629 | N2 SUPPLY SI TK 2 | N-001 |
| 1JSIBHS 0631 | SI TK 3 FILL/DRN | J-200 |
| 1JSIBUV 0631 | SI TK 3 FILL/DRN | N-001 |
| 1JSIBUY 0631 | SI TK 3 FILL/DRN | N-001 |
| 1JSIBHS 0632 | N2 SUPPLY SI TK 3 | J-200 |
| 1JSIBHV 0632 | N2 SUPPLY SI TK 3 | N-001 |
| 1JSIBHY 0632 | N2 SUPPLY SI TK 3 | N-001 |
| 1JSIBHV 0633 | SI TK 3 VENT | N-001 |
| 1JSIBHS 0633A | SI TK 3 VENT--CR | J-200 |
| 1JSIBHS 0633B | SI TK 3 VENT--RS | N-001 |
| 1JSIBHS 0633C | SI TK 3 VENT DISCONNECT (RS) | N-001 |
| 1JSIAHS 0634 | SI TK 3 ISOL | J-200 |
| 1JSIAUV 0634 | SI TK 3 ISOL | N-001 |
| 1JSIAZI 0634 | SI TK 3 ISOL | J-200 |
| 1JSIAZT 0634 | SI TK 3 ISOL | N-001 |
| 1JSIAHS 0635 | LPSI FLOW CONTROL TO RC 1A | J-200 |
| 1JSIAUV 0635 | LPSI FLOW CONTROL TO RC 1A | N-001 |
| 1JSIAZI 0635 | LPSI FLOW CONTROL TO RC 1A | J-200 |
| 1JSIAZT 0635 | LPSI FLOW CONTROL TO RC 1A | N-001 |
| 1JSIBHS 0636 | HPSI B FLOW CONTROL TO RC 1A | J-200 |
| 1JSIBUV 0636 | HPSI B FLOW CONTROL TO RC 1A | N-001 |
| 1JSIBZI 0636 | HPSI B FLOW CONTROL TO RC 1A | J-200 |
| 1JSIBZT 0636 | HPSI B FLOW CONTROL TO RC 1A | N-001 |
| 1JSIAHS 0637 | HPSI A FLOW CONTROL TO RC 1A | J-200 |
| 1JSIAUV 0637 | HPSI A FLOW CONTROL TO RC 1A | N-001 |
| 1JSIAZI 0637 | HPSI A FLOW CONTROL TO RC 1A | J-200 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 173 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 101 (SI-9)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIAZT 0637 | HPSI A FLOW CONTROL TO RC 1A | N=001 |
| 1JSIBHS 0638 | SI TK 3 CHECK VLV LEAK LN ISOL | J=200 |
| 1JSIBUV 0638 | SI TK 3 CHECK VLV LEAK LN ISOL | N=001 |
| 1JSIBUY 0638 | SI TK 3 CHECK VLV LEAK LN ISOL | N=001 |
| 1JSIAHS 0639 | N2 SUPPLY SI TK 3 | J=200 |
| 1JSIAHV 0639 | N2 SUPPLY SI TK 3 | N=001 |
| 1JSIAHY 0639 | N2 SUPPLY SI TK 3 | N=001 |
| 1JSIBHS 0641 | SI TK 4 FILL/DRN | J=200 |
| 1JSIBUV 0641 | SI TK 4 FILL/DRN | N=001 |
| 1JSIBUY 0641 | SI TK 4 FILL/DRN | N=001 |
| 1JSIBHS 0642 | N2 SUPPLY SI TK 4 | J=200 |
| 1JSIBHV 0642 | N2 SUPPLY SI TK 4 | N=001 |
| 1JSIBHY 0642 | N2 SUPPLY SI TK 4 | N=001 |
| 1JSIBHV 0643 | SI TK 4 VENT | N=001 |
| 1JSIBHS 0643A | SI TK 4 VENT=CR | J=200 |
| 1JSIBHS 0643B | SI TK 4 VENT=RS | N=001 |
| 1JSIBHS 0643C | SI TK 4 VENT DISCONNECT (RS) | N=001 |
| 1JSIAHS 0644 | SI TK 4 ISOL | J=200 |
| 1JSIAUV 0644 | SI TK 4 ISOL | N=001 |
| 1JSIAZI 0644 | SI TK 4 ISOL | J=200 |
| 1JSIAZT 0644 | SI TK 4 ISOL | N=001 |
| 1JSIAHS 0645 | LPSI FLOW CONTROL TO RC 1B | J=200 |
| 1JSIAUV 0645 | LPSI FLOW CONTROL TO RC 1B | N=001 |
| 1JSIAZI 0645 | LPSI FLOW CONTROL TO RC 1B | J=200 |
| 1JSIAZT 0645 | LPSI FLOW CONTROL TO RC 1B | N=001 |
| 1JSIBHS 0646 | HPSI 2 FLOW CONTROL TO RC 1B | J=200 |
| 1JSIBUV 0646 | HPSI 2 FLOW CONTROL TO RC 1B | N=001 |
| 1JSIBZI 0646 | HPSI 2 FLOW CONTROL TO RC 1B | J=200 |
| 1JSIBZT 0646 | HPSI 2 FLOW CONTROL TO RC 1B | N=001 |
| 1JSIAHS 0647 | HPSI 1 FLOW CONTROL TO RC 1B | J=200 |
| 1JSIAUV 0647 | HPSI 1 FLOW CONTROL TO RC 1B | N=001 |
| 1JSIAZI 0647 | HPSI 1 FLOW CONTROL TO RC 1B | J=200 |
| 1JSIAZT 0647 | HPSI 1 FLOW CONTROL TO RC 1B | N=001 |
| 1JSIBHS 0648 | SI TK 4 CHECK VLV LEAK LN ISOL | J=200 |
| 1JSIBUV 0648 | SI TK 4 CHECK VLV LEAK LN ISOL | N=001 |
| 1JSIBUY 0648 | SI TK 4 CHECK VLV LEAK LN ISOL | N=001 |
| 1JSIAHS 0649 | N2 STOP SI TK 4 | J=200 |
| 1JSIAHV 0649 | N2 STOP SI TK 4 | N=001 |
| 1JSIAHY 0649 | N2 STOP SI TK 4 | N=001 |
| 1JSIAHS 0651 | S/D CLG ISOL LOOP 1 | J=200 |
| 1JSIAUV 0651 | S/D CLG ISOL LOOP 1 | N=001 |
| 1JSIAZI 0651 | S/D CLG ISOL LOOP 1 | J=200 |
| 1JSIAZT 0651 | S/D CLG ISOL LOOP 1 | N=001 |
| 1JSIBHS 0652 | S/D CLG ISOL LOOP 2 | J=200 |
| 1JSIBUV 0652 | S/D CLG ISOL LOOP 2 | N=001 |
| 1JSIBZI 0652 | S/D CLG ISOL LOOP 2 | J=200 |
| 1JSIBZT 0652 | S/D CLG ISOL LOOP 2 | N=001 |
| 1JSICHS 0653 | S/D CLG ISOL LOOP 1 | J=200 |
| 1JSICUV 0653 | S/D CLG ISOL LOOP 1 | N=001 |
| 1JSICZI 0653 | S/D CLG ISOL LOOP 1 | J=200 |
| 1JSICZT 0653 | S/D CLG ISOL LOOP 1 | N=001 |
| 1JSIDHS 0654 | S/D CLG ISOL LOOP 2 | J=200 |
| 1JSIDUV 0654 | S/D CLG ISOL LOOP 2 | N=001 |
| 1JSIDZI 0654 | S/D CLG ISOL LOOP 2 | J=200 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 174 of 202)

12/17/82 02128102 — Q INSTRUMENTS BY SYSTEM — PAGE 102 (SI-10)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIDZT 0654 | S/D CLG ISOL LOOP 2 | N-001 |
| 1JSIAHS 0655 | S/D CLG CONT ISOL LOOP 1 | J-200 |
| 1JSIAUV 0655 | S/D CLG CONT ISOL LOOP 1 | N-001 |
| 1JSIBHS 0656 | S/D CLG CONT ISOL LOOP 2 | J-200 |
| 1JSIBUV 0656 | S/D CLG CONT ISOL LOOP 2 | N-001 |
| 1JSIAHS 0657 | S/D CLG TEMP CONTROL TRAIN A | J-200 |
| 1JSIAHV 0657 | S/D CLG TEMP CONTROL TRAIN A | N-001 |
| 1JSIAZI 0657 | S/D CLG TEMP CONTROL TRAIN A | J-200 |
| 1JSIAZT 0657 | S/D CLG TEMP CONTROL TRAIN A | N-001 |
| 1JSIBHS 0658 | S/D CLG TEMP CONTROL TRAIN B | J-200 |
| 1JSIBHV 0658 | S/D CLG TEMP CONTROL TRAIN B | N-001 |
| 1JSIBZI 0658 | S/D CLG TEMP CONTROL TRAIN B | J-200 |
| 1JSIBZT 0658 | S/D CLG TEMP CONTROL TRAIN B | N-001 |
| 1JSIBHS 0659 | TRAIN B RECIRC TO RWT | J-200 |
| 1JSIBUV 0659 | TRAIN B RECIRC TO RWT | N-001 |
| 1JSIBHS 0659-1 | TRAIN B RECIRC TO RWT--RS | N-001 |
| 1JSIAHS 0660 | TRAIN A RECIRC TO RWT | J-200 |
| 1JSIAUV 0660 | TRAIN A RECIRC TO RWT | N-001 |
| 1JSIAHS 0660-1 | TRAIN A RECIRC TO RWT--RS | N-001 |
| 1JSIEHV 0661 | SI DRN TO RDT | N-001 |
| 1JSINHV 0661 | SI DRN TO RDT | N-001 |
| 1JSIAHS 0664 | CS PMP A TO RWT ISOL | J-200 |
| 1JSIAUV 0664 | CS PMP A TO RWT ISOL | N-001 |
| 1JSIBHS 0665 | CS PMP B TO RWT ISOL | J-200 |
| 1JSIBUV 0665 | CS PMP B TO RWT ISOL | N-001 |
| 1JSIAHS 0666 | HPSI PMP A TO RWT ISOL | J-200 |
| 1JSIAUV 0666 | HPSI PMP A TO RWT ISOL | N-001 |
| 1JSIBHS 0667 | HPSI PMP B TO RWT ISOL | J-200 |
| 1JSIBUV 0667 | HPSI PMP B TO RWT ISOL | N-001 |
| 1JSIBHS 0668 | LPSI PMP B TO RWT ISOL | J-200 |
| 1JSIBUV 0668 | LPSI PMP B TO RWT ISOL | N-001 |
| 1JSIAHS 0669 | LPSI PMP A TO RWT ISOL | J-200 |
| 1JSIAUV 0669 | LPSI PMP A TO RWT ISOL | N-001 |
| 1JSIBHS 0671 | CONT SPRAY CONTROL TRAIN B | J-200 |
| 1JSIBUV 0671 | CONT SPRAY CONTROL TRAIN B | N-001 |
| 1JSIBZI 0671 | CONT SPRAY CONTROL TRAIN B | J-200 |
| 1JSIBZT 0671 | CONT SPRAY CONTROL TRAIN B | N-001 |
| 1JSIAHS 0672 | CONT SPRAY CONTROL TRAIN A | J-200 |
| 1JSIAUV 0672 | CONT SPRAY CONTROL TRAIN A | N-001 |
| 1JSIAZI 0672 | CONT SPRAY CONTROL TRAIN A | J-200 |
| 1JSIAZT 0672 | CONT SPRAY CONTROL TRAIN A | N-001 |
| 1JSIAHS 0673 | CONT SUMP ISOL TRAIN A | J-200 |
| 1JSIAUV 0673 | CONT SUMP ISOL TRAIN A | N-001 |
| 1JSIAHS 0674 | CONT SUMP ISOL TRAIN A | J-200 |
| 1JSIAUV 0674 | CONT SUMP ISOL TRAIN A | N-001 |
| 1JSIBHS 0675 | CONT SUMP ISOL TRAIN B | J-200 |
| 1JSIBUV 0675 | CONT SUMP ISOL TRAIN B | N-001 |
| 1JSIBHS 0676 | CONT SUMP ISOL TRAIN B | J-200 |
| 1JSIBUV 0676 | CONT SUMP ISOL TRAIN B | N-001 |
| 1JSIAHS 0678 | S/D CLG HE ISOL TRAIN A | J-200 |
| 1JSIAHV 0678 | S/D CLG HE ISOL TRAIN A | N-001 |
| 1JSIAZI 0678 | S/D CLG HE ISOL TRAIN A | J-200 |
| 1JSIAZT 0678 | S/D CLG HE ISOL TRAIN A | N-001 |
| 1JSIBHS 0679 | S/D CLG HE ISOL TRAIN B | J-200 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 175 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 103 (SI-11)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSI8HV 0679 | S/D CLG HE ISOL TRAIN B | N=001 |
| 1JSI8ZI 0679 | S/D CLG HE ISOL TRAIN B | J=200 |
| 1JSI8ZT 0679 | S/D CLG HE ISOL TRAIN B | N=001 |
| 1JSI8HS 0680 | SPRAY CHEM PP B DSCH TO CS PP | J=200 |
| 1JSI8UV 0680 | SPRAY CHEM PP B DSCH TO CS PP | N=001 |
| 1JSIAHS 0681 | SPRAY CHEM PP A DSCH TO CS PP | J=200 |
| 1JSIAUV 0681 | SPRAY CHEM PP A DSCH TO CS PP | N=001 |
| 1JSIAHS 0682 | RWT RETURN HDR CONT ISOL VLV | J=200 |
| 1JSIAUV 0682 | RWT RETURN HDR CONT ISOL VLV | N=001 |
| 1JSIAUY 0682 | RWT RETURN HDR CONT ISOL VLV | N=001 |
| 1JSIAHS 0683 | LPSI PP A ISOL | J=200 |
| 1JSIAHV 0683 | LPSI PP A ISOL | N=001 |
| 1JSIAHS 0684 | S/D CLG HE ISOL TRAIN A | J=200 |
| 1JSIAHV 0684 | S/D CLG HE ISOL TRAIN A | N=001 |
| 1JSIAHS 0685 | LPSI-CONT SPRAY PP CROSS A | J=200 |
| 1JSIAHV 0685 | LPSI-CONT SPRAY PP CROSS A | N=001 |
| 1JSIAHS 0686 | CONT SPRAY A CROSS CONNECT | J=200 |
| 1JSIAHV 0686 | CONT SPRAY A CROSS CONNECT | N=001 |
| 1JSIAHS 0687 | CONT SPRAY ISOL TRAIN A | J=200 |
| 1JSIAHV 0687 | CONT SPRAY ISOL TRAIN A | N=001 |
| 1JSIAHS 0688 | S/D CLG HE A BYPASS | J=200 |
| 1JSIAHV 0688 | S/D CLG HE A BYPASS | N=001 |
| 1JSI8HS 0689 | S/D CLG HE ISOL TRAIN B | J=200 |
| 1JSI8HV 0689 | S/D CLG HE ISOL TRAIN B | N=001 |
| 1JSI8HS 0690 | S/D CLG LOOP B WARMUP BYPASS | J=200 |
| 1JSI8HV 0690 | S/D CLG LOOP B WARMUP BYPASS | N=001 |
| 1JSIAHS 0691 | S/D CLG LOOP A WARMUP BYPASS | J=200 |
| 1JSIAHV 0691 | S/D CLG LOOP A WARMUP BYPASS | N=001 |
| 1JSI8HS 0692 | LPSI PP B ISOL | J=200 |
| 1JSI8HV 0692 | LPSI PP B ISOL | N=001 |
| 1JSI8HS 0693 | S/D CLG HE B BYPASS | J=200 |
| 1JSI8HV 0693 | S/D CLG HE B BYPASS | N=001 |
| 1JSI8HS 0694 | LPSI-CONT SPRAY PP CROSS B | J=200 |
| 1JSI8HV 0694 | LPSI-CONT SPRAY PP CROSS B | N=001 |
| 1JSI8HS 0695 | CONT SPRAY ISOL TRAIN B | J=200 |
| 1JSI8HV 0695 | CONT SPRAY ISOL TRAIN B | N=001 |
| 1JSI8HS 0696 | CONT SPRAY B CROSS CONNECT | J=200 |
| 1JSI8HV 0696 | CONT SPRAY B CROSS CONNECT | N=001 |
| 1JSIAHS 0698 | HPSI PP A DSCH | J=200 |
| 1JSIAHV 0698 | HPSI PP A DSCH | N=001 |
| 1JSI8HS 0699 | HPSI PP B DSCH | J=200 |
| 1JSI8HV 0699 | HPSI PP B DSCH | N=001 |
| 1JSIALT 0704 | CONTMT SPRAY SYS A HDR WTR LVL | J=311 |
| 1JSI8LT 0705 | CONTMT SPRAY SYS B HDR WTR LVL | J=311 |
| 1JSIALI 0706 | CONTAINMENT WATER LEVEL | J=111 |
| 1JSIALT 0706 | CONTAINMENT WATER LEVEL | J=475 |
| 1JSIEFO 0706 | RESTRICTION ORIFICE FOR PT-319 | J=425 |
| 1JSIALE 0706A | CONTAINMENT WATER LEVEL | J=475 |
| 1JSIALE 0706B | CONTAINMENT WATER LEVEL | J=475 |
| 1JSI8LI 0707 | CONTAINMENT WATER LEVEL | J=111 |
| 1JSI8LT 0707 | CONTAINMENT WATER LEVEL | J=475 |
| 1JSIEFO 0707 | RESTRICTION ORIFICE FOR PT-329 | J=425 |
| 1JSI8LE 0707A | CONTAINMENT WATER LEVEL | J=475 |
| 1JSI8LE 0707B | CONTAINMENT WATER LEVEL | J=475 |

## Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 176 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 104 (SI-12)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSIAHS 0708 | RECIRC SUMP A FOR PASS | J-200 |
| 1JSIAHV 0708 | TAG# REVISED TO UV-708 | J-603 |
| 1JSIAUV 0708 | RECIRC SUMP A FOR PASS | J-603 |
| 1JSIEFO 0708 | RESTRICTION ORIFICE FOR PT-339 | J-425 |
| 1JSIAHS 0709 | HPSI PP A RECIRC FOR PASS | J-200 |
| 1JSIAHV 0709 | TAG # REVISED TO UV-709 | J-603 |
| 1JSIAUV 0709 | HPSI PP A FOR PASS | J-603 |
| 1JSIEFO 0709 | RESTRICTION ORIFICE FOR PT-349 | J-425 |
| 1JSIBHS 0710 | HPSI PP B RECIRC FOR PASS | J-200 |
| 1JSIBHV 0710 | TAG # REVISED TO UV-710 | J-603 |
| 1JSIBUV 0710 | HPSI PP B FOR PASS | J-603 |
| 1JSIEFO 0710 | RESTRICTION ORIFICE FOR PT-390 | J-425 |
| 1JSIEFO 0711 | RESTRICTION ORIFICE FOR PT-391 | J-425 |
| 1JSINTE 0712 | CONTNT RECIRC SUMP TRAIN A | J-556 |
| 1JSINTE 0713 | CONTNT RECIRC SUMP TRAIN A | J-556 |

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CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 177 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 70 (SI-13)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PSIAV004 | 13PM221A |
| 1PSIAV005 | 13PM221A |
| 1PSIAV006 | 13PM221A |
| 1PSIAV007 | 13PM221A |
| 1PSIAV009 | 13PM221A |
| 1PSIAV016 | 13PM221A |
| 1PSIAV018 | 13PM221A |
| 1PSIAV023 | 13PM221A |
| 1PSIAV028 | 13PM221A |
| 1PSIAV032 | 13PM221A |
| 1PSIAV037 | 13PM221A |
| 1PSIAV039 | 13PM221A |
| 1PSIAV046 | 13PM221A |
| 1PSIAV047 | 13PM221A |
| 1PSIAV055 | 13PM221A |
| 1PSIAV056 | 13PM221A |
| 1PSIAV068 | 13PM221A |
| 1PSIAV069 | 13PM221A |
| 1PSIAV070 | 13PM221A |
| 1PSIAV071 | 13PM221A |
| 1PSIAV080 | 13PM221A |
| 1PSIAV081 | 13PM221A |
| 1PSIAV083 | 13PM221A |
| 1PSIAV084 | 13PM221A |
| 1PSIAV088 | 13PM221A |
| 1PSIAV089 | 13PM221A |
| 1PSIAV105 | 13NM001 C |
| 1PSIAV130 | 13NM001 |
| 1PSIAV148 | 13NM001 |
| 1PSIAV156 | 13NM001 |
| 1PSIAV157 | 13NM001 C |
| 1PSIAV164 | 13NM001 |
| 1PSIAV170 | 13NM001 |
| 1PSIAV172 | 13NM001 C |
| 1PSIAV174 | 13NM001 C |
| 1PSIAV175 | 13NM001 C |
| 1PSIAV184 | 13NM001 C |
| 1PSIAV201 | 13NM001 C |
| 1PSIAV203 | 13NM001 C |
| 1PSIAV205 | 13NM001 C |
| 1PSIAV207 | 13NM001 C |
| 1PSIAV218 | 13NM001 C |
| 1PSIAV253 | 13NM001 |
| 1PSIAV256 | 13NM001 |
| 1PSIAV257 | 13NM001 C |
| 1PSIAV260 | 13NM001 C |
| 1PSIAV262 | 13NM001 C |
| 1PSIAV270 | 13NM001 |
| 1PSIAV271 | 13NM001 |
| 1PSIAV274 | 13NM001 |
| 1PSIAV404 | 13NM001 C |
| 1PSIAV416 | 13NM001 C |
| 1PSIAV419 | 13NM001 C |
| 1PSIAV421 | 13NM001 C |
| 1PSIAV424 | 13NM001 C |

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CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 178 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 71 (SI-14)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PSIAV429 | 13NM001 C |
| 1PSIAV433 | 13NM001 C |
| 1PSIAV434 | 13NM001 C |
| 1PSIAV435 | 13NM001 C |
| 1PSIAV437 | 13NM001 C |
| 1PSIAV438 | 13NM001 C |
| 1PSIAV443 | 13NM001 C |
| 1PSIAV450 | 13NM001 C |
| 1PSIAV451 | 13NM001 C |
| 1PSIAV458 | 13NM001 C |
| 1PSIAV459 | 13NM001 C |
| 1PSIAV465 | 13NM001 C |
| 1PSIAV470 | 13NM001 C |
| 1PSIAV476 | 13NM001 C |
| 1PSIAV483 | 13NM001 C |
| 1PSIAV485 | 13NM001 C |
| 1PSIAV486 | 13NM001 C |
| 1PSIAV523 | 13NM001 |
| 1PSIAV550 | 13NM001 |
| 1PSIAV551 | 13NM001 |
| 1PSIAV552 | 13NM001 |
| 1PSIAV801 | 13PM221A |
| 1PSIAV807 | 13PM221A |
| 1PSIAV810 | 13PM221A |
| 1PSIAV811 | 13PM221A |
| 1PSIAV817 | 13PM221A |
| 1PSIAV819 | 13PM221A |
| 1PSIAV820 | 13PM221A |
| 1PSIAV821 | 13PM221A |
| 1PSIAV824 | 13PM221A |
| 1PSIAV828 | 13PM221A |
| 1PSIAV833 | 13PM221A |
| 1PSIAV836 | 13PM221A |
| 1PSIAV839 | 13PM221A |
| 1PSIAV840 | 13PM221A |
| 1PSIAV841 | 13PM221A |
| 1PSIAV848 | 13PM221A |
| 1PSIAV849 | 13PM221A |
| 1PSIAV850 | 13PM221A |
| 1PSIAV851 | 13PM221A |
| 1PSIAV856 | 13PM221A |
| 1PSIAV859 | 13PM221A |
| 1PSIAV864 | 13PM221A |
| 1PSIAV866 | 13PM221A |
| 1PSIAV874 | 13PM221A |
| 1PSIAV876 | 13PM221A |
| 1PSIAV884 | 13PM221A |
| 1PSIAV885 | 13PM221A |
| 1PSIAV892 | 13PM221A |
| 1PSIAV899 | 13PM221A |
| 1PSIAV902 | 13PM221A |
| 1PSIAV906 | 13PM221A |
| 1PSIAV908 | 13PM221A |
| 1PSIAV909 | 13PM221A |
| 1PSIAV925 | 13PM221A |

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CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 179 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 72 (SI-15)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PSIAV926 | 13PM221A |
| 1PSIAV927 | 13PM221A |
| 1PSIAV932 | 13PM221A |
| 1PSIAV935 | 13PM221C |
| 1PSIAV936 | 13PM221C |
| 1PSIAV940 | 13PM221C |
| 1PSIAV944 | 13PM221A |
| 1PSIAV945 | 13PM221A |
| 1PSIAV011 | 13PM221A |
| 1PSIAV012 | 13PM221A |
| 1PSIAV013 | 13PM221A |
| 1PSIAV014 | 13PM221A |
| 1PSIBV015 | 13PM221A |
| 1PSIBV017 | 13PM221A |
| 1PSIBV019 | 13PM221A |
| 1PSIAV024 | 13PM221A |
| 1PSIBV030 | 13PM221A |
| 1PSIAV031 | 13PM221A |
| 1PSIBV040 | 13PM221A |
| 1PSIBV041 | 13PM221A |
| 1PSIBV042 | 13PM221A |
| 1PSIAV045 | 13PM221A |
| 1PSIAV050 | 13PM221A |
| 1PSIAV057 | 13PM221A |
| 1PSIAV073 | 13PM221A |
| 1PSIAV074 | 13PM221A |
| 1PSIBV075 | 13PM221A |
| 1PSIBV090 | 13PM221A |
| 1PSIBV091 | 13PM221A |
| 1PSIAV092 | 13PM221A |
| 1PSIBV093 | 13PM221A |
| 1PSIAV094 | 13PM221A |
| 1PSIBV096 | 13PM221A |
| 1PSIAV097 | 13PM221A |
| 1PSIAV098 | 13PM221A |
| 1PSIAV104 | 13NM001 |
| 1PSIBV120 | 13NM001 |
| 1PSIAV128 | 13NM001 |
| 1PSIBV155 | 13NM001 |
| 1PSIAV158 | 13NM001 C |
| 1PSIAV166 | 13PM221A |
| 1PSIAV176 | 13NM001 C |
| 1PSIBV177 | 13NM001 C |
| 1PSIBV180 | 13NM001 C |
| 1PSIAV182 | 13NM001 C |
| 1PSIBV185 | 13NM001 C |
| 1PSIAV200 | 13NM001 C |
| 1PSIAV202 | 13NM001 C |
| 1PSIBV204 | 13NM001 C |
| 1PSIBV206 | 13NM001 C |
| 1PSIBV208 | 13NM001 C |
| 1PSIBV219 | 13NM001 C |
| 1PSIBV254 | 13NM001 |
| 1PSIAV264 | 13NM001 C |
| 1PSIBV266 | 13NM001 C |

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CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 180 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 73 (SI-16)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PSIAV268 | 13NM001 C |
| 1PSIAV272 | 13NM001 |
| 1PSIAV273 | 13NM001 |
| 1PSIAV400 | 13NM001 |
| 1PSIAV402 | 13NM001 C |
| 1PSIAV405 | 13NM001 C |
| 1PSIAV408 | 13NM001 C |
| 1PSIAV418 | 13NM001 C |
| 1PSIAV420 | 13NM001 C |
| 1PSIAV426 | 13NM001 C |
| 1PSIAV427 | 13NM001 C |
| 1PSIAV436 | 13NM001 C |
| 1PSIAV440 | 13NM001 C |
| 1PSIAV441 | 13NM001 C |
| 1PSIAV442 | 13NM001 C |
| 1PSIAV445 | 13NM001 C |
| 1PSIAV446 | 13NM001 C |
| 1PSIAV447 | 13NM001 C |
| 1PSIAV448 | 13NM001 C |
| 1PSIAV454 | 13NM001 |
| 1PSIAV455 | 13NM001 |
| 1PSIAV478 | 13NM001 |
| 1PSIAV482 | 13NM001 C |
| 1PSIAV484 | 13NM001 |
| 1PSIAV487 | 13NM001 |
| 1PSIAV509 | 13NM001 |
| 1PSIAV533 | 13NM001 |
| 1PSIAV553 | 13NM001 |
| 1PSIAV554 | 13NM001 |
| 1PSIAV555 | 13NM001 |
| 1PSIAV814 | 13PM221A |
| 1PSIAV815 | 13PM221A |
| 1PSIAV825 | 13PM221A |
| 1PSIAV829 | 13PM221A |
| 1PSIAV831 | 13PM221A |
| 1PSIAV832 | 13PM221A |
| 1PSIAV834 | 13PM221A |
| 1PSIAV837 | 13PM221A |
| 1PSIAV842 | 13PM221A |
| 1PSIAV843 | 13PM221A |
| 1PSIAV852 | 13PM221A |
| 1PSIAV853 | 13PM221A |
| 1PSIAV854 | 13PM221A |
| 1PSIAV855 | 13PM221A |
| 1PSIAV861 | 13PM221A |
| 1PSIAV862 | 13PM221A |
| 1PSIAV867 | 13PM221A |
| 1PSIAV869 | 13PM221A |
| 1PSIAV870 | 13PM221A |
| 1PSIAV871 | 13PM221A |
| 1PSIAV879 | 13PM221A |
| 1PSIAV886 | 13PM221A |
| 1PSIAV891 | 13PM221A |
| 1PSI3V895 | 13PM221A |
| 1PSIAV896 | 13PM221A |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 181 of 202)

04/19/82 15:50:39 VALVE-"MO" CLASS PAGE 74 (SI-17)

| TAG NUMBER | B/SPEC/ | |
|---|---|---|
| 1PSIAV900 | 13PM221A | |
| 1PSIAV904 | 13PM221A | |
| 1PSIAV905 | 13PM221A | |
| 1PSIAV907 | 13PM221A | |
| 1PSIAV910 | 13PM221A | |
| 1PSIAV931 | 13PM221A | |
| 1PSIAV933 | 13PM221C | |
| 1PSIAV937 | 13PM221C | |
| 1PSIAV938 | 13PM221C | |
| 1PSIAV939 | 13PM221C | |
| 1PSIAV941 | 13PM221A | |
| 1PSIAV942 | 13PM221A | |
| 1PSIEV059 | 13PM221A | |
| 1PSIEV060 | 13PM221A | |
| 1PSIEV061 | 13PM221A | |
| 1PSIEV062 | 13PM221A | |
| 1PSIEV063 | 13PM221A | |
| 1PSIEV064 | 13PM221A | |
| 1PSIEV085 | 13PM221A | |
| 1PSIEV099 | 13PM221A | |
| 1PSIEV101 | 13NM001 | |
| 1PSIEV108 | 13NM001 | |
| 1PSIEV113 | 13NM001 | |
| 1PSIEV114 | 13NM001 | |
| 1PSIEV115 | 13NM001 | C |
| 1PSIEV116 | 13NM001 | C |
| 1PSIEV117 | 13NM001 | |
| 1PSIEV119 | 13NM001 | |
| 1PSIEV123 | 13NM001 | C |
| 1PSIEV124 | 13NM001 | C |
| 1PSIEV125 | 13NM001 | C |
| 1PSIEV126 | 13NM001 | C |
| 1PSIEV127 | 13NM001 | |
| 1PSIEV129 | 13NM001 | |
| 1PSIEV133 | 13NM001 | C |
| 1PSIEV134 | 13NM001 | C |
| 1PSIEV135 | 13NM001 | C |
| 1PSIEV136 | 13NM001 | C |
| 1PSIEV137 | 13NM001 | |
| 1PSIEV139 | 13NM001 | |
| 1PSIEV143 | 13NM001 | C |
| 1PSIEV144 | 13NM001 | C |
| 1PSIEV145 | 13NM001 | C |
| 1PSIEV146 | 13NM001 | C |
| 1PSIEV147 | 13NM001 | |
| 1PSIEV149 | 13NM001 | |
| 1PSIEV152 | 13NM001 | |
| 1PSIEV165 | 13NM001 | |
| 1PSIEV188 | 13NM001 | |
| 1PSIEV210 | 13NM001 | |
| 1PSIEV212 | 13NM001 | |
| 1PSIEV213 | 13NM001 | C |
| 1PSIEV214 | 13NM001 | C |
| 1PSIEV215 | 13NM001 | C |
| 1PSIEV216 | 13NM001 | C |

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CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 182 of 202)

04/19/82 15:50:39 VALVE-MOM CLASS PAGE 75 (SI-18)

| TAG NUMBER | B/SPEC/ | |
|---|---|---|
| 1PSIEV217 | 13NM001 | C |
| 1PSIEV220 | 13NM001 | |
| 1PSIEV222 | 13NM001 | C |
| 1PSIEV223 | 13NM001 | C |
| 1PSIEV224 | 13NM001 | C |
| 1PSIEV225 | 13NM001 | C |
| 1PSIEV226 | 13NM001 | C |
| 1PSIEV227 | 13NM001 | C |
| 1PSIEV228 | 13NM001 | C |
| 1PSIEV229 | 13NM001 | C |
| 1PSIEV230 | 13NM001 | |
| 1PSIEV232 | 13NM001 | C |
| 1PSIEV233 | 13NM001 | C |
| 1PSIEV234 | 13NM001 | C |
| 1PSIEV235 | 13NM001 | C |
| 1PSIEV236 | 13NM001 | C |
| 1PSIEV237 | 13NM001 | C |
| 1PSIEV238 | 13NM001 | C |
| 1PSIEV239 | 13NM001 | C |
| 1PSIEV240 | 13NM001 | |
| 1PSIEV242 | 13NM001 | |
| 1PSIEV243 | 13NM001 | |
| 1PSIEV244 | 13NM001 | |
| 1PSIEV245 | 13NM001 | C |
| 1PSIEV246 | 13NM001 | C |
| 1PSIEV247 | 13NM001 | C |
| 1PSIEV248 | 13NM001 | |
| 1PSIEV249 | 13NM001 | |
| 1PSIEV252 | 13NM001 | |
| 1PSIEV258 | 13NM001 | |
| 1PSIEV259 | 13NM001 | |
| 1PSIEV281 | 13NM001 | |
| 1PSIEV282 | 13NM001 | |
| 1PSIEV283 | 13NM001 | |
| 1PSIEV284 | 13NM001 | |
| 1PSIEV298 | 13NM001 | |
| 1PSIEV460 | 13NM001 | |
| 1PSIEV461 | 13NM001 | |
| 1PSIEV462 | 13NM001 | |
| 1PSIEV463 | 13NM001 | |
| 1PSIEV464 | 13NM001 | |
| 1PSIEV500 | 13NM001 | C |
| 1PSIEV501 | 13NM001 | C |
| 1PSIEV506 | 13NM001 | C |
| 1PSIEV508 | 13NM001 | |
| 1PSIEV510 | 13NM001 | |
| 1PSIEV511 | 13NM001 | |
| 1PSIEV516 | 13NM001 | C |
| 1PSIEV522 | 13NM001 | C |
| 1PSIEV525 | 13NM001 | C |
| 1PSIEV526 | 13NM001 | C |
| 1PSIEV532 | 13NM001 | C |
| 1PSIEV535 | 13NM001 | C |
| 1PSIEV536 | 13NM001 | C |
| 1PSIEV540 | 13NM001 | |

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CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 183 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 76 SAFETY INJECTION (SI-19)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PSIEV541 | 13NM001 |
| 1PSIEV542 | 13NM001 |
| 1PSIEV543 | 13NM001 |
| 1PSIEV803 | 13PM221A |
| 1PSIEV804 | 13PM221A |
| 1PSIEV826 | 13PM221A |
| 1PSIEV827 | 13PM221A |
| 1PSIEV830 | 13PM221A |
| 1PSIEV835 | 13PM221A |
| 1PSIEV838 | 13PM221A |
| 1PSIEV857 | 13PM221A |
| 1PSIEV858 | 13PM221A |
| 1PSIEV860 | 13PM221A |
| 1PSIEV863 | 13NM001A |
| 1PSIEV865 | 13PM221A |
| 1PSIEV868 | 13PM221A |
| 1PSIEV872 | 13PM221A |
| 1PSIEV877 | 13PM221A |
| 1PSIEV878 | 13PM221A |
| 1PSIFV880 | 13PM221A |
| 1PSIEV881 | 13PM221A |
| 1PSIEV882 | 13PM221A |
| 1PSIEV883 | 13PM221A |
| 1PSIEV887 | 13PM221A |
| 1PSIEV888 | 13PM221A |
| 1PSIEV894 | 13PM221A |
| 1PSIEV897 | 13PM221A |
| 1PSIEV898 | 13PM221A |
| 1PSIEV911 | 13PM221A |
| 1PSIEV915 | 13PM221A |
| 1PSIEV916 | 13PM221A |
| 1PSIEV919 | 13PM221A |
| 1PSIEV920 | 13PM221A |
| 1PSIEV921 | 13PM221A |
| 1PSIEV922 | 13PM221A |
| 1PSIEV923 | 13PM221A |
| 1PSIEV924 | 13PM221A |
| 1PSIEV930 | 13PM221A |
| 1PSIEV947 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 184 of 202)

04/19/82 15:38:46 EQUIPMENT-"0" CLASS PAGE 108 ESSENTIAL SPRAY PONDS (SP-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MSPAM01 | SPRAY POND A CLG NOZZLES | 13MM185 |
| 1MSPAM02 | SPRAY POND A JUNCTION BXS | 13MM185 |
| 1MSPAP01 | ESPS PUMP & DRIVE | 13MM095 |
| 1MSPBM01 | SPRAY POND B CLG NOZZLES | 13MM185 |
| 1MSPBM02 | SPRAY POND B JUNCTION BXS | 13MM185 |
| 1MSPBP01 | ESPS PUMP & DRIVE | 13MM095 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 185 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 106 (SP-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSPAHS 0001 | ESP PP A | J-200 |
| 1JSPBHS 0002 | ESP PP B | J-200 |
| 1JSPAFT 0005 | ESP PP A DISCH FLOW | J-311 |
| 1JSPNFE 0005 | ESP PP A DSCH FLOW | J-449 |
| 1JSPBFT 0006 | ESP PP B DISCH FLOW | J-311 |
| 1JSPNFE 0006 | ESP PP B DSCH FLOW | J-449 |
| 1JSPBFE 0007 | ESP TRAIN A I/L FLOW | J-449 |
| 1JSPBFE 0008 | ESP TRAIN B I/L FLOW | J-449 |
| 1JSPATW 0023 | ECW HX A I/L | J-556 |
| 1JSPBTW 0024 | ECW HX B I/L | J-556 |
| 1JSPAXCV 0025 | EXCESS FL CHK VLV FOR PI 25 | J-705 |
| 1JSPBXCV 0026 | EXCESS FLOW CHECK VLV PI-26 | J-705 |
| 1JSPAPSV 0029 | ECW HX A | M-071 |
| 1JSPBPSV 0030 | ECW HX B | M-071 |
| 1JSPAXCV 0031 | EXCESS FL CHK VLV FOR PI 31 | J-705 |
| 1JSPBXCV 0032 | EXCESS FL CHK VLV FOR PI 32 | J-705 |
| 1JSPATW 0035 | ECW HX A OUT | J-556 |
| 1JSPBTW 0036 | ECW HX B OUT | J-556 |
| 1JSPATW 0037 | ECW HX A OUT | J-556 |
| 1JSPBTW 0038 | ECW HX B OUT | J-556 |
| 1JSPAHCV 0045 | ECW HX A I/L | J-605 |
| 1JSPBHCV 0046 | ECW HX B I/L | J-605 |
| 1JSPAHCV 0047 | ECW HX A OUT | J-605 |
| 1JSPBHCV 0048 | ECW HX B OUT | J-605 |
| 1JSPAHS 0049 | ESP A I/L SPRAY OR BY-PASS | J-200 |
| 1JSPAHV 0049A | ESP A I/L | J-605 |
| 1JSPAHV 0049B | ESP A I/L SPRAY BY-PASS | J-605 |
| 1JSPBHS 0050 | ESP B I/L SPRAY OR BY-PASS | J-200 |
| 1JSPBHV 0050A | ESP B I/L | J-605 |
| 1JSPBHV 0050B | ESP B I/L SPRAY BY-PASS | J-605 |
| 1JSPAXCV 0057 | EXCESS FL CHK VLV FOR PI 57 | J-705 |
| 1JSPBXCV 0058 | EXCESS FL CHK VLV FOR PI 58 | J-705 |
| 1JSPAFO 0059 | ESP A SPRAY BY-PASS | J-425 |
| 1JSPBFO 0060 | ESP B SPRAY BY-PASS | J-425 |
| 1JSPAHCV 0125 | DG A JKT WTR CLR I/L | J-605 |
| 1JSPBHCV 0126 | DG B LUBE OIL CLR I/L | J-605 |
| 1JSPAHCV 0127 | DG A JKT WTR CLR OUT | J-605 |
| 1JSPBHCV 0128 | DG B LUBE OIL CLR OUT | J-605 |
| 1JSPAHCV 0129 | DG A AIR AFT CLRS I/L | J-605 |
| 1JSPBHCV 0130 | DG B AIR AFT CLRS I/L | J-605 |
| 1JSPAHCV 0131 | DG A AIR AFT CLRS OUT | J-605 |
| 1JSPBHCV 0132 | DG B AIR AFT CLRS OUT | J-605 |
| 1JSPAHCV 0133 | DG A LUBE OIL CLR I/L | J-605 |
| 1JSPBHCV 0134 | DG B JKT WTR CLR I/L | J-605 |
| 1JSPAHCV 0135 | DG A LUBE OIL CLR OUT | J-605 |
| 1JSPBHCV 0136 | DG B JKT WTR CLR OUT | J-605 |
| 1JSPAPSV 0137 | DG A FUEL OIL CLR OUT | J-691 |
| 1JSPBPSV 0138 | DG B LUBE OIL CLR OUT | J-691 |
| 1JSPAPSV 0139 | DG A JKT WTR CLR OUT | J-691 |
| 1JSPBPSV 0140 | DG B AIR APT CLR OUT | J-691 |
| 1JSPAPSV 0141 | DG A AIR APT CLR OUT | J-691 |
| 1JSPBPSV 0142 | DG B JKT WTR CLR OUT | J-691 |
| 1JSPAPSV 0143 | DG A LUBE OIL CLR OUT | J-691 |
| 1JSPBPSV 0144 | DG B FUEL OIL CLR OUT | J-691 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 186 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 107 (SP-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSPATW 0145 | DG A COOLING WATER I/L TEMP | J-556 |
| 1JSPBTW 0146 | DG B COOLING WATER I/L TEMP | J-556 |
| 1JSPATW 0147 | DG A FUEL OIL CLR OUT | J-556 |
| 1JSPBTW 0148 | DG B FUEL OIL CLR OUT | J-556 |
| 1JSPATW 0149 | DG A JKT WTR CLR OUTLET | J-556 |
| 1JSPBTW 0150 | DG B JKT WTR CLR OUTLET | J-556 |
| 1JSPATW 0151 | DG A AIR AFTER CLR OUTLET | J-556 |
| 1JSPBTW 0152 | DG B AIR AFTER CLR OUTLET | J-556 |
| 1JSPATW 0153 | DG A LUBE OIL COOLER OUTLET | J-556 |
| 1JSPBTW 0154 | DG B LUBE OIL COOLER OUTLET | J-556 |
| 1JSPATW 0189 | DG A JKT WTR CLR OUTLET | J-556 |
| 1JSPBTW 0190 | DG B JKT WTR CLR OUTLET | J-556 |
| 1JSPATW 0191 | DG A AIR AFTER CLR OUTLET | J-556 |
| 1JSPBTW 0192 | DG B AIR AFTER CLR OUTLET | J-556 |
| 1JSPATW 0193 | DG A LUBE OIL COOLER OUTLET | J-556 |
| 1JSPBTW 0194 | DG B LUBE OIL COOLER OUTLET | J-556 |
| 1JSPATW 0195 | DG A JKT WTR CLR OUTLET | J-556 |
| 1JSPBTW 0196 | DG B JKT WTR CLR OUTLET | J-556 |
| 1JSPATW 0197 | DG A AIR AFTER CLR OUTLET | J-556 |
| 1JSPBTW 0198 | DG B AIR AFTER CLR OUTLET | J-556 |
| 1JSPATW 0199 | DG A LUBE OIL COOLER OUTLET | J-556 |
| 1JSPBTW 0200 | DG B LUBE OIL COOLER OUTLET | J-556 |
| 1JSPAXCV 0201 | SPARE | J-705 |
| 1JSPBXCV 0202 | SPARE | J-705 |
| 1JSPAXCV 0203 | SPARE | J-705 |
| 1JSPBXCV 0204 | SPARE | J-705 |
| 1JSPAXCV 0205 | SPARE | J-705 |
| 1JSPBXCV 0206 | SPARE | J-705 |
| 1JSPEHCV 0207 | ESP WATER TRANSFER | J-605 |
| 1JSPEHCV 0208 | ESP WATER TRANSFER | J-605 |
| 1JSPATE 0213 | RETAGGED AS JSPNTE 213 | J-556 |
| 1JSPATW 0213 | ESP PP A DISCH TEMP | J-556 |
| 1JSPNTE 0213 | ESP PP A DISCH TEMP | J-556 |
| 1JSPATE 0214 | RETAGGED AS JSPNTE 214 | J-556 |
| 1JSPBTW 0214 | ESP PP B DISCH TEMP | J-556 |
| 1JSPNTE 0214 | ESP PP B DISCH TEMP | J-556 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 187 of 202)

04/19/82 15:50:39 VALVE-"ON" CLASS PAGE 78 (SP-4)

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PSPAV028 | 13PM221C |
| 1PSPAV034 | 13PM221C |
| 1PSPAV035 | 13PM221C |
| 1PSPAV036 | 13PM221C |
| 1PSPAV037 | 13PM231 |
| 1PSPAV039 | 13PM221C |
| 1PSPAV040 | 13PM221A |
| 1PSPAV041 | 13PM221B |
| 1PSPAV043 | 13PM221C |
| 1PSPAV044 | 13PM221C |
| 1PSPAV045 | 13PM221C |
| 1PSPAV082 | 13PM221C |
| 1PSPAV083 | 13PM221C |
| 1PSPAV084 | 13PM221C |
| 1PSPAV085 | 13PM221C |
| 1PSPAV086 | 13PM221C |
| 1PSPAV087 | 13PM221C |
| 1PSPAV088 | 13PM221C |
| 1PSPAV096 | 13PM231 |
| 1PSPAV097 | 13PM221C |
| 1PSPAV098 | 13PM221C |
| 1PSPAV109 | 13PM221C |
| 1PSPAV111 | 13PM221C |
| 1PSPAV112 | 13PM221C |
| 1PSPAV115 | 13PM221C |
| 1PSPAV116 | 13PM221C |
| 1PSPAV128 | 13PM221C |
| 1PSPAV334 | 13MH018C |
| 1PSPAV337 | 13MH018C |
| 1PSPAV339 | 13MH018C |
| 1PSPBV011 | 13PM221C |
| 1PSPBV012 | 13PM221B |
| 1PSPBV014 | 13PM221C |
| 1PSPBV015 | 13PM221C |
| 1PSPBV016 | 13PM221C |
| 1PSPBV017 | 13PM221C |
| 1PSPBV020 | 13PM221C |
| 1PSPBV022 | 13PM221C |
| 1PSPBV024 | 13PM231 |
| 1PSPBV025 | 13PM221C |
| 1PSPBV026 | 13PM221C |
| 1PSPBV079 | 13PM221C |
| 1PSPBV089 | 13PM221C |
| 1PSPBV090 | 13PM221C |
| 1PSPBV091 | 13PM221C |
| 1PSPBV092 | 13PM221C |
| 1PSPBV093 | 13PM221C |
| 1PSPBV094 | 13PM221C |
| 1PSPBV095 | 13PM231 |
| 1PSPBV099 | 13PM221C |
| 1PSPBV100 | 13PM221C |
| 1PSPBV113 | 13PM221C |
| 1PSPBV114 | 13PM221C |
| 1PSPBV117 | 13PM221C |
| 1PSPBV118 | 13PM221C |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 188 of 202)

(SP-5)

04/19/82 15:50:39 VALVE-"NON" CLASS PAGE 79

| TAG NUMBER | R/SPEC/ |
|---|---|
| 1PSPAV129 | 13PM221C |
| 1PSPAV434 | 13MM018C |
| 1PSPAV437 | 13MM018C |
| 1PSPAV439 | 13MM018C |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 189 of 202)

04/19/82 15:38:46 EQUIPMENT-"OH" CLASS PAGE 110 RADIATION MONITORING (SQ-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSOAC01 | SRMS CONTR RM CABINET-TRAIN A | 13NM997 |
| 1JSOBC01 | SRMS CONTR RM CABINET-TRAIN B | 13NM997 |
| 1JSONC02 | NSSS RADIATION MONITORING CAB | 13NM001 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 190 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 109 — (SQ-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSQBRI 0001 | HC CONTMT ATMOS | N=997 |
| 1JSQBRU 0001 | HC CONTMT ATMOS | N=997 |
| 1JSQARI 0029 | HJ CONTROL ROOM VENT A | N=997 |
| 1JSQARR 0029 | MULTIPOINT RECORDER | N=997 |
| 1JSQARSH 0029 | HJ CONTROL ROOM VENT A | N=997 |
| 1JSQARU 0029 | HJ CONTROL ROOM VENT A | N=997 |
| 1JSQARY 0029A | D/A CONVERTOR | N=997 |
| 1JSQARY 0029B | ISOLATION/INTERFACE DEVICE | N=997 |
| 1JSQBRI 0030 | HJ CONTROL ROOM VENT B | N=997 |
| 1JSQBRSH 0030 | HJ CONTROL ROOM VENT B | N=997 |
| 1JSQBRU 0030 | HJ CONTROL ROOM VENT B | N=997 |
| 1JSQBRY 0030A | D/A CONVERTOR | N=997 |
| 1JSQBRY 0030B | ISOLATION/INTERFACE DEVICE | N=997 |
| 1JSQARI 0031 | HF FUEL POOL AREA | N=997 |
| 1JSQARSH 0031 | HF FUEL POOL AREA | N=997 |
| 1JSQARU 0031 | HF FUEL POOL AREA | N=997 |
| 1JSQARY 0031A | D/A CONVERTOR | N=997 |
| 1JSQARY 0031B | ISOLATION/INTERFACE DEVICE | N=997 |
| 1JSQBRI 0032 | HF FUEL BLDG EXHAUST | N=997 |
| 1JSQBRSH 0032 | HF FUEL BLDG EXHAUST | N=997 |
| 1JSQBRU 0032 | SPARE | N=997 |
| 1JSQBRY 0032A | D/A CONVERTOR | N=997 |
| 1JSQBRY 0032B | ISOLATION/INTERFACE DEVICE | N=997 |
| 1JSQARE 0033 | SQ RFLG MACH AREA DETCTR=ANNUN | N=997 |
| 1JSQARI 0033 | CP REFUELING MACHINE AREA | N=997 |
| 1JSQARU 0033 | CP REFUELING MACHINE AREA | N=997 |
| 1JSQARY 0033A | D/A CONVERTOR | N=997 |
| 1JSQARY 0033B | ISOLATION/INTERFACE DEVICE | N=997 |
| 1JSQBRI 0034 | CP CONTMT PURGE | N=997 |
| 1JSQBRU 0034 | CP CONTMT PURGE | N=997 |
| 1JSQBRY 0034A | D/A CONVERTER | N=997 |
| 1JSQBRY 0034B | ISOLATION/INTERFACE DEVICE | N=997 |
| 1JSQARSH 0037 | CP PRE-ACCESS PURGE AREA A | N=997 |
| 1JSQARU 0037 | CP PRE-ACCESS PURGE AREA A | N=997 |
| 1JSQARY 0037A | D/A CONVERTER | N=997 |
| 1JSQARY 0037B | ISOLATION/INTERFACE DEVICE | N=997 |
| 1JSQBRSH 0038 | CP PRE-ACCESS PURGE AREA B | N=997 |
| 1JSQBRU 0038 | CP PRE-ACCESS PURGE AREA B | N=997 |
| 1JSQBRY 0038A | D/A CONVERTER | N=997 |
| 1JSQBRY 0038B | ISOLATION/INTERFACE DEVICE | N=997 |
| 1JSQNRU 0139 | MAIN STM LINE EFFLUENT | N=997 |
| 1JSQNRE 0139A | MAIN STM LINE EFFLUENT | N=997 |
| 1JSQNRE 0139B | MAIN STM LINE EFFLUENT | N=997 |
| 1JSQNRU 0140 | MAIN STM LINE EFFLUENT | N=997 |
| 1JSQNRE 0140A | MAIN STM LINE EFFLUENT | N=997 |
| 1JSQNRE 0140B | MAIN STM LINE EFFLUENT | N=997 |
| 1JSQNRB 0141 | CONDENSOR VAC PP/GLND SEAL EXH | N=997 |
| 1JSQNRE 0141 | CONDENSOR VAC PP/GLND SEAL EXH | N=997 |
| 1JSQNRU 0141 | CONDENSOR VAC PP/GLND SEAL EXH | N=997 |
| 1JSQNRB 0142 | CONDENSOR VAC PP/GLND SEAL EXH | N=997 |
| 1JSQNRE 0142 | CONDENSOR VAC PP GLND SEAL EXH | N=997 |
| 1JSQNRU 0142 | CONDENSOR VAC PP GLND SEAL EXH | N=997 |
| 1JSQNRB 0143 | PLANT VENT MON LOW SAMPLER | N=997 |
| 1JSQNRE 0143 | PLANT VENT MON LOW | N=997 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 191 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 110 (SQ-3)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSQNRU 0143 | PLANT VENT MON LOW | N-997 |
| 1JSQNRB 0144 | PLANT VENT MON HI SAMPLER | N-997 |
| 1JSQNRE 0144 | PLANT VENT MON HI | N-997 |
| 1JSQNRU 0144 | PLANT VENT MON HI | N-997 |
| 1JSQBRE 0145 | FUEL BLDG B VENT EXH MON LOW | N-997 |
| 1JSQBRU 0145 | FUEL BLDG B VENT EXH MON LOW | N-997 |
| 1JSQBRE 0146 | FUEL BLDG VNT EXH MON HI CH-B | N-997 |
| 1JSQBRU 0146 | FUEL BLDG VNT EXH MON HI CH-B | N-997 |
| 1JSQARE 0148 | IN CONTMT AREA MON CH-A | N-997 |
| 1JSQARU 0148 | IN CONTMT AREA MON CH-A | N-997 |
| 1JSQBRE 0149 | CONTMT HI RANGE MON CH-B | N-997 |
| 1JSQBRU 0149 | CONTMT HI RANGE MON CH-B | N-997 |
| 1JSQARE 0150 | PRIMARY COOLANT MON CH-A | N-997 |
| 1JSQARU 0150 | PRIMARY COOLANT MON CH-A | N-997 |
| 1JSQBRE 0151 | PRIMARY COOLANT MON CH-B | N-997 |
| 1JSQBRU 0151 | PRIMARY COOLANT MON CH-B | N-997 |
| 1JSQNRU 0152 | PERSONNEL IARM SDCHX-WEST | N-997 |
| 1JSQNRE 0152A | PERSONNEL IARM SDCHX-WEST | N-997 |
| 1JSQNRIA 0152A | PERS IARM SDCHX-WEST | N-997 |
| 1JSQNRE 0152B | PERSONNEL IARM ECW-EAST | N-997 |
| 1JSQNRIA 0152B | PERS IARM SDCHX-EAST | N-997 |
| 1JSQNRE 0152C | PERSONNEL IARM STAIRWAY-SOUTH | N-997 |
| 1JSQNRIA 0152C | PERS IARM STAIRWAY-SOUTH | N-997 |
| 1JSQNRE 0152D | PERSONNEL IARM-STAIRWAY-NORTH | N-997 |
| 1JSQNRIA 0152D | PERS IARM STAIRWAY-NORTH | N-997 |
| 1JSQNRU 0153 | PERSONNEL IARM-ECWHX-WEST | N-997 |
| 1JSQNRE 0153A | PERSONNEL IARM-ECWHX-WEST | N-997 |
| 1JSQNRIA 0153A | PERS IARM ECWHX-WEST | N-997 |
| 1JSQNRE 0153B | PERSONNEL IARM H2 RECOM CHG PP | N-997 |
| 1JSQNRIA 0153B | PERS IARM H2 RECOM CHG PMP | N-997 |
| 1JSQNRE 0153C | PERSONNEL IARM H2 RECOMB MCC | N-997 |
| 1JSQNRIA 0153C | PERS IARM H2 RECOB MCC | N-997 |
| 1JSQNRU 0154 | PERS IARM BORIC ACID WEST PIPE | N-997 |
| 1JSQNRE 0154A | PERS IARM BORIC ACID WEST PIPE | N-997 |
| 1JSQNRIA 0154A | PERS IARM BORIC ACID WEST PIPE | N-997 |
| 1JSQNRE 0154B | PERS IARM-MG SETS LOAD ENTER E | N-997 |
| 1JSQNRIA 0154B | PERS IARM MG SETS LOAD ENTER E | N-997 |
| 1JSQNRE 0154C | PERS IARM CNTRL RM MON | N-997 |
| 1JSQNRIA 0154C | PERS IARM CNTRL RM MON | N-997 |
| 1JSQNRU 0155 | PERS IARM A-SIDE | N-997 |
| 1JSQNRE 0155A | PENET IARM A-SIDE | N-997 |
| 1JSQNRE 0155B | PENET IARM A-SIDE | N-997 |
| 1JSQNRE 0155C | PENET IARM WEST PIPING PENET | N-997 |
| 1JSQNRU 0156 | PENET IARM EAST PIPING PENET | N-997 |
| 1JSQNRE 0156A | PENET IARM EAST PIPING PENET | N-997 |
| 1JSQNRE 0156B | PENET IARM WEST ELEC PENET | N-997 |
| 1JSQNRE 0156C | PENET IARM EAST ELEC PENET | N-997 |
| 1JSQNRU 0157 | PENET IARM A-SIDE MSSS PENET | N-997 |
| 1JSQNRE 0157A | PENET IARM A-SIDE MSSS | N-997 |
| 1JSQNRE 0157B | PENET IARM B-SIDE MSSS | N-997 |
| 1JSQNRE 0157C | PENET IARM WEST ELEC PENET | N-997 |
| 1JSQNRU 0158 | PENET IARM EAST ELEC PENET | N-997 |
| 1JSQNRE 0158A | PENET IARM EAST ELEC PENET | N-997 |
| 1JSQNRE 0158B | PENET IARM WEST PENET AUX BLDG | N-997 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 192 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 111

(SQ-4)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSQNRE 0158C | PENET IARM EAST PENET AUX BLDG | N=997 |
| 1JSQNRE 0158D | PENET IARM HOT LAB PASS | N=997 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 193 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 112 NUCLEAR SAMPLING SYSTEM (SS-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MSSE1142 | PENETRATION-SAMPLING | 13HM500 |
| | | |
| | | |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 194 of 202)

12/17/82 02:28:02 — Q INSTRUMENTS BY SYSTEM — PAGE 113 (SS-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JSSNPSV 0109 | GAS SAMPLE RETURN | N-001 |
| 1JSSNPSV 0124 | PRESR S/S SAMPLE RETURN | N-001 |
| 1JSSBUV 0200 | HOT LEG SAMPLE CNTMT ISOL | N-001 |
| 1JSSBHS 0200A | HOT LEG SAMPLE CNTMT ISOL | J-200 |
| 1JSSBUV 0201 | PRESR SURGE SAMPLE CNTMT ISOL | N-001 |
| 1JSSBHS 0201A | PRESR SURGE SAMPLE CNTMT ISOL | J-200 |
| 1JSSBUV 0202 | PRESR S/S SAMPLE CNTMT ISOL | N-001 |
| 1JSSBHS 0202A | PRESR S/S SAMPLE CNTMT ISOL | J-200 |
| 1JSSAUV 0203 | HOT LEG SAMPLE CNTMT ISOL | N-001 |
| 1JSSAHS 0203A | HOT LEG SAMPLE CNTMT ISOL | J-200 |
| 1JSSAUV 0204 | PRESR SURGE SAMPLE CNTMT ISOL | N-001 |
| 1JSSAHS 0204A | PRESR SURGE SAMPLE CNTMT ISOL | J-200 |
| 1JSSAUV 0205 | PRESR S/S SAMPLE CNTMT ISOL | N-001 |
| 1JSSAHS 0205A | PRESR S/S SAMPLE CNTMT ISOL | J-200 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 195 of 202)

04/19/82 15:50:39 VALVE-"Q" CLASS PAGE 81 SAMPLING SYSTEM (SS-3)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PSSAV130 | 13NM001 C |
| 1PSSAV161 | 13NM001 C |
| 1PSSAV127 | 13NM001 C |
| 1PSSAV178 | 13NM001 C |
| 1PSSEV009 | 13PM221A |
| 1PSSEV010 | 13PM221A |
| 1PSSEV011 | 13PM221A |
| 1PSSEV013 | 13PM221A |
| 1PSSEV014 | 13PM221A |
| 1PSSEV016 | 13PM221A |
| 1PSSEV017 | 13PM221A |
| 1PSSEV131 | 13NM001 C |
| 1PSSEV133 | 13NM001 C |
| 1PSSEV135 | 13NM001 C |
| 1PSSEV152 | 13NM001 C |
| 1PSSEV154 | 13NM001 C |
| 1PSSEV206 | 13NM001 |
| 1PSSEV207 | 13NM001 |
| 1PSSEV208 | 13NM001 |
| 1PSSEV800 | 13PM221A |
| 1PSSEV802 | 13PM221A |
| 1PSSEV804 | 13PM221A |
| 1PSSNV004 | 13PM221A |
| 1PSSNV005 | 13PM221A |
| 1PSSNV006 | 13PM221A |
| 1PSSNV007 | 13PM221A |
| 1PSSNV008 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 196 of 202)

04/19/82 15:38:46 EQUIPMENT-"QR" CLASS PAGE 114 CHILLED WATER (WC-1)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MHCEU60 | PENETRATION-CHILLED WTR | 13MM500 |
| 1MHCEU61 | PENETRATION-CHILLED WTR | 13MM500 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 197 of 202)

12/17/82 02:28:02 Q INSTRUMENTS BY SYSTEM PAGE 115

(WC-2)

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JWCBHS 0061 | NORM CHW RETURN CONTM IV | J=200 |
| 1JWCBUV 0061 | NORM CHW RETURN CONTM IV | P=2218 |
| 1JWCAHS 0062 | NORM CHW RETURN CONTM IV | J=200 |
| 1JWCAUV 0062 | NORM CHW RETURN CONTM IV | P=2218 |
| 1JWCBHS 0063 | NORM CHW SUP CONTM IV | J=200 |
| 1JWCBUV 0063 | NORM CHW SUP CONTM IV | P=2218 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 198 of 202)

04/19/82 15:50:39 VALVE-"NO" CLASS PAGE 83 (WC-3)

| TAG NUMBER | B/SPEC/ |
|---|---|
| 1PWCEV039 | 13PM221B |
| 1PWCEV158 | 13PM221A |
| 1PWCEV161 | 13PM221A |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 199 of 202)

04/19/82 15:38:46 EQUIPMENT-"0" CLASS PAGE 116

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1EZAAC01 | AUX RELAY CAB CLASS 1E | 13EM022 |
| 1EZAAC02 | ISOLATION RELAY CAB CLASS 1E | 13EM022 |
| 1EZAAC03 | AUX RELAY CAB CLASS 1E | 13EM022 |
| 1EZAAC04 | AUX RELAY CAB CLASS 1E | 13EM022 |
| 1EZAAC05 | AUX RELAY CAB CLASS 1E | 13EM022 |
| 1EZAAC06 | AUXILIARY RELAY CAB CLASS 1E | 13EM022 |
| 1EZABC01 | AUX RELAY CAB CLASS 1E | 13EM022 |
| 1EZABC02 | ISOLATION RELAY CAB CLASS 1E | 13EM022 |
| 1EZABC03 | AUX RELAY CAB CLASS 1E | 13EM022 |
| 1EZABC04 | AUX RELAY CAB CLASS 1E | 13EM022 |
| 1EZABC05 | AUX RELAY CAB CLASS 1E | 13EM022 |
| 1EZABC06 | AUXILIARY RELAY CAB CLASS 1E | 13EM022 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 200 of 202)

04/19/82 15:38:14A EQUIPMENT-NON CLASS PAGE 118

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1JZCEA01 | SI TK 2A/SG 2 XMITTER RACK | 13NM001 |
| 1JZCEA03 | SI TK 1A/SG 1 XMITTER RACK | 13NM001 |
| 1JZCEA05 | XMITTER RACK-RC/CH | 13NM001 |
| 1JZCND01 | TRNSFER SYSTEM CONTROL CONSOLE | 13NM001 |
| 1MZCEU64 | PENETRATION, SPARE | |
| 1MZCEU65 | PENETRATION, SPARE | |
| 1MZCEU66 | PENETRATION, SPARE | |
| 1MZCEU68 | PENETRATION, SPARE | |
| 1MZCEU69 | PENETRATION, SPARE | |
| 1MZCEU70 | PENETRATION, SPARE | |
| 1MZCEU71 | PENETRATION, SPARE | |
| 1MZCEU73 | PENETRATION, SPARE | |
| 1MZCEU74 | PENETRATION, SPARE | |
| 1MZCEU80 | PENETRATION, SPARE | |
| 1MZCEU81 | PENETRATION, SPARE | |
| 1MZCNG01 | CONTAIN POLAR CRANE 225/35 TON | 13MM043 |

# Table D-1

## CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 201 of 202)

04/19/82 15:38:46 EQUIPMENT="Q" CLASS PAGE 120

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1MZFEM01 | SPENT FUEL RACKS | 13NM001 |
| 1MZFEM02 | NEW FUEL RACKS | 13NM001 |
| 1MZFNG01 | CASKHANDLING CRANE (150/15TON) | 13MH062 |
| 1MZFNG02 | NEW FUEL HANDLING CRANE 10 TON | 13MH062 |

Table D-1

CLASS IE ELECTRICAL EQUIPMENT BY SYSTEM (Sheet 202 of 202)

04/19/82 15:38:46 EQUIPMENT-NON CLASS PAGE 122

| TAG NUMBER | DESCRIPTION | BECHTEL SPEC/PO |
|---|---|---|
| 1EZJAC01 | AUX RELAY CAB CLASS-1E | 13EM022 |
| 1EZJAC02 | ISOLATION RELAY CAB CLASS 1E | 13EM022 |
| 1EZJAC03 | AUX RELAY CAB CLASS-1E | 13EM022 |
| 1EZJBC01 | AUX RELAY CAB CLASS-1E | 13EM022 |
| 1EZJBC02 | ISOLATION RELAY CAB CLASS 1E | 13EM022 |
| 1EZJBC03 | AUX RELAY CAB CLASS-1E | 13EM022 |
| 1JZJAC02A | BOP ANALOG INSTR CABINET | 13JM111 |
| 1JZJAC02B | BOP ANALOG INSTR CABINET | 13JM111 |
| 1JZJAF01 | REMOTE SHUTDOWN PANEL | 13NM001 |
| 1JZJBC02A | BOP ANALOG INSTR CABINET | 13JM111 |
| 1JZJBF01 | REMOTE SHUTDOWN PANEL | 13NM001 |
| 1JZJBF07 | DISCONNECT SWITCH PANEL | 13NM001 |
| 1JZJCF01 | REMOTE SHUTDOWN PNL | 13NM001 |
| 1JZJDE01 | REMOTE SHUTDOWN PNL | 13NM001 |
| 1JZJNF01 | REMOTE SHUTDOWN PANEL | 13NM001 |

# APPENDIX E

## COLD SHUTDOWN LIST

(Reprinted from Fire Protection
Evaluation Report, Amendment 3)

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 1 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| AUXILIARY FEEDWATER<br>Function: Maintain water inventory in the steam generators during hot standby, and effect a reactor shutdown | | | | | | | |
| Train: A (Channel A) | M-AFA-P01<br>M-AFA-K01<br>J-AFA-E01 | Auxiliary feed-water pump and turbine | E-AF57-AC-1RD | Turbine control feeder | | | X |
| | | | E-AF57-AC-1XA<br>or<br>E-AF57-AC-1XB | Turbine control<br><br>Turbine control | <br><br>SK-52A | SK-52B | SK-52C |
| | | | E-AF56-AC-1XA | Turbine speed signal | | | X |
| | | | E-AF56-AC-1XB<br>or<br>E-RM31-AC-1XD | Turbine speed display<br><br>Turbine speed display | <br><br>SI-52A | SI-52B | |
| | | | E-RM10-AC-1RB<br>or<br>E-ZJ01-AC-1RN | Turbine speed display power<br><br>Turbine speed display power | SI-52A | <br><br>SI-52B | |

a. Required for hot shutdown and cold shutdown unless otherwise noted.
b. Required for cold shutdown only.
c. Both Valves SPA HV-49A and SPA HV-49B should not be coincidentally closed by any spuriously generated signals.
d. Both Valves SPB HV-50A and SPB HV-50B should not be coincidentally closed by any spuriously generated signals.
e. Class IE power available (due to backfit for TMI Task 41).

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 2 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| AUXILIARY FEEDWATER (continued) | | | | | | | |
| | M-AFA-P01<br>M-AFA-K01<br>J-AFA-E01 | Auxiliary feedwater pump and turbine | E-SG02-AC-1RH | AFW turbine ramp start | | X | |
| | | | E-SG01-AC-1RH | AFW turbine pump start | | X | |
| | | | E-ZJ01-AC-1RM | Rack power | | | |
| | J-AFA-HV-54 | Auxiliary feedwater turbine trip and throttle valve | E-AF07-AC-1RC<br>or<br>E-AF07-AC-1RD | Valve open/close | HS-54A, HS-54D | HS-54B, HS-54F | |
| | | | E-AF07-AC-1RC<br>or<br>E-AF07-AC-1RD | Turbine trip | | | |
| | | | E-AF07-AC-1RA | MOV limit stop | | | |
| | | | E-AF07-AC-1KA | Valve feeder | | | |
| | | | E-AF07-AC-1KB | Valve feeder | | | |
| | | | E-AF07-AC-1RF | Valve open/close | | | |
| | | | E-AF07-AC-1RG | Valve open/close | | | |
| | | | E-AF07-AC-1RJ | Valve open/close | | | |
| | J-AFA-FT-40A | Auxiliary feedwater flow to SG No. 1 | E-AF58-AC-1XA | Flow signal | | | |
| | | | E-RM31-AC-1XD<br>or<br>E-AF58-AC-1XC | Flow display | FI-40A | FI-40B | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 3 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| AUXILIARY FEEDWATER (continued) | | | | | | | |
| | J-AFA-FT-40A | Auxiliary feedwater flow to SG No. 1 | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-RM10-AC-1RD | Display power | | | |
| | | | E-ZJ01-AC-1RM | Rack power | | | |
| | J-AFA-FT-40B | Auxiliary feedwater flow to SG No. 2 | E-AF58-AC-1XB | Flow signal | | | |
| | | | E-RM31-AC-1XD | Flow display | FI-40A | | |
| | | | or E-AF58-AC-1XC | Flow display | | FI-40B | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-RM10-AC-1RD | Display power | | | |
| | | | E-ZJ01-AC-1RM | Rack power | | | |
| | J-AFA-HV-32 | Auxiliary feedwater regulating valve to SG No. 1 | E-AF04-AC-1RB | MOV limit stop | | | |
| | | | E-AF04-AC-1RC | Valve open/close | HS-32A | | |
| | | | or E-AF04-AC-1RD | Valve open/close | | HS-32B | |
| | | | E-AF04-AC-1KA | Valve feeder | | | X |
| | | | E-AF04-AC-1KB | Valve feeder | | | X |
| | | | E-AF04-AC-1KC | Valve feeder | | | X |
| | | | E-AF04-AC-1RA | Valve indication | | | |
| | | | E-AF04-AC-1RB | Valve open/close | | | |
| | | | E-AF04-AC-1RE | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 4 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| AUXILIARY FEEDWATER (continued) | | | | | | | |
| | J-AFA-HV-32 | Auxiliary feedwater regulating valve to SG No. 1 | E-AF04-AC-1RJ | Valve indication | | | |
| | | | E-AF04-AC-1RK | Valve indication | | | |
| | | | E-AF04-AC-1RI | Valve indication | | | |
| | J-AFA-UV-37 | Auxiliary feedwater isolation valve to SG. No. 2 | E-AF10-AC-1RB | MOV limit stop | | | |
| | | | E-AF10-AC-1RC or E-AF10-AC-1RD | Valve open/close | HS-37A | HS-37B | |
| | | | E-AF10-AC-1KA | Valve feeder | | | X |
| | | | E-AF10-AC-1KB | Valve feeder | | | X |
| | | | E-AF10-AC-1KC | Valve feeder | | | X |
| | J-AFA-UV-37 | Auxiliary feedwater isolation valve to SG No. 2 | E-AF10-AC-1RE | ESFAS | | | |
| | | | E-AF10-AC-1RF | ESFAS | | | |
| Train: A (Channel C) | J-AFC-HV-33 | Auxiliary feedwater regulating valve to SG No. 2 | E-AF06-CC-1RB | MOV limit stop | | | |
| | | | E-AF06-CC-1RC or E-AF06-CC-1RD | Valve open/close | HS-33A | HS-33B | |
| | | | E-AF06-CC-1KA | Valve feeder | | | X |
| | | | E-AF06-CC-1KB | Valve feeder | | | X |
| | | | E-AF06-CC-1KC | Valve feeder | | | X |
| | | | E-AF06-CC-1RA | Valve indication | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 5 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| AUXILIARY FEEDWATER (continued) | | | | | | | |
| | J-AFC-HV-33 | Auxiliary feedwater regulating valve to SG No. 2 | E-AF06-CC-1RE | ESFAS | | | |
| | | | E-AF06-CC-1RJ | Valve indication | | | |
| | | | E-AF06-CC-1RH | Valve indication | | | |
| | | | E-AF06-CC-IRI | Valve indication | | | |
| | J-AFC-UV-36 | Auxiliary feedwater isolation valve to SG No. 1 | E-AF11-CC-1RB | MOV limit stop | | | |
| | | | E-AF11-CC-1RC or E-AF11-CC-1RD | Valve open/close | HS-36A | HS-36B | |
| | | | E-AF11-CC-1KA | Valve feeder | | | X |
| | | | E-AF11-CC-1KB | Valve feeder | | | X |
| | | | E-AF11-CC-1KC | Valve feeder | | | X |
| | | | E-AF11-CC-1RF | ESFAS | | | |
| Train: B (Channel B) | M-AFB-P01 | Auxiliary feedwater pump (motor driven) | E-AF01-BC-1RD | Pump start/stop | HS-10 | | |
| | | | E-AF01-BC-1CA | Pump feeder | | | |
| | | | Integral with switchgear | Circuit disconnect | | | CS-3 |
| | | | E-AF01-BC-1RB | ESFAS | | | |
| | | | E-AF01-BC-1RE | Current transformer | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 6 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| AUXILIARY FEEDWATER (continued) | | | | | | | |
| | J-AFB-HV-30 | Auxiliary feedwater regulatting valve to SG No. 1 | E-AF03-BC-1RB or E-AF03-BC-1RC | Valve open/close | HS-30A | HS-30B | |
| | | | E-AF03-BC-1RD | ESFAS | | | |
| | | | E-AF03-BC-1RG | ESFAS | | | |
| | | | E-AF03-BC-1RA | MOV limit stop | | | |
| | | | E-AF03-BC-1KA | Valve feeder | | | X |
| | | | E-AF03-BC-1RH | Circuit disconnect | | HS-30E | |
| | | | E-AF03-BC-1RJ | Circuit disconnect | | | |
| | J-AFB-HV-31 | Auxiliary feedwater regulatting valve to SG No. 2 | E-AF03-BC-2RC or E-AF03-BC-2RB | Valve open/close | HS-31A | HS-31B | |
| | | | E-AF03-BC-2RA | MOV limit stop | | | |
| | | | E-AF03-BC-2KA | Valve feeder | | | X |
| | | | E-AF03-BC-2RH | Circuit disconnect | | HS-31E | |
| | J-AFB-HV-31 | Auxiliary feedwater regulatting valve to SG No. 2 | E-AF03-BC-2RJ | Circuit disconnect | | | |
| | | | E-AF03-BC-2RD | ESFAS | | | |
| | | | E-AF03-BC-2RG | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 7 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| AUXILIARY FEEDWATER (continued) | | | | | | | |
| | J-AFB-UV-35 | Auxiliary feedwater isolation valve to SG No. 2 | E-AF05-BC-2RC or E-AF05-BC-2RB | Valve open/close | HS-35A | HS-35B | |
| | | | E-AF05-BC-2RA | MOV limit stop | | | |
| | | | E-AF05-BC-2KA | Valve feeder | | | X |
| | | | E-AF05-BC-2RH | Circuit disconnect | | HS-35E | |
| | | | E-AF05-BC-2RJ | Circuit disconnect | | | |
| | | | E-AF05-BC-2RD | ESFAS | | | |
| | | | E-AF05-BC-2RG | ESFAS | | | |
| | J-AFB-UV-34 | Auxiliary feedwater isolation valve to SG No. 1 | E-AF05-BC-1RC or E-AF05-BC-1RB | Valve open/close | HS-34A | H-34B | |
| | | | E-AF05-BC-1RA | MOV limit stop | | | |
| | | | E-AF05-BC-1KA | Valve feeder | | | |
| | | | E-AF05-BC-1RH | Circuit disconnect | | HS-34E | |
| | | | E-AF05-BC-1RJ | Circuit disconnect | | | |
| | J-AFB-UV-34 | Auxiliary feedwater isolation valve to SG No. 1 | E-AF05-BC-1RD | ESFAS | | | |
| | | | E-AF05-BC-1RG | ESFAS | | | |
| | J-AFB-FT-41A | Auxiliary feedwater flow to SG No. 1 | E-AF58-BC-1XA | Flow signal | | | |

# Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 8 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| AUXILIARY FEEDWATER (continued) | | | | | | | |
| | J-AFB-FT-41A | Auxiliary feedwater flow to SG No. 1 | E-RM31-BC-1XD or E-AF58-BC-1XC | Flow display | FI-41A | FI-41B | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | | | E-RM10-BC-1RD | Display power | | | |
| | | | E-ZJ02-BC-1RN | Rack power | | | |
| | J-AFB-FT-41B | Auxiliary feedwater flow to SG No. 2 | E-AF58-BC-1XB | Flow signal | | | |
| | | | E-RM31-BC-1XD or E-AF58-BC-1XC | Flow display | FI-41A | FI-41B | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | | | E-RM10-BC-1RD | Display power | | | |
| | | | E-ZJ02-BC-1RN | Rack power | | | |
| CONDENSATE STORAGE AND TRANSFER | | | | | | | |
| Function: Provide condensate to auxiliary feedwater pump for steam generator makeup and provide refill for ESF surge tanks | | | | | | | |
| Train: A (Channel A) | J-CTA-LT-35 | Condensate storage tank level | E-CT54-AC-1XA | Tank level signal | | | |
| | | | E-AF58-AC-1XC | Tank level display | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 9 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONDENSATE STORAGE AND TRANSFER (continued) | | | | | | | |
| | J-CTA-LT-35 | Condensate storage tank level | E-RM31-AC-1XD | Tank level display | LI-35A | | |
| | | | E-RM10-AC-1RB | Display power | | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-ZJ01-AC-1RM | Rack power | | | |
| | M-CTA-P01 | Condensate transfer Transfer Pump No. 1 | E-CT01-AC-1KA | Pump feeder | | | |
| | | | E-CT01-AC-1RA | Pump control | HS-15 | | |
| | | | E-CT01-AC-1RF | Pump control | | | |
| Train: B (Channel B) | J-CTB-LT-36 | Condensate storage tank level | E-CT55-BC-1XA | Tank level signal | | | |
| | | | E-AF58-BC-1XC | Tank level display | | LI-36B | |
| | | | E-RM31-BC-1XD | Tank level display | LI-36A | | |
| | | | E-RM10-BC-1RB | Display Power | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | | | E-ZJ02-BC-1RN | Rack power | | | |

# Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 10 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONDENSATE STORAGE AND TRANSFER (continued) | | | | | | | |
| | M-CTB-P01 | Condensate transfer Pump No. 2 | E-CT01-BC-1KA | Pump feeder | | | |
| | | | E-CT01-BC-1RA | Pump control | HS-16 | | |
| | | | E-CT01-BC-1RE | Pump control | | | |
| | | | E-CT01-BC-1RF | Pump control | | | |
| MAIN STEAM | | | | | | | |
| Function: Dissipate heat generated by NSSS through atmospheric dump valves, provide steam to AFW turbine-driven pump, and provide effective control of reactor coolant temperature during shutdown | | | | | | | |
| Train: A | J-SGA-UV-134 | Steam supply valve to auxiliary feedwater (turbine-driven) pump | E-SG01-AC-1RC or E-SG01-AC-1RD | Valve start/stop | HS-134A | HS-134B | |
| | | | E-SG01-AC-1KA | Valve feeder | | | X |
| | | | E-SG01-AC-1KB | Valve feeder | | | X |
| | | | E-SG01-AC-1KC | Valve feeder | | | X |
| | | | E-SG01-AC-1RB | Valve limit stop | | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 11 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | | | | | | | |
| | J-SGA-UV-134 | Steam supply valve to auxiliary feedwater (turbine-driven) pump | E-SG01-AC-1RE | ESFAS | | | |
| | | | E-SG01-AC-1RH | Turbine ramp start | | | |
| | J-SGA-UV-138 | Steam supply valve to auxiliary feedwater (turbine driven) pump | E-SG02-AC-1RC or E-SG02-AC-1RD | Valve start/stop | HS-138A | HS-138B | |
| | | | E-SG02-AC-1KA | Valve feeder | | | X |
| | | | E-SG02-AC-1KB | Valve feeder | | | X |
| | | | E-SG02-AC-1KC | Valve feeder | | | X |
| | | | E-SG02-AC-1RB | Valve limit stop | | | X |
| | | | E-SG02-AC-1RE | ESFAS | | | |
| | | | E-SG02-AC-1RH | Turbine ramp start | | | |
| | J-SGA-PT-1013A | Steam generator No. 1 pressure | E-SG60-AC-1XB | Pressure signal | | | |
| | | | E-SG60-AC-1XA | Pressure signal | | | |
| | | | E-RM44-AC-1XC or E-SG60-AC-1XD | Pressure display | PI-1013A | PI-1013A-1 | |
| | | | E-SB01-AC-1RP | Display power | | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |

# Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 12 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | | | | | | | |
| | J-SGA-PT-1023A | Steam generator No. 2 pressure | E-SG60-AC-3XB | Pressure signal | | | |
| | | | E-SG60-AC-3XA | Pressure signal | | | |
| | | | E-RM44-AC-1XC | Pressure display | PI-1023A | | |
| | | | or E-SG60-AC-3XD | Pressure display | | PI-1023A-1 | |
| | | | E-SB01-AC-1RP | Display power | | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | J-SGA-LT-1113A | Steam generator No. 1 level (wide range) | E-SG64-AC-1XB | Level signal | | | |
| | | | E-SG64-AC-1XA | Level signal | | | |
| | | | E-RM44-AC-1XC | Level display | LI-1113A | | |
| | | | or E-SG64-AC-1XD | Level display | | LI-1113A-1 | |
| | | | E-SB01-AC-1RD | Display power | | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | J-SGA-LT-1123A | Steam generator No. 2 level (wide range) | E-SG64-AC-2XB | Level signal | | | |
| | | | E-SG64-AC-2XA | Level signal | | | |
| | J-SGA-LT-1123A | Steam generator No. 2 level (wide range) | E-RM44-AC-1XC | Level display | LI-1113A | | |
| | | | or E-SG64-AC-1XD | Level display | | LI-1123A-1 | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 13 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | | | | | | | |
| | J-SGA-LT-1123A | Steam generator No. 2 level (wide range) | E-SB01-AC-1RD | Display power | | | |
| | | | or | | | | |
| | | | E-2J01-AC-1RN | Display power | | | |
| | J-SGE-UV-170 | Steam generator No. 1 line No. 1 main steam isolation valve | E-SG23-AC-1RA | Valve indication | | | |
| | | | E-SG23-AC-1RB | Valve indication | | | |
| | | | E-SG23-AC-1RD | Valve feeder | | | |
| | | | E-SG23-AC-1RE | Valve open/close | HS-251<br>HS-170A | | |
| | | | E-SG23-AC-1RF | Valve open/close | HS-170C<br>HS-275 | | |
| | | | E-SG23-AC-1RG | ESFAS | | | |
| | J-SGE-UV-171 | Steam generator No. 2 line No. 1 main steam isolation valve | E-SG23-AC-2RA | Valve indication | | | |
| | | | E-SG23-AC-2RB | Valve indication | | | |
| | | | E-SG23-AC-2RD | Valve feeder | | | |
| | | | E-SG23-AC-2RE | Valve open/close | HS-250<br>HS-171A | | |
| | | | E-SG23-AC-2RF | Valve open/close | HS-171C<br>HS-277 | | |
| | | | E-SG23-AC-2RG | ESFAS | | | |
| | J-SGE-UV-181 | Steam generator No. 2 line No. 2 main steam isolation valve | E-SG23-AC-4RA | Valve indication | | | |
| | | | E-SG23-AC-4RB | Valve indication | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 14 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | | | | | | | |
| | J-SGE-UV-181 | Steam generator No. 2 line No. 2 main steam isolation valve | E-SG23-AC-4RD | Valve feeder | | | |
| | | | E-SG23-AC-4RE | Valve open/close | HS-250<br>HS-181A | | |
| | J-SGE-UV-181 | Steam generator No. 2 line No. 2 main steam isolation valve | E-SG23-AC-4RF | Valve open/close | HS-181C<br>HS-281 | | |
| | | | E-SG23-AC-4RG | ESFAS | | | |
| | J-SGE-UV-180 | Steam generator No. 1 line No. 2 main steam isolation valve | E-SG23-AC-3RA | Valve indication | | | |
| | | | E-SG23-AC-3RB | Valve indication | | | |
| | | | E-SG23-AC-3RD | Valve feeder | | | |
| | | | E-SG23-AC-3RE | Valve open/close | HS-251<br>HS-180A | | |
| | | | E-SG23-AC-3RF | Valve open/close | HS-180C<br>HS-279 | | |
| | | | E-SG23-AC-3RG | ESFAS | | | |
| | J-SGA-HV-179 | Steam generator No. 2 line No. 2 atmospheric dump valve | E-SG21-AC-1RA | Solenoid 'A' coil feeder | | | X |
| | | | E-SG21-AC-1RB or E-SG21-AC-1RC | Solenoid 'A' open/close | HS-179A | HS-179C | |
| | | | E-SG21-CC-1RA | Solenoid 'B' coil feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 15 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | | | | | | | |
| | J-SGA-HV-179 | Steam generator No. 2 line No. 2 atmospheric dump valve | E-SG21-CC-1RB or E-SG21-CC-1RC | Solenoid'B' open/close Solenoid 'B' open/close | HS-179B | HS-179D | |
| | | | E-SG51-AC-4XC or E-SG51-AC-4XD | Position control Position control | HIC-179A | HIC-179B | |
| | | | E-SG51-AC-4XB | Control signal to I/P converter | | | |
| | J-SGA-HV-179 | Steam Generator No. 2 line No. 2 atmospheric dump valve | E-RM10-AC-1RD or E-ZJ01-AC-1RN | Controller power Controller power | | | |
| | J-SGA-HV-179 | Steam generator No. 2 line No. 2 atmospheric dump valve accumulator X01B | E-SG57-AC-1XA | Pressure signal | | | |
| | | | E-SG27-AC-1RB | Solenoid PV313A open | PSL-313 | | |
| | J-SGA-HV-184 | Steam generator No. 1 line No. 1 atmospheric dump valve | E-SG18-AC-1RA | Solenoid 'A' coil feeder | | | X |
| | | | E-SG18-AC-1RB or E-SG18-AC-1RC | Solenoid 'A' open/close Solenoid 'A' open/close | HS-184A | HS-184C | |
| | | | E-SG18-CC-1RA | Solenoid 'B' coil feeder | | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 16 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | | | | | | | |
| | J-SGA-HV-184 | Steam generator No. 1 line No. 1 atmospheric dump valve | E-SG18-CC-1RB or E-SG18-CC-1RC | Solenoid 'B' open/close | HS-184B | HS-184D | |
| | | | E-SG51-AC-1XC or E-SG51-AC-1XD | Position control | HIC-184A | HIC-184B | |
| | | | E-SG51-AC-1XB | Control signal to I/P converter | | | |
| | | | E-SG51-AC-1XC or E-ZJ01-AC-1RN | Controller power | | | |
| | J-SGA-HV-184 | Steam generator No. 1 line No. 1 atmospheric dump valve accumulator X01A | E-SG27-AC-1RC | Solenoid PV313B open | PSL-313 | | |
| | | | E-SG57-AC-1XA | Pressure signal | | | |
| Train: B | J-SGB-PT-1013B | Steam generator No. 1 pressure | E-SG61-BC-1XB | Pressure signal | | | |
| | | | E-SG61-BC-1XA | Pressure signal | | | |
| | | | E-RM45-BC-1XB or E-SG61-BC-1XD | Pressure display | PI-1013B | PI-1013B-1 | |
| | | | E-SB02-BC-1RO or E-ZJ02-BC-1RO | Display power | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 17 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | J-SGB-PT-1023B | Steam generator No. 2 pressure | E-SG61-BC-3XB | Pressure signal | | | |
| | | | E-SG61-BC-3XA | Pressure signal | | | |
| | | | E-RM45-BC-1XB | Pressure display | PI-1023B | | |
| | | | or | | | | |
| | | | E-SG61-BC-3XD | Pressure display | | PI-1023B-1 | |
| | | | E-SB02-BC-1RO | Display power | | | |
| | | | or | | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | J-SGB-LT-1113B | Steam generator No. 1 level (wide range) | E-SG65-BC-1XA | Level signal | | | |
| | | | E-SG65-BC-1XB | Level signal | | | |
| | | | E-RM45-BC-1XB | Level display | LI-1113B | | |
| | | | or | | | | |
| | | | E-SG65-BC-1XD | Level display | | LI-1113B-1 | |
| | | | E-SB02-BC-1RO | Display power | | | |
| | | | or | | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | J-SGB-LT-1123B | Steam generator No. 2 level (wide range) | E-SG65-BC-2XA | Level signal | | | |
| | | | E-SG65-BC-2XB | Level signal | | | |
| | | | E-RM45-BC-1XB | Level display | LI-1113B | | |
| | | | or | | | | |
| | | | E-SG65-BC-2XD | Level display | | LI-1113B-1 | |
| | | | E-SB02-BC-1RO | Display power | | | |
| | | | or | | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 18 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | J-SGE-UV-170 | Steam generator No. 1 line No. 1 main steam isolation valve | E-SG23-BC-1RA | Valve indication | | | |
| | | | E-SG23-BC-1RB | Valve indication | | | |
| | | | E-SG23-BC-1RD | Valve feeder | | | |
| | | | E-SG23-BC-1RE | Valve open/close | HS-253<br>HS-170B | | |
| | | | E-SG23-BC-1RF | Valve open/close | HS-170D<br>HS-276 | | |
| | | | E-SG23-BC-1RG | ESFAS | | | |
| | J-SGE-UV-171 | Steam generator No. 2 line No. 1 main steam isolation valve | E-SG23-BC-2RA | Valve indication | | | |
| | | | E-SG23-BC-2RB | Valve indication | | | |
| | | | E-SG23-BC-2RD | Valve feeder | | | |
| | | | E-SG23-BC-2RE | Valve open/close | HS-252<br>HS-171B | | |
| | | | E-SG23-BC-2RF | Valve open/close | HS-171D<br>HS-278 | | |
| | | | E-SG23-BC-2RG | ESFAS | | | |
| | J-SGE-UV-181 | Steam generator No. 2 line No. 2 main steam isolation valve | E-SG23-BC-4RA | Valve indication | | | |
| | | | E-SG23-BC-4RB | Valve indication | | | |
| | | | E-SG23-BC-4RD | Valve feeder | | | |
| | | | E-SG23-BC-4RE | Valve open/close | HS-252<br>HS-181B | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 19 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | J-SGE-UV-181 | Steam generator No. 2 line No. 2 main steam isolation valve | E-SG23-BC-4RF | Valve open/close | HS-181D HS-282 | | |
| | | | E-SG23-BC-4RG | ESFAS | | | |
| | J-SGE-UV-180 | Steam generator No. 1 line No. 2 main steam isolation valve | E-SG23-BC-3RA | Valve indication | | | |
| | | | E-SG23-BC-3RB | Valve indication | | | |
| | | | E-SG23-BC-3RD | Valve feeder | | | |
| | | | E-SG23-BC-3RE | Valve open/close | HS-253 HS-180B | | |
| | | | E-SG23-BC-3RF | Valve open/close | HS-180D HS-280 | | |
| | | | E-SG23-BC-3RG | ESFAS | | | |
| | J-SGB-HV-178 | Steam generator No. 1 line No. 2 atmospheric dump valve | E-SG22-BC-1RA | Solenoid 'A' coil feeder | | | X |
| | | | E-SG22-BC-1RB or E-SG22-BC-1RC | Solenoid 'A' open/close | HS-178A | HS-178C | |
| | | | E-SG22-BC-1RD | Circuit disconnect | | HS-178I | |
| | | | E-SG22-BC-2RG | Circuit disconnect | | | |
| | | | E-SG22-DC-1RA | Solenoid 'B' coil feeder | | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 20 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | J-SGB-HV-178 | Steam generator No. 1 line No. 2 atmospheric dump valve | E-SG22-DC-1RB or E-SG22-DC-1RC | Solenoid 'B' open/close | HS-178B | HS-178D | |
| | | | E-SG22-DC-1RD | Circuit disconnect | | HS-178J | |
| | | | E-SG22-DC-1RE | Circuit disconnect | | | |
| | | | E-SG51-BC-3XA or E-SG51-BC-3XD | Position control | HIC-178A | HIC-178B | |
| | | | E-SG51-BC-3XB | Control signal to I/P converter | | | |
| | | | E-RM10-BC-1RD or E-ZJ02-BC-1RO | Controller power | | | |
| | | | (Later) | Circuit disconnect | | | |
| | J-SGB-HV-178 | Steam generator No. 1 line No. 2 atmospheric dump valve accumulator X01B | E-SG27-BC-1RB | Solenoid PV306A open | PSL-306 | | |
| | | | E-SG57-BC-1XA | Pressure signal | | | |
| | J-SGB-HV-185 | Steam generator No. 2 line No. 1 atmospheric dump valve | E-SG20-BC-1RA | Solenoid 'A' coil feeder | | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 21 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | J-SGB-HV-185 | Steam generator No. 2 line No. 1 atmospheric dump valve | E-SG20-BC-1RB or E-SG20-BC-1RC | Solenoid 'A' open/close | HS-185A | HS-185C | |
| | | | E-SG20-BC-1RD | Circuit disconnect | | HS-185I | |
| | | | E-SG20-BC-2RG | Circuit disconnect | | | |
| | | | E-SG20-DC-1RA | Solenoid 'B' coil feeder | | | X |
| | | | E-SG20-DC-1RB or E-SG20-DC-1RC | Solenoid 'B' open/close | HS-185B | HS-185D | |
| | | | E-SG20-DC-1RD | Circuit disconnect | | HS-185J | |
| | | | E-SG20-DC-1RE | Circuit disconnect | | | |
| | J-SGB-HV-185 | Steam generator No. 2 line No. 1 atmospheric dump valve accumulator | E-SG51-BC-2XA or E-SG51-BC-2XD | Position control | HIC-185A | HIC-185B | |
| | | | E-SG51-BC-2XB | Control signal to I/P converter | | | |
| | | | E-SG51-BC-2XC | Controller power | | | |
| | | | E-ZJ02-BC-1RO | Controller power | | | |
| | | | (Later) | Circuit disconnect | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 22 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| MAIN STEAM (continued) | J-SGB-HV-185 | Steam generator No. 2 line No. 1 atmospheric dump valve accumulator X01A | E-SG27-BC-1RC | Solenoid PV306B open | PSL-306 | | |
| | | | E-SG57-BC-1XA | Pressure signal | | | |
| REACTOR COOLANT | | | | | | | |
| Function: Provide sufficient cooling during shutdown operations to preclude significant fuel damage | | | | | | | |
| Train: A | M-RCE-B01<br>M-RCE-B09<br>M-RCE-A14 | Pressurizer backup heaters | E-RC10-NC-1FA | Heater feeder | | | X |
| | | | E-RC10-NC-1FB | Heater feeder | | | X |
| | | | E-RC10-AC-1RA | Heater on/off | HS-100-4 | | |
| | | | E-RC10-AC-1RD | Heater on/off | | HS-100-4-1 | |
| | | | E-RC10-AC-1RE | ESFAS override | | | X |
| | | | E-RC10-AC-1RB | ESFAS | | | |
| | J-RCA-LT-110X | Pressurizer level | E-RC74-AC-1XC | Level signal | | | |
| | | | E-RC74-AC-1XB | Level signal | | | |
| | | | E-RM44-AC-1XA | Level display | LI-110X | | |
| | | | E-RC74-AC-1XD | Level display | | LI-110X-1 | |
| | | | E-RC74-AC-1XA | Level recorder | LR-110X | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 23 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| REACTOR COOLANT (continued) | J-RCA-LT-110X | Pressurizer level | E-SB01-AC-1RP | Display power | | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-SB01-AC-1RN | Rack power | | | |
| | J-RCA-TE-112HA | Hot-leg Loop 1 temperature | E-RC57-AC-1XC | Temperature sensor | | | |
| | | | E-RM44-AC-1XB | Temperature display | TI-112HA | | |
| | | | E-RC57-AC-1XE | Temperature display | | TI-112HA-1 | |
| | | | E-RC57-AC-1XA | Temperature recorder | TR-112HA | | |
| | | | E-SB01-AC-1RP | Display power | | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-SB01-AC-1RN | Rack power | | | |
| | J-RCA-PT-102A | Pressurizer pressure | E-RC64-AC-1XB | Pressure signal | | | |
| | | | E-RC64-AC-1XC | Pressure signal | | | |
| | | | E-RM44-AC-1XC | Pressure display | PI-102A | | |
| | | | E-RC64-AC-1XA | Pressure recorder | PR-102A | | |
| | | | | or | | | |
| | | | E-RC64-AC-1XD | Pressure display | | PI-102A-1 | |
| | | | E-SB01-AC-1RP | Display power | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 24 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| REACTOR COOLANT (continued) | J-RCA-PT-102A | Pressurizer pressure | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-SB01-AC-1RN | Rack power | | | |
| Train: B | M-RCE-B18<br>M-RCE-B10<br>M-RCE-A05 | Pressurizer backup heaters | E-RC10-NC-2FA | Heater feeder | | | X |
| | | | E-RC10-NC-2FB | Heater feeder | | | X |
| | | | E-RC10-BC-1RA | Heater on/off | HS-100-5 | | |
| | | | E-RC10-BC-1RB | Heater on/off | | | |
| | | | E-RC10-BC-1RD | Heater on/off | HS-100-5-1 | | |
| | | | E-RC10-BC-1RE | SIAS override | | | X |
| | | | E-RC10-BC-1RA | ESFAS | | | |
| | | | E-RC10-BC-1RC | Circuit disconnect | | HS-100-5-2 | |
| | | | E-RC10-BC-1RH | Circuit disconnect | | | |
| | J-RCB-LT-110Y | Pressurizer level | E-RC74-BC-1XA | Level signal | | | |
| | | | E-RC74-BC-1XB | Level signal | | | |
| | | | E-RM44-BC-1XA | Level display | LI-110Y | | |
| | | | E-SB02-BC-1RN | Rack power | | | |
| | | | E-RC74-BC-1XC | Level display | | LI-110Y-1 | |
| | | | E-SB02-BC-1RO | Display power | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 25 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| REACTOR COOLANT (continued) | J-RCB-TE-122HB | Hot-leg loop 1 temperature | E-RC57-BC-2XA | Temperature sensor | | | |
| | | | E-RC57-BC-2XB | Temperature sensor | | | |
| | | | E-RM45-BC-1XA | Temperature display | TI-122HB | | |
| | | | | or | | | |
| | | | E-RC57-BC-2XD | Temperature display | | TI-122HB-1 | |
| | | | E-SB02-BC-1RO | Display power | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | | | E-SB02-BC-1RN | Rack power | | | |
| | J-RCB-PT-102B | Pressurizer pressure | E-RC64-BC-1XA | Pressure signal | | | |
| | | | E-RC64-BC-1XB | Pressure signal | | | |
| | | | E-RM45-BC-1XB | Pressure display | PI-102B | | |
| | | | | or | | | |
| | | | E-RC64-BC-1XC | Pressure display | | PI-102B-1 | |
| | | | E-SB02-BC-1RO | Display power | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | | | E-SB02-BC-1RN | Rack power | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 26 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING | | | | | | | |
| Function: Provide RCS makeup and decay heat removal capability | | | | | | | |
| Train: A | J-SIA-FT-306 | LPSI pump No. 1 flow(b) | E-SI80-AC-1XA | Flow signal | | | |
| | | | E-SI80-AC-1XC | Flow display | FI-306 | | |
| | | | or | | | | |
| | | | E-RM42-AC-1XC | Flow display | | FI-306-1 | |
| | | | E-SB01-AC-1RS | Display power | | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-SB01-AC-1RM | Rack power | | | |
| | J-SIA-HV-608 | SIT No. 4 vent valve(b) | E-SI51-AC-2RA | Solenoid open/close | HS-608A | | |
| | | | or | | | | |
| | | | E-SI51-AC-2RB | Solenoid open/close | | HS-608B | |
| | | | E-SI51-AC-2RC | Solenoid coil feeder | | | |
| | | | E-SI51-AC-2RD | Solenoid coil feeder | | | |
| | | | E-SI51-AC-2RE | Solenoid coil feeder | | | |
| | | | E-SI51-AC-2RB | Valve open/close | | | |

Table E-1

EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 27 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIA-HV-605 | SIT No. 1 vent valve [b] | E-SI50-AC-1RA or E-SI50-AC-1RB | Solenoid open/close | HS-605A | HS-605B | |
| | | | E-SI50-AC-1RC | Solenoid coil feeder | | | |
| | | | E-SI50-AC-1RD | Solenoid coil feeder | | | |
| | | | E-SI50-AC-1RE | Solenoid coil feeder | | | |
| | J-SIA-HV-606 | SIT No. 2 vent valve [b] | E-SI50-AC-2RA or E-SI50-AC-2RB | Solenoid open/close | HS-606A | HS-606B | |
| | | | E-SI50-AC-2RC | Solenoid open/close | | | |
| | | | E-SI50-AC-2RD | Solenoid open/close | | | |
| | | | E-SI50-AC-2RE | Solenoid open/close | | | |
| | J-SIA-HV-607 | SIT No. 3 vent valve [b] | E-SI51-AC-1RA | Solenoid open/close | HS-607A | HS-607B | |
| | | | E-SI51-AC-1RB | Solenoid open/close | | | |
| | | | E-SI51-AC-1RC | Solenoid coil feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 28 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | | | | | | | |
| | J-SIA-HV-607 | SIT No. 3 vent valve (b) | E-SI51-AC-1RD | Solenoid coil feeder | | | |
| | | | E-SI51-AC-1RE | Solenoid coil feeder | | | |
| | J-SIA-UV-617 | Containment penetration external isolation valve hp header No. 1 | E-SI09-AC-1RA | MOV limit stops valve | | | |
| | | | E-SI09-AC-1RC | Valve open/close | HS-617 | | |
| | | | E-SI09-AC-1KA | Valve feeder | | | |
| | | | E-SI09-AC-1RB | Valve open/close | | | |
| | J-SIA-UV-627 | Containment penetration external isolation valve hp header No. 1 | E-SI09-AC-2RA | MOV limit stop | | | |
| | | | E-SI09-AC-2RC | Valve open/close | HS-627 | | |
| | | | E-SI09-AC-2KA | Valve feeder | | | |
| | | | E-SI09-AC-2RB | Valve open/close | | | |
| | J-SIA-UV-637 | Containment penetration external isolation valve hp header No. 1 | E-SI10-AC-1RA | MOV limit stop | | | |
| | | | E-SI10-AC-1RC | Valve open/close | HS-637 | | |
| | | | E-SI10-AC-1KA | Valve feeder | | | |
| | | | E-SI10-AC-1RB | Valve open/close | | | |
| | J-SIA-UV-647 | Containment penetration external isolation valve hp header No. 1 | E-SI10-AC-2RA | MOV limit stop | HS-647 | | |
| | | | E-SI10-AC-2RC | Valve open/close | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 29 of 100)[a].

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIA-UV-647 | Containment penetration external isolation valve hp header No. 1 | E-SI10-AC-2KA | Valve feeder | | | |
| | | | E-SI10-AC-2RB | Valve open/close | | | |
| | J-SIA-UV-635 | Containment penetration external isolation valve lp header No. 1[b] | E-SI08-AC-1RA | MOV limit stop | | | |
| | | | E-SI08-AC-1RC | Valve open/close | HS-635 | | |
| | | | E-SI08-AC-1KA | Valve feeder | | | |
| | | | E-SI08-AC-1RB | Valve open/close | | | |
| | J-SIA-UV-645 | Containment penetration external isolation valve lp header No. 1[b] | E-SI08-AC-2RA | MOV limit stop | | | |
| | | | E-SI08-AC-2RB | Valve open/close | | | |
| | | | E-SI08-AC-2KA | Valve feeder | | | |
| | | | E-SI08-AC-2RC | Valve open/close | HS-645 | | |
| | J-SIA-HV-691 | Shutdown cooling warmup bypass valve[b] | E-SI28-AC-1RA | MOV limit stop | | | |
| | | | E-SI28-AC-1RB | Valve open/close | HS-691 | | |
| | | | E-SI28-AC-1KA | Valve feeder | | | |
| | | | E-SI28-AC-1RC | ESFAS (bypass O/L) | | | |
| | J-SIA-UV-669 | LPSI pumps to RWT isolation valves[b] | E-SI19-AC-1RA | MOV limit stop | | | |
| | | | E-SI19-AC-1RC | Valve open/close | HS-669 | | |
| | | | E-SI19-AC-1KA | Valve feeder | | | |
| | | | E-SI19-AC-1RB | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 30 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | | | | | | | |
| | J-SIA-UV-634 | SIT No. 3 isolation valve (b) | E-SI05-AC-1RB | MOV limit stop | | | |
| | | | E-SI05-AC-1RE | MOV limit stop | | | |
| | | | E-SI05-AC-1RG | Valve open/close | HS-634 | | |
| | | | E-SI05-AC-1KB | Valve feeder | | | |
| | | | E-SI05-AC-1KA | Valve feeder | | | |
| | | | E-SI05-AC-1RH | ESFAS | | | |
| | | | E-SI05-AC-1RI | Valve open/close | | | |
| | J-SIA-UV-644 | SIT No. 4 isolation valve (b) | E-SI05-AC-2RB | MOV limit stop | | | |
| | | | E-SI05-AC-2RE | MOV limit stop | | | |
| | | | E-SI05-AC-2RG | Valve open/close | HS-644 | | |
| | | | E-SI05-AC-2KB | Valve feeder | | | |
| | | | E-SI05-AC-2RA | SESS | | | |
| | | | E-SI05-AC-2KA | Valve feeder | | | |
| | | | E-SI05-AC-2RH | ESFAS | | | |
| | | | E-SI05-AC-2RI | Valve open/close | | | |
| | J-SIA-HV-683 | LPSI pump suction isolation valve (b) | E-SI26-AC-1RA | MOV limit stop | | | |
| | | | E-SI26-AC-1RB | Valve open/close | HS-683 | | |
| | | | E-SI26-AC-1KA | Valve feeder | | | |
| | | | E-SI26-AC-1RC | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 31 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIA-TE-351X | SDC heat exchanger inlet temperature [b] | E-SI80-AC-3XA | Temperature signal | | | |
| | | | E-SI80-AC-3XD | Temperature display | TR-351 | | |
| | | | E-SI80-AC-3XC | Temperature display | | TI-351X | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-SB01-AC-1RM | Rack power | | | |
| | J-SIA-TE-351Y | LPSI temperature at heat exchanger outlet [b] | E-SI80-AC-4XA | Temperature signal | | | |
| | | | E-SI80-AC-4XC | Temperature display | | TI-351Y | |
| | | | E-SI80-AC-3XD | Temperature display | TR-351 | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-SB01-AC-1RM | Rack power | | | |
| | J-SIA-UV-651 | Shutdown cooling isolation valve [b] | E-SI13-AC-1RB | MOV limit stop | | | |
| | | | E-SI13-AC-1RC | MOV limit stop | | | |
| | | | E-SI13-AC-1RE | Valve open/close | HS-651 | | |
| | | | E-SI13-AC-1KA | Valve feeder | | | |
| | | | E-SI13-AC-1KB | Valve feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 32 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIA-UV-653 | Shutdown cooling containment isolation valve (b) | E-SI14-CC-1RA | Valve open/close | HS-653 | | |
| | | | E-SI14-CC-1RB | MOV limit stop | | | |
| | | | E-SI14-CC-1RC | MOV limit stop | | | |
| | | | E-SI14-CC-1RD | MOV limit stop | | | |
| | | | E-SI14-CC-1KB | Valve feeder | | | |
| | | | E-SI14-CC-1KC | Valve feeder | | | |
| | | | E-SI14-CC-1KD | Valve feeder | | | |
| | | | E-SI14-CC-1FA | Valve feeder (DC) | | | |
| | J-SIA-UV-655 | Shutdown cooling containment isolation valve (b) | E-SI15-AC-1RA | Valve open/close | HS-655 | | |
| | | | E-SI15-AC-1RC | MOV limit stop | | | |
| | | | E-SI15-AC-1KA | Valve feeder | | | |
| | | | E-SI15-AC-1RB | Valve open/close | | | |
| | M-SIA-P01 | LPSI pump (b) | E-SI02-AC-1RA | Pump start/stop | HS-3 | | |
| | | | E-I02-AC-1RB | Override permissive | | | |
| | | | E-SI02-AC-1CA | Override permissive | | | |
| | | | E-SI02-AC-1CA | Pump feeder | | | |
| | | | E-SI02-AC-1RC | Pump start/stop | | | |
| | | | 1-SI02-AC-1RJ | Pump indication | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 33 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | | | | | | | |
| | J-SIA-HV-685 | LPSI pump cross-connect valve to SDC heat exchanger [b] | E-SI30-AC-1RA | MOV limit stop | | | |
| | | | E-SI30-AC-1RB | Valve open/close | HS-685 | | |
| | | | E-SI30-AC-1KA | Valve feeder | | | |
| | | | E-SI30-AC-1RC | ESFAS | | | |
| | J-SIA-HV-686 | Containment spray/LPSI cross-connect valve [b] | E-SI31-AC-1RA | MOV limit stop | | | |
| | | | E-SI31-AC-1RB | Valve open/close | HS-686 | | |
| | | | E-SI31-AC-1KA | Valve feeder | | | |
| | | | E-SI31-AC-1RC | ESFAS | | | |
| | J-SIA-UV-672 | Containment spray control valve [b] | E-SI20-AC-1RA | MOV limit stop | | | |
| | | | E-SI20-AC-1RC | Valve open/close | HS-672 | | |
| | | | E-SI20-AC-1KA | Valve feeder | | | |
| | | | E-SI20-AC-1RB | ESFAS | | | |
| | J-SIA-HV-657 | Shutdown cooling temperature control valve [b] | E-SI27-AC-1RA | MOV limit stop | | | |
| | | | E-SI27-AC-1RB | Valve open/close | HS-657 | | |
| | | | E-SI27-AC-1KA | Valve feeder | | | |
| | | | E-SI27-AC-1RC | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 34 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIA-HV-687 | Containment spray isolation valve (b) | E-SI24-AC-1RA | MOV limit stop | | | |
| | | | E-SI24-AC-1RB | Valve open/close | HS-687 | | |
| | | | E-SI24-AC-1KA | Valve feeder | | | |
| | | | E-SI24-AC-1RC | ESFAS | | | |
| | J-SIA-HV-306 | LPSI header discharge valve (b) | E-SI23-AC-1RA | MOV limit stop | | | |
| | | | E-SI23-AC-1RB | Valve open/close | HS-306 | | |
| | | | E-SI23-AC-1KA | Valve feeder | | | |
| | | | E-SI23-AC-1RD | ESFAS | | | |
| | J-SIA-HV-684 | Shutdown cooling heat exchanger isolation valve (b) | E-SI25-AC-1RA | MOV limit stop | | | |
| | | | E-SI25-AC-1RB | Valve open/close | HS-684 | | |
| | | | E-SI25-AC-1KA | Valve feeder | | | |
| | | | E-SI25-AC-1RC | ESFAS (bypass O/L) | | | |
| | J-SIA-HV-678 | Shutdown cooling heat exchanger isolation valve (b) | E-SI33-AC-1RA | MOV limit stop | | | |
| | | | E-SI33-AC-1RC | Valve open/close | HS-678 | | |
| | | | E-SI33-AC-1RD | ESFAS | | | |
| | | | E-SI33-AC-1KA | Valve feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 35 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIA-HV-688 | Shutdown cooling heat exchanger bypass valve (b) | E-SI29-AC-1RA | MOV limit stop | | | |
| | | | E-SI29-AC-1RB | Valve open/close | HS-688 | | |
| | | | E-SI29-AC-1KA | Valve feeder | | | |
| | | | E-SI29-AC-1RC | ESFAS (bypass O/L) | | | |
| | J-SIA-PT-341 | SIT No. 4 pressure | E-SI71-AC-2XB | Pressure signal | | | |
| | | | E-SI71-AC-2XA | Pressure signal | | | |
| | J-SIA-PT-341 | SIT No. 4 pressure | E-RM42-AC-1XB | Pressure display | PI-341 | | |
| | | | E-SI71-AC-2XC | Pressure display | | PI-341-1 | |
| | | | E-SB01-AC-1RS | Display power | | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-SB01-AC-1RM | Rack power | | | |
| | J-SIA-PT-331 | SIT No. 3 pressure | E-SI71-AC-1XB | Pressure signal | | | |
| | | | E-SI71-AC-1XA | Pressure signal | | | |
| | | | E-RM42-AC-1XB | Pressure display | PI-331 | | |
| | | | E-SI71-AC-1XC | Pressure display | | PI-331-1 | |
| | | | E-SB01-AC-1RS | Display power | | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |
| | | | E-SB01-AC-1RM | Rack power | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 36 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | | | | | | | |
| Train: B | J-SIB-FT-307 | LPSI pump No. 2 flow (b) | E-SI81-BC-1XA | Flow signal | | | |
| | | | E-RM42-BC-1XC or E-SI81-BC-1XC | Flow display | FI-307 | FI-307-1 | |
| | | | E-SB02-BC-1RM | Display power | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | | | E-SB02-BC-1RD | Rack power | | | |
| | J-SIB-HV-643 | SIT No. 4 vent valve (b) | E-SI53-BC-2RA or E-SI53-BC-2RB | Solenoid open/close | HV-643A | HV-643B | |
| | J-SIB-HV-643 | SIT No. 4 vent valve (b) | E-SI53-BC-2RC | Solenoid coil feeder | | | |
| | | | E-SI53-BC-2RD | Solenoid coil feeder | | | |
| | | | E-SI53-BC-2RE | Solenoid coil feeder | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-HV-633 | SIT No. 3 vent valve (b) | E-SI53-BC-1RA or E-SI53-BC-1RB | Solenoid open/close | HS-633A | HS-633B | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 37 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIB-HV-633 | SIT No. 3 vent valve[b] | E-SI53-BC-1RC | Solenoid coil feeder | | | |
| | | | E-SI53-BC-1RD | Solenoid coil feeder | | | |
| | | | E-SI53-BC-1RE | Solenoid coil feeder | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-HV-623 | SIT No. 2 vent valve[b] | E-SI52-BC-2RA | Solenoid open/ close | HS-623A | | |
| | | | E-SI52-BC-2RB | Solenoid open/ close | | HS-623B | |
| | | | E-SI52-BC-2RC | Solenoid coil feeder | | | |
| | | | E-SI52-BC-2RD | Solenoid coil feeder | | | |
| | | | E-SI52-BC-2RE | Solenoid coil feeder | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIG-HV-613 | SIT No. 1 vent valve[b] | E-SI52-BC-1RA or E-SI52-BC-1RB | Solenoid open/ close Solenoid open/ close | HS-613A | HS-613B | |
| | | | E-SI52-BC-1RC | Solenoid coil feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 38 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | | | | | | | |
| | J-SIG-HV-613 | SIT No. 1 vent valve (b) | E-SI52-BC-1RD | Solenoid coil feeder | | | |
| | | | E-SI52-BC-1RE | Solenoid coil feeder | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-UV-616 | Containment penetration external isolation valve hp header No. 2 | E-SI11-BC-1RA | MOV limit stop | | | |
| | | | E-SI11-BC-1RC | Valve open/close | HS-616 | | |
| | | | E-SI11-BC-1KA | Valve feeder | | | |
| | | | E-SI11-BC-1RB | ESFAS | | | |
| | J-SIB-UV-626 | Containment penetration external isolation valve hp header No. 2 | E-SI11-BC-2RA | MOV limit stop | | | |
| | | | E-SI11-BC-2RC | Valve open/close | HS-626 | | |
| | | | E-SI11-BC-2KA | Valve feeder | | | |
| | | | E-SI11-BC-2RB | ESFAS | | | |
| | J-SIB-UV-636 | Containment penetration external isolation valve hp header No. 2 | E-SI12-BC-1RA | MOV limit stop | | | |
| | | | E-SI12-BC-2RC | Valve open/close | HS-636 | | |
| | | | E-SI12-BC-1KA | Valve feeder | | | |
| | | | E-SI12-BC-1RB | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 39 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIB-UV-646 | Containment penetration external isolation valve hp header No. 2 | E-SI12-BC-2RA | MOV limit stop | | | |
| | | | E-SI12-BC-2RC | Valve open/close | HS-646 | | |
| | | | E-SI12-BC-2KA | Valve feeder | | | |
| | | | E-SI12-BC-2RB | ESFAS | | | |
| | J-SIB-UV-615 | Containment penetration external isolation valve lp header No. 2 [b] | E-SI07-BC-1RA | MOV limit stop | | | |
| | | | E-SI07-BC-1RC | Valve open/close | HS-615 | | |
| | | | E-SI07-BC-1KA | Valve feeder | | | |
| | | | E-SI07-BC-1RB | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-UV-625 | Containment penetration external isolation valve lp header No. 2 | E-SI07-BC-2RA | MOV limit stops | | | |
| | | | E-SI07-BC-2RC | Valve open/close | HS-625 | | |
| | | | E-SI07-BC-2KA | Valve feeder | | | |
| | | | E-SI07-BC-2RB | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-HV-690 | Shutdown cooling warmup bypass valve [b] | E-SI28-BC-1RA | MOV limit stops | | | |
| | | | E-SI28-BC-1RB | Valve open/close | HS-690 | | |
| | | | E-SI28-BC-1KA | Valve feeder | | | |
| | | | E-SI28-BC-1RC | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 40 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIB-UV-668 | LPSI pumps to RWT isolation valves (mini-flow) (b) | E-SI19-BC-1RA | MOV limit stops | | | |
| | | | E-SI19-BC-1RC | Valve open/close | HS-668 | | |
| | | | E-SI19-BC-1KA | Valve feeder | | | |
| | | | E-SI19-BC-1RB | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-UV-614 | SIT No. 1 isolation valve (b) | E-SI06-BC-1RC | MOV limit stop | | | |
| | | | E-SI06-BC-1RF | MOV limit stop | | | |
| | | | E-SI06-BC-1RH | Valve open/close | HS-614 | | |
| | | | E-SI06-BC-1KB | Valve feeder | | | |
| | | | E-SI06-BC-1KA | Valve feeder | | | |
| | | | E-SI06-BC-1RB | ESFAS | | | |
| | | | E-SI06-BC-1RG | Valve open/close | | | |
| | J-SIB-UV-624 | SIT No. 2 isolation valve (b) | E-SI06-BC-2RC | MOV limit stop | | | |
| | | | E-SI06-BC-2RF | MOV limit stop | | | |
| | | | E-SI06-BC-2RH | Valve open/close | | | |
| | | | E-SI06-BC-2KB | Valve feeder | | | |
| | | | E-SI06-BC-2KA | Valve feeder | | | |
| | | | E-SI06-BC-2RB | ESFAS | | | |
| | | | E-SI06-BC-2RG | Valve open/close | HS-624 | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 41 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | | | | | | | |
| | J-SIB-HV-692 | LPSI pump suction isolation valve[b] | E-SI26-BC-1RA | MOV limit stop | | | |
| | | | E-SI26-BC-1RB | Valve open/close | HS-683 | | |
| | | | E-SI26-BC-1KA | Valve feeder | | | |
| | | | E-SI26-BC-1RC | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-TE-352X | SDC heat exchanger inlet temperature[b] | E-SI81-BC-3XA | Temperature signal | | | |
| | | | E-SI81-BC-3XD | Temperature display | TR-352 | | |
| | | | E-SI81-BC-3XC | Temperature display | | TI-352-X | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | | | E-SB02-RC-1RD | Rack power | | | |
| | J-SIB-TE-352Y | LPSI temperature at SDC heat exchanger outlet[b] | E-SI81-BC-4XA | Temperature signal | | | |
| | | | E-SI81-BC-4XC | Temperature display | | TI-352-Y | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | | | E-SB02-BC-1RD | Rack power | | | |
| | J-SIB-UV-652 | SDC suction isolation valve[b] | E-SI13-BC-1RB | MOV limit stop | | | |
| | | | E-SI13-BC-1RC | MOV limit stop | | | |
| | | | E-SI13-BC-1RE | Valve open/close | HS-652 | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 42 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIB-UV-652 | SDC suction isolation valve (b) | E-SI13-BC-1KA | Valve feeder | | | |
| | | | E-SI13-BC-1KB | Valve feeder | | | |
| | | | E-SI13-BC-1RD | Valve open/close | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-UV-654 | Shutdown cooling containment isolation valve (b) | E-SI14-DC-1RA | Valve open/close | HS-654 | | |
| | | | E-SI14-DC-1RE | MOV limit stop | | | |
| | | | E-SI14-DC-1RC | MOV limit stop | | | |
| | | | E-SI14-DC-1RD | MOV limit stop | | | |
| | | | E-SI14-DC-1KC | Valve feeder | | | |
| | | | E-SI14-DC-1KD | Valve feeder | | | |
| | | | E-SI14-DC-1KB | Valve feeder (DC) | | | |
| | | | E-SI14-DC-1RB | Valve open/close | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-UV-656 | Shutdown cooling containment isolation valve (b) | E-SI15-BC-1RA | Valve open/close | HS-656 | | |
| | | | E-SI15-BC-1RB | MOV limit stop | | | |
| | | | E-SI15-BC-1RC | MOV limit stop | | | |
| | | | E-SI15-BC-1KA | Valve feeder | | | |
| | | | (later) | Circuit disconnect | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 43 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | M-SIB-P01 | LPSI pump[b] | E-SI02-BC-1RA | Pump start/stop | HS-4 | | |
| | | | E-SI02-BC-1RB | Override permissive | | | |
| | | | E-SI02-BC-1RD | Override permissive | | | |
| | | | E-SI02-BC-IRJ | Pump indication | | | |
| | | | E-SI02-BC-1CA | Pump feeder | | | |
| | | | E-SI02-BC-1RC | Pump start/stop | | | |
| | | | E-SI02-BC-1RE | Motor current indication | | | |
| | | | Integral with switchgear | Circuit disconnect | | | |
| | J-SIB-HV-694 | LPSI pump cross-connect valve to SDC heat exchanger[b] | E-SI30-BC-1RA | MOV limit stop | | | |
| | | | E-SI30-BC-1RC | Valve open/close | HS-694 | | |
| | | | E-SI30-BC-1KA | Valve feeder | | | |
| | | | E-SI30-BC-1RB | Valve open/close | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-HV-696 | Containment spray/LPSI cross-connect valve[b] | E-SI31-BC-1RA | MOV limit stop | | | |
| | | | E-SI31-BC-1RB | Valve open/close | HS-696 | | |
| | | | E-SI31-BC-1KA | Valve feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 44 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIB-HV-696 | Containment spray/LPSI cross-connect valve (b) | E-SI31-BC-1RC | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-UV-671 | Containment spray control valve (b) | E-SI20-BC-1RA | MOV limit stop | | | |
| | | | E-SI20-BC-1RC | Valve open/close | HS-671 | | |
| | | | E-SI20-BC-1KA | Valve feeder | | | |
| | | | E-SI20-BC-1RB | ESFAS | | | |
| | J-SIB-HV-658 | SDC temperature control valve (b) | E-SI27-BC-1RA | MOV limit stop | | | |
| | | | E-SI27-BC-1RB | Valve open/close | HS-658 | | |
| | | | E-SI27-BC-1KA | Valve feeder | | | |
| | | | E-SI27-BC-1RC | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-HV-695 | Containment spray isolation valve (b) | E-SI24-BC-1RA | MOV limit stop | | | |
| | | | E-SI24-BC-1RB | Valve open/close | HS-695 | | |
| | | | E-SI24-BC-1KA | Valve feeder | | | |
| | | | E-SI24-BC-1RC | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-HV-307 | LPSI header discharge valve (b) | E-SI23-BC-1RA | MOV limit stop | | | |
| | | | E-SI23-BC-1RB | Valve open/close | HS-307 | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 45 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | | | | | | | |
| | J-SIB-HV-307 | LPSI header discharge valve[b] | E-SI23-BC-1KA | Valve feeder | | | |
| | | | E-SI23-BC-1RD | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-HV-689 | SDC heat exchanger isolation valve[b] | E-SI25-BC-1RA | MOV limit stop | | | |
| | | | E-SI25-BC-1RB | Valve open/close | HS-689 | | |
| | | | E-SI25-BC-1KA | Valve feeder | | | |
| | | | E-SI25-BC-1RC | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-HV-679 | SDC heat exchanger isolation valve[b] | E-SI33-BC-1RA | MOV limit stop | | | |
| | | | E-SI33-BC-1RC | Valve open/close | HS-679 | | |
| | | | E-SI33-BC-1RD | ESFAS | | | |
| | | | E-SI33-BC-1KA | Valve feeder | | | |
| | J-SIB-HV-693 | SDC heat exchanger bypass valve[b] | E-SI29-BC-1RA | MOV limit stop | | | |
| | | | E-SI29-BC-1RB | Valve open/close | HS-693 | | |
| | | | E-SI29-BC-1KA | Valve feeder | | | |
| | | | E-SI29-BC-1RC | ESFAS | | | |
| | | | (later) | Circuit disconnect | | | |
| | J-SIB-PT-321 | SIT No. 2 pressure | E-SI71-BC-2XB | Pressure signal | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 46 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| SAFETY INJECTION AND SHUTDOWN COOLING (continued) | J-SIB-PT-321 | SIT No. 2 pressure | E-RM42-BC-1XB | Pressure display | PI-321 | | |
| | | | E-SI71-BC-2XC | Pressure display | | PI-321-1 | |
| | | | E-SB02-BC-1RM | Display power | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | | | E-SB02-BC-1RD | Rack power | | | |
| | J-SIB-PT-311 | SIT No. 1 pressure | E-SI71-BC-1XB | Pressure signal | | | |
| | | | E-RM42-BC-1XB | Pressure display | PI-311 | | |
| | | | E-SI71-BC-1XC | Pressure display | | PI-311-1 | |
| | | | E-SB02-BC-1RM | Display power | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | | | E-SB02-BC-1RD | Rack power | | | |
| CHEMICAL AND VOLUME CONTROL | | | | | | | |
| Function: Maintain system inventory, maintain RCS chemistry and purity, provide auxiliary spray to RCS pressurizer, and provide borated water for safety injection | | | | | | | |
| Train: A | J-CHA-HV-205 | Pressurizer auxiliary spray valve (b) | E-CH39-AG-1RD or E-CH29-AC-1RE | Valve open/close<br>Valve open/close | HS-205 | HS-205-1 | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 47 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CHEMICAL AND VOLUME CONTROL (continued) | J-CHA-HV-205 | Pressurizer auxiliary spray valve (b) | E-CH39-AC-1RAB | Solenoid coil feeder | | | |
| | | | E-CH39-AC-1RB | Solenoid coil feeder | | | |
| | | | E-CH39-AC-1RC | Solenoid coil feeder | | | |
| | M-CHE-P01 | Charging pump No. 3 | E-CH26-AC-1RA | Pump start/stop | HS-218A | | |
| | | | E-CH26-AC-1FA | Pump feeder | | | |
| | | | E-CH26-AC-1RB | Pump stop | | | |
| | | | E-CH26-AC-1RD | Pump stop | | | |
| | | | E-CH26-AC-1RE | Pump start/stop | | | |
| | J-CHA-LT-200 | Refueling water tank level | E-CH02-AC-1XA | Level signal | | | |
| | | | E-CH02-AC-1XB | Level display | | LI-200-1 | |
| | | | E-ZJ01-AC-1RN | Display power | | LI-200-1 | |
| | | | E-SB01-AC-1RN | Rack power | | | |
| | J-CHA-PT-212 | Charging line pressure | E-CHA1-AC-1XA | Pressure signal | | | |
| | | | E-RM43-AC-1XA or E-CHA1-AC-1XB | Pressure display | PI-212 | PI-212-1 | |
| | | | E-SB01-AC-1RP | Display power | | | |
| | | | E-ZJ01-AC-1RN | Display power | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 48 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CHEMICAL AND VOLUME CONTROL (continued) | | | | | | | |
| | J-CHA-PT-212 | Charging line pressure | E-SB01-AC-1RN | Rack power | | | |
| | J-CHA-UV-506 | RCP gland seal controlled bleedoff containment isolation valve | E-CH14-AC-1RB or E-CH14-AC-1RF | Valve open/close | HS-506 | HS-506-1 | |
| | | | E-CH14-AC-1RC | Solenoid coil feeder | | | |
| | | | E-CH14-AC-1RD | Solenoid coil feeder | | | |
| | | | E-CH14-AC-1RH | Solenoid coil feeder | | | |
| | | | E-CH14-AC-1RA | Valve open/close | | | |
| | M-CHA-P01 | Charging pump No. 1 | E-CH24-AC-1RA | Pump start/stop | HS-216 | | |
| | | | E-CH24-AC-1FA | Pump feeder | | | |
| | | | E-CH24-AC-1RB | Pump stop | | | |
| | | | E-CH24-AC-1RD | Pump stop | | | |
| | | | E-CH24-AC-1RE | Pump start/stop | | | |
| | J-CHA-UV-516 | Letdown isolation valve to regenerative heat-exchanger | E-CH12-AC-1RB or E-CH12-AC-1RF | Valve open/close | HS-516 | HS-516-1 | |
| | | | E-CH12-AC-1RC | Solenoid coil feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 49 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CHEMICAL AND VOLUME CONTROL (continued) | | | | | | | |
| | J-CHA-UV-516 | Letdown isolation valve to regenerative heat-exchanger | E-CH12-AC-1RD | Solenoid coil feeder | | | |
| | | | E-CH12-AC-1RJ | Solenoid coil feeder | | | |
| | | | E-CH12-AC-1RA | ESFAS | | | |
| | | | E-CH12-AC-1RG | ESFAS | | | |
| | | | E-CH12-AC-1RH | ESFAS | | | |
| | | | E-CH12-AC-1RI | SESS | | | |
| | | | E-CH12-AC-1RJ | Valve control | | | |
| Train: B | J-CHB-HV-203 | Pressurizer auxiliary spray valve (b) | E-CH39-BC-1RD or E-CH39-BC-1RE | Valve open/close | HS-203 | HS-203-1 | |
| | | | E-CH39-BC-1RA | Solenoid coil feeder | | | |
| | | | E-CH39-BC-1RB | Solenoid coil feeder | | | |
| | | | E-CH39-BC-1RC | Solenoid coil feeder | | | |
| | M-CHE-P01 | Charging pump No. 3 | E-CH26-BC-1RA | Pump start/stop | HS-218 | | |
| | | | E-CH26-BC-1FA or E-CH26-EC-1FA | Pump feeder | | | |
| | | | E-CH39-BC-1RG | Circuit disconnect | HS-203-2 | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 50 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CHEMICAL AND VOLUME CONTROL (continued) | M-CHE-P01 | Charging pump No. 3 | E-CH26-BC-1RB | Pump stop | | | |
| | | | E-CH26-BC-1RD | Pump stop | | | |
| | | | E-CH26-BC-1RE | Pump start/stop | | | |
| | J-CHB-LT-201 | Refueling water tank level | E-CHC2-BC-1XA | Level signal | | | |
| | | | E-RM43-BC-1XA or E-CHC2-BC-1XB | Level display | LI-201 | LI-201-1 | |
| | | | E-SB02-BC-1RO | Display power | | | |
| | | | E-SB02-BC-1RN | Rack power | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | J-CHB-FT-212 | Charging flow | E-CHA1-BC-1XA | Flow signal | | | |
| | | | E-RM43-BC-1XA or E-CHA1-BC-1XB | Flow display | FI-212 | FI-212-1 | |
| | | | E-SB02-BC-1RN | Rack power | | | |
| | | | E-ZJ02-BC-1RO | Display power | | | |
| | J-CHB-UV-505 | RCP gland seal controlled bleedoff containment isolation valve (outside) | E-CH15-BC-1RB or E-CH15-BC-1RE | Valve open/close | HS-505 | HS-505-1 | |
| | | | E-CH15-BC-1RC | Solenoid coil feeder | | | |
| | | | E-CH15-BC-1RG | Solenoid coil feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 51 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CHEMICAL AND VOLUME CONTROL (continued) | J-CHB-UV-505 | RCP gland seal controlled bleedoff containment isolation valve (outside) | E-CH15-BC-1RJ | Circuit disconnect | | HS-505-2 | |
| | | | E-CH15-BC-1RK | Circuit disconnect | | | |
| | | | E-CH15-BC-1RA | ESFAS | | | |
| | M-CHB-P01 | Charging pump No. 2 | E-CH25-BC-1RA | Pump start/stop | HS-217 | | |
| | | | E-CH25-BC-1FA | Pump feeder | | | |
| | | | Integral with load center | Circuit disconnect | | | CS-2 |
| | | | E-CH25-BC-1RB | Pump stop | | | |
| | | | E-CH25-BC-1RD | Pump stop | | | |
| | | | E-CH25-BC-1RE | Pump start/stop | | | |
| | J-CHB-UV-515 | Letdown line to regenerative heat-exchanger valve | E-CH31-BC-1RB or E-CH31-BC-1RF | Valve open/close | HS-515 | HS-515-1 | |
| | | | E-CH31-BC-1RC | Solenoid coil feeder | | | |
| | | | E-CH31-BC-1RD | Solenoid coil feeder | | | |
| | | | E-CH31-BC-1RK | Solenoid coil feeder | | | |
| | | | E-CH25-BC-1RB | Valve stop | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 52 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CHEMICAL AND VOLUME CONTROL (continued) | | | | | | | |
| | J-CHB-UV-515 | Letdown line to regenerative heat-exchanger valve | E-CH25-BC-1RD | Valve stop | | | |
| | | | E-CH25-BC-1RE | Valve start/stop | | | |
| | | | E-CH25-BC-1RH | Circuit disconnect | | HS-515-2 | |
| | | | E-CH25-BC-1RP | Circuit disconnect | | | |
| Train: non-train related | J-CHN-UV-501 (c) | Volume control tank outlet | E-CH02-NC-1KA | Valve feeder | | | |
| | | | E-CH02-NC-1RA | Valve open/close | HS-501 | | CS-2 |
| | | | E-CH02-NC-1RB | MOV limit stop | | | |
| | | | E-CH02-NC-1RE | Valve open/close | | | LC-227 |
| | | | Integral with MCC | Circuit disconnect | | | CS-3 |
| | J-CHE-HV-536 (c) | RWT gravity feed valve | E-CH72-NC-1KA | Valve feeder | | | |
| | | | E-CH72-NC-1RA | MOV limit stop | | | |
| | | | E-CH72-NC-1RB | Valve open/close | HS-536 | | CS-2 |
| | | | Integral with MCC | Circuit disconnect | | | CS-3 |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 53 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| ESSENTIAL SPRAY POND | | | | | | | |
| Function: Remove heat from ECWS and DG cooling water heat exchanger, and dissipate heat into the atmosphere | | | | | | | |
| Train: A | M-SPA-P01 | Essential spray pond pump (b) | E-SP01-AC-1RF | Pump start/stop | HS-1 | | |
| | | | E-SP01-AC-1CA | Pump feeder | | | X |
| | | | E-SP01-AC-1RA | ESFAS | | | |
| | | | E-SP01-AC-1RC | Pump start/stop | | | |
| | J-SPA-HV-49A | ESP spray header inlet valve (b) (c) | E-SP06-AC-1KA | Valve feeder | | | |
| | | | E-SP06-AC-1RA | MOV limit stop | | | |
| | | | E-SP06-AC-1RB | Valve open/close | HS-49 | | |
| | J-SPA-HV-49B | ESP spray header bypass valve (b) (c) | E-SP07-AC-1KA | Valve feeder | | | |
| | | | E-SP07-AC-1RA | MOV limit stop | | | |
| | | | E-SP07-AC-1RB | Valve open/close | HS-49 | | |
| | M-HSA-J01 | Essential spray pond pump house AHU | (later) | (later) | | | |
| Train: B | M-SPB-P01 | Essential spray pond pump (b) | E-SP01-BC-1RF | Pump start/stop | HS-2 | | |
| | | | E-SP01-BC-1CA | Pump feeder | | | X |
| | | | Integral with switchgear | Circuit disconnect | | | CS-3 |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 54 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| ESSENTIAL SPRAY POND (continued) | | | | | | | |
| | J-SPB-HV-50A | ESP spray header inlet valve(b) (d) | E-SP06-BC-1KA | Valve feeder | | | |
| | | | E-SP06-BC-1RA | MOV limit stop | | | |
| | | | E-SP06-BC-1RB | Valve open/close | HS-50 | | |
| | J-SPB-HV-50B | ESP spray header bypass valve(b) (d) | E-SP07-BC-1KA | Valve feeder | | | |
| | | | E-SP07-BC-1RA | MOV limit stop | | | |
| | | | E-SP07-BC-1RB | Valve open/close | HS-50 | | |
| | M-HSB-J01 | Essential spray pond pump house AHU | (later) | (later) | | | |
| ESSENTIAL CHILLED WATER | | | | | | | |
| Function: Supply chilled water to HVAC Systems for Control Building, Auxiliary Building, and Main Steam Support Structure | | | | | | | |
| Train: A | M-ECA-E01 | Essential chiller A | E-EC01-AC-1CA | Motor feeder | | | X |
| | | | E-EC01-AC-1RF | Motor start/stop | HS-1A | | |
| | | | E-EC01-AC-1RB | Valve start/stop | | | |
| | | | E-EC01-AC-1RJ | Current transformer | | | |
| | | | E-EC01-AC-1RK | Chiller control | | | |
| | | | E-EC01-AC-1RC | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 55 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| ESSENTIAL CHILLED WATER (continued) | | | | | | | |
| | M-ECA-E01 | Essential chiller A | E-EC01-AC-1RP | ESFAS | | | |
| | | | E-EC01-AC-1RH | ESFAS | | | |
| | | | E-EC01-AC-1RM | Essential cooling flow | | | |
| | | | E-EC01-AC-1RL | Essential chilled flow | | | |
| | M-ECA-P01 | Essential chilled water circulation pump | E-EC03-AC-1RA | Pump start/stop | | | X |
| | | | E-EC03-AC-1KA | Pump feeder | | | |
| | | | E-EC03-AC-1RD | ESFAS | | | |
| | J-ECA-FT-533 | Main chilled water supply flow | E-EC53-AC-1XA | Flow signal | | | |
| | | | E-EC01-AC-1RL | Flow signal | | | |
| | | | E-RM10-AC-1RE | Rack power | | | |
| Train: B | M-ECB-E01 | Essential chiller B | E-EC01-BC-1CA | Motor feeder | | | X |
| | | | E-EC01-BC-1RF | Motor start/stop | HS-2A | | |
| | | | Integral with switchgear | Circuit disconnect | | | CS-3 |
| | | | E-EC01-BC-1RJ | Current transformer | | | |
| | | | E-EC01-BC-1RC | ESFAS | | | |
| | | | E-EC01-BC-1RP | ESFAS | | | |
| | | | E-EC01-BC-1RB | Valve start/stop | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 56 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| ESSENTIAL CHILLED WATER (continued) | | | | | | | |
| | M-ECB-E01 | Essential chiller B | E-EC01-BC-1RK | Chiller control | | | |
| | | | E-EC01-BC-1RD | Expansion tank level | | | |
| | | | E-EC01-BC-1RM | Essential cooling flow | | | |
| | | | E-EC01-BC-1RL | Essential chilled flow | | | |
| | M-ECB-P01 | Essential chilled water circulation pump | E-EC03-BC-1RA | Pump start/stop | | | X |
| | | | E-EC03-BC-1RD | ESFAS | | | |
| | | | E-EC03-BC-1KA | Pump feeder | | | X |
| | J-ECB-FT-534 | Main chilled water supply flow | E-EC53-BC-1XA | Flow signal | | | |
| | | | E-EC01-BC-1RL | Flow signal | | | |
| | | | E-ZJ02-BC-1RN | Rack power | | | |
| ESSENTIAL COOLING WATER | | | | | | | |
| Function: Remove heat from all essential components required for emergency shutdown, and reject heat to the essential spray ponds through ECWS heat exchanger | | | | | | | |
| Train: A | M-EWA-P01 | ECWS pump | E-EW01-AC-1RA | Pump start/stop | HS-1 | | |
| | | | E-EW01-AC-1CA | Pump feeder | | | X |
| | | | E-EW01-AC-1RC | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 57 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| ESSENTIAL COOLING WATER (continued) | J-EWA-LT91 | ECWS surge tank level | E-EW54-AC-1XA | Level transmitter | | | |
| | | | E-EW02-AC-1RB | Valve open/close | | | |
| | | | E-RM10-AC-1RE | Rack power | | | |
| | J-EWA-FT151 | Cooling water flow to essential chiller | E-EW52-AC-1XA | Flow signal | | | |
| | | | E-EC01-AC-1RM | Flow signal | | | |
| | | | E-RM10-AC-1RE | Rack power | | | |
| Train: B | M-EWB-P01 | ECWS pump | E-EW01-BC-1RA | Pump start/stop | HS-2 | | |
| | | | E-EW01-BC-1CA | Pump feeder | | | X |
| | | | Integral with switchgear | Circuit disconnect | | | CS-3 |
| | | | E-EW01-BC-1RC | ESFAS | | | |
| | J-EWB-LT92 | ECW surge tank level | E-EW54-BC-1XA | Level transmitter | | | |
| | | | (Later) | Level switch | | | |
| | | | E-EW02-BC-1RB | Valve open/close | | | |
| | | | E-ZJ02-BC-1RN | Rack power | | | |
| | J-EWB-FT152 | Cooling water flow to essential chiller | E-EW52-BC-1XA | Flow signal | | | |
| | | | E-EC01-BC-1RM | Flow signal | | | |
| | | | E-ZJ02-BC-1RN | Rack power | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 58 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| HVAC - AUXILIARY BUILDING | | | | | | | |
| Function: Provide required environment for ESF equipment rooms | | | | | | | |
| Train: A | M-HAA-Z04 | Auxiliary feedwater pump room A essential ACU | E-HA06-AC-1KA | ACU feeder | | | |
| | | | E-HA06-AC-1RB | ACU start/stop | | | |
| | | | E-HA06-AC-1RC | ACU start/stop | | | |
| | | | E-HA06-AC-1RA | ESFAS | | | |
| | | | E-HA06-AC-1RD | ACU start/stop | | | |
| | M-HAA-Z02 | LPSI pump room essential ACU[b] | E-HA02-AC-1KA | ACU feeder | | | |
| | | | E-HA02-AC-1RB | ACU start/stop | | | X |
| | | | E-HA02-AC-1RA | ESFAS | | | |
| | M-HAA-Z05 | Essential cooling water pump room essential ACU | E-HA04-AC-1KA | ACU feeder | | | |
| | | | E-HA04-AC-1RA | ESFAS | | | |
| | | | E-HA04-AC-1RB | ACU start/stop | | | X |
| | | | E-HA04-AC-1RD | ESFAS | | | |
| | M-HAA-Z06 | Essential penetration room essential ACU | E-HA05-AC-1KA | ACU Feeder | | | |
| | | | E-HA05-AC-1RA | ESFAS | | | |
| | | | E-HA05-AC-1RC | ESFAS | | | |
| Train: B | M-HAB-Z04 | Auxiliary feedwater pump room B essential ACU | E-HA06-BC-1KA | ACU feeder | | | X |
| | | | E-HA06-BC-1RC | ACU start/stop | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 59 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| HVAC - AUXILIARY BUILDING (continued) | | | | | | | |
| | M-HAB-Z04 | Auxiliary feedwater pump room B essential ACU | E-HA06-BC-1RB | ACU start/stop | | | X |
| | | | E-HA06-BC-1RA | ESFAS | | | |
| | | | E-HA06-BC-1RD | ACU start/stop | | | |
| | M-HAB-Z02 | LPSI pump room essential ACU(b) | E-HA02-BC-1KA | ACU feeder | | | |
| | | | E-HA02-BC-1RB | ACU start/stop | | | X |
| | | | E-HA02-BC-1RA | ESFAS | | | |
| | M-HAB-Z05 | Essential cooling water pump room essential ACU | E-HA04-BC-1KA | ACU feeder | | | |
| | | | E-HA04-BC-1RA | ESFAS | | | |
| | | | E-HA04-BC-1RB | ACU start/stop | | | X |
| | | | E-HA04-BC-1RD | ESFAS | | | |
| | M-HAB-Z06 | Essential penetration room essential ACU | E-HA05-BC-1KA | ACU feeder | | | |
| | | | E-HA05-BC-1RA | ESFAS | | | |
| | | | E-HA05-BC-1RC | ESFAS | | | |
| HVAC-CONTROL BUILDING | | | | | | | |
| Function: Furnish the required environment for all ESF equipment and battery rooms | | | | | | | |
| Train: A | M-HJA-Z03 | ESF switchgear room essential air handling unit | E-HJ06-AC-1RA | Unit start/stop | HS-67 | | |
| | | | E-HJ06-AC-1KA | Line feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 60 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| HVAC-CONTROL BUILDING (continued) | | | | | | | |
| | M-HJA-Z03 | ESF switchgear room essential air handling unit | E-HJ06-AC-1RB | LOP signal | | | |
| | | | E-HJ06-AC-1RC | ESFAS | | | |
| | M-HJA-J01A | Control building battery rooms essential exhaust fans | E-HJ23-AC-1RA | Unit start/stop | HS-81 | | |
| | | | E-HJ23-AC-1KA | Line feeder | | | |
| | | | E-HJ23-AC-1RB | LOP signal | | | |
| | | | E-HJ23-AC-1RC | ESFAS | | | |
| | M-HJA-J01B | Control building battery rooms essential exhaust fan | E-HJ23-AC-2RA | Unit start/stop | HS-83 | | |
| | | | E-HJ23-AC-2KA | Line feeder | | | |
| | | | E-HJ23-AC-2RB | LOP signal | | | |
| | | | E-HJ23-AC-2RC | ESFAS | | | |
| Train: B | M-HJB-Z03 | ESF switchgear room essential air handling unit | E-HJ06-BC-1RA | Unit start/stop | HS-68 | | |
| | | | E-HJ06-BC-1RF | Unit start/stop | HS-68 | | |
| | | | E-HJ06-BC-1KA | Line feeder | | | |
| | | | E-HJ06-BC-1RB | LOP signal | | | |
| | | | E-HJ06-BC-1RC | ESFAS | | | |
| | | | Integral with MCC | Circuit disconnect | | | CS-3 |
| | M-HJB-J01A | Control building battery rooms essential exhaust fan | E-HJ23-BC-2RA | Unit start/stop | HS-84 | | |
| | | | E-HJ23-BC-2RF | Unit start/stop | HS-84 | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 61 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| HVAC CONTROL BUILDING (continued) | | | | | | | |
| | M-HJB-J01A | Control building battery rooms essential exhaust fan | E-HJ23-BC-2KA | Line feeder | | | |
| | | | E-HJ23-BC-2RB | LOP signal | | | |
| | | | E-HJ23-BC-2RC | ESFAS | | | |
| | | | E-HJ23-BC-2RE | Unit start/stop | | | |
| | | | Integral with MCC | Circuit disconnect | | | CS-3 |
| | M-HJB-J01B | Control building battery rooms essential exhaust fans | E-HJ23-BC-1RA | Unit start/stop | HS-82 | | |
| | | | E-HJ23-BC-1RE | Unit start/stop | HS-82 | | |
| | | | E-HJ23-BC-1KA | Line feeder | | | |
| | | | Integral with MCC | Circuit disconnect | | | CS-3 |
| | | | E-HJ23-BC-1RB | LOP signal | | | |
| | | | E-HJ23-BC-1RC | ESFAS | | | |
| HVAC DIESEL BUILDING | | | | | | | |
| Function: Furnish the required environment for ESF equipment rooms | | | | | | | |
| Train: A | M-HDA-A01 | Diesel generator control room air handling unit | E-HD05-AC-1RA | AHU indication | | | X |
| | | | E-HD05-AC-1RB | AHU start/stop | | | X |
| | | | E-HD05-AC-1RE | AHU start/stop | | | |
| | | | E-HD05-AC-1KA | AHU feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 62 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| HVAC DIESEL BUILDING (continued) | | | | | | | |
| | M-HDA-J01 | Diesel generator essential exhaust fan | E-HD01-AC-1RA | Fan start/stop | | | HS-13 |
| | | | E-HD01-AC-1RC | Fan start/stop | | | X |
| | | | E-HD01-AC-1FA | Fan feeder | | | |
| Train: B | M-HDB-A01 | Diesel generator control room air handling unit | E-HD05-BC-1RA | AHU indication | | | |
| | | | E-HD05-BC-1RB | AHU start/stop | | | X |
| | | | E-HD05-BC-1RE | AHU start/stop | | | X |
| | | | E-HD05-BC-1KA | AHU feeder | | | |
| | M-HDB-J01 | Diesel generator essential exhaust fan | E-HD01-BC-1RA | Fan start/stop | | | HS-14 |
| | | | E-HD01-BC-1RC | Fan start/stop | | | X |
| | | | E-HD01-BC-1FA | Fan feeder | | | |
| STANDBY GENERATION | | | | | | | |
| Function: Provide onsite electrical power when offsite (normal) power is interrupted | | | | | | | |
| Train: A | M-DFA-P01 | Diesel fuel oil transfer pump | E-DF01-AC-1RA | Pump start/stop | HS-21B | | |
| | | | E-DF01-AC-1RB | Pump start/stop | | HS-21A | |
| | | | E-DF01-AC-1RC | Pump start/stop | | | |
| | | | E-DF01-AC-1KA | Pump feeder | | | |
| | | | E-DF01-AC-1RH | Pump start/stop | | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 63 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| STANDBY GENERATION (continued) | E-PEA-G01 | Diesel generator 4.16 KV breaker | E-PE01-AC-1RA | Breaker trip-close | HS-503B | | CS-1 |
| | | | E-PE01-AC-1RB | Auto trip-close | | | X |
| | | | E-PE01-AC-1CC | Bus power supply | | | |
| | | | E-PE01-AC-1CB | Bus power supply | | | |
| | | | E-PE01-AC-1CA | Bus power supply | | | |
| | | | E-PE01-AC-1RD | Generator differential protection | | | |
| | | | E-PE01-AC-1RF | DG protection | | | |
| | | | E-PE01-AC-1RG | ESFAS signal | | | |
| | | | E-PE01-AC-1RE | Sequencer start | | | |
| | | | E-PE01-AC-1RC | SEIS, SEAS | | | |
| | | Diesel generator metering & relaying | E-PE02-AC-1CA | DG power output | | | |
| | | | E-PE02-AC-1CB | DG power output | | | |
| | | | E-PE02-AC-1CC | DG power output | | | |
| | | | E-PE02-AC-1RA | Excitation & volt reg control | | | |
| | | | E-PE02-AC-1RB | Excitation & volt reg control | | | |
| | | | E-PE02-AC-1RC | Excitation & volt reg control | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 64 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| STANDBY GENERATION (continued) | E-PEA-G01 | Diesel generator metering & relaying | E-PE02-AC-1RD | Generator differential protection | | | |
| | | | E-PE02-AC-1RE | Generator field voltage | X | | X |
| | | | E-PE02-AC-1RF | Generator field current | X | | X |
| | | | E-PE02-AC-1KA | Generator field power | | | |
| | | | E-PE02-AC-1KB | Excitation power | | | |
| | | | E-PE02-NC-1RA | Metering and protection | X | | X |
| | | | E-PE01-NC-1CA | Metering and protection | X | | X |
| | | | E-PE01-NC-1RL | Metering and protection | X | | X |
| | | | E-PE01-NC-1RD | Metering and protection | X | | X |
| | | | E-PE02-NC-1RC | Metering and protection | X | | X |
| | | | E-PE02-NC-1RB | Metering and protection | X | | X |
| | | | E-PE02-NC-1RK | Metering and protection | X | | X |
| | | | E-PE02-NC-1RJ | Metering and protection | X | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 65 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| STANDBY GENERATION (continued) | E-PEA-G01 | Diesel generator metering and relaying | E-PE02-NC-1RH | Metering and protection | X | | X |
| | | | E-PE02-NC-1RG | Metering | X | | X |
| | | | E-PE02-NC-1RF | Metering | X | | X |
| | | Diesel generator tripping and voltage regulation | E-PE03-AC-1RA | Volt regulator control | X | | X |
| | | Diesel engine control | E-DG07-AC-1XA | Diesel engine control | X | | X |
| | | | E-DG07-AC-1XB | Diesel engine control | X | | X |
| | | | E-DG07-AC-1XC | Diesel engine control | X | | X |
| | | | E-DG07-AC-1RK | Diesel engine control | X | | X |
| | | | E-DG07-AC-1RJ | Diesel engine control | X | | X |
| | | | E-DG07-AC-1RL | Diesel engine control | X | | X |
| | | | E-DG07-AC-1RM | Diesel engine control | X | | X |
| | | | E-DG07-AC-1RG | Diesel engine control | X | | X |
| | | | E-DG07-AC-1RH | Diesel engine Control | X | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 66 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| STANDBY GENERATION (continued) | E-PEA-G01 | Diesel engine control | E-DG07-AC-1RB | Diesel engine Control | X | | X |
| | | | E-DG07-AC-1RC | Diesel engine Control | X | | X |
| | | | E-DG07-AC-1RA | Diesel engine Control | X | | X |
| | | | E-DG07-AC-1RD | Diesel engine Control | X | | X |
| | | | E-DG07-AC-1RE | Diesel engine Control | X | | X |
| | | | E-DG07-AC-1RF | Diesel engine Control | X | | X |
| | | | E-DG07-AC-1RP | Diesel engine Control | X | | X |
| | | | E-DG07-AC-1RQ | Diesel engine Control | X | | X |
| Train: B | M-DFB-P01 | Diesel fuel oil transfer pump | E-DF01-BC-1RA | Pump start/stop | HS-22B | | |
| | | | E-DF01-BC-1RB | Pump start/stop | | HS-22A | |
| | | | E-DF01-BC-1RC | Pump start/stop | | | |
| | | | E-DF01-BC-1RJ | Circuit disconnect | | CS-3 | |
| | | | E-DF01-BC-1RL | Circuit disconnect | | CS-3 | |
| | | | E-DF01-BC-1KA | Pump feeder | | | |
| | | | E-DF01-BC-1RH | Pump start/stop | | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 67 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| STANDBY GENERATION (continued) | E-PEB-G02 | Diesel generator 4.16-kV breaker | E-PE01-BC-1RA | Brkr trip-close | HS-504B | | CS-1 |
| | | | E-PE01-BC-1RB | Auto trip-close | | | X |
| | | | E-PE01-BC-1CC | Bus power supply | | | |
| | | | E-PE01-BC-1CB | Bus power supply | | | |
| | | | E-PE01-BC-1CA | Bus power supply | | | |
| | | | E-PE01-BC-1RE | Sequencer start | | | |
| | | | E-PE01-BC-1RD | Generator differential protection | | | |
| | | | E-PE01-BC-1RF | DG protection | | | |
| | | | E-PE01-BC-1RG | ESFAS signal | | | |
| | | | E-PE01-BC-1RC | SEIS, SEAS | | | |
| | | | Integral with switchgear | Circuit disconnect | | | CS-3 |
| | | | E-PE02-BC-1CA | DG power output | | | |
| | | | E-PE02-BC-1CB | DG power output | | | |
| | | | E-PE02-BC-1CC | DG power output | | | |
| | | | E-PE02-BC-1KA | Generator field power | | | |
| | | | E-PE02-BC-1KB | Excitation power | | | |
| | | | E-PE02-BC-1RA | Excitation & voltage regulator control | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 68 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| STANDBY GENERATION (continued) | E-PEB-G02 | Diesel generator metering and relaying | E-PE02-BC-1RB | Excitation & voltage regulator control | | | |
| | | | E-PE02-BC-1RC | Excitation & voltage regulator control | | | |
| | | | E-PE02-BC-1RD | Generator differential protection | | | |
| | | | E-PE02-BC-1RE | Generator field volt | X | | X |
| | | | E-PE02-BC-1RF | Generator field current | X | | X |
| | | | E-PE02-NC-2RA | Metering and protection | X | | X |
| | | | E-PE02-NC-2RB | Metering and protection | X | | X |
| | | | E-PE02-NC-2RC | Metering and protection | | | |
| | | | E-PE02-NC-2RD | Metering and protection | X | | X |
| | | | E-PE02-BC-1RE | Circuit disconnect | | CS-3 | |
| | | | E-PE02-BC-1RF | Circuit disconnect | | CS-3 | |
| | | | E-PE02-BC-1RG | Circuit disconnect | | CS-3 | |
| | | | E-PE02-BC-1RH | Circuit disconnect | | CS-3 | |
| | | | E-PE02-NC-2RF | Metering and protection | X | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 69 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| STANDBY GENERATION (continued) | E-PEB-G02 | Diesel generator metering and relaying | E-PE02-NC-2RG | Metering and protection | X | | X |
| | | | E-PE02-NC-2RH | Metering and protection | X | | X |
| | | | E-PE02-NC-2RG | Metering and protection | X | | X |
| | | | E-PE02-NC-2RJ | Metering and protection | X | | X |
| | | | E-PE02-NC-2RK | Metering and protection | X | | X |
| | | | E-PE02-NC-2CA | Metering and protection | X | | X |
| | | | E-PE02-NC-2RL | Metering and protection | X | | X |
| | | Diesel generator tripping & voltage regulation | E-PE03-BC-1RA | Voltage regulator control | X | | X |
| | | | E-PE03-BC-1RB | Circuit disconnect | | CS-3 | |
| | | Diesel engine control | E-DG07-BC-1XA | Diesel engine control | X | | X |
| | | | E-DG07-BC-1XB | Diesel engine control | X | | X |
| | | | E-DG07-BC-1XC | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RK | Diesel engine control | X | | X |

Table E-1

EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 70 of 100) [a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| STANDBY GENERATION (continued) | E-PEB-G02 | Diesel engine control | E-DG07-BC-1RJ | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RL | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RR | Circuit disconnect | | CS-4 | |
| | | | E-DG07-BC-1RS | Circuit disconnect | | CS-4 | |
| | | | E-DG07-BC-1RJ | Circuit disconnect | | CS-4 | |
| | | | E-DG07-BC-1RW | Circuit disconnect | | CS-4 | |
| | | | E-DG07-BC-1RX | Circuit disconnect | | CS-4 | |
| | | | E-DG07-BC-1RM | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RG | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RH | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RB | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RC | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RA | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RQ | Diesel engine control | X | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 71 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| STANDBY GENERATION (Continued) | | | | | | | |
| | E-PEB-G02 | Diesel engine control | E-DG07-BC-1RP | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RF | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RE | Diesel engine control | X | | X |
| | | | E-DG07-BC-1RD | Diesel engine control | X | | X |
| 4160V-AC CLASS IE POWER | | | | | | | |
| Function: Provide power to class IE motors and load centers | | | | | | | |
| Train: A | E-PBA-503L | 4160V class IE normal power supply | E-PB01-AC-1RA | Brkr open/close | HS-503L | | CS-1 |
| | | | E-PB01-AC-1RB | Load shed | | | |
| | | | E-PB01-AC-1RC | Supply voltage | EI-503L | | X |
| | E-PBA-503K | 4160V class IE alternate power supply | E-PB02-AC-1RA | Brkr open/close | HS-503K | | CS-1 |
| | | | E-PB02-AC-1RB | Load shed | | | |
| | | | E-PB02-AC-1RC | Supply voltage | EI-503K | | X |
| Train: B | E-PBB-504K | 4160V class IE normal power supply | E-PB01-BC-1RA | Brkr open/close | HS-504K | | CS-1 |
| | | | E-PB01-BC-1RB | Load shed | | | |
| | | | E-PB01-BC-1RC | Supply voltage | EI-504K | | X |
| | | | Integral with switchgear | Circuit disconnect | | | CS-3 |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 72 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 4160V-AC CLASS IE POWER (continued) | | | | | | | |
| | E-PBB-504L | 4160V class IE alternate power supply | E-PB02-BC-1RA | Brkr open/close | HS-504L | | CS-1 |
| | | | E-PB02-BC-1RB | Load shed | | | |
| | | | E-PB02-BC-1RC | Supply voltage | EI-504L | | X |
| | | | Integral with switchgear | Circuit disconnect | | | CS-3 |
| 480V-AC CLASS IE POWER | | | | | | | |
| Function: Provide power to Class IE motor control centers and load centers | | | | | | | |
| Train: A | E-PHA-M31 | 480V class IE power supply | E-PH01-AC-1FA | Power supply to MCC E-PHA-M31 | | | |
| | | | E-PH01-AC-1RA | Indication | X | | |
| | E-PHA-M33 | 480V class IE power supply | E-PH01-AC-2FA | Power supply to MCC E-PHA-M33 | | | |
| | | | E-PH01-AC-2RA | Indication | X | | |
| | E-PHA-M35 | 480V class IE power supply | E-PH01-AC-3FA | Power supply to MCC E-PHA-M35 | | | |
| | | | E-PH01-AC-3RA | Indication | X | | |
| | E-PHA-M37 | 480V class IE power supply | E-PH02-AC-1FA | Power supply to MCC-PHA-M37 | | | |
| | | | E-PH01-AC-1RA | Indication | X | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 73 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 480V-AC CLASS IE POWER (continued) | | | | | | | |
| | E-PGA-L31 | 480V class IE power supply | E-PG06-AC-1RA | Brkr open/close | HS-L31B2 | | |
| | | | E-PG06-AC-1RB | Bus voltage | EI-L31 | | |
| | | | E-PG06-AC-1RC | ESFAS | | | |
| | E-PGA-L33 | 480V class IE power supply | E-PG07-AC-1RA | Brkr open/close | HS-L33B2 | | |
| | | | E-PG07-AC-1RC | Bus voltage | EI-L33 | | |
| | | | E-PG07-AC-1RE | ESFAS | | | |
| | E-PGA-L35 | 480 class IE power supply | E-PG08-AC-1RA | Brkr open/close | HS-L35B2 | | |
| | | | E-PG08-AC-1RC | Bus voltage | EI-L35 | | |
| | | | E-PG08-AC-1RE | ESFAS | | | |
| Train: B | E-PHB-M32 | 480V class IE power supply | E-PH03-BC-1FA | Power supply to MCC E-PHB-M32 | | | |
| | | | E-PH03-BC-1RA | Indication | X | | |
| | E-PHB-M34 | 480V class IE power supply | E-PH03-BC-2FA | Power supply to MCC E-PHB-M34 | | | |
| | | | E-PH03-BC-2RA | Indication | X | | |
| | E-PHB-M36 | 480V class IE power supply | E-PH03-BC-3FA | Power supply to MCC E-PHB-M36 | | | |
| | | | E-PH03-BC-3RA | Indication | X | | |
| | E-PHB-M38 | 480V class IE power supply | E-PH04-BC-1FA | Power supply to MCC E-PHB-M38 | | | |
| | | | E-PH04-BC-1RA | Indication | X | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 74 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 480V-AC CLASS IE POWER (continued) | | | | | | | |
| | E-PGB-L32 | 480V class IE power supply | E-PG06-BC-1RA | Brkr open/close | HS-L32B2 | | |
| | | | E-PG06-BC-1RB | Bus voltage | EI-L32 | | |
| | | | E-PG06-BC-1RC | ESFAS | | | |
| | | | Integral with LC | Circuit disconnect | | | CS-1 |
| | E-PGB-L34 | 480V class IE power supply | E-PG07-BC-1RA | Brkr open/close | HS-L34B2 | | |
| | | | E-PG07-BC-1RC | Bus voltage | EI-L34 | | |
| | | | E-PG07-BC-1RE | ESFAS | | | |
| | | | Integral with LC | Circuit disconnect | | | CS-1 |
| | E-PGB-L36 | 480V class IE power supply | E-PG08-BC-1RA | Brkr open/close | HS-L36 | | |
| | | | E-PG08-BC-1RC | Bus voltage | EI-L36 | | |
| | | | E-PG08-BC-1RE | ESFAS | | | |
| | | | Integral with LC | Circuit disconnect | | | CS-2 |
| 126V-DC CLASS IE POWER | | | | | | | |
| Function: Provide dc control power for Class IE switchgear and load centers | | | | | | | |
| Train: A | E-PBA-S03 | 125 V-dc control power supply | E-PB03-AC-1KM | Switchgear control | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 75 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 125V-DC CLASS IE POWER (continued) | | | | | | | |
| | E-PGA-L31 | 125 V-dc control power supply | E-PG03-AC-1KN | Switchgear control | | | |
| | E-PGA-L33 | 125 V-dc control power supply | E-PG03-AC-1KM | Switchgear control | | | |
| | E-PGA-L35 | 125 V-dc power control supply | E-PG03-AC-1KO | Switchgear control | | | |
| Train: B | E-PBB-S04 | 126 V-dc power control supply | E-PB06-BC-1KM | Switchgear control | | | |
| | E-PGB-L32 | 126 V-dc control power supply | E-PG06-BC-1KO | Switchgear control | | | |
| | E-PGB-L34 | 125 V-dc control power supply | E-PG06-BC-1KM | Switchgear control | | | |
| | E-PGB-L36 | 125 V-dc power control supply | E-PG06-BC-1KN | Switchgear control | | | |
| Function: Provide dc control power for auxiliary relay cabinets | | | | | | | |
| Train: A | E-ZAA-C01 | 125 V-dc power supply | E-ZA03-AC-1RO | Display power | | | |
| | E-ZAA-C03 | 125 V-dc power supply | E-ZA03-AC-1RM | Display power | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 76 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 126V-DC CLASS IE POWER (continued) | | | | | | | |
| | E-ZAA-C04 | 125 V-dc power supply | E-ZA03-AC-1RN | Display power | | | |
| | | | E-ZA03-AC-1KU | Display power | | | |
| | E-ZAA-C05 | 125 V-dc power supply | E-ZA03-AC-1RP | Display power | | | |
| | E-ZAA-C06 | 125 V-dc power supply | E-ZA03-AC-1RQ | Display power | | | |
| | E-ZJA-C01 | 125 V-dc power supply | E-ZJ03-AC-1KM | Display power | | | |
| | E-ZJA-C03 | 125 V-dc power supply | E-ZJ03-AC-1KN | Display power | | | |
| Train: B | E-ZAB-C01 | 125 V-dc power supply | E-ZA06-BC-1RO | Display power | | | |
| | E-ZAB-C03 | 125 V-dc power supply | E-ZA06-BC-1RM | Display power | | | |
| | E-ZAB-C04 | 125 V-dc power supply | E-ZA06-BC-1RN | Display power | | | |
| | E-ZAB-C05 | 125 V-dc power supply | E-ZA06-BC-1RP | Display power | | | |
| | E-ZAB-C06 | 125 V-dc power supply | E-ZA06-BC-1RQ | Display power | | | |
| | E-ZJB-C01 | 125 V-dc power supply | E-ZJ06-BC-1KM | Display power | | | |
| | E-ZJB-C03 | 125 V-dc power supply | E-ZJ06-BC-1KN | Display power | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 77 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 125V-DC CLASS IE POWER (continued) | | | | | | | |
| Function: Provide 125V-DC steady state loads and supply charging current to 125V-DC batteries | | | | | | | |
| Train: A | E-PKA-H11 | Battery charger A | E-PK04-AC-1KA | Batt chgr 480V feeder | | | |
| | | | E-PK04-AC-1RA | Load shed/ sequencer | X | | |
| | | | Integral with MCC | Brkr close/trip | | | X |
| | | | E-PK04-AC-1RB | Chgr dc voltage | EI-M4104 | | X |
| | | | E-PK04-AC-1RC | Chgr dc current | II-M4104 | | X |
| | | | E-PK04-AC-1RE | Space heater | | | |
| | E-PKA-H15 | Battery charger AC | E-PK04-AC-2KA | Batt chgr 480V feeder | | | |
| | | | E-PK04-AC-2RA | Load shed/ sequencer | X | | |
| | | | Integral with MCC | Brkr close/trip | | | X |
| | | | E-PK04-AC-2RB | Chgr dc voltage | EI-M4105 | | X |
| | | | E-PK04-AC-2RC | Chgr dc current | II-M4105 | | X |
| | | | E-PK04-AC-2RE | Space heater | | | |
| | | | E-PK04-AC-2RF | Channel A output indication | | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 78 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 125V-DC CLASS IE POWER (continued) | | | | | | | |
| | E-PKA-H15 | Battery charger AC | E-PK04-AC-2RG | Channel A output indication | X | | |
| | | | E-PK04-CC-2RA | Channel C output indication | | | X |
| | | | E-PK04-CC-2RB | Channel C output indication | X | | |
| | E-PKA-H13 | Battery charger C | E-PK04-AC-3KA | Batt chgr 480V feeder | | | |
| | | | E-PK04-AC-3RA | Load shed/ sequencer | X | | |
| | | | Integral with MCC | Brkr close/trip | | | X |
| | | | E-PK04-AC-3RB | Space heater | | | |
| | | | E-PK04-CC-1RA | Charger dc voltage | EI-M4304 | | X |
| | | | E-PK04-CC-1RB | Charger dc current | II-M4304 | | X |
| | E-PKA-M4102 | 125V-dc batt A brkr | E-PK01-AC-1FA | Battery leads | | | |
| | | | E-PK01-AC-1FB | Battery leads | | | |
| | | | E-PK01-AC-1FC | Battery leads | | | |
| | | | E-PK01-AC-1RA | Bus voltage | EI-M41 | | X |
| | | | E-PK01-AC-1RB | Brkr open/close | HS-M4102 | | X |
| | | | E-PK01-AC-1RE | Battery current | II-M4102 | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 79 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 125V-DC CLASS IE POWER (continued) | | | | | | | |
| | E-PKC-M4302 | 125V-dc batt C brkr | E-PK02-CC-1FA | Battery leads | | | |
| | | | E-PK02-CC-1FB | Battery leads | | | |
| | | | E-PK02-CC-1FC | Battery leads | | | |
| | | | E-PK02-CC-1RA | Bus voltage | EI-M43 | | X |
| | | | E-PK02-CC-1RB | Brkr open/close | HS-M4302 | | X |
| | | | E-PK02-CC-1RE | Battery current | II-M4302 | | X |
| Train: B | E-PKB-H12 | Battery charger B | E-PK04-BC-1KA | Batt chgr 480V feeder | | | |
| | | | E-PK04-BC-1RA | Load shed/ sequencer | X | | |
| | | | Integral with MCC | Brkr close/trip | | | X |
| | | | E-PK04-BC-1RB | Chgr dc voltage | EI-M4204 | | X |
| | | | E-PK04-BC-1RC | Chgr dc current | II-M4204 | | X |
| | | | E-PK04-BC-1RE | Space heater | | | |
| | | | E-PK04-BC-1RF | Voltmeter disconnect | | | CS-1 |
| | | | E-PK04-BC-1RG | Ammeter disconnect | | | CS-1 |
| | | | Integral with MCC | Control disconnect | | | CS-1 |
| | E-PKB-H16 | Battery charger BD | E-PK04-BC-1MA | Batt chgr 480V feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 80 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 125V-DC CLASS IE POWER (continued) | | | | | | | |
| | E-PKB-H16 | Battery charger BD | E-PK04-BC-2RA | Load shed/ sequencer | X | | |
| | | | Integral with MCC | Brkr close/trip | | | X |
| | | | E-PK04-BC-2RB | Chgr dc voltage | EI-M4205 | | X |
| | | | E-PK04-BC-2RC | Chgr dc current | II-M4205 | | X |
| | | | E-PK04-BC-2RE | Space heater | | | |
| | | | E-PK04-BC-2RH | Voltmeter disconnect | | | CS-1 |
| | | | E-PK04-BC-2RJ | Ammeter disconnect | | | CS-1 |
| | | | Integral with MCC | Control disconnect | | | CS-1 |
| | | | E-PK04-BC-2RF | Channel B output indication | | | X |
| | | | E-PK04-BC-2RG | Channel B output indication | X | | |
| | | | E-PK04-DC-2RA | Channel D output indication | | | X |
| | | | E-PK04-DC-2RB | Channel D output indication | X | | |
| | E-PKB-H14 | Battery charger D | E-PK04-BC-3KA | Batt chgr 480V feeder | | | |
| | | | E-PK04-BC-3RA | Load shed/ sequencer | X | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 81 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 125V-DC CLASS IE POWER (continued) | E-PKB-H14 | Battery charger D | Integral with MCC | Brkr close/trip | | | X |
| | | | E-PK04-BC-3RB | Space heater | | | |
| | | | E-PK04-DC-1RA | Chgr dc.voltage | EI-M4404 | | X |
| | | | E-PK04-DC-1RB | Chgr dc current | II-M4404 | | X |
| | | | Integral with chgr | Vm and Am disconnect | | | CS-2 |
| | | | Integral with MCC | Control disconnect | | | CS-1 |
| | E-PKB-M4202 | 125V-dc batt B brkr | E-PK01-BC-1FA | Battery leads | | | |
| | | | E-PK01-BC-1FB | Battery leads | | | |
| | | | E-PK01-BC-1FC | Battery leads | | | |
| | | | E-PK01-BC-1RA | Bus voltage | EI-M42 | | X |
| | | | E-PK01-BC-1RB | Brkr open/close | HS-M4202 | | X |
| | | | E-PK01-BC-1RE | Battery current | II-M4202 | | X |
| | | | Integral with MCC | Circuit disconnect | | | CS-1 |
| | E-PKD-M4402 | 125V-dc batt D brkr | E-PK02-DC-1FA | Battery leads | | | |
| | | | E-PK02-DC-1FB | Battery leads | | | |
| | | | E-PK02-DC-1FC | Battery leads | | | |
| | | | E-PK02-DC-1RA | Bus voltage | EI-M44 | | X |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 82 of 100) (a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| 125V-DC CLASS IE POWER (continued) | | | | | | | |
| | E-PKD-M4402 | 125V-dc batt D brkr | E-PK02-DC-1RB | Brkr open/close | HS-M4402 | | X |
| | | | E-PK02-DC-1RE | Battery current | II-M4402 | | X |
| | | | Integral with MCC | Circuit disconnect | | | CS-1 |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 83 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT HYDROGEN CONTROL SYSTEM<br>Function: Monitor and maintain containment atmosphere hydrogen concentration at acceptable limits | | | | | | | |
| | J-HPA-E02 | Hydrogen analyzer | E-HP04AC-1XA | Hydrogen monitoring | X | - | - |
| | | | E-HP04AC-1RB | | | | |
| | | | E-HP04AC-1RC | | | | |
| | | | E-HP04AC-1RD | | | | |
| | | | E-HP04AC-1RE | | | | |
| | | | E-HP04AC-1KA | | | | |
| | A-E-HPA-J05 (AN-HPA-D01) | Hydrogen recombiner | E-HP04AC-2RA | ESFAS | | | |
| | | | E-HP04AC-2RB | ESFAS | - | - | - |
| | | | E-HP04AC-2RC | System trouble alarm | | | |
| | | | E-HP04AC-2KA | Recombiner feeder | | | |
| | J-HPA-HV-7A | Hydrogen analyzer 'A' inlet valve | E-HP01-AC-1RA | Valve open | HS-7 | - | - |
| | | | E-HP01-AC-1RB | MOV limit sw. | | | |
| | | | E-HP01-AC-1RI | MOV limit sw. | | | |
| | J-HPA-HV-7B | Analyzer outlet isolation valve | E-HP01-AC-1RA | Valve open | HS-7 | - | - |
| | | | E-HP01-AC-1RG | MOV limit sw. | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 84 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT HYDROGEN CONTROL SYSTEM (continued) | | | | | | | |
| | J-HPA-HV-7B | Analyzer outlet isolation valve | E-HP01-AC-1RF | Valve open | | | |
| | | | E-HP01-AC-1RJ | MOV limit sw. | | | |
| | J-HPA-UV-1 | Train 'A' upstream supply isolation valve | E-HP02-AC-1RF | Valve open/close | HS-1 | - | X |
| | | | E-HP02-AC-1RE | Override permissive | | | |
| | | | E-HP02-AC-1RD | Valve open/close | | | X |
| | | | E-HP02-AC-1RB | MOV limit stop | | | X |
| | | | E-HP02-AC-1KA | Valve feeder | | | X |
| | | | E-HP02-AC-1KB | Valve feeder | | | X |
| | J-HPA-UV-3 | Train 'A' downstream supply isolation valve | E-HP03-AC-1RE | Valve open/close | HS-3 | - | X |
| | | | E-HP03-AC-1RD | Override permissive | | | |
| | | | E-HP03-AC-1RA | ESFAS | | | |
| | | | E-HP03-AC-1KA | Valve feeder | | | X |
| | | | E-HP03-AC-1RB | ESFAS | | | |
| | J-HPA-UV-5 | Train 'A' return isolation valve | E-HP03-AC-2RE | Valve open/close | HS-5 | - | X |
| | | | E-HP03-AC-2RD | Override permissive | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 85 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT HYDROGEN CONTROL SYSTEM (continued) | | | | | | | |
| | J-HPA-UV-5 | Train 'A' return isolation valve | E-HP03-AC-2RA | ESFAS | | | |
| | | | E-HP03-AC-2KA | Valve feeder | | | X |
| | | | E-HP03-AC-2RB | ESFAS | | | |
| | J-HPB-UV-2 | Train 'B' upstream supply isolation valve | E-HP02-BC-1RF | Valve open/close | HS-2 | - | X |
| | | | E-HP02-BC-1RB | MOV limit sw. | | | X |
| | | | E-HP02-BC-1KA | Valve feeder | | | X |
| | | | E-HP02-BC-1KB | Valve feeder | | | X |
| | | | E-HP02-BC-1RE | Override permissive | | | |
| | | | E-HP02-BC-1RG | ESFAS | | | |
| | | | E-HP02-BC-1RC | ESFAS | | | |
| | J-HPB-UV-4 | Train 'B' downstream supply isolation valve | E-HP03-BC-1RE | Valve open/close | HS-4 | - | X |
| | | | E-HP03-BC-1RC | MOV limit sw. | | | X |
| | | | E-HP03-BC-1RD | Override permissive | | | |
| | | | E-HP03-BC-1KA | Valve feeder | | | X |
| | | | E-HP03-BC-1RA | ESFAS | | | |
| | | | E-HP03-BC-1RB | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 86 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT HYDROGEN CONTROL SYSTEM (continued) | | | | | | | |
| | J-HPB-UV-6 | Train 'B' return isolation valve | E-HP03-BC-2RE | Valve open/close | HS-6 | - | X |
| | | | E-HP03-BC-2RC | MOV limit sw. | | | X |
| | | | E-HP03-BC-2RD | Override permissive | | | |
| | | | E-HP03-BC-2KA | Valve feeder | | | X |
| | | | E-HP03-BC-2RA | ESFAS | | | |
| | | | E-HP03-BC-2RB | ESFAS | | | |
| | J-HPB-E02 | Train 'B' Post LOCA Hydrogen Monitoring | E-HP04-BC-1XA | | | | |
| | | | E-HP04-BC-1RB | | | | |
| | | | E-HP04-BC-1RC | | | | |
| | | | E-HP04-BC-1RD | | | | |
| | | | E-HP04-BC-1RE | | | | |
| | | | E-HP04-BC-1KA | Monitoring pnl. feeder | | | |
| | A-E-HPB-J05 | Train 'B' $H_2$ recombiner | E-HP04-BC-2RA | ESFAS | | | |
| | | | E-HP04-BC-2RB | ESFAS | | | |
| | | | E-HP04-BC-2RC | System trouble alarm | | | |
| | | | E-HP04-BC-2KA | Recombiner feeder | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 87 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT HYDROGEN CONTROL SYSTEM (continued) | | | | | | | |
| | J-HPB-HV-8A | Hydrogen analyzer B inlet valve | E-HP01-BC-1RA | Valve open | HS-8 | - | - |
| | | | E-HP01-BC-1RB | MOV limit sw. | | | |
| | | | E-HP01-BC-1RE | Valve open | | | |
| | | | E-HP01-BC-1RI | MOV limit sw. | | | |
| | | | E-HP01-BC-1RM | Valve indication | | | |
| | J-HPB-HV-8B | Hydrogen analyzer 'B' outlet valve | E-HP01-BC-1RA | Valve open | HS-8 | - | - |
| | | | E-HP01-BC-1RG | MOV limit sw. | | | |
| | | | E-HP01-BC-1RF | Valve open | | | |
| | | | E-HP01-BC-1RJ | MOV limit sw. | | | |
| CONTAINMENT PURGE SYSTEM | | | | | | | |
| Train 'A' | J-CPA-UV-2A | Outside ctmt. inlet isolation valve | E-CP01-AC-1RB | Valve open/close | HS-2 | - | X |
| | | | E-CP01-AC-1RA | MOV limit sw. | | | X |
| | | | E-CP01-AC-1KA | Valve Feeder | | | X |
| | | | E-CP01-AC-1RC | Override permissive | | | |
| | | | E-CP01-AC-1RD | ESFAS | | | |
| | | | E-CP01-AC-1RG | ESFAS | | | |
| | | | E-CP01-AC-1RH | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 88 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT PURGE SYSTEM (continued) | | | | | | | |
| Train 'A' (continued) | | | | | | | |
| | J-CPA-UV-4A | Outside ctmt. inlet isolation valve | E-CP03-AC-1RB | Valve open/close | HS-4 | - | X |
| | | | E-CP03-AC-1RA | MOV limit sw. | | | X |
| | | | E-CP03-AC-1KA | Valve feeder | | | X |
| | | | E-CP03-AC-1RC | Override permissive | | | |
| | | | E-CP03-AC-1RD | ESFAS | | | |
| | | | E-CP03-AC-1RG | ESFAS | | | |
| | | | E-CP03-AC-1RH | ESFAS | | | |
| | J-CPA-UV-2B | Inside ctmt. outlet isolation valve | E-CP02-AC-1RC | Valve open/close | HS-2 | - | X |
| | | | E-CP02-AC-1KB | Valve feeder | | | X |
| | | | E-CP02-AC-1KA | Valve feeder | | | X |
| | | | E-CP02-AC-1RA | MOV limit sw. | | | X |
| | | | E-CP02-AC-1RD | Override permissive | | | |
| | | | E-CP02-AC-1RE | ESFAS | | | |
| | | | E-CP02-AC-1RH | ESFAS | | | |
| | | | E-CP02-AC-1RF | ESFAS | | | |
| | | | E-CP02 [illegible]G | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 89 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT PURGE SYSTEM (continued) | | | | | | | |
| Train 'A' (continued) | J-CPA-UV-4B | Inside ctmt. outlet isolation valve | E-CP04-AC-1RC | Valve open/close | HS-4 | - | X |
| | | | E-CP04-AC-1KB | Valve feeder | | | X |
| | | | E-CP04-AC-1KA | Valve feeder | | | X |
| | | | E-CP04-AC-1RA | MOV limit sw. | | | |
| | | | E-CP04-AC-1RD | Override permissive | | | |
| | | | E-CP04-AC-1RE | ESFAS | | | |
| | | | E-CP04-AC-1RH | ESFAS | | | |
| | | | E-CP04-AC-1RF | ESFAS | | | |
| | | | E-CP04-AC-1RG | ESFAS | | | |
| Train 'B' | J-CPB-UV-3A | Inside ctmt. inlet isolation valve | E-CP02-BC-1RC | Valve open/close | HS-3 | - | X |
| | | | E-CP02-BC-1KB | Valve feeder | | | X |
| | | | E-CP02-BC-1KA | Valve feeder | | | X |
| | | | E-CP02-BC-1RA | MOV limit sw. | | | |
| | | | E-CP02-BC-1RD | Override permissive | | | |
| | | | E-CP02-BC-1RE | ESFAS | | | |
| | | | E-CP02-BC-1RH | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 90 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT PURGE SYSTEM (continued) | | | | | | | |
| Train 'B' (continued) | J-CPB-UV-3A | Inside ctmt. inlet isolation valve | E-CP02-BC-1RF | ESFAS | | | |
| | | | E-CP02-BC-1RG | ESFAS | | | |
| | J-CPB-UV-5A | Inside ctmt. inlet isolation valve | E-CP04-BC-1RC | Valve open/close | HS-5 | - | X |
| | | | E-CP04-BC-1KB | Valve feeder | | | X |
| | | | E-CP04-BC-1KA | Valve feeder | | | X |
| | | | E-CP04-BC-1RA | MOV limit sw. | | | |
| | | | E-CP04-BC-1RD | Override permissive | | | |
| | | | E-CP04-BC-1RE | ESFAS | | | |
| | J-CPB-UV-3B | Outside ctmt. outlet isolation valve | E-CP01-BC-1RB | Valve open/close | HS-3 | - | X |
| | | | E-CP01-BC-1RA | MOV limit sw. | | | X |
| | | | E-CP01-BC-1KA | Valve feeder | | | X |
| | | | E-CP01-BC-1RC | Override permissive | | | |
| | | | E-CP01-BC-1RD | ESFAS | | | |
| | | | E-CP01-BC-1RG | ESFAS | | | |
| | | | E-CP01-BC-1RH | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 91 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT PURGE SYSTEM (continued) | | | | | | | |
| Train 'B' (continued) | J-CPB-UV-5B | Outside ctmt. outlet isolation valve | E-CP03-BC-1RB | Valve open/close | HS-5 | | X |
| | | | E-CP03-BC-1RA | MOV limit sw. | | | X |
| | | | E-CP03-BC-1KA | Valve feeder | | | X |
| | | | E-CP03-BC-1RC | Override permissive | | | |
| | | | E-CP03-BC-1RD | ESFAS | | | |
| | | | E-CP03-BC-1RG | ESFAS | | | |
| | | | E-CP03-BC-1RH | ESFAS | | | |
| RADIATION MONITORING SYSTEM | | | | | | | |
| | J-SQA-RU-37 | Train A Power access purge area monitor | E-SQ01-AC-1RV | | | | |
| | | | E-SQ01-AC-1RX | | | | |
| | | | E-SQ01-AC-1RY | | | | |
| | J-SQA-RU-38 | Train B Power access purge area monitor | E-SQ01-BC-1RQ | | | | |
| | | | E-SQ01-BC-1RR | | | | |
| | | | E-SQ01-BC-1RS | | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 92 of 100)(a)

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT SPRAY SYSTEM TO SUPPLY CONTAINMENT SPRAY FOR IODINE REMOVAL SYSTEM (SAFETY INJECTION) | | | | | | | |
| Train 'A' | M-SIA-P03 | Cont. spray pumps | E-SI03-AC-1RA | Pump start/stop | HS-5 | - | X |
| | | | E-SI03-AC-1CA | Pump feeder | | | X |
| | | | E-SI03-AC-1RB | Override permissive | | | |
| | | | E-SI03-AC-1RD | Override permissive | | | X |
| | | | E-SI03-AC-1RC | Pump start/stop | | | |
| | | | E-SI03-AC-1RG | Saf. equip. inoperable status | | | |
| | J-SIA-UV-673 | Shutdown cooling ctmt. iso. valve | E-SI21-AC-1RD | Valve open/close | HS-673 | - | X |
| | | | E-SI21-AC-1RE | Override permissive | | | X |
| | | | E-SI21-AC-1KA | Valve feeder | | | X |
| | | | E-SI21-AC-1RC | Valve open/close | | | |
| | | | E-SI21-AC-1KB | Valve feeder | | | |
| | | | E-SI21-AC-1RB | MOV limit stop | | | |
| | | | E-SI21-AC-1RA | Saf. equip. actu. status | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 93 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT SPRAY SYSTEM TO SUPPLY CONTAINMENT SPRAY FOR IODINE REMOVAL SYSTEM (SAFETY INJECTION) (continued) | | | | | | | |
| Train 'A' (continued) | J-SIA-UV-674 | Shutdown cooling ctmt. sump iso. valve | E-SI22-AC-1RC | Valve open/close | HS-674 | - | X |
| | | | E-SI22-AC-1RA | MOV limit stop | | | |
| | | | E-SI22-AC-1KA | Valve feeder | | | X |
| | | | E-SI22-AC-1RB | ESFAS | | | |
| | | | E-SI22-AC-1RE | Saf. equip. actuation status | | | |
| | | | E-SI22-AC-1RD | Saf. equip. inoperable status | | | |
| Train 'B' | M-SIB-P03 | Containment spray pump | E-SI03-BC-1RA | Pump start/stop | HS-6 | - | X |
| | | | E-SI03-BC-1CA | Pump feeder | | | X |
| | | | E-SI03-BC-1RC | Pump start/stop | | | |
| | | | E-SI03-BC-1RB | Override permissive | | | X |
| | | | E-SI03-BC-1RD | Override permissive | | | |
| | | | E-SI03-BC-1RG | Saf. equip. inoperable status | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 94 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT SPRAY SYTEM TO SUPPLY CONTAINMENT SPRAY FOR IODINE REMOVAL SYSTEM (SAFETY INJECTION) (continued) | | | | | | | |
| Train 'B' (continued) | J-SIB-UV-675 | Containment sump iso. valve | E-SI21-BC-1RD | Valve open/close | HS-675 | - | X |
| | | | E-SI21-BC-1KA | Valve feeder | | | X |
| | | | E-SI21-BC-1KB | Valve feeder | | | X |
| | | | E-SI21-BC-1RA | Saf. equip. actu. status | | | |
| | | | E-SI21-BC-1RB | MOV limit stop | | | |
| | | | E-SI21-BC-1RE | Override permissive | | | |
| | J-SIB-UV-676 | Containment sump iso. valve | E-SI22-BC-1RC | Valve open/close | HS-676 | - | X |
| | | | E-SI22-BC-1RA | MOV limit stop | | | |
| | | | E-SI22-BC-1KA | Valve feeder | | | X |
| | | | E-SI22-BC-1RB | ESFAS | | | |
| | | | E-SI22-BC-1RE | Saf. equip. actuation status | | | |
| | | | E-SI22-BC-1RD | Saf. equip. inoperable status | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 95 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT SPRAY SYSTEM TO SUPPLY CONTAINMENT SPRAY FOR IODINE REMOVAL SYSTEM (SAFETY INJECTION) (continued) | | | | | | | |
| Train 'B' (continued) | M-SIA-P05 | Spray chemical addition pumps | E-SI36-AC-1RA | Pump start/stop | HS-60 | | X |
| | | | E-SI36-AC-1KA | Pump feeder | | | X |
| | | | E-SI36-AC-1RB | ESFAS | | | |
| | | | E-SI36-AC-1RC | Override permissive | | | X |
| | | | E-SI36-AC-1RD | Saf. equip. inoperable status | | | |
| | J-SIA-UV-603 | Spray chemical pumps suction valve | E-SI38-AC-1RD | Valve open/close | HS-603 | - | X |
| | | | E-SI38-AC-1RK | Saf. equip. actuation status | | | |
| | | | E-SI38-AC-1RE | ESFAS | | | |
| | | | E-SI38-AC-1RH | Saf. equip. inoperable status | | | |
| | J-SIA-UV-681 | Hydrazine, pump to ctmt. spray pump valve | E-SI37-AC-1RD | Valve open/close | HS-681 | - | |
| | | | E-SI37-AC-1RK | Saf. equip. actuation status | | | |
| | | | E-SI37-AC-1RE | ESFAS | | | |
| | | | E-SI37-AC-1RH | Saf. equip. inoperable status | | | |

# Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 96 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT SPRAY SYSTEM TO SUPPLY CONTAINMENT SPRAY FOR IODINE REMOVAL SYSTEM (SAFETY INJECTION) (continued) | | | | | | | |
| Train 'B' (continued) | M-SIB-P05 | Spray chemical addition pump | E-SI36-BC-1RA | Pump start/stop | HS-61 | | X |
| | | | E-SI36-BC-1KA | Pump feeder | | | X |
| | | | E-SI36-BC-1RB | ESFAS | | | |
| | | | E-SI36-BC-1RC | Override permissive | | | X |
| | | | E-SI36-BC-1RD | Saf. equip. inoperable status | | | |
| | J-SIB-UV-602 | Spray chemical pump suction valve | E-SI38-BC-1RD | Valve open/close | HS-602 | - | |
| | | | E-SI38-BC-1RK | Saf. equip. actuation status | | | |
| | | | E-SI38-BC-1RE | ESFAS | | | |
| | | | E-SI38-BC-1RH | Saf. equip. inoperable status | | | |
| | J-SIB-UV-680 | Hydrazine, pump to containment spray pump | E-SI37-BC-1RD | Valve open/close | HS-681 | - | |
| | | | E-SI37-BC-1RC | Valve open/close | | | |
| | | | E-SI37-BC-1RK | Saf. equip. actuation status | | | |
| | | | E-SI37-BC-1RE | ESFAS | | | |
| | | | E-SI37-BC-1RH | Saf. equip. inoperable status | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 97 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT SPRAY SYSTEM TO SUPPLY CONTAINMENT SPRAY FOR IODINE REMOVAL SYSTEM (SAFETY INJECTION) (continued) | | | | | | | |
| Train 'B' (continued) | M-SIA-P02 | HP safety injection pump | E-SI01-AC-1RA | Pump start/stop | HS-1 | | X |
| | | | E-SI01-AC-1RC | Pump start/stop | | | |
| | | | E-SI01-AC-1CA | Pump feeder | | | X |
| | | | E-SI01-AC-1RD | Override permissive | | | X |
| | | | E-SI01-AC-1RB | Override permissive | | | X |
| | | | E-SI01-AC-1RG | Saf. equip. inoperable status | | | |
| | J-SIA-HV-698 | HPSI pump A discharge valve | E-SI39-AC-1RB | Valve open/close | HS-698 | - | X |
| | | | E-SI39-AC-1RA | Valve open/close | | | X |
| | | | E-SI39-AC-1KA | Valve feeder | | | X |
| | | | E-SI39-AC-1RD | ESFAS | | | |
| | | | E-SI39-AC-1RC | Saf. equip. inoperable status | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 98 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| CONTAINMENT SPRAY SYSTEM TO SUPPLY CONTAINMENT SPRAY FOR IODINE REMOVAL SYSTEM (SAFETY INJECTION) (continued) | | | | | | | |
| Train 'B' (continued) | M-SIB-P02 | HP safety injection pump | E-SI01-BC-1RA | Pump start/stop | HS-2 | - | X |
| | | | E-SI01-BC-1RC | Pump start/stop | | | |
| | | | E-SI01-BC-1CA | Pump feeder | | | X |
| | | | E-SI01-BC-1RD | Override permissive | | | X |
| | | | E-SI01-BC-1RB | Override permissive | | | X |
| | | | E-SI01-BC-1RG | Saf. equip. inoperable status | | | |
| | J-SIB-HV-699 | HPSI pump B discharge valve | E-SI39-BC-1RB | Valve open/close | HS-699 | - | X |
| | | | E-SI39-BC-1RA | MOV limit stop | | | X |
| | | | E-SI39-BC-1KA | Valve feeder | | | X |
| | | | E-SI39-BC-1RD | ESFAS | | | |
| | | | E-SI39-BC-1RC | Saf. equip. inoperable status | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 99 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| RADIOACTIVE WASTE DRAIN SYSTEM | | | | | | | |
| | J-RDA-UV-23 | Containment radwaste sumps internal isolation valve | E-RD08-AC-1RE | Valve open/close | HS-23 | - | X |
| | | | E-RD08-AC-1KA | Valve feeder | | | X |
| | | | E-RD08-AC-1RA | ESFAS | | | |
| | | | E-RD08-AC-1RB | MOV limit sw. | | | |
| | | | E-RD08-AC-1RD | Override permissive | | | X |
| | | | E-RD08-AC-1KB | Valve feeder | | | X |
| | | | E-RD08-AC-1RG | ESFAS | | | |
| | | | E-RD08-AC-1RF | ESFAS | | | |
| | J-RDA-UV-24 | Ctmt. radwaste sumps external iso. valve | E-RD07-BC-1RG | Valve open | HS-24 | - | |
| | | | E-RD07-BC-1RF | Override permissive | | | |
| | | | E-RD07-BC-1RD | Energize solenoid valve | | | |
| | | | E-RD07-BC-1RC | MOV limit sw. | | | |
| | | | E-RD07-BC-1RA | MOV limit sw. | | | |
| | | | E-RD07-BC-1RB | ESFAS | | | |

## Table E-1

## EQUIPMENT REQUIRED FOR COLD SHUTDOWN WITHOUT OFFSITE POWER AVAILABLE (Sheet 100 of 100)[a]

| System | Device Tag Number | Description | Circuit | Circuit Function | Display/Control Location | | |
|---|---|---|---|---|---|---|---|
| | | | | | Control Room | Remote Shutdown Panel | Local |
| RADIOACTIVE WASTE DRAIN SYSTEM (continued) | | | | | | | |
| | J-RDA-LSH -147 | Level switch Train A | E-RD04-AC-1RA | Class '1E' annunciator | - | - | - |
| | J-RDA-LSH -149 | Level switch Train A | E-RD04-AC-1RB | Class '1E' annunciator | - | - | - |
| | J-RDA-LSH -151 | Level switch Train A | E-RD04-AC-1RC | Class '1E' annunciator | - | - | - |
| | J-RDB-LSH -148 | Level switch Train B | E-RD05-BC-1RA | Class '1E' annunciator | - | - | - |
| | J-RDB-LSH -150 | Level switch Train B | E-RD05-BC-1RB | Class '1E' annunciator | - | - | - |
| | J-RDB-LSH -152 | Level switch Train B | E-RD05-BC-1RC | Class '1E' annunciator | - | - | - |

# APPENDIX F

## LIST OF NEW TMI-2 RELATED EQUIPMENT

APPENDIX F

# POST ACCIDENT MONITORING

## DESIGN CRITERIA

Post Accident Monitoring Instrumentation shall be provided in accordance with Regulatory Guide 1.97, Revision 2, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Access Plant and Environs Conditions During and Following an Accident."

1) The following design and qualification criteria categories shall be used:

Category 1:

- Instrumentation shall be qualified in accordance with Regulatory Guide 1.89, NUREG-0588 and Regulatory Guide 1.100.
- Instrumentation shall be designed so that any single failure shall not result in loss of the surveillance function on the system level after an incident. Redundant or diverse channels shall be electrically independent and physically separated in accordance with Regulatory Guide 1.75.
- Instrumentation shall be powered from Class IE Power.
- Instrumentation shall be available prior to an accident except as provided in IEEE 279, paragraph 4.11 or as specified in Technical Specifications.
- Instrumentation shall be Quality Class Q.
- Continuous indication shall be provided.
- Recording shall be provided (one channel).

- Transmission of signals for other use shall be through isolation devices.
- Types A, B, and C instruments shall be specifically identified on the control panels.

Category 2:

- Sensors shall be qualified in accordance with Regulatory Guide 1.89 and NUREG-0588. Seismic qualification in accordance with Regulatory Guide 1.100 shall be provided with the instrumentation is part of a safety related system.
- Instrumentation shall be powered from a non-Class IE instrument bus with Class IE Power as backup or from Class IE Power.
- The out-of-service interval shall be based on normal Technical Specification requirements on the applicable system.
- Sensors shall be Quality Class Q, (in some cases, Quality Class R) displays shall be Quality Class R.
- Display shall be on an individual instrument or on demand on a CRT.
- Data recording shall be provided for effluent radioactivity monitors, area radiation monitors, and meteorology monitors. Dedicated recorders shall be provided where direct or immediate trend or transient information is essential for operator informaiton or action.
- Transmission of signals for other use shall be through isolation devices.
- Types A, B, and C instruments shall be specifically identified on the control panels.

Category 3:

- Instrumentation shall be of high-quality commercial grade and shall be selected to withstand the service environment.
- Display shall be on an individual instrument or on demand on a CRT. Data recording shall be provided for effluent radioactivity monitors, area radiation monitors, and meteorology monitors. Dedicated recorders shall be provided where direct or immediate trend or transient information is essential for operator information or action.

2) Servicing, testing, and calibration programs shall be provided to maintain the capability of the monitoring instrumentation. For those instruments where the required interval between testing will be less than the normal time interval between generating station shutdowns, a capability for testing during power operation shall be provided.

3) Whenever means for removing channels from service are included in the design, the design shall facilitate administrative control of the access to such removal means.

4) The design shall facilitate administrative control of the access to all setpoint adjustments, module calibration adjustments, and test points.

5) The monitoring instrumentation design shall minimize the development of conditions that would cause meters, annunciators, recorders, alarms, etc., to give anomalous indications potentially confusing to the operator.

6) The instrumentation shall be designed to facilitate the recognition, location, replacement, repair, or adjustment of malfunctioning components or modules.

7) To the extent practicable, monitoring instrumentation inputs shall be from sensors that directly measure the desired variables.

8) To the extent practical, the same instruments shall be used for accident monitoring as are used for the normal operations of the plant to enable the operator to use, during accident situations, instruments with which he is most familiar. However, where the required range of monitoring instrumentation results in a loss of instrumentation sensitivity in the normal operating range separate instruments shall be used.

9) Periodic testing shall be in accordance with the applicable portions of Regulatory Guide 1.118 pertaining to testing of instruments channels. (Note: Response time testing not usually needed.)

SYSTEM DESCRIPTION

1) Type A Variables: Those variables to be monitored that provide the primary information required to permit the control room operator to take specific manually controlled actions for which no automatic control is provided and which are required for safety systems to accomplish their safety function for design basis accident events. Primary information is that which is essential for the direct accomplishment of the specified safety functions; it does not include those variables which are associated with contingency actions that may also be identified in written procedures.

A C-E review of emergency guidelines (LOCA, MSLB, SG tube rupture, ATWS, reactor trip, loss of feed and loss of forced flow) is completed to identify for each event:

Required Manual Action
Instrument Consulted
Required Range and Accuracy
Current Qualification Status

In addition, a review of the emergency procedures after they are developed will be performed to ensure the required variables have been identified.

2) Type B Variables: Those variables that provide information to indicate whether plant safety functions are being accomplished. Plant safety functions are (1) reactivity control, (2) core cooling, (3) maintaining reactor coolant system integrity, and (4) maintaining containment integrity (including radioactive effluent control). Variables are listed with designated ranges and category for design and qualification requirements. Key variables are indicated by design and qualification Category 1.

- Category 1

| Variable | Requirement | Design Feature |
|---|---|---|
| Containment Sump Water Level - wide range | Bottom of Containment to 600,000 gallon equivalent | Sensor Range - 11 ft. (+6 in. above sump to +6 in. above maximum expected flood level) Display - 2 channels, Class IE, recording on one channel |

Type B Category 1 (Cont'd)

| Variable | Requirement | Design Feature |
|---|---|---|
| Containment Pressure | 0 to design pressure (60 psig)<br>10 psia to design pressure (60 psig) | Sensor Range - -5 psig to 180 psig<br>Display - 2 channels, Class IE, Recording on one channel |
| Containment Isolation Valve Position (excluding check valves) | Closed - not closed | Display - Valve status for all automatic or remote manual containment isolation valves |

- Category 2

| Variable | Requirement | Design Feature |
|---|---|---|
| Containment Sump Water Level - Narrow Range | Sump | Sensor Range - +6 in. above bottom of Radwaste Drain Sump to +6 in. above top of sump<br>Display - 1/sump, Sensor qualified to post LOCA environment, Seismic Category II |

- Type B Category 3

| Variable | Requirement | Design Feature |
|---|---|---|
| RCS Soluble Boron Concentration | 0 to 6000 ppm | Post Accident Sampling System: Range - 0 to 6000 ppm, remote sample, in-line automatic (grab sample backup) |

3) Type C Variables - Those variables that provide information to indicate the potential for being breached or the actual breach of the barriers to fission product releases. The barriers are (1) fuel cladding, (2) primary coolant pressure boundary, and (3) containment.

- Category 1

| Variable | Requirement | Design Feature |
|---|---|---|
| Radioactivity Concentration or Radiation Level in Circulating Primary Coolant | 1/2 Tech Spec Limit to 100 times Tech Spec limit, R/hr | Sensor Range - 1R/hr to $10^5$R/hr Display - CRT, non-Class IE, & 2 safety related channels displays at cabinet, Class IE, recording on one channel |
| Containment pressure | 10 psia to design pressure (60 psig) 10 psia to 3 times design pressure | Sensor Range - -5 psig to 180 psig Display - 2 channels, Class IE, recording on one channel |

- Type C Category 1 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Containment Sump Water Level - Wide Range | Bottom of Containment to 600,000 gallon equivalent | Sensor Range - 11 ft. (+6 in. above sump to +6 in. above maximum expected flood level)<br>Display - 2 channels, Class IE, recording on one channel |
| Containment Hydrogen Concentration | 0 to 10% (Capable of operating from 10 psia to maximum design pressure) | Sensor Range - 0 to 10%<br>Available 30 minutes after initiation of Safety Injection. Capable of operating from -5 psig to 60 psig (containment design pressure)<br>Display - 2 channels, Class IE, recording on one channel |

- Type C Category 2

| Variable | Requirement | Design Feature |
|---|---|---|
| Containment Sump Water Level - Narrow Range | Sump | Sensor Range - +6 in. above bottom of Radwaste Drain Sump to 6 in. above top of sump |

- Type C Category 2 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Containment Sump (Con't) | | Display - 1/sump<br>Sensor qualified to post LOCA environment, Seismic Category II |
| Containment Effluent Radioactivity - Noble Gases from Identified Release Points | $10^{-6}$ µCi/cc to $10^{-2}$ µCi/cc | Sensor Range - $10^{-6}$ µCi/cc to $10^{-2}$ µCi/cc at plant Vent<br>Display - CRT<br>Sensor qualified to post accident environment, Seismic Category II |
| Radiation Exposure Rate (inside buildings or areas which are in direct contact with primary containment where penetrations and hatches are located) | $10^{-1}$ R/hr to $10^{4}$ R/hr | 13 monitors<br>Sensor Range - $10^{-1}$ R/hr to $10^{4}$ R/hr<br>Display - CRT<br>Sensors qualified to post accident environment, Seismic Category II |

- Type C Category 2 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Effluent Radioactivity - Noble Gases (from buildings indicated above) | $10^{-6}$µCi/cc to $10^{3}$µCi/cc | Sensor Range - $10^{-6}$µCi/cc to $10^{5}$µCi/cc at Fuel Building Vent<br>Display - CRT<br>Sensor qualified to post accident environment, Seismic Category II |

- Category 3

| Variable | Requirement | Design Feature |
|---|---|---|
| Analysis of Primary Coolant (Gamma Spectrum) | 10µCi/gm to 10 Ci/gm or TID-14844 source term in coolant volume | Post Accident Sampling System:<br>Range - $10^{-3}$µCi/cc to 10 Ci/cc<br>Remote Sample, isotopic, in-line automatic (grab sample backup) |
| Containment Area Radiation | 1 R/hr to $10^{4}$ R/hr | Sensor Range - 1 R/hr to $10^{4}$ R/hr<br>Display - CRT |

- Category 3 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Effluent Radioactivity - Noble Gas Effluent from Condenser Air Removal System Exhaust | $10^{-6}$µCi/cc to $10^{-2}$µCi/cc | Sensor Range - $10^{-6}$µCi/cc to $10^{+3}$µCi/cc<br>Display - CRT<br>Sensor qualified to post accident environment |

4) Type D Variables - Those variables that provide information to indicate the operation of individual safety systems and other systems important to safety. These variables are to help the operator make appropriate decisions in using the individual systems important to safety in mitigating the consequences of an accident.

- Category 1

| Variable | Requirement | Design Feature |
|---|---|---|
| Condensate Storage Tank Level | Plant Specific | Sensor Range - 0 to 50 ft.<br>Display - 2 channels, Class IE, recording on one channel |

- Type D Category 2

| Variable | Requirement | Design Feature |
|---|---|---|
| Primary System Safety Relief Valve Positions | Closed - Not Closed | Sensors qualified to post accident environment |
| Pressurizer Heater Status | Electric current | Sensor Range - 0 to 500 amps<br>Sensors qualified to post accident environment |
| Safety/Relief Positions or Main Steam Flow | Closed - Not Closed | Sensors qualified to post accident environment |
| Auxiliary Feed-water Flow | 0 to 110% Design Flow | Sensor Range - 0 to 2000 gpm = 0 to 228%<br>Display - 2 channels, Class IE |
| Containment Atmosphere Temperature | 40°F to 400°F | Sensor Range - 0 to 400°F<br>Sensor qualified to post accident environment |
| Containment Sump Water Temperature | 50°F to 250°F | Sensor Range - 50 to 250°F<br>Sensor qualified to post accident environment<br>Display - 1/sump |

- Type D Category 2 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Essential Cooling Water System Temperature | 32°F to 200°F | Sensor Range - 0 to 200°F<br>Display - 1/train, sensor qualified to post accident environment, Seismic Category II |
| Esential Cooling Water System | 0 to 110% Design Flow | Sensor Range - 0 to 20,000 gpm = 0 to 114%<br>Display - 1/train, sensor qualified to post accident environment, Seismic Category II |
| Emergency Ventilation Damper position | Open - Closed Status | Display - Damper status for all automatic or remote manual emergency ventilation dampers |
| Status of Standby Power and Other Energy Sources | Voltages, Currents, Pressures | Display - ESF bus voltages and currents, Class IE<br>Low Pressure alarms on MSIV, MFIV and atmospheric dump valve accumulators. Sensor qualified to post accident environment, Seismic Category II |

- Type D Category 3

| Variable | Requirement | Design Feature |
|---|---|---|
| Reactor Coolant Pump Status | Motor Current | Display - Pump motor Current |
| High-Level Radioactive Liquid Tank Level | Top to Bottom | Display - Sensor range 0-32,000 gal Main control room alarm of Radwaste System Trouble. Radwaste Systems are normally controlled from Radwaste Control Room. Main control room display on demand via CRT terminal. |
| Radioactive Gas Holdup Tank Pressure | 0 to 150% Design Pressure | Display - Sensor range will be provided to comply with 0 to 150% design pressure. Main control room alarm of Radwaste System Trouble. Radwaste Systems are normally controlled from Radwaste Control Room. Main control room display on demand via CRT terminal. |

5) Type E Variables - Those variables to be monitored as required for use in determining the magnitude of the release of radioactive materials and continually assessing such releases.

- Catgeory 1

| Variable | Requirement | Design Feature |
|---|---|---|
| Containment Area Radiation-High Range | 1 R/hr to $10^7$ R/hr | Sensor Range: 1 R/hr $10^7$ R/hr<br>Display: CRT and 2 safety related channel displays at cabinet, Class 1E, Recording on one channel |

- Type E Category 2

| Variable | Requirement | Design Feature |
|---|---|---|
| Radiation Exposure Rate (inside buildings or areas where access is required to service Equipment important to safety) | $10^{-1}$ R/hr to $10^4$ R/hr | 10 monitors<br>Sensor Range - $10^{-1}$ R/hr to $10^4$ R/hr<br>Display - CRT<br>Sensors qualified to post accident environment<br>Local display and annunciation |

- Type E Category 2 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Containment or Purge Effluent - Noble Gases and Vent Flow Rate | $10^{-6}$ µCi/cc to $10^{5}$ µCi/cc<br>0 to 110% Vent Design Flow | Plant vent monitored as identified below |
| Common Plant Vent - Noble Gases and Vent Flow Rate | $10^{-6}$ µCi/cc to $10^{3}$ µCi/cc<br>0 to 110% Design Flow | Plant vent monitored as identified below |
| Auxiliary Building - Noble Gases and Vent Flow Rate | $10^{-6}$ µCi/cc to $10^{3}$ µCi/cc<br>0 to 110% Vent Design Flow | Sensor Range - $10^{-9}$ µCi/cc to $10^{5}$ µCi/cc at Plant Vent<br>Display - CRT, non-Class IE<br>Sensor qualified to post accident environment<br>Calculated flow data is provided |
| Condenser Air Removal System Exhaust - Noble Gases and Vent Flow Rate | $10^{-6}$ µCi/cc to $10^{5}$ µCi/cc<br>0 to 110% Vent Design Flow | Sensor Range - $10^{-6}$ µCi/cc to $10^{5}$ µCi/cc<br>Display - CRT, Non-Class IE<br>Sensor qualified to post accident environment<br>Calculated flow data is provided |

- Type E Category 2 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Vent from Steam Generators Safety Relief Valves or Atmospheric Dump Valves - Noble Gases and Vent Flow Rate | $10^{-1}$ µCi/cc to $10^{3}$ µCi/cc (Duration of releases in seconds and Mass of Steam per Unit Time) | Monitor/Steam Line Sensor Range - $10^{-1}$ µCi/cc to $10^{3}$ µCi/cc Display - CRT Sensors qualified to post Accident Environment |
| Fuel Building Vent - Noble Gases and Vent Flow Rate | $10^{-6}$ µCi/cc to $10^{2}$ µCi/cc 0 to 110% Vent Design Flow | Sensor Range - $10^{-6}$ u Ci/cc to $10^{2}$ µCi/cc Display - CRT Sensors qualified to post accident environment Calculated flow data is provided |

- Type E Category 3

| Variable | Requirement | Design Feature |
|---|---|---|
| Particulates and Halogens at all Identified Release Points (except Steam Generator Safety Relief Valves or | $10^{-3}$ µCi/cc to $10^{2}$ µCi/cc 0 to 110% Vent Design Flow | Monitors at Plant Vent Fuel Building Vent Main Condenser Air Removal Exhaust Sensor Range - $10^{-3}$ µCi/cc to $10^{2}$ µCi/cc |

- Type E Category 3 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Atmospheric Steam Dump Valves and Condensor Air Removal System Exhaust) Sampling, with onsite analysis capability | | Calculated flow data is provided |
| Airborn Radiohalogens and particulates (Portable Sampling with onsite analysis capability) | $10^{-9}$ µCi/cc to $10^{-3}$ µCi/cc | $5 \times 10^{-9}$ µCi/cc to $5 \times 10^{-4}$ µCi/cc Particulate<br>$5 \times 10^{-10}$ µCi/cc to $5 \times 10^{-5}$ µCi/cc Iodine<br>$10^{-6}$ to $10^{-1}$ µCi/cc Halogens |
| Plant and Environs Radiation (Portable Instrumentation) | $10^{-3}$ R/hr to $10^{4}$ R/hr, photons $10^{-3}$ rads/hr to $10^{4}$ rads/hr, beta radiations and low-energy photons | PVNGS will comply |
| Plant and Environs Radioactivity (Portable Instrumentation) | Multichannel Gamma-Ray Spectrometer | PVNGS will comply |

- Type E Category 3 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Wind Direction | 0 to 360° (±5° accuracy with a deflection of 15°). Starting speed 0.45 mps (1.0 mph). Damping ratio between 0.4 and 0.6, distance constant 2 meters. | 0 to 540° (±5° accuracy). Starting threshold 0.75 mph. Damping ratio 0.4, distance constant 3.3 ft. |
| Wind Speed | 0 to 30 mps (67 mph) ±0.22 mps (0.5 mph) accuracy for wind speeds less than 0.45 mps (1.0 mph). | 0 to 50 mph ±1% or 0.15 mph or whichever is greater, with a starting threshold of 0.6 mph. |

- Type E Category 3 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Estimation of Atmospheric Stability | Based on vertical temperature difference from primary system, -5°C to 10°C (-9°F to 18°F) and ±0.15°C accuracy per 50 meter intervals (+0.3°F accuracy per 164-foot intervals) or analogous range for alternative stability estimates | Based on a vertical difference of 160 ft, ±6°F analog and digital, +18° to -6°F analog only and ±0.18°F accuracy. |
| Accident Sampling Capability (Analysis Capability Onsite) | | Post Accident Sampling System: (Remote Sample, in-line automatic grab sample backup) |
| Primary Coolant & Sump via Grab Sample | Grab Sample | Ranges: |
| • Gross Activity | 10 μCi/ml to 10 Ci/ml | $10^{-3}$ μCi/cc to 10 Ci/cc |

- Type E Category 3 (Con't)

| Variable | Requirement | Design Feature |
|---|---|---|
| Primary Coolant (Con't) | | |
| • Gamma Spectrum | (Isotopic Analysis | Isotopic Analysis |
| • Boron Content | 0 to 6000 ppm | 0 to 6000 ppm |
| • Chloride Content | 0 to 20 ppm | 0 to 20 ppm |
| • Dissolved Hydrogen | 0 to 2000 cc (STP)/kg | 0 to 2000 cc (STP)/kg |
| • Dissolved Oxygen | 0 to 20 ppm | 0 to 20 ppm |
| • pH | 1 to 13 | 1 to 13 |
| Accident Sampling Capability (Analysis Capability On-Site) | | Post Accident Sampling System: (Remote Sample, in-line (automatic) |
| Containment Air | Grab Sample | |
| • Hydrogen Content | 0 to 10% | 0 to 10% |
| • Oxygen Content | 0 to 30% | 0 to 30% |
| • Gamma Spectrum | (Isotopic Analysis | $10^{-7}$ µCi/cc to $10^{5}$ µCi/cc Isotopic Analysis |

# APPENDIX G

## RESPONSES TO NRC QUESTIONS

## (LETTER, KNIGHTON TO VAN BRUNT, MARCH 14, 1983)

1

# APPENDIX G

## RESPONSES TO NRC QUESTIONS
## (LETTER, KNIGHTON TO VAN BRUNT, MARCH 14, 1983)

QUESTION 1.

Arizona Public Service Company (APS) commits to interim justification prior to power escalation above 5% of full power. However, 10 CFR 50.49(i) requires this prior to operating license issuance. The information is required 60 days prior to operating license issuance.

RESPONSE: The response is provided in the revised section 1.1.

QUESTION 2.

For Environmental Designator III, the 318°F temperature extreme is stated to apply to Class 1E cable only. An explanation is required why this temperature extreme is not applied to other equipment in the same area.

RESPONSE: Cable was the only item of Class 1E equipment which was in the vicinity of piping which could be affected by a postulated pipe break. Other Class 1E equipment in the auxiliary building would not be affected by any postulated pipe break of high energy lines.

QUESTION 3.

Note (b) page 4.1-146 states that subcompartments below 100' elevation are unaffected by the MSSS Design Basis Pipe Break. Can they be affected by other HELBS. An explanation should be supplied.

RESPONSE: In accordance with the definition of high energy lines per Branch Technical Position MEB 3-1, Section B.2.E, no high energy lines exist in the MSSS below elevation 100 feet. Additionally, there are no HVAC penetrations that would connect the rooms below elevation 100 feet with the rooms above 100 feet.

QUESTION 4.

Section 3.3 does not explain the derivation of the qualification level of $3.3 \times 10^7$ rads gamma for Environmental Designator 1, Table 4.1-3. Provide an explanation for differences between Tables 4.1-3 and 3.3-5.

RESPONSE: Refer to the revised section 3.3. Additionally, it is noted that the value of $3.3 \times 10^7$ rads gamma provides margin over the baseline calculation described in section 3.3 (refer to table 3.3-5G).

QUESTION 5. The 30 day dose given in table 3.3-6 is $6.4 \times 10^6$ rads gamma, yet table 4.1-3 uses $1 \times 10^6$ rads gamma as a qualification parameter. Explain this apparent inconsistency.

RESPONSE: The value of $6.4 \times 10^6$ rads gamma as presented in table 3.3-6 is the dose for those rooms containing LPSI recirculation fluids under intact primary degraded core conditions. The value of $1 \times 10^6$ rads gamma is the overall auxiliary building dose for a design basis LOCA. Table 4.1-3 has been revised to reflect this distinction.

QUESTION 6.

Section 3.6 supplies no description of accelerated aging methodology. A description of the procedures used should be provided.

RESPONSE: Accelerated aging methodology is evaluated on a case by case basis during review of supplier qualification documentation. In general Arrhenius methods are used. If other methods are used, proper justification is provided in the documentation package. Generically, equipment is subjected to thermal aging prior to a simulated design basis accident.

QUESTION 7.

The chemical spray parameters listed in table 4.1-3 and the very brief explanation in section 3.8 contains no explanation of the method used to determine the spray concentration. Provide this explanation and demonstrate conformance to NUREG-0588, Section 1.3.

RESPONSE: Refer to the revised section 3.8. 1

QUESTION 8.

Appendix B is apparently for BOP items only. Supply the checklist that NSSS items are reviewed with.

RESPONSE: The checklists identified in appendix B are used for NSSS as well as BOP. The title page for appendix B inadvertently referenced BOP only in the original issue. Refer to appendix B.

QUESTION 9.

If any out of containment areas other than Environmental Designators II, III, and VI see any radiation due to a DBA, supply a justification for exclusion of other areas from harsh environment designation.

RESPONSE: The mild environment areas are defined as areas within the plant site which do not experience any significant increases in temperature, pressure, or radiation (greater than $10^3$ rads) due to a design basis accident. These defined mild areas have no pipes containing process radioactive fluids and do not have the ability to holdup containment radioactivity leakage.

QUESTION 10.

If any NSSS or BOP supplied equipment is utilizing thermal equivalence analysis (see CENPD-255 Revision 3), supply an example for a specific equipment item.

RESPONSE: None of the submitted environmental qualification programs for BOP and NSSS utilize thermal equivalance approach to equipment qualification.

1 QUESTION 11.

The maximum operability time designated for any equipment is 30 days. Justify this low value.

RESPONSE: The 30 days operability time was a conservative estimate for the time required for the harsh environments to return to pre-accident conditions with the exception of radiation. As shown in figures 3.3-2 through 3.3-4, radiation sources at 30 days are less than one-one hundredth of their initial values.. Consequently, the increase in radiation dose is negligible beyond 30 days.

At 30 days the only safety function that must be operable is shutdown cooling. For shutdown cooling one train of the shutdown cooling pumps, valves, heat exchangers and support equipment (HVAC and cooling water) must be operable.

The operating shutdown cooling valves are motor operated and cannot fail in an unsafe manner since the valves fail as-is. The shutdown cooling heat exchangers are cooled by the essential cooling water system (ECWS). The heat exchangers are metallic and are insensitive to environmental stress. They are fully qualified for 40 years of service. Each pump is capable of providing 100% cooling and each train's pump can be aligned to provide flow to the other train's shutdown cooling heat exchanger. The pumps are shielded from shutdown cooling piping and are accessible for maintenance at 30 days.

HVAC serving the shutdown cooling compartments can be replaced by various methods such as portable coolers and fans. Thirty days provide ample time to install temporary cooling. Accordingly, a 30-day qualification period provides adequate assurance of operability.

At 30 days, the LPSI and CS pumps are redundant since spray cooling is not required at the same time as low pressure injection. Thus, within each of the two trains of the safety injection system there are two redundant pumps, either of which is adequate to provide flow for that train. Maintenance can be performed at 30 days, even on an operating train, since the LPSI and CS compartments are shielded from each other. Thus, the operability time for the PSI and CS pumps is 30 days. 1

The remaining piece of safety injection system equipment is the HPSI pump. One safety injection train's pump must operate until the time that its function can be performed by some other piece of equipment (assuming a single failure). Four months is an adequate time to restore the letdown line to operation and align a charging pump as replacement HPSI. Thus four months is used as the qualification period for the HPSI pumps.

In the qualification process it has been determined that the HPSI, LPSI and CS pumps have demonstrated operability times in excess of the required times discussed above. See table 4.1-2 sheets 16, 17, and 18.

QUESTION 12.

It is unclear how the values for temperature and radiation for Environmental Designator II were arrived at. Supply an explanation. Please include the temperature profile used to determine the requirement.

RESPONSE: The Main Steam Support Structure is structurally divided into two areas. Elevations above 100 feet contain the main steam lines for which the MSLB environmental parameters are indicated. Since the floors in the upper section are open grated the environmental parameters are the same for all levels. The top of the MSSS is open to the atmosphere which limits the temperature and pressure during an MSLB to 300F and 21 psig. The below grade (below 100 feet) is physically separate from the area of the main steam lines by a reinforced concrete floor and therefore would not be affected by an MSLB. The entrance to the below grade areas of the MSSS is outside of the MSSS itself.

Auxiliary feedwater pumps and their associated valves and instruments are not required beyond 24 hours after an accident. Accordingly, airborne dose, per the Methodology of section 3.3.1.6, is $10^5$ rads.

QUESTION 13.

Compliance with the rule on the environmental qualification 10 CFR 50.49 especially with equipment important to safety (para. B(2)) and equipment required by R.G. 1.97, Rev. 2

(para. b(3)) and a statement that all safety-related component located in the harsh environment (para. b(1)) should be included in the qualification program. This should include equipment required for MELB, spent fuel handling accident, etc. (Required 60 days prior to OL).

RESPONSE: The response is provided in the revised section 1.1.

QUESTION 14.

Comparison of the systems list included in the EQ program with the list provided in Table 3.2-1 of the FSAR. Any omission should be justified.

RESPONSE: Table 2.2-1 of this report identifies the systems containing safety-related equipment located in a harsh environment. FSAR Table 3.2-1 is the quality classification of structures, systems, and components. The FSAR table includes safety and non-safety related equipment. Table G-1 lists structures, systems, and components indicating either inclusion in this report or the justification for exclusion. 1

QUESTION 15.

The category qualified (pending) is defined as the review is in progress and the documentation is not complete. The review of ≅ 85% of the files should be completed with only retest, relocate or modification as the resolution of the open item. Provide the open item listing for all the packages defined as qualified (pending) and their resolutions with the scheduled date for completing the qualification.

RESPONSE: Refer to the revised tables 4.1-1 and 4.1-2. Category qualified (pending) is no longer used.

APPENDIX G

Table G-1
SYSTEM COMPARISONS (Sheet 1 of 5)

| FSAR Table 3.2-1 Principal Components | Inclusion in EQ Report or Justification for Exclusion |
|---|---|
| 1. Reactor Equipment (Reactor Components) | Not Included Not Class IE(a) |
| 2. (RC) Reactor Coolant System | Included |
| 3. (CH) Chemical and Volume Control System | Included |
| 4. (SI) Safety Injection and Shutdown Cooling System | Included |
| 5. (SI) Containment Spray System | Included |
| 6. Containment, Building Combustible Gas Control Systems | |
| (HP) Containment Hydrogen Control System | Included |
| 7. Instrumentation and Control Systems | |
| (SB) Reactor Protection System | Included |
| (SA) Engineered Safety Features Actuation Systems | Included |
| (SE) Ex-Core Neutron Monitoring System | Included |
| 8. Electric Systems | |
| (PB) Class IE 4.16-kV Power System | Included |
| (PG) Class IE 480-V Power Switchgear System | Included |
| (PH) Class IE 480-V Power MCC System | Included |
| (PK) Class IE 125-V DC Power System | Included |
| (PN) Class IE Instrument AC Power System | Included |

Table G-1
SYSTEM COMPARISONS (Sheet 2 of 5)

| FSAR Table 3.2-1 Principal Components | Inclusion in EQ Report or Justification for Exclusion |
|---|---|
| 9. Component and Fuel Handling Equipment and Fuel Storage | |
| (FX) Fuel Handling and Storage System | Not Included Not Class IE(a) |
| (PC) Fuel Pool Cooling and Cleanup System | Included |
| 10. Water Systems | |
| (SP) Essential Spray Pond System | Included |
| (CW) Circulating Water System | Not Included Not Class IE |
| (EW) Essential Cooling Water System | Included |
| (NC) Nuclear Cooling Water System | Included |
| (TC) Turbine Cooling Water System | Not Included Not Class IE |
| (PW) Plant Cooling Water System | Not Included Not Class IE |
| (WC) Chilled Water System | Included |
| (EC) Essential Chilled Water System | Included |
| (DS) Domestic Water System | Not Included Not Class IE |
| (CT) Condensate Transfer and Storage System | Included |
| (DW) Demineralized Water System | Included |
| (TB) Cooling Tower Makeup and Blowdown System | Not Included Not Class IE |

Table G-1
SYSTEM COMPARISONS (Sheet 3 of 5)

| FSAR Table 3.2-1 Principal Components | Inclusion in EQ Report or Justification for Exclusion |
|---|---|
| 11. Compressed Air Systems | |
| (IA) Instrument and Service Air System | Included |
| 12. Sampling System | |
| (SS) Nuclear Sampling System | Included |
| 13. Equipment and Floor Drains | |
| (RD) Radioactive Waste Drains System | Included |
| 14. Chemical Addition System | |
| (SC) Secondary Chemical Control System | Not Included Not Class IE |
| 15. Heating, Ventilation and Air Conditioning | |
| (HA) HVAC - Auxiliary Building | Included |
| (HF) HVAC - Fuel Building | Included |
| (HR) HVAC - Radwaste Building | Not Included Not Class IE |
| (HT) HVAC - Turbine Building | Not Included Not Class IE |
| (HC) HVAC - Containment Building | Included |
| (CP) Containment Purge System | Included |
| (HD) HVAC - Diesel Generator Building | Included |
| (HJ) HVAC - Control Building | Included |
| 16. Fire Protection System | |
| (QK) Fire Detection and Alarm System | Included |

Table G-1
SYSTEM COMPARISONS (Sheet 4 of 5)

| FSAR Table 3.2-1 Principal Components | Inclusion in EQ Report or Justification for Exclusion |
|---|---|
| 17. Diesel Generator System | |
| (DF) Diesel Fuel Oil and Transfer Systems | Included |
| (DG) Diesel Generator Systems | Included |
| 18. Compressed Gas Storage System | |
| (GA) Service Gas System ($N_2$ and $H_2$) | Included |
| 19. Chemical Production System | |
| (CC) Chemical Production System | Not Included<br>Not Class IE |
| 20. Steam and Power Conversion System | |
| (SG) Main Steam System | Included |
| (GS) Turbine Steam Seal and Drain System | Not Included<br>Not Class IE |
| (CI) Chlorine Injection System | Not Included<br>Not Class IE |
| (CD) Condensate System | Not Included<br>Not Class IE(a) |
| (AF) Auxiliary Feedwater System | Included |
| (AS) Auxiliary Steam System | Not Included<br>Not Class IE |
| (SC) Secondary Chemical Control System | Not Included<br>Not Class IE(a) |
| (OS) Lube Oil Storage, Transfer, and Purification System | Not Included<br>Not Class IE |
| 21. Liquid Radwaste System | |
| (LR) Liquid Radwaste System | Not Included<br>Not Class IE |

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Table G-1
SYSTEM COMPARISONS (Sheet 5 of 5)

| FSAR Table 3.2-1 Principal Components | Inclusion in EQ Report or Justification for Exclusion |
|---|---|
| 22. Gaseous Radwaste System | |
| (GR) Gaseous Radwaste System | Included |
| 23. Solid Radwaste System | |
| (SR) Solid Radwaste System | Not Included<br>Not Class IE |
| 24. Water Reclamation System | Not Included<br>Not Class IE |
| 25. Structures | Not Included<br>Not Class IE(a) |
| 26. Water Reclamation Plant Structures | Not Included<br>Not Class IE |
| 27. Water Reclamation Supply System | Not Included<br>Not Class IE |
| 28. Radiation Monitoring System | |
| (SQ) Radiation Monitoring System | Included |
| 29. Radiation Exposure and Maintenance System | Not Included<br>Not Class IE |
| 30. Accident Related Meteorological Data Collection Equipment | Not Included<br>Not Class IE |

a. Some components within the system which are considered important to safety are classified Quality Class Q Seismic Category I devices.

QUESTION 16.

FSAR Table 6.2.1-9 shows that, for reactor at 102% power and for 8.75 ft.$^2$ MSLB break with the loss of one cooling train, the peak containment temperature is ≅ 401°F. The EQ report shows only 370°F. Explain.

RESPONSE: The instantaneous peak vapor temperature is 401F. The peak surface temperature is 370F. Refer also to the revised section 3.2.1.

QUESTION 17.

Radiation environment (section 3.3) appears to be low as compared to the plant with the similar design. During the last telephone conversation the staff has asked to provide basis, assumption and sample calculation to determine the acceptability of the radiation dose. Also, if any place, credit is taken because of the location of the equipment a sample calculation with the basis and assumption should be provided. 1

RESPONSE: The response is provided in the revised section 3.3.

QUESTION 18.

Section 3.2-4 is missing and should be addressed.

RESPONSE: Section 3.2-4 has been added.

QUESTION 19.

Reference to R.G. 1.33 Rev. 2 and ANS-3.2/ANSI N18.7-1976 in appendix A should be added.

RESPONSE: Refer to the revised appendix A.

QUESTION 20.

Difference between the spray environment during testing vs. required should be explained and the basis for acceptance should be provided.

RESPONSE: Refer to the revised tables 4.1-1 and 4.1-2. Each program is evaluated on a case by case basis for acceptability. The evaluations are stored in the central files. No qualification program is considered complete in which the spray environment falls short of specification requirements without acceptable justification.

QUESTION 21.

1 From the submittal it is unclear whether the field verification of equipment was performed.

RESPONSE: Field verification of equipment was performed while inspecting field mounting conditions to compare with the seismic reports. This was performed on all installed equipment which had seismic test requirements in the specification regardless of its respective environmental designator. This field mounting inspection had the secondary benefit of insuring that the specified environmental requirements was consistent with the actual location within the plant.

QUESTION 22.

Confirm that accuracy and response time requirement was considered for all the applicable equipment e.g. transmitters, switches etc.

RESPONSE: Accuracy and response time requirements were extracted from qualification reports, where the supplier establishes the pass/fail criteria for the specific equipment undergoing the test program. Accuracy and response time requirements as stated in this report are as or more restrictive than the equipment specifications. In all situations where they were given in the test programs they were extracted and reported in tables 4.1-1 and 4.1-2.

QUESTION 23.

Provide the list of equipment below submergence and discuss the qualification for submergence. If this question has been answered before provide the reference to the question and answer.

RESPONSE: Refer to the revised section 3.7. 1

QUESTION 24.

Explain why the fig. 3.2-4 peaks to only 325°F and then drops to 250°F in 2 minutes. Is this only one of the spectrums of breaks or this is the most limiting one?

RESPONSE: The referenced figure represents the worst case break which would require a CPC trip. The rapid decrease to 250F is due to containment spray.

QUESTION 25.

In discussion of the drainage system in FSAR Section 9.3.3.2, credit has been taken for the level switches and pumps for the flood protection. Confirm that these equipments are included in the qualification program. Also credit has been taken for

the check valves to avoid flooding because of the backflow. Please confirm that these check valves are safety-related and are included in your QA program.

RESPONSE: Although flooding is considered as a design basis accident, the sump pumps are non-Class 1E. Flood protection is provided by separation, not by pumping (refer to FSAR Section 9.3.3.2.1.1.2). The level switches found in the MSSS and in the HPSI, LPSI and CS pump rooms are Class 1E to advise the control room operator that flooding is occurring (see Specification JM-481, table 4.1-1 Sheet 40).

Check valves used in drains to common sumps are Class 1E however since they are mechanical devices only they do not appear in harsh environment qualification programs per NUREG-0588. These check valves are quality Class Q and are therefore included within the QA program.

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QUESTION 26.

Provide a list of TMI Action Plan equipment in your program by it's I.D. number. Provide the qualification status of the TMI items which require qualification but are not in the qualification program at the present time. (Required within two weeks after the audit.)

RESPONSE: APS will provide a list of equipment added because of TMI plant modifications along with the qualification status of each program within the requested time frame.

QUESTION 27.

In many status sheet (#13, 15 etc.) the environmental parameter is not enveloped by the test and the status is defined as qualified without any explanation. Provide the explanation.

RESPONSE: Footnotes have been added to the status sheets to explain apparent discrepancies. Refer to the revised tables 4.1-1 and 4.1-2. 1

# APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

APPENDIX X

# QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | | Modification Required |
|---|---|---|---|
| Safety Injection System | | | |
| Limit Switch on Pneumatic Valves: | | | |
| Namco EA170-31100 | | | |
| SI-322 | Leakage Control (Close) | Cont. Bldg. | |
| SI-332 | | | Replace Limit Switches |
| SI-618 | | | |
| SI-628 | | | |
| SI-638 | | | |
| SI-648 | | | |
| Namco EA170-31302 | | | |
| SI-611 | Sit Level Cntrl. | Cont. Bldg. | |
| SI-621 | | | |
| SI-631 | | | |
| SI-641 | | | |
| SI-682 | | | |

# QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | | Modification Required |
|---|---|---|---|
| Chemical and Volume Control System | | | |
| Limit Switch on Pneumatic Valves: | | | |
| Namco EA170-31302 | | | |
| CH-515<br>CH-516 | Letdown Line Isolation | Cont. Bldg.<br>Cont. Bldg. | Replace Limit Switches |
| CH-505<br>CH-506 | Controlled Bleedoff Isolation | Aux. Bldg.<br>Cont. Bldg. | |
| CH-523 | Letdown line Isolation | Aux. Bldg. | |
| CH-560<br>CH-561 | RDT to RDP Isolation | Cont. Bldg.<br>Aux. Bldg. | |
| CH-580 | R makeup water to RDT Isolation | Aux. Bldg. | |
| CH-240 | Close to Allow Aux Spray | Contl. Bldg. | |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | Modification Required |
|---|---|---|
| **Safety Injection System** | | |
| Solenoid Pilot Valve on Pneumatic Valves: | | |
| ASCO NP-8320-A187-V | | |
| SI-322 | Cont. Bldg. | Replace elastomers and name plates and install vented conduit pull-fittings |
| SI-332 | Cont. Bldg. | |
| SI-618 | Cont. Bldg. | |
| SI-628 | Cont. Bldg. | |
| SI-638 | Cont. Bldg. | |
| SI-648 | Cont. Bldg. | |
| SI-611 | Cont. Bldg. | |
| SI-621 | Cont. Bldg. | |
| SI-631 | Cont. Bldg. | |
| SI-641 | Cont. Bldg. | |
| SI-682 | Cont. Bldg. | |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | Modification Required |
|---|---|---|
| Chemical and Volume Control System | | |
| Solenoid Pilot Valve on Pneumatic Valves: | | |
| ASCO NP8320-A187-V | | |
| CH-515 | Cont. Bldg. | Replace elastomers and name plates. |
| CH-516 | Cont. Bldg. | (Install vented conduit pull-fittings on valves located inside containment) |
| CH-505 | Aux. Bldg. | |
| CH-506 | Cont. Bldg. | |
| CH-523 | Aux. Bldg. | |
| CH-560 | Cont. Bldg. | |
| CH-561 | Aux. Bldg. | |
| CH-240 | Cont. Bldg. | |
| ASCO HT8321A1 | | |
| CH-580 | Aux. Bldg. | Replace with complete solenoid valve with NP-1 series solenoid valve |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | | Modification Required |
|---|---|---|---|
| Secondary Chemistry | | | |
| Solenoid Valve Operator on Valves: | | | |
| Valcor Model V526-5683-1 | | | |
| SC-204 | Sample Line Isolation | Cont. Bldg. | Replace cover, cable connector, O-rings |
| SC-211 | | Cont. Bldg. | |
| SC-220 | | Cont. Bldg. | |
| SC-222 | | Cont. Bldg. | |
| SC-224 | | Cont. Bldg. | |
| SC-226 | | Cont. Bldg. | |
| Sample System Solenoid Operator on Valves: | | | |
| Valcor Model V526-5683-6 | | | |
| SS-203 | Sample line Isolation | Cont. Bldg | See SC-204 etc. above |
| SS-204 | | Cont. Bldg. | |
| SS-205 | | Cont. Bldg. | |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | | Modification Required |
|---|---|---|---|
| | Safety Injection System | | |
| Solenoid Valve Operator on Valves: | | | |
| Target Rock Model 77L-002 | | | |
| SI-659 | Miniflow | Aux. Bldg. | Refurbish all valves |
| SI-660 | Isolation | Aux. Bldg. | |
| Target Rock Model 77L-001 | | | |
| SI-605 | Sit Vent (Close) | Cont. Bldg. | Refurbish all valves |
| SI-606 | | Cont. Bldg. | |
| SI-607 | | Cont. Bldg. | |
| SI-608 | | Cont. Bldg. | |
| SI-613 | | Cont. Bldg. | |
| SI-623 | | Cont. Bldg. | |
| SI-633 | | Cont. Bldg. | |
| SI-643 | | Cont. Bldg. | |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | | Modification Required |
|---|---|---|---|
| Chemical and Volume Control | | | |
| Solenoid Valve Operator on Valves: | | | |
| Target Rock Model 77L-003 | | | |
| CH-203 | Isolate Aux. | Cont. Bldg. | Refurbish Valves |
| CH-205 | Spray | Cont. Bldg. | |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | | Modification Required |
|---|---|---|---|
| Safety Injection System | | | |
| Limitorque Motor Operator SMB-1-60 on Valves: | | | |
| SI-614 | SIT Isolation | Cont. Bldg | Replace Motors with motors in Qual. Program. |
| SI-624 | | Cont. Bldg. | |
| SI-634 | | Cont. Bldg. | |
| SI-644 | | Cont. Bldg. | |
| SI-683 | Align LPSI SDC | Aux. Bldg. | Replace Limit switches, torque switches, terminal strips. |
| SI-692 | | Aux. Bldg. | |
| SI-686 | Isolate CSS | Aux. Bldg. | |
| SI-696 | | Aux. Bldg. | |
| SMB-3-100 on Valves: | | | |
| SI-651 | Isolate SCS | Cont. Bldg. | See SI-614 etc, above |
| SI-652 | | Cont. Bldg. | |
| SMB-1-40 on Valves: | | | |
| SI-653 | | Cont. Bldg. | |
| SI-654 | | Cont. Bldg. | |
| SMB-1-40 on Valves: | | | |
| SI-306 | Isolate SDC | Aux. Bldg. | See SI-683 etc, above |
| SI-307 | | Aux. Bldg. | |
| SI-690 | Throttle LPSI | Aux. Bldg. | |
| SI-691 | | Aux. Bldg. | |
| SI-655 | Isolate SCS from RCS | Aux. Bldg. | |
| SI-656 | | Aux. Bldg. | |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | | Modification Required |
|---|---|---|---|
| SMC-04-5 on Valves: | | | |
| SI-664 | CSP miniflow Isolation | Aux. Bldg. | See SI-683 etc, above |
| SI-665 | | Aux. Bldg. | |
| SI-668 | LPSI miniflow Isolation | Aux. Bldg. | |
| SI-669 | | Aux. Bldg. | |
| SMC-04-7 on Valves: | | | |
| SI-616 | HPSI Control | Aux. Bldg. | |
| SI-617 | | Aux. Bldg. | |
| SI-626 | | Aux. Bldg. | |
| SI-627 | | Aux. Bldg. | |
| SI-636 | | Aux. Bldg. | |
| SI-637 | | Aux. Bldg. | |
| SI-646 | | Aux. Bldg. | |
| SI-647 | | Aux. Bldg. | |
| SI-666 | HPSIP miniflow Isolation | Aux. Bldg. | |
| SI-667 | | Aux. Bldg. | |
| SMB-0-10 on Valves: | | | |
| SI-698 | Align HPSI | Aux. Bldg. | |
| SI-699 | | Aux. Bldg. | |
| SMB-00-10 on Valves: | | | |
| SI-604 | Hot Leg Insrt | Aux. Bldg. | |
| SI-609 | | Aux. Bldg. | |
| SI-673 | Isolate Cont Sump | Cont. Bldg. | See SI-614 etc, above |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | | Modification Required |
|---|---|---|---|
| SI-675 | Isolate Cont Sump | Cont. Bldg. | See SI-614 etc. above |
| SI-674 | | Aux. Bldg. | See SI-683 etc. above |
| SI-676 | | Aux. Bldg. | |
| SMB-000-5 on Valves: | | | |
| SI-657 | Throttle Sdchx | Aux. Bldg. | |
| SI-658 | | Aux. Bldg. | |
| SI-678 | | Aux. Bldg. | |
| SI-679 | | | |
| SMB-0-25 (DC) on Valves: | | | |
| SI-321 | Throttle HPSI | Aux. Bldg. | Replace Reliance DC motors with peerless DC motors |
| SI-331 | | Aux. Bldg. | |
| SB-3-150 on Valves: | | | |
| SI-615 | Control LPSI/SIS | Aux. Bldg. | See SI-683 etc above |
| SI-625 | | Aux. Bldg. | |
| SI-635 | | Aux. Bldg. | |
| SI-645 | | Aux. Bldg. | |
| SB-0-25 on Valves: | | | |
| SI-671 | Throttle CSS | Aux. Bldg. | |
| SI-672 | | Aux. Bldg. | |
| SMB-0-25 on Valves: | | | |
| SI-685 | Isolate CSS | Aux. Bldg. | |
| SI-694 | | Aux. Bldg. | |
| SI-684 | | Aux. Bldg. | |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| | Description and Tag #'s | | Modification Required |
|---|---|---|---|
| SI-687 | Isolate CSS | Aux. Bldg. | See SI-683 etc. above |
| SI-688 | CSP Bypass | Aux. Bldg. | |
| SI-689 | Isolate CSS | Aux. Bldg. | |
| SI-693 | CSP Bypass | Aux. Bldg. | |
| SI-695 | Isolate CSS | Aux. Bldg. | |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | | | Modification Required |
|---|---|---|---|
| Chemical and Volume Control | | | |
| Limitorque Motor Operator SMB-00-15 on Valves: | | | |
| CH-255 | (NOTE 5) | Aux. Bldg. | See SI-683 etc. above |
| CH-254 | (NOTE 5) | Aux. Bldg. | |
| SB-1-60 on Valves: | | | |
| CH-530 | RWT Isolation | Aux. Bldg. | |
| CH-531 | | Aux. Bldg. | |
| CH-524 | Charging Line Isolation | Aux. Bldg. | |

APPENDIX X

## QUALIFICATION RELATED EQUIPMENT RETROFITS

| Description and Tag #'s | Modification Required |
|---|---|
| Transmitter Racks | Provide qualified means of wire terminations. |