

**DONALD C. COOK NUCLEAR PLANT
RELAY EVALUATION REPORT**

ATTACHMENT NO. 3 TO AEP:NRC:1040C

**RESPONSE TO NRC G.L. 87-02
UNRESOLVED SAFETY ISSUE A-46**

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**DONALD C. COOK NUCLEAR PLANT
UNRESOLVED SAFETY ISSUE A-46
RELAY EVALUATION REPORT**

AEP:NRC:1040C - ATTACHMENT 3

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1.0 INTRODUCTION

In December 1980, the Nuclear Regulatory Commission issued Unresolved Safety Issue A-46, Seismic Qualification of Equipment in Operating Plants, related to seismic adequacy of mechanical and electrical equipment in nuclear plants which were issued construction permits prior to 1972. After substantial technical research by both the Seismic Qualification Utility Group (SQUG) and the NRC regarding this issue, the Staff published, on February 19, 1987, a detailed approach for resolving USI A-46 in Generic Letter 87-02, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue (USI) A-46. The approach is primarily based on the use of earthquake experience data to verify the seismic adequacy of existing equipment. However, this approach is difficult to apply to relays because of the variability of relays and control circuits, and because a relay's primary failure mode (contact chatter) is difficult or impossible to document by post earthquake examination. Also, there have been instances of relay malfunction in earthquakes and in seismic shake table tests at accelerations near nuclear plant design levels.

Therefore, as part of the resolution of USI A-46, a relay seismic functionality review is required. The purpose of the review is to determine if the safe shutdown systems which have been identified, could be adversely affected by relay malfunction during an earthquake. Verification of seismic adequacy is required for relays for which malfunction is deemed unacceptable.

The approved methodology for performing the relay evaluation is outlined in Section 6 of the Generic Implementation Procedure, Revision 2, dated February 14, 1992 (GIP-2); Electric Power Research Institute Report EPRI NP-7148-SL, Procedure for Evaluating Nuclear Power Plant Relay Seismic Functionality, dated December 1990; and in the NRC Supplemental Safety Evaluation Report No. 2, dated May 22, 1992. The relay evaluation for Donald C. Cook Nuclear Plant Units 1 & 2 was, in general, performed in accordance with these documents. The results of the evaluation are summarized in this report.

2.0 EQUIPMENT LIST

The list of equipment which has been selected to satisfy the shutdown requirements of USI A-46 is known as the Safe Shutdown Equipment List (SSEL). Details of the development of the SSEL are not included in this report, but are discussed in the Donald C. Cook Nuclear Plant SSEL Report (reference 10). Components on the SSEL which are electrically powered or controlled are required to be included in the relay evaluation to determine if relay chatter in the components' control circuitry could adversely affect the function of the component. This includes active components which could inadvertently start, stop, or change state due to relay chatter, and thereby, prevent a safe

shutdown function from being accomplished; and passive components which would be in the proper state, and upon loss of power would remain in the proper state, but due to relay chatter could change state and prevent proper operation of the safe shutdown system. A listing of the components which were included in the relay evaluation, known as the SSEL-R, is included in Appendix A.

Before performing the circuit analysis, the functional requirements of each of the components on the SSEL-R must be determined (i.e. what state or position is required of the component for it to perform its safe shutdown function). This position is known as the desired position. Also, in some cases, it is important to know the state of the equipment at the onset of the earthquake (given the GIP assumption that the reactor coolant system will be at or near normal operating temperature and pressure). This is referred to as the normal state. If normal state of equipment cannot be determined with certainty or if the desired state is dependant on other variable factors, such as Loss of Offsite Power (LOOP), all possible operating states were considered. Any assumptions made regarding normal or desired states are documented in the Appendix B footnotes.

3.0 CIRCUIT ANALYSIS

A circuit analysis was performed for each of the SSEL-R components to determine which of the relays associated with the components must be seismically evaluated. During the review, components in the SSEL-R control circuits were classified in one of three categories; not vulnerable, chatter acceptable, or essential. Only the essential relays require a seismic capacity versus demand evaluation.

When performing the circuit analysis, the control circuits were first reviewed to eliminate from further consideration those devices which are seismically not vulnerable. In accordance with the criteria given in EPRI NP-7148-SL, relays were classified as not vulnerable if they are manually or mechanically actuated switches and a reasonable amount of force is required to operate the device. Devices were judged as not vulnerable based on physical inspection or by review of the vendor instruction manuals. Also, per EPRI NP-7148-SL, solid state devices were categorized as not vulnerable.

For contacts which could not be classified as not vulnerable, a simple failure modes and effects analysis was performed to examine the consequences of relay malfunction and determine chatter acceptability. If contact chatter would not prevent the system/component from performing its required function, and no other undesirable effects would occur as a result of the malfunction, the contacts were classified as chatter acceptable. In some cases it is difficult or impossible to predict the effects of relay chatter. In these cases it was conservatively assumed that the relays are essential. Contacts were also classified as chatter acceptable if operator actions can be

relied upon to reset equipment which could potentially operate erroneously during a seismic event. This option was used on a very limited basis and is discussed further in section 5.0.

The details of the circuit analysis were documented on elementary drawings which were color coded as follows; devices classified as not vulnerable were marked in yellow, devices classified as chatter acceptable were marked in green, and devices classified as essential were marked in pink. The marked up drawings are not included in this report, however, the EPRI NP-7148-SL G.4 forms, which summarize the circuit analysis, were completed for each of the safe shutdown systems and are included in Appendix B. It is not a GIP requirement that each relay associated with an SSEL component be individually listed, however, the conclusion reached regarding each relay associated with an SSEL component can be ascertained from the G.4 forms. A list of the relays which were categorized as essential is included in Appendix C.

4.0 CAPACITY VERSUS DEMAND

For each relay which has been identified as essential, a capacity versus demand screening is required to demonstrate that the relays have adequate seismic ruggedness to preclude contact chatter during a Design Basis Earthquake (DBE). The relay capacities were determined from either the relay Generic Equipment Ruggedness Spectra (GERS) which are summarized in EPRI NP-7147-SL, Seismic Ruggedness of Relays, and its addenda; or from shaker table testing which was performed in accordance with IEEE 344-1975. All of the test reports from which relay capacity data was obtained are listed in Section 10.0. These relay capacities were then compared to the demands which were calculated for the relay locations in accordance with the screening levels (1, 2, 3, or 4) discussed in the GIP, Section 6.

When determining the seismic demand for each relay, the panels in which the relays are located were first categorized as low, medium, or high amplification. This was accomplished during a walkdown with the seismic capability engineers (SCEs). The criteria given in Appendix I of EPRI NP-7148-SL were considered when making these determinations, as well as, data from previous modal testing. A complete tabulation of the panels which contain essential relays and their amplification classifications is provided in Appendix D. Note that some small, wall-mounted panels were judged by the seismic capability engineers to be rigid and, therefore, require no amplification. These panels are noted as RIG in the 'Amp Factor' column. Also, the 4kV switchgear was judged by the seismic capability engineers to be medium amplification. This is based on the split compartment construction of the switchgear and the previous modal testing. Further details of these determinations are contained in reference 7.

In addition to the three amplification categories (low, medium, and high), Appendix I of EPRI NP-7148-SL also discusses the use

of case-by-case evaluations to estimate the amplification factor. This type of evaluation was performed for one panel, 2-BC-B-PNL, which is essentially a terminal box on a floor mounted stand. The justification for the amplification factor used for this panel is shown on page 5 of Appendix D.

The Screening Level 1 demand criteria given in the GIP is 5g for low amplification panels and 8g for medium and high amplification panels. However, screening level 1 can only be used if the largest horizontal component of the 5% damped, free-field, Safe Shutdown Earthquake ground response spectrum, to which the plant is licensed, is enveloped by the Bounding Spectrum. In addition, the relays must be located within approximately 40 feet of grade. Because Cook Nuclear Plant's ground response spectrum is enveloped by the Bounding Spectrum (See reference 11) and all of the essential relays are located within approximately 40 feet of grade (608'), screening level 1 was used to screen essential relays whenever the 5g or 8g requirement was exceeded.

For screening level 2 the floor response spectra (see Appendix G) must be multiplied by an amplification factor (3 for low amplification panels, 4.5 for medium amplification panels, and 7 for high amplification panels) to obtain the demand. Also, since Cook Nuclear Plant's floor response spectra have been characterized as median centered, an additional 1.5 multiplication factor is required. The relay capacity must be compared to this resultant amplified response spectra between 4 and 16 hertz (peak) and at 33 hertz and above (ZPA). The majority of the relays on the essential relay list were screened based on this screening level. The following table lists the 5% damped screening level 2 demands for each building/elevation:

BLDG/ ELEV	FRS Peak/ZPA (g's)	1.5FRS Peak/ZPA (g's)	LOW (3X) Peak/ZPA (g's)	MED (4.5X) Peak/ZPA (g's)	HI (7X) Peak/ZPA (g's)
AUX587	.55/.20	.83/.30	2.49/.90	3.74/1.35	5.81/2.1
DG609	.60/.22	.90/.33	2.7/.99	4.05/1.49	6.3/2.31
AUX633	.66/.22	.99/.33	2.97/.99	4.46/1.49	6.93/2.31
AUX650	.65/.225	.98/.34	2.94/1.02	4.41/1.53	6.86/2.38
TUR591	.575/.20	.86/.30	2.58/.90	3.87/1.35	6.02/2.1

Table 4-1

Screening Level 2 Seismic Demand Levels

Screening level 3 allows the use of the GENRS software as specified in EPRI NP-7146-SCCML to develop an amplified floor response spectra. The resultant amplified response spectra is then compared with the relay capacity to demonstrate that the relay has adequate seismic capacity. This methodology can only be used for relays located within medium amplification panels. Screening level 3 was used for only three relay types all of which are located only within panels which were classified as medium amplification. The following table lists the 5% damped screening level 3 demand for each building/elevation. See reference 7 for further details of the development of these amplified response spectra.

BLDG/ELEV	PEAK (4-16Hz)	ZPA ($\geq 33\text{Hz}$)
AUX587	1.95g	1.33g
DG609	2.51g	1.60g
AUX633	1.91g	1.11g
AUX650	1.77g	1.23g
TURB591	1.95g	1.10g

Table 4-2

Screening Level 3 Seismic Demand Levels

Screening level 4, Use of Current Qualification Methods, was used when the panels which house the relays were included in the IEEE 344-75 test. Relays which were screened on this basis include relays within battery chargers, inverters, and the reactor protection racks; all of which were seismically tested in their enclosures in accordance with IEEE 344-1975.

Lastly, several relays were screened based on the criteria given in EPRI NP-7148-SL, section 5, step 7. This criteria states that relays which directly control switchgear breakers can be screened based on the switchgear GERS. This criteria was used only for the 4kV switchgear antipump relays. The relays screened on this basis are listed in Appendix E with an 'S' in the screening level column. The Seismic Evaluation Report (Reference 11) should be referenced for the complete details of the switchgear evaluation.

Appendix E is a tabulation of the capacity and demand information for each of the essential relays. The information listed includes tag number, model number, relay panel, panel location, amplification factor, screening level, demand (peak and ZPA), capacity (peak and ZPA), and the capacity basis. Also, the last column references notes which are listed on the last two pages of Appendix E.

5.0 OPERATOR ACTIONS

The Generic Implementation Procedure allows the use of operator actions under certain circumstances to correct the effects of relay misoperation during a seismic event. Two operator actions are specified as a result of the Cook Nuclear Plant relay evaluation. These required actions are included in the Cook Nuclear Plant Operations Department Seismic Safe Shutdown Procedure which is currently under development. This procedure will be utilized by the operators to shutdown the units following a seismic event.

The first operator action is required because the circuitry which trips switchgear room roof fans 1-HV-SGRS2, 1-HV-SGRS3, 2-HV-SGRS2, and 2-HV-SGRS3 when a fire is detected at the large outdoor transformers, has not been seismically evaluated. Therefore, during a seismic event it is possible that these fans may be tripped and locked out. The seismic shutdown procedure requires that the operators verify that these fans have not been locked out. The operators have adequate time because the heat-up of the switchgear room would be gradual if the fans tripped. Operator access is not a concern since the controls are located in the switchgear room which is easily accessible. Also, an indicating light is available at the fan controls in the switchgear room which indicates when the fans have been locked out. If the fans have been locked out the operator will be instructed to verify that there is not a fire at the outdoor transformers, and then to reset the fans.

The second operator action is required because the relays in the Plant Process Computer (PPC) Room Halon Actuation System were not included in the relay evaluation. Chatter of these relays could cause the PPC room dampers (1-HV-AC-FD-1, 1-HV-AC-FD-2, 1-HV-AC-FD-3, 2-HV-AC-FD-1, 2-HV-AC-FD-2, and 2-HV-AC-FD-3) to close. Loss of HVAC to the plant process computer is not a concern, however, closure of these dampers would also interrupt the HVAC to the control room air conditioning equipment room. The seismic shutdown procedure requires that the operator verify that PPC room dampers have not closed. The operators have adequate time because the heat up of the control room air conditioning equipment room would be gradual if the dampers closed. Operator access is not a concern since the dampers are located directly above the control room in the control room air conditioning equipment rooms and in the plant process computer rooms. If any of the dampers are closed the operator will be instructed to verify that there is not a fire in the PPC room, and then to open the dampers.

Given that there are only two additional operator actions required as a result of the relay evaluation, both of which require minimal time and effort, the overall additional demand placed on the operators is not viewed as excessive.

6.0 RELAY WALKDOWNS

Relay walkdowns were conducted on several different occasions to verify relay mountings, model numbers, and locations. The relay evaluation procedure requires a spot check of the relays on the essential relay list. Approximately 90% of the essential relays were walked down to verify their location, their part number and the adequacy of their mounting. No significant deviations were noted in any of these areas. A walkdown was also conducted to verify that the GERS restrictions for General Electric IAC relays and Agastat time delay relays are met. During the walkdown it was verified that all GE IAC relays time dial settings are greater than 1, and that all Agastat 7000 series relays have time delay settings of greater than .3 seconds.

7.0 OUTLIERS

Relays which do not meet the requirements of the GIP screening process are characterized as outliers. Resolution of outliers is required or a justification must be provided for not resolving the outliers. All of Cook Nuclear Plant's relay outliers have been resolved, although, some of the resolutions have not yet been fully implemented. However, all of the corrective actions which have not been fully implemented are in-process and have a scheduled completion date. For further information on each of the outliers, refer to the Outlier Screening Verification Sheets (OSVS) in Appendix F. Summaries of each of the relay evaluation outliers are as follows:

General Electric type CFD relays were used for the differential protection of the Emergency Diesel Generators. These relays appear on the Low Ruggedness Relay list in Appendix E of EPRI NP-7148-SL. The relays were replaced in 1994 during the Unit 1 and 2 refueling outages with Asea Brown Boveri type 87M differential relays. A total of 12 CFD relays were replaced via Request for Change 12-RFC-3067.

General Electric type IJD relays were used for the differential protection of the safety related 4kV/600V transformers. These relays also appear on the Low Ruggedness Relay list in Appendix E of EPRI NP-7148-SL. The relays were replaced in 1994 during the Unit 1 and 2 refueling outages with Asea Brown Boveri type 87T differential relays. A total of 24 IJD relays were replaced via Request for Change 12-RFC-3067.

Normally closed contacts of deenergized General Electric type HGA relays were (are) used from the Emergency Diesel Generator starting relay #2. There is one starting relay per diesel in this configuration. General Electric type HGA relays which utilize normally closed contacts appear on the Low Ruggedness Relay list in Appendix E of EPRI NP-7148-SL. For Unit 1, both diesel's starting relays were replaced with Cutler Hammer type M600 relays in 1995, however, the relays were not yet replaced for Unit 2. The replacement will take place prior to the Unit 2

1996 refueling outage. The design change to implement this replacement is Minor Modification 12-MM-549.

Emergency Diesel Generator Starting Relay #1 is also an outlier for which the corrective action has not been fully implemented. There is one starting relay per diesel which is located on the terminal block wall of the Station Auxiliaries (SA) panel in the control room. Previous modal testing of these panels indicated a resonant frequency of the terminal block wall at approximately 8 hertz. Therefore, this portion of the panel has been categorized as high amplification. High amplification panels at the 633' elevation have a Screening level 2 demand of 6.93g. The relays used in this application are General Electric type HFA, which have a seismic capacity (normally closed contact, deenergized) of only 5g. Because this relay does not meet the capacity versus demand requirements of USI A-46, the relays will be relocated to the main portion of the panel where the amplification has been categorized as medium (screening level 2 demand of 4.46g). An evaluation of the relays based on the Cook Nuclear Plant licensing basis criteria indicates that the relays possess adequate seismic ruggedness to preclude contact chatter, however, to conform to the USI A-46 criteria the relays will be relocated. This design change to relocate these relays (12-DCP-18) is currently scheduled to be installed during the 1997 refueling outages for both Units 1 and 2.

Lastly, the switchgear roof fans and PPC room dampers which require operator actions, as discussed in Section 5.0, must also be classified as outliers until the Safe Shutdown Procedure is completed. This procedure is scheduled for completion by July 31, 1997.

8.0 RESULTS

The USI A-46 Relay Evaluation demonstrates that the equipment selected to shutdown Cook Nuclear Plant Units 1 and 2, in accordance with the criteria outline in the Generic Implementation Procedure, would not be adversely affected by seismically induced relay contact chatter. That is, relay contact chatter will not prevent any of the components on the SSEL from performing its desired function. Included in this evaluation are requirements that the Emergency Diesel Generators start and sequentially load during the SSE, and that Safety Injection or Containment Spray signals not be erroneously generated due to relay chatter. All of the relays associated with SSEL-R components have either been shown to be seismically not vulnerable, chatter acceptable, seismically adequate, or have been classified as outliers for which some corrective action will be implemented. With the exception of the relay outliers (which will be corrected), the components on the SSEL and the relays associated with these components meet the requirements of Section 6.0 of the Generic Implementation Procedure, Rev 2, EPRI NP-7148-SL, and the NRC SSER No. 2.

9.0 DEVIATIONS FROM GIP

The USI A-46 Relay Evaluation for Donald C. Cook Nuclear Plant Units 1 and 2 was performed in general accordance with Section 6.0 of the Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment, Revision 2; EPRI NP-7148-SL Evaluation of Relay Seismic Functionality; and the NRC Supplemental Safety Evaluation Report No. 2. No significant or programmatic deviations from these documents were made.

10.0 REFERENCES

- 1) Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment, Revision 2, dated February 1992
- 2) EPRI NP-7148-SL - Evaluation of Relay Seismic Functionality, dated December 1990
- 3) EPRI NP-7147-SL - Seismic Ruggedness of Relays, dated August 1991
- 4) EPRI NP-7147-SL Volume 2: Addendum 1 - Seismic Ruggedness of Relays, dated September 1993
- 5) EPRI NP-7147-SL Volume 2: Addendum 2 - Seismic Ruggedness of Relays, dated April 1995
- 6) EPRI NP-5223-SL-R1 - Generic Seismic Ruggedness of Power Plant Equipment, dated August 1991
- 7) Memorandum from Steve Anagnostis, Stevenson & Associates, to R. C. Steele, AEPSC, Final Report on Relay Seismic Demand, dated September 30, 1995
- 8) Memorandum from Jess Betlack, MPR Associates, to R. C. Steele, AEPSC, General Electric IAC GERS Applicability, dated April 28, 1993
- 9) Memorandum from I. C. Huang, AEPSC, to G. G. Thomas, Stevenson & Associates, Donald C. Cook Nuclear Plant Floor Response Spectra, dated August 25, 1993
- 10) Donald C. Cook Nuclear Plant USI A-46 SSEL Report, AEP:NRC:1040C Attachment 1
- 11) Donald C. Cook Nuclear Plant USI A-46 Seismic Evaluation Report, AEP:NRC:1040C Attachment 2
- 12) Donald C. Cook Nuclear Plant Operations Department Seismic Safe Shutdown Procedure, Draft
- 13) Marked-Up Elementary Drawings, File No. NEID-SQ-1

- 14) ABB RC5535 - ABB Power T&D Company Seismic Qualification Report for Transformer Differential Relay 219T2441, dated February 7, 1979
- 15) ABB RC5536 - ABB Power T&D Company Seismic Qualification Report for 87M 3ø Percentage Differential Relay, dated March 23, 1977
- 16) ACTON 16013-2 - Acton Environmental Testing Corporation Report of Test for Seismic and Environmental Testing of Mercoid Pressure Switches for American Electric Power Service Corporation, dated July 7, 1981
- 17) Farwell & Hendricks 10260-0 - Seismic Qualification Report on a 5 kVA Inverter for D. C. Cook Nuclear Plant, dated December 18, 1984
- 18) Farwell & Hendricks 20148-2 - Final Qualification Report for the Dynalco Speed Transmitter and Magnetic Pick-up for D. C. Cook Nuclear Plant, dated February 20, 1986
- 19) Farwell & Hendricks 20240-1 - Final Qualification Report for an Agastat 9400 Series Timing Relay for D. C. Cook Nuclear Plant, dated January 10, 1986
- 20) Farwell & Hendricks 60149-0 - Commercial Quality Dedication Report for an Airpax Relay, dated May 6, 1987
- 21) Farwell & Hendricks 61107-2 - Nuclear Environmental Qualification Report for Cutler Hammer Relays, dated June 2, 1992
- 22) General Electric PCR448-93-006 - Product Certification Report for Auxiliary Hand Reset Relays, dated May 20, 1993
- 23) General Electric RN-150 - Nuclear Qualified Devices Relays, Control Switches & Accessories, dated January 25, 1990
- 24) NQS Report 1619 Revision 2 - Seismic Qualification of the Foxboro Company Reactor Protection Process Instrumentation Racks for American Electric Power, Donald C. Cook Nuclear Power Plant Units 1 and 2, dated July 21, 1993
- 25) WYLE 44761-1 - Seismic Simulation Test Report for Nine Electrical Components with Associated Mounting Hardware and a Battery Charger, dated November 1, 1979
- 26) WYLE 47612-1 - An Extreme Operating Condition Test and Seismic Simulation Test on a 7.5 KVA Static Inverter, dated April 26, 1985
- 27) WYLE 49275-1 - Test Program on Solidstate Model BCS25300 300-Ampere Battery Charger, dated September 22, 1988

- 28) WYLE 58826 Revision A - Qualification Testing of One
Neutron-Flux Monitoring System for Gamma-Metrics, dated May
23, 1983

Appendices

- Appendix A - Safe Shutdown Equipment List for Relay Evaluation
- Appendix B - G.4 Forms (Summary of Circuit Analysis)
- Appendix C - Essential Relay List
- Appendix D - Essential Relay Panel Amplification Factors
- Appendix E - Essential Relay Capacity & Demand Data
- Appendix F - Agastat 9400 Capacity versus Demand
- Appendix G - Outlier Seismic Verification Sheets
- Appendix H - Floor Response Spectra
- Appendix I - Lead Relay Reviewer Resumé

APPENDIX A

SAFE SHUTDOWN EQUIPMENT LISTS FOR RELAY EVALUATION

UNIT 1 SSEL-R PAGES 1-12

UNIT 2 SSEL-R PAGES 13-24

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT		
CLASS	DEVICE NUMBER	EQUIPMENT DESCRIPTION
1	1-AB-A	600VAC MCC AB-A
1	1-AB-D	600 VAC MCC 1-AB-D
1	1-AB-N	CONTROL CENTER VALVE
1	1-ABD-A	600VAC MCC ABD-A
1	1-ABD-B	600VAC MCC ABD-B
1	1-ABD-C	600VAC MCC ABD-C
1	1-ABD-D	600VAC MCC ABD-D
1	1-ABV-A	600VAC VCC ABV-A
1	1-ABV-D	MCC 1-ABV-D
1	1-AM-A	600VAC MCC AM-A
1	1-AM-D	600VAC MCC AM-D
1	1-AZ-BC	600VAC MCC AZ-BC
1	1-AZV-A	600VAC VCC AZV-A
1	1-EZC-A	600VAC MCC EZC-A
1	1-EZC-B	600VAC MCC EZC-B
1	1-EZC-C	600VAC MCC EZC-C
1	1-EZC-D	600VAC MCC EZC-D
1	1-PS-A	600 VAC MCC 1-PS-A
1	1-PS-D	600 VAC MCC 1-PS-D
2	1-11A	600VAC BUS 11A SWITCHGEAR
2	1-11A1	REACTOR ROD CONTROL SOUTH MOTOR-GENERATOR SET CRDMG-1S SUPPLY BREAKER
2	1-11A10	WEST TURBINE AUXILIARY COOLING WATER PUMP PP-14W SUPPLY BREAKER
2	1-11A11	600VAC BUS 11A SUPPLY BREAKER
2	1-11A12	600VAC BUS 11A SPARE CIRCUIT BREAKER
2	1-11A13	600VAC MOTOR CONTROL CENTER AM-A1 SUPPLY BREAKER
2	1-11A2	600VAC MCC AM-A SUPPLY BREAKER
2	1-11A3	600VAC MCC EZC-A SUPPLY BREAKER
2	1-11A4	SOUTH PLANT LIGHTING TRANSFORMER TR-LTG-9S SUPPLY BREAKER
2	1-11A5	600VAC MCC ABD-A SUPPLY BREAKER
2	1-11A6	600VAC MCCS AB-A, PS-A, TPP-A, AND VCCS ABV-A, AZV-A SUPPLY BREAKER
2	1-11A7	SERVICE BUILDING LIGHTING TRANSFORMER 12-TR-LTG-14 SUPPLY BREAKER
2	1-11A8	600VAC BORIC ACID HEAT TRACE CONTROL CENTER BHT-A SUPPLY BREAKER
2	1-11A9	TSC UPS EMER FEED CONSTANT VOLTAGE TRANSFORMER 12-TSC-UPS-CVT SUPPLY BREAKER
2	1-11AC	600 VAC. BUS 11A TO 600VAC. BUS 11C TIE BREAKER
2	1-11B	600VAC BUS 11B SWITCHGEAR
2	1-11B1	600VAC MCC ABD-B SUPPLY BREAKER (1-ELSC)
2	1-11B10	PLANT AIR COMPRESSOR OME-41 SUPPLY BREAKER
2	1-11B11	600VAC BUS 11B SUPPLY BREAKER
2	1-11B12	SOUTH NON-ESSENTIAL SERVICE WATER PUMP PP-8S SUPPLY BREAKER
2	1-11B13	TURBINE ROOM INDUCTION HEATING, STRESS RELIEF AND BOLT HEATERS SUPPLY BREAKER
2	1-11B2	600VAC MCC EZC-B SUPPLY BREAKER
2	1-11B3	EAST AND WEST AUXILIARY BUILDING CRANES 12-QM-3E AND 12-QM-3W SUPPLY BREAKER
2	1-11B4	600VAC MCC AZ-BC SUPPLY BREAKER
2	1-11B5	600VAC MOTOR CONTROL CENTERS TBG-BE AND TBP-BW SUPPLY BREAKER
2	1-11B6	EAST TURBINE AUXILIARY COOLING WATER PUMP PP-14E SUPPLY BREAKER
2	1-11B7	PLANT HEATING BOILER FORCED DRAFT FAN 12-OME-10-FAN SUPPLY BREAKER
2	1-11B8	MAKEUP PLANT VACUUM DEGASIFIER 2ND STAGE VACUUM PUMP 12-PP-44M SUPPLY BREAKER
2	1-11B9	600VAC BUS 11B SPARE CIRCUIT BREAKER
2	1-11BD	TIE CIRCUIT BREAKER BETWEEN BUS 11B AND 11D
2	1-11C	600V BUS 11C SWITCHGEAR
2	1-11C1	600VAC BUS 11C SUPPLY BREAKER
2	1-11C10	600VAC MCCS ABD-C AND TSC-S SUPPLY BREAKER
2	1-11C11	600VAC BUS 11C SPARE CIRCUIT BREAKER

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
2	1-11C12	NORTH SPENT FUEL PIT PUMP 12-PP-31N SUPPLY BREAKER
2	1-11C13	CIRCUIT BREAKER-600V FOR RECIPROCATING CHARGING PUMP 1-PP-49
2	1-11C14	600VAC BUS 11C SPARE CIRCUIT BREAKER
2	1-11C15	TECHNICAL SUPPORT CENTER UNINTERRUPTABLE POWER SUPPLY NORMAL SUPPLY BREAKER
2	1-11C16	600VAC MOTOR CONTROL CENTERS TBC-CS AND TBG-CW SUPPLY BREAKER
2	1-11C17	NORTH NON-ESSENTIAL SERVICE WATER PUMP PP-8N SUPPLY BREAKER
2	1-11C18	TURBINE BUILDING 240/50 TON OVERHEAD CRANE 12-QM-1 SUPPLY BREAKER
2	1-11C2	CONTAINMENT POLAR CRANE QM-4 SUPPLY BREAKER
2	1-11C3	600VAC MOTOR CONTROL CENTER AM-C1 SUPPLY BREAKER
2	1-11C4	CIRCULATING WATER TRAVELING SCREENS NORTH WASH PUMP 12-PP-15N SUPPLY BREAKER
2	1-11C5	MAKEUP PLANT VACUUM DEGASIFIER STANDBY VACUUM PUMP 12-PP-44W SUPPLY BREAKER
2	1-11C6	600VAC MCC EZC-C SUPPLY BREAKER
2	1-11C7	600VAC BUS 11C SPARE CIRCUIT BREAKER
2	1-11C8	SERVICE BUILDING AND CONTAINMENT STANDBY LIGHTING TRANSFORMER TR-LTG-8 SUPPLY BREAKER
2	1-11C9	MAIN AND SPARE TRANSFORMER AUXILIARIES NORMAL DISTRIBUTION CABINET TCSN SUPPLY BREAKER
2	1-11D	600VAC BUS 11D SWITCHGEAR
2	1-11D1	600VAC BUS 11D SUPPLY BREAKER
2	1-11D10	NORTH PLANT LIGHTING TRANSFORMER TR-LTG-9N SUPPLY BREAKER
2	1-11D11	600VAC BORIC ACID HEAT TRACE CONTROL CENTER BHT-D SUPPLY BREAKER
2	1-11D13	REACTOR ROD CONTROL NORTH MOTOR-GENERATOR SET CRDMG-1N SUPPLY BREAKER
2	1-11D14	600VAC MCC 1-AB-D, VCC 1-ABV-D, MCC 1-PS-D SUPPLY BREAKER
2	1-11D3	CONTAINMENT LIGHTING TRANSFORMER TR-LTG-10 SUPPLY BREAKER
2	1-11D4	600VAC BUS 11D SPARE CIRCUIT BREAKER
2	1-11D5	600VAC MCC ABD-D SUPPLY BREAKER
2	1-11D6	600VAC MCC EZC-D SUPPLY BREAKER
2	1-11D8	600VAC MCC AM-D SUPPLY BREAKER
2	1-11D9	MAIN AND SPARE TRANSFORMER AUXILIARIES EMERGENCY DISTRIBUTION CABINET TCSE SUPPLY BREAKER
2	1-52-BYA	REACTOR ROD CONTROL TRAIN 'A' REACTOR TRIP BYPASS CIRCUIT BREAKER
2	1-52-BYB	REACTOR ROD CONTROL TRAIN 'B' REACTOR TRIP BYPASS CIRCUIT BREAKER
2	1-52-RTA	REACTOR ROD CONTROL TRAIN 'A' REACTOR TRIP CIRCUIT BREAKER
2	1-52-RTB	REACTOR ROD CONTROL TRAIN 'B' REACTOR TRIP CIRCUIT BREAKER
3	1-T11A	4KV BUS T11A
3	1-T11A1	SOUTH SAFETY INJECTION PUMP PP-26S SUPPLY BREAKER
3	1-T11A10	600V BUS 11A SUPPLY TRANSFORMER TR11A SUPPLY BREAKER
3	1-T11A11	AB EMERG DIESEL GENERATOR TO 4KV BUS T11A SUPPLY BREAKER
3	1-T11A12	CIRCUIT BREAKER FROM 69KV TO BUS T11A
3	1-T11A2	WEST MOTOR DRIV AUX FEEDWATER PUMP PP-3W SUPPLY BREAKER
3	1-T11A3	WEST CONTAINMENT SPRAY PUMP PP-9W SUPPLY BREAKER
3	1-T11A4	WEST RHR PUMP PP-35W SUPPLY BREAKER
3	1-T11A5	WEST ESW PUMP PP-7W SUPPLY BREAKER
3	1-T11A6	4KV BUS T11A TO 480V PRESSURIZER HEATER BUS SUPPLY TRANSFORMER TR11A PHA SUPPLY BREAKER
3	1-T11A7	WEST CCW PUMP PP-10W SUPPLY BREAKER
3	1-T11A8	WEST CENTRIFUGAL CHARGING PUMP PP-50W SUPPLY BREAKER
3	1-T11A9	4KV BUS 1A TO 4KV BUS T11A TIE BREAKER
3	1-T11B	4KV BUS T11B
3	1-T11B1	4KV BUS 1B TO 4KV BUS T11B TIE BREAKER
3	1-T11B2	CIRCUIT BREAKER FROM 69KV BUS TO BUS T11B
3	1-T11B4	AB EMERG DIESEL GENERATOR TO 4KV BUS T11 SUPPLY BREAKER
3	1-T11C	4KV BUS T11C
3	1-T11C1	4KV BUS 1C TO 4KV BUS T11C TIE BREAKER
3	1-T11C2	CIRCUIT BREAKER-4KV FROM 69KV TO BUS T11C
3	1-T11C3	CD EMERG DIESEL GENERATOR TO 4KV BUS T11C SUPPLY BREAKER
3	1-T11D	4KV BUS T11D

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
3	1-T11D1	CIRCUIT BREAKER 4KV FROM 69KV FEED TO BUS T11D
3	1-T11D10	EAST ESS SERVICE WATER PUMP 1-PP-7E SUPPLY BREAKER
3	1-T11D11	EAST MOTOR DRIVEN AUXILLARY FEED WATER PUMP PP-3E SUPPLY BREAKER
3	1-T11D12	4KV BUS 1D TO 4KV BUS T11D TIE BREAKER
3	1-T11D2	600V BUS 11D SUPPLY TRANSFORMER TR11D SUPPLY BREAKER
3	1-T11D3	CIRCUIT BREAKER-4KV EAST CCW PUMP-1E SUPPLY BREAKER
3	1-T11D4	EAST CONTAINMENT SPRAY PUMP PP-9E SUPPLY BREAKER
3	1-T11D5	NORTH SAFETY INJECTION PUMP PP-26N SUPPLY BREAKER
3	1-T11D6	EAST RHR PUMP PP-35E SUPPLY BKR
3	1-T11D7	EAST CENTRIFUGAL CHARGING PUMP 1-PP-50E SUPPLY BREAKER
3	1-T11D8	CD EMERG DIESEL GENERATOR TO 4KV BUS T11D SUPPLY BREAKER
3	1-T11D9	4KV BUS T11D TO 480V PRESSURIZER HEATER BUS SUPPLY TRANSFORMER TR11PHC SUPPLY BREAKER
4	1-CRID-I-CVT	10KVA TRANSFORMER-CONSTANT VOLTAGE
4	1-CRID-II-CVT	120V AC CR INST DISTR CH-II ISOL. CONT. VOLT TRANSF
4	1-CRID-III-CVT	10KVA ISOLIMITER -CONSTANT VOLTAGE -TRANSFORMER
4	1-CRID-IV-CVT	10KVA ISOLIMITER- CONSTANT VOLTAGE- TRANSFORMER
4	1-DGAB-FFCKT	AB EMERGENCY DIESEL GENERATOR OME-150-AB FIELD FLASH CIRCUIT TRANSFORMER
4	1-DGCD-FFCKT	CD EMERGENCY DIESEL GENERATOR OME-150-CD FIELD FLASH CKT TRANSFORMER
4	1-TR-AFW	AUXILIARY FEEDWATER 120/208VAC DIST PNL AFW SUPPLY TRANSFORMER
4	1-TR-ELSC	120/208 VAC EMERGENCY LOCAL SHUTDOWN DISTRIBUTION TRANSFORMER
4	1-TR11A	600VAC BUS 11A SUPPLY TRANSFORMER
4	1-TR11B	600VAC BUS 11B SUPPLY TRANSFORMER
4	1-TR11C	600VAC BUS 11C SUPPLY TRANSFORMER
4	1-TR11D	600VAC BUS 11D SUPPLY TRANSFORMER
5	1-PP-10E	EAST CCW PUMP
5	1-PP-10W	WEST CCW PUMP
5	1-PP-26N	NORTH SAFETY INJECTION PUMP
5	1-PP-26S	SOUTH SAFETY INJECTION PUMP
5	1-PP-3E	EAST MOTOR DRIV AUX FEEDWATER PUMP
5	1-PP-3W	WEST MOTOR DRIVEN AUX FEEDWATER PUMP
5	1-PP-4	TURBINE DRIV AUX FEEDWATER PUMP
5	1-PP-46-1	BORIC ACID STORAGE TANKS TRANSFER PUMP 1
5	1-PP-46-2	BORIC ACID STORAGE TANKS TRANSFER PUMP 2
5	1-PP-49	RECIPROCATING CHARGING PUMP
5	1-PP-50E	EAST CENTRIFUGAL CHARGING PUMP
5	1-PP-50W	WEST CENTRIFUGAL CHARGING PUMP
5	1-PP-82N	CONTROL ROOM NORTH CHILL WATER CIRCULATION PUMP
5	1-PP-82S	CONTROL A/C SOUTH CHILL WATER CIRCULATION PUMP
5	1-QT-106-AB1	AB EMERGENCY DIESEL FUEL OIL TRANSFER PUMP #1
5	1-QT-106-AB2	AB EMERGENCY DIESEL FUEL OIL TRANSFER PUMP #2
5	1-QT-106-CD1	CD EMERG DIESEL FUEL OIL TRANSFER PUMP 1
5	1-QT-106-CD2	CD EMERG DIESEL FUEL OIL TRANSFER PUMP 2
5	1-QT-111-AB	AB EMERG DIESEL LUBE OIL BEFORE AND AFTER PUMP
5	1-QT-111-CD	CD EMERG DIESEL LUBE OIL BEFORE AND AFTER PUMP
5	1-QT-117-AB	AB EMERG DIESEL LUBE OIL HEATER QT-116-AB PUMP
5	1-QT-117-CD	CD EMERG DIESEL LUBE OIL HEATER QT-116-CD PUMP
5	1-QT-119-AB	AB EMERG DIESEL LUBE OIL FILTER (QT-118-AB) PUMP
5	1-QT-119-CD	CD EMERG DIESEL BYPASS LUBE OIL FILTER (QT-118-CD) PUMP
5	1-QT-130-AB1	AB EMERG DIESEL JACKET WATER PUMP 1
5	1-QT-130-AB2	AB EMERG DIESEL JACKET WATER PUMP 2
5	1-QT-130-CD1	CD EMERG DIESEL JACKET WATER PUMP 1
5	1-QT-130-CD2	CD EMERG DIESEL JACKET WATER PUMP 2
5	1-QT-135-AB	AB EMERG DIESEL AUX JACKET WATER PUMP

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

<u>EQUIPMENT</u>	<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
	5	1-QT-135-CD	CD EMERG DEISEL AUX JACKET WATER PUMP
	5	12-PP-10	SPARE CCW PUMP
	5	12-PP-31N	NORTH SPENT FUEL PIT PUMP
	6	1-PP-35E	EAST RHR PUMP
	6	1-PP-35W	WEST RHR PUMP
	6	1-PP-7E	EAST ESW PUMP
	6	1-PP-7W	WEST ESW PUMP
	6	1-PP-9E	EAST CONTAINMENT SPRAY PUMP
	6	1-PP-9W	WEST CONTAINMENT SPRAY PUMP
	7	1-CRV-410	DEMINERALIZED MAKEUP WATER TO CCW SURGE TANK 'A' 1.5" AIR OPERATED SHUTOFF VALVE
	7	1-CRV-411	DEMINERALIZED MAKEUP WATER TO CCW SURGE TANK 'B' 1.5" AIR OPERATED SHUTOFF VALVE
	7	1-DCR-301	STEAM GENERATOR 1 BLOWDOWN SAMPLE DSR-301 CONTAINMENT ISOLATION VALVE
	7	1-DCR-302	STEAM GENERATOR 2 BLOWDOWN SAMPLE DSR-302 CONTAINMENT ISOLATION VALVE
	7	1-DCR-303	STEAM GENERATOR 3 BLOWDOWN SAMPLE DSR-303 CONTAINMENT ISOLATION VALVE
	7	1-DCR-304	STEAM GENERATOR 4 BLOWDOWN SAMPLE DSR-304 CONTAINMENT ISOLATION VALVE
	7	1-DCR-310	STEAM GENERATOR OME-3-1 BLOWDOWN CONTAINMENT ISOLATION VALVE
	7	1-DCR-320	STEAM GENERATOR OME-3-2 BLOWDOWN CONTAINMENT ISOLATION VALVE
	7	1-DCR-330	STEAM GENERATOR OME-3-3 BLOWDOWN CONTAINMENT ISOLATION VALVE
	7	1-DCR-340	STEAM GENERATOR OME-3-4 BLOWDOWN CONTAINMENT ISOLATION VALVE
	7	1-DRV-407	MAIN STEAM LEADS CONDENSATION DRAIN TANK TK-200, OUTLET SHUTOFF VALVE
	7	1-FRV-245	WEST MOTOR DRIV AUX FEEDWATER PUMP PP-3W 2" AIR OPERATED TEST VALVE
	7	1-FRV-247	WEST MOTOR DRIV AUX FEEDWATER PUMP PP-3W EMERG 1" AIR OPERATED LEAKOFF GLOBE VALVE
	7	1-FRV-255	EAST MOTOR DRIV AUX FEEDWATER PUMP PP-3E 2" AIR OPERATED TEST VALVE
	7	1-FRV-256	TURBINE DRIV AUX FEED PUMP PP-4 2" AIR OPERATED TEST VALVE
	7	1-FRV-257	EAST MOTOR DRIV AUX FEEDWATER PUMP PP-3E EMERG 1" AIR OPERATED LEAKOFF VALVE
	7	1-FRV-258	TURBINE DRIV AUX FEED PUMP EMERG 1" AIR OPERATED LEAKOFF GLOBE VALVE
	7	1-GCR-314	NITROGEN SUPPLY TO ACCUMULATOR TANKS CONTAINMENT ISOLATION VALVE
	7	1-GRV-341	NITROGEN SUPPLY TO ACCUMULATOR TANKS VENT TO ATMOS. VALVE
	7	1-HV-AES-1D1	AUX BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-1 CHARCOAL FILTER BYPASS DAMPER 1
	7	1-HV-AES-1D2	AUX BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-1 CHARCOAL FILTER BYPASS DAMPER 2
	7	1-HV-AES-1D3	AUX BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-1 CHARCOAL FILTER FACE DAMPER
	7	1-HV-AES-2D1	AUX BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-2 CHARCOAL FILTER BYPASS DAMPER 1
	7	1-HV-AES-2D2	AUX BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-2 CHARCOAL FILTER BYPASS DAMPER 2
	7	1-HV-AES-2D3	AUX BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-2 CHARCOAL FILTER FACE DAMPER
	7	1-HV-SGR-MD-1	CONTROL ROD DRIVE EQUIP ROOM AND INVERTER AREA VENTILATION RECIRCULATING AIR INLET DAMPER
	7	1-HV-SGR-MD-2	CONTROL ROD DRIVE EQUIP ROOM AND INVERTER AREA VENTILATION RECIRCULATING AIR INLET DAMPER
	7	1-IRV-112	ACCUMULATOR TANK OME-6-1 NITROGEN SUPPLY VENT VALVE
	7	1-IRV-116	ACCUMULATOR TANK OME-6-1 AIR OPERATED OUTLET TO REACTOR COOLANT LOOP #1 COLD LEG TEST VALVE
	7	1-IRV-122	ACCUMULATOR TANK OME-6-2 NITROGEN SUPPLY VENT VALVE
	7	1-IRV-126	ACCUMULATOR TANK OME-6-2 AIR OPERATED OUTLET AND SI TO RC LOOP 2 COLD LEG TEST VALVE
	7	1-IRV-132	ACCUMULATOR TANK OME-6-3 NITROGEN SUPPLY VENT VALVE
	7	1-IRV-136	ACCUMULATOR TANK OME-6-3 OUTLET AND SI TO RC LOOP 3 COLD LEG AIR OPERATED TEST VALVE
	7	1-IRV-142	ACCUMULATOR TANK OME-6-4 NITROGEN SUPPLY VENT VALVE
	7	1-IRV-146	ACCUMULATOR TANK OME-6-4 AIR OPERATED OUTLET AND SI TO RC LOOP 4 COLD LEG TEST VALVE
	7	1-IRV-147	WEST RHR AND SOUTH SI TO RC LOOPS 2 AND 3 AIR OPERATED TEST VALVE
	7	1-IRV-148	EAST RHR AND NORTH SI TO RC LOOPS 1 AND 4 AIR OPERATED TEST VALVE
	7	1-IRV-149	WEST RHR TO REACTOR COOLANT LOOPS 2 AND 3 0.75" AIR OPERATED TEST VALVE
	7	1-IRV-150	EAST RHR TO REACTOR COOLANT LOOPS 1 AND 4 0.75" AIR OPERATED TEST VALVE
	7	1-IRV-260	SAFETY INJECTION TEST LINE SHUTOFF 0.75" AIR OPERATED VALVE
	7	1-IRV-310	EAST RHR HEAT EXCHANGER HE-17E 8" AIR OPERATED OUTLET FLOW CONTROL VALVE
	7	1-IRV-311	RHR HEAT EXCHANGERS BYPASS FLOW 8" AIR OPERATED CONTROL VALVE
	7	1-IRV-320	WEST RHR HEAT EXCHANGER HE-17W 8" AIR OPERATED OUTLET FLOW CONTROL VALVE
	7	1-IRV-50	BORON INJECTION TO ACCUMULATOR FILL LINE 1" AIR OPERATED CONTROL VALVE

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT		EQUIPMENT DESCRIPTION
CLASS	DEVICE NUMBER	
7	1-IRV-60	SAFETY INJECTION TO ACCUMULATOR FILL LINE 1" AIR OPERATED CONTROL VALVE
7	1-MCR-251	STEAM GENERATOR 1 STEAM SAMPLE MSX-101 0.5" AIR OPERATED CONTAINMENT ISOLATION VALVE
7	1-MCR-252	STEAM GENERATOR 2 STEAM SAMLPE MSX-102 0.5" AIR OPERATED CONTAINMENT ISOLATION VALVE
7	1-MCR-253	STEAM GENERATOR 3 STEAM SAMPLE MSX-103 0.5" AIR OPERATED CONTAINMENT ISOLATION VALVE
7	1-MCR-254	STEAM GENERATOR 4 STEAM SAMPLE MSX-104 0.5" AIR OPERATED CONTAINMENT ISOLATION VALVE
7	1-MRV-151	STEAM GENERATOR 1 STEAM SAMPLE MSX-101 0.5" AIR OPERATED CONTAINMENT ISOLATION VALVE
7	1-MRV-152	STEAM GENERATOR 2 STEAM SAMPLE MSX-102 0.5" AIR OPERATED CONTAINMENT ISOLATION VALVE
7	1-MRV-153	STEAM GENERATOR 3 STEAM SAMPLE MSX-103 0.5" AIR OPERATED CONTAINMENT ISOLATION VALVE
7	1-MRV-154	STEAM GENERATOR 4 STEAM SAMPLE MSX-104 0.5" AIR OPERATED CONTAINMENT ISOLATION VALVE
7	1-MRV-211	STEAM GENERATOR 1 STOP VALVE MRV-210 STEAM CYLINDER 'A' DUMP VALVE
7	1-MRV-212	STEAM GENERATOR 1 STOP VALVE MRV-212 STEAM CYLINDER 'B' DUMP VALVE
7	1-MRV-213	STEAM GENERATOR OME-3-1 PORV
7	1-MRV-221	STEAM GENERATOR 2 STOP VALVE MRV-220 STEAM CYLINDER 'A' DUMP VALVE
7	1-MRV-222	STEAM GENERATOR 2 STOP VALVE MRV-220 STEAM CYLINDER 'B' DUMP VALVE
7	1-MRV-223	STEAM GENERATOR OME-3-2 PORV
7	1-MRV-231	STEAM GENERATOR 3 STOP VALVE MRV-230 STEAM CYLINDER 'A' DUMP VALVE
7	1-MRV-232	STEAM GENERATOR 3 STOP VALVE MRV-230 STEAM CYLINDER 'B' DUMP VALVE
7	1-MRV-233	STEAM GENERATOR OME-3-3 PORV
7	1-MRV-241	STEAM GENERATOR 4 STOP VALVE MRV-240 STEAM CYLINDER 'A' DUMP VALVE
7	1-MRV-242	STEAM GENERATOR 4 STOP VALVE MRV-240 STEAM CYLINDER 'B' DUMP VALVE
7	1-MRV-243	STEAM GENERATOR OME-3-4 PORV
7	1-NRV-101	REACTOR COOLANT LOOP 1 HOT LEG SAMPLE NSX-101 SHUTOFF VALVE
7	1-NRV-102	PRESSURIZER LIQUID SPACE SAMPLE NSX-102 0.5" AIR OPERATED SHUTOFF VALVE
7	1-NRV-103	REACTOR COOLANT LOOP 3 HOT LEG SAMPLE NSV-103 SHUTOFF VALVE
7	1-NRV-104	PRESSURIZER STEAM SPACE SAMPLE NSX-104 0.5" AIR OPERATED SHUTOFF VALVE
7	1-NRV-151	PRESSURIZER 'B' PRESSURE RELIEF VALVE
7	1-NRV-152	PRESSURIZER 'B' PRESSURE RELIEF VALVE
7	1-NRV-153	PRESSURIZER 'A' PRESSURE RELIEF VALVE
7	1-NRV-163	REACTOR COOLANT LOOP 3 TO PRESSURIZER 4" AIR OPERATED VALVE
7	1-NRV-164	REACOR COOLANT LOOP 4 TO PRESSURIZER SPRAY 4" AIR OPERATED CONTROL VALVE
7	1-QRV-10	RCP 1 SEAL 1 LEAKOFF TO RCP SEAL WATER RETURN FILTER QC-109 2" AIR OPERATED SHUTOFF VALVE
7	1-QRV-111	REACTOR COOLANT NORMAL LETDOWN TRAIN 'A' SHUTOFF VALVE
7	1-QRV-112	REACTOR COOLANT NORMAL LETDOWN TRAIN 'B' SHUTOFF VALVE
7	1-QRV-113	RC EXCESS LETDOWN TO EXCESS LETDOWN HEAT EXCHANGER HE-13 AIR OPERATED 'B' SHUTOFF VALVE
7	1-QRV-114	RC EXCESS LETDOWN TO EXCESS LETDOWN HEAT EXCHANGER HE-13 AIR OPERATED 'A' SHUTOFF VALVE
7	1-QRV-150	RCPS STARTUP SEAL SYSTEM BYPASS TO SEAL WATER RETURN FILTER QC-109 SHUTOFF VALVE
7	1-QRV-170	EXCESS LETDOWN HEAT EXCHANGER HE-13 1" AIR OPERATED OUTLET PRESSURE CONTROL VALVE
7	1-QRV-171	EXCESS LETDOWN HEAT EXCHANGER HE-13 1" AIR OPERATED OUTLET DIVERSION VALVE
7	1-QRV-20	RCP 2 SEAL 1 LEAKOFF TO RCP SEAL WATER RETURN FILTER QC-109 2" AIR OPERATED SHUTOFF VALVE
7	1-QRV-251	SEAL INJECTION WATER FLOW 2" AIR OPERATED CONTROL VALVE
7	1-QRV-30	RCP 3 SEAL 1 LEAKOFF TO RCP SEAL WATER RETURN FILTER QC-109 2" AIR OPERATED SHUTOFF VALVE
7	1-QRV-40	RCP 4 SEAL 1 LEAKOFF TO RCP RETURN FILTER QC-109 2" AIR OPERATED SHUTOFF VALVE
7	1-QRV-400	NORTH BORIC ACID BLENDER QP-21 2" AIR OPERATED TO CVCS CHARGING PUMP SUCTION SHUTOFF VALVE
7	1-QRV-411	NORTH BA FILTER TO CVCS CHARGING PUMPS AND NORTH BA BLENDER AIR OPERATED FLOW CONTROL VALVE
7	1-QRV-451	NORTH BORIC ACID BLENDER QP-21 TO REACTOR COOLANT LETDOWN VOLUME CONTROL TANK SHUTOFF VALVE
7	1-WRV-761	EAST ESW PUMP PP-7E DISCHARGE STRAINER EAST BASKET BACKWASH OUTLET SHUTOFF VALVE
7	1-WRV-762	WEST ESW PUMP PP-7W DISCHARGE STRAINER EAST BASKET BACKWASH OUTLET SHUTOFF VAVLE
7	1-WRV-766	EAST ESW PUMP DISCHARGE STRAINER EAST BASKET BACKWASH 4" AIR OPERATED INLET SHUTOFF VALVE
7	1-WRV-767	WEST ESW PUMP DISCHARGE STRAINER EAST BASKET BACKWASH INLET 4" AIR OPERATED SHUTOFF VALVE
7	1-WRV-771	EAST ESW PUMP PP-7E DISCHARGE STRAINER WEST BASKET BACKWASH OUTLET SHUTOFF VALVE
7	1-WRV-772	WEST ESW PUMP PP-7W DISCHARGE STRAINER WEST BASKET BACKWASH SHUTOFF VALVE
7	1-WRV-776	EAST ESW PUMP DISCHARGE STRAINER WEST BASKET BACKWASH INLET 4" AIR OPERATED SHUTOFF VALVE
7	1-WRV-777	WEST ESW PUMP DISCHARGE STRAINER WEST BASKET BACKWASH INLET 4" AIR OPERATED SHUTOFF VALVE

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
7	1-XRV-220	AB EMERG DIESEL STARTING AIR JET ASSIST CONTROL VALVE
7	1-XRV-221	AB EMERG DIESEL FRONT BANK STARTING AIR SHUTOFF VALVE
7	1-XRV-222	AB EMERG DIESEL REAR BANK STARTING AIR SHUTOFF VALVE
7	1-XRV-225	CD EMERG DIESEL STARTING AIR JET ASSIST CONTROL VALVE
7	1-XRV-226	CD EMERG DIESEL FRONT BANK STARTING AIR SHUTOFF VALVE
7	1-XRV-227	CD EMERG DIESEL REAR BANK STARTING AIR SHUTOFF VALVE
7	12-CRV-51	UNIT 1 AND 2 CONDENSATE STORAGE TANK CROSSTIE 8" AIR OPERATED SHUTOFF VALVE
7	12-QRV-410	NORTH BAST TK-12N 2" AIR OPERATED INLET FLOW CONTROL VALVE
7	12-QRV-420	MIDDLES BAST TK-12M 2" AIR OPERATED INLET FLOW CONTROL VALVE
8	1-CCM-451	RCPS BEARING OIL COOLERS CCW RETURN HEADER 'A' CONTAINMENT MOTOR OPERATED VALVE
8	1-CCM-452	RC PUMPS BEARING OIL COOLERS CCW RETURN HEADER 'B' CONTAINMENT 8" MOTOR OPERATED VALVE
8	1-CCM-453	RCP THERMAL BARRIER CCW OUTLET 'A' CONTAINMENT 4" MOTOR OPERATED ISOLATION VALVE
8	1-CCM-454	RC PUMPS THERMAL BARRIER CCW RETURN HEADER 'B' CONTAINMENT 4" MOTOR OPERATED VALVE
8	1-CCM-458	CCW TO REACTOR COOLANT PUMPS TRAIN 'A' CONTAINMENT ISOLATION VALVE
8	1-CCM-459	CCW TO REACTOR COOLANT PUMPS TRAIN 'B' CONTAINMENT ISOLATION VALVE
8	1-CMO-410	EAST CCW TO HEAT EXCHANGER HE-15E CCW OUTLET SHUTOFF VALVE
8	1-CMO-411	CCW PUMPS SUCTION CROSSTIE HEADER 'A' 18" MOTOR OPERATED SHUTOFF VALVE
8	1-CMO-412	CCW PUMPS DISCHARGE CROSSTIE HEADER 'A' 16" MOTOR OPERATED SHUTOFF VALVE
8	1-CMO-413	CCW PUMPS SUCTION CROSSTIE HEADER 'B' 18" MOTOR OPERATED SHUTOFF VALVE
8	1-CMO-414	CCW PUMPS DISCHARGE CROSSTIE HEADER 'A' 16" MOTOR OPERATED SHUTOFF VALVE
8	1-CMO-415	CCW TO MISCELANEOUS SERVICE HEADER 'A' 16" MOTOR OPERATED SHUTOFF VALVE
8	1-CMO-416	CCW TO MISCELANEOUS SERVICE HEADER 'B' 16" MOTOR OPERATED SHUTOFF VALVE
8	1-CMO-419	EAST RHR HEAT EXCHANGER HE-17E CCW OUTLET SHUTOFF VALVE
8	1-CMO-420	WEST CCW TO HEAT EXCHANGER HE-15W CCW OUTLET SHUTOFF VALVE
8	1-CMO-429	WEST RHR HEAT EXCHANGER HE-17W CCW OUTLET SHUTOFF VALVE
8	1-FMO-211	TDAPPUMP PP-4 DISCHARGE TO SG OME-3-1 MOTOR OPERATED CONTROL VALVE
8	1-FMO-212	WEST MDAFPUMP PP-3W SUPPLY TO SG OME-3-1 MOTOR OPERATED CONTROL VALVE
8	1-FMO-221	TDAPPUMP PP-4 DISCHARGE TO STEAM GENERATOR OME-3-2 MOTOR OPERATED CONTROL VALVE
8	1-FMO-222	EAST MDAFPUMP PP-3E SUPPLY TO STEAM GENERATOR OME 3-2 MOTOR OPERATED CONTROL VALVE
8	1-FMO-231	TDAPP-4 PUMP SUPPLY TO STEAM GENERATOR OME 3-3 MOTOR OPERATED CONTROL VALVE
8	1-FMO-232	EAST MDAFPUMP PP-3E SUPPLY TO STEAM GENERATOR 3-3 MOTOR OPERATED CONTROL VALVE
8	1-FMO-241	TDAPPUMP PP-4 DISCHARGE TO STEAM GENERATOR OME-3-4 MOTOR OPERATED CONTROL VALVE
8	1-FMO-242	WEST MDAFPUMP PP-3W SUPPLY TO STEAM GENERATOR 3-4 MOTOR OPERATED CONTROL VALVE
8	1-HV-DDP-AB1	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FAN HV-DGX-1 TEMPERING AIR DAMPER
8	1-HV-DDP-AB2	DIESEL GENERATOR ROOM 1AB VENTILATION SUPPLY FAN HV-DGS-1 TEMPERING AIR DAMPER 1-HV-DDP-AB2
8	1-HV-DDP-CD1	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FAN HV-DGX-2 TEMPERING AIR DAMPER
8	1-HV-DDP-CD2	DIESEL GEN ROOM 1 CD VENTILATION SUPPLY FAN 1-HV-DGS-2 TEMPERING AIR DAMPER 1-HV-DDP-CD2
8	1-HV-DGS-DAB	AB EDG ROOM VENTILATION SUPPLY FAN HV-DGS-1 OUTSIDE AIR SHUTOFF DAMPER
8	1-HV-DGS-DCD	CD EDG ROOM VENTILATION SUPPLY FAN HV-DGS-2 OUTSIDE AIR SHUTOFF DAMPER
8	1-HV-SGR-MD-3	4KV ROOM 600V SWGR XFORMERS TR11A & TR11C AREA VENT SUPPLY FAN HV-SGRS-8 SUCTION DAMPER
8	1-HV-SGR-MD-4	4KV ROOM 600V SWGR XFORMERS AREA VENTILATION SUPPLY FAN HV-SGRS-7 SUCTION DAMPER
8	1-HV-SGR-MD-5	600VAC MOTOR CONTROL CENTER MEZZANINE AREA VENTILATION SUPPLY FAN HV-SGRS-9 VENT DAMPER
8	1-ICM-111	RHR TO REACTOR COOLANT LOOPS 2 AND 3 COLD LEGS CONTAINMENT ISOLATION VALVE
8	1-ICM-129	REACTOR COOLANT LOOP 2 HOT LEG TO RHR PUMPS SUCTION CONTAINMENT ISOLATION VALVE
8	1-ICM-250	BORON INJECTION TANK 'A' CONTAINMENT ISOLATION VALVE
8	1-ICM-251	BORON INJECTION TANK 'B' CONTAINMENT ISOLATION VALVE
8	1-ICM-260	NORTH SAFETY INJECTION PUMP PP-26N DISCHARGE CONTAINMENT ISOLATION 4" MOTOR OPERATED VALVE
8	1-ICM-265	SOUTH SAFETY INJECTION PUMP PP-26S DISCHARGE CONTAINMENT ISOLATION 4" MOTOR OPERATED VALVE
8	1-ICM-305	RECIRC SUMP TO EAST RHR/CTS PUMPS SUCTION CONTAINMENT ISOLATION 18" MOTOR OPERATED VALVE
8	1-ICM-306	RECIRC SUMP TO WEST RHR/CTS PUMPS SUCTION CONTAINMENT ISOLATION 18" MOTOR OPERATED VALVE
8	1-ICM-311	EAST RHR TO RC LOOPS 1 AND 4 HOT LEGS CONTAINMENT ISOLATION 8" MOTOR OPERATED VALVE
8	1-ICM-321	WEST RHR TO RC LOOPS 2 AND 3 HOT LEGS CONTAINMENT ISOLATION 8" MOTOR OPERATED VALVE
8	1-IMO-128	REACTOR COOLANT LOOP 2 HOT LEG TO RHR PUMPS SUCTION SHUTOFF VALVE

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT		EQUIPMENT DESCRIPTION
CLASS	DEVICE NUMBER	
8	1-IMO-210	EAST CONTAINMENT SPRAY PUMP PP-9E DISCHARGE SHUTOFF 10" MOTOR OPERATED VALVE
8	1-IMO-211	EAST CONTAINMENT SPRAY PUMP PP-9E DISCHARGE SHUTOFF 10" MOTOR OPERATED VALVE
8	1-IMO-212	EAST CS PUMP PP-9E DISCHARGE TO CS ADDITIVE EDUCTOR 2" MOTOR OPERATED SHUTOFF VALVE
8	1-IMO-215	RWST TO EAST CONTAINMENT SPRAY PUMP PP-9E SUCTION 12" MOTOR OPERATED SHUTOFF VALVE
8	1-IMO-220	WEST CONTAINMENT SPRAY PUMP PP-9W DISCHARGE SHUTOFF 10" MOTOR OPERATED VALVE
8	1-IMO-221	WEST CONTAINMENT SPRAY PUMP PP-9W DISCHARGE SHUTOFF 10" MOTOR OPERATED VALVE
8	1-IMO-222	WEST CS PUMP PP-9W DISCHARGE TO CS ADDITIVE EDUCTOR SHUTOFF 2" MOTOR OPERATED VALVE
8	1-IMO-225	RWST TO WEST CONTAINMENT SPRAY PUMP PP-9W SUCTION 12" MOTOR OPERATED SHUTOFF VALVE
8	1-IMO-255	BORON INJECTION TANK 'A' INLET SHUTOFF VALVE
8	1-IMO-256	BORON INJECTION TANK 'B' INLET SHUTOFF VALVE
8	1-IMO-261	TK-33 SUPPLY TO SAFETY INJECTION PUMP SHUTOFF 8" MOTOR OPERATED VALVE
8	1-IMO-262	SI PUMPS RECIRC TO RWST TK-33 TRAIN 'A' SHUTOFF 2" MOTOR OPERATED VALVE
8	1-IMO-263	SI PUMPS RECIRC TO RWST TK-33 TRAIN 'B' SHUTOFF 2" MOTOR OPERATED VALVE
8	1-IMO-270	SAFETY INJECTION PUMPS DISCHARGE CROSSTIE TRAIN 'A' SHUTOFF 4" MOTOR OPERATED VALVE
8	1-IMO-275	SAFETY INJECTION PUMPS DISCHARGE CROSSTIE TRAIN 'B' SHUTOFF 4" MOTOR OPERATED VALVE
8	1-IMO-310	EAST RHR PUMP PP-35E SUCTION SHUTOFF 14" MOTOR OPERATED VALVE
8	1-IMO-312	EAST RHR HEAT EXCHANGER HE-17E OUTLET MINI-FLOW LINE SHUTOFF VALVE
8	1-IMO-314	EAST RHR PUMP PP-35E DISCHARGE CROSSTIE SHUTOFF 8" MOTOR OPERATED VALVE
8	1-IMO-315	EAST RHR AND NORTH SAFETY INJECTION TO REACTOR COOLANT LOOPS 1 AND 4 HOT LEGS SHUTOFF VALVE
8	1-IMO-316	EAST RHR AND NORTH SI TO RC LOOPS 1 AND 4 COLD LEGS SHUTOFF 8" MOTOR OPERATED VALVE
8	1-IMO-320	WEST RHR PUMP PP-35W SUCTION SHUTOFF 14" MOTOR OPERATED VALVE
8	1-IMO-322	WEST RHR HEAT EXCHANGER HE-17W OUTLET MINI-FLOW LINE SHUTOFF VALVE
8	1-IMO-324	WEST RHR PUMP PP-35W DISCHARGE CROSSTIE SHUTOFF 8" MOTOR OPERATED VALVE
8	1-IMO-325	WEST RHR AND SOUTH SAFETY INJECTION TO REACTOR COOLANT LOOPS 2 AND 3 HOT LEGS SHUTOFF VALVE
8	1-IMO-326	WEST RHR AND SOUTH SI TO RC LOOPS 2 AND 3 COLD LEGS SHUTOFF 8" MOTOR OPERATED VALVE
8	1-IMO-330	EAST RHR TO UPPER CONTAINMENT SPRAY SHUTOFF 8" MOTOR OPERATED VALVE
8	1-IMO-331	WEST RHR TO UPPER CONTAINMENT SPRAY SHUTOFF 8" MOTOR OPERATED VALVE
8	1-IMO-340	EAST RHR HEAT EXCHANGER TO CHARGING PUMPS SUCTION SHUTOFF 8" MOTOR OPERATED VALVE
8	1-IMO-350	WEST RHR HEAT EXCHANGER OUTLET TO SI PUMP SUCTION SHUTOFF 8" MOTOR OPERATED VALVE
8	1-IMO-360	SAFETY INJECTION PUMPS TO CVCS CHARGING PUMPS SUCTION HEADER CROSSTIE SHUTOFF VALVE
8	1-IMO-361	SI PUMPS SUCTION TO AND FROM CHARGING PUMPS SUCTION 'A' SHUTOFF 4" MOTOR OPERATED VALVE
8	1-IMO-362	SI PUMPS SUCTION TO AND FROM CHARGING PUMP 'B' SHUTOFF 4" MOTOR OPERATED VALVE
8	1-IMO-390	RWST TK-33 TO RHR PUMPS SUCTION SHUTOFF 12" MOTOR OPERATED VALVE
8	1-IMO-51	BORON INJECTION TO REACTOR COOLANT LOOP 1 SHUTOFF 1.5" MOTOR OPERATED VALVE
8	1-IMO-52	BORON INJECTION TO REACTOR COOLANT LOOP 2 SHUTOFF 1.5" MOTOR OPERATED VALVE
8	1-IMO-53	BORON INJECTION TO REACTOR COOLANT LOOP 3 SHUTOFF 1.5" MOTOR OPERATED VALVE
8	1-IMO-54	BORON INJECTION TO REACTOR COOLANT LOOP 4 SHUTOFF 1.5" MOTOR OPERATED VALVE
8	1-IMO-910	RWST TO CHARGING PUMP SUCTION SHUTOFF VALVE
8	1-IMO-911	RWST TO CHARGING PUMP SUCTION SHUTOFF VALVE
8	1-LSO-240	AB EMERG DIESEL UPPER VALVE GEAR LUBRICATION CONTROL SOLENOID 1
8	1-LSO-241	AB EMERG DIESEL UPPER VALVE GEAR LUBRICATION CONTROL SOLENOID 2
8	1-LSO-245	CD EMERG DIESEL GENERATOR UPPER VALVE GEAR LUBRICATION CONTROL SOLENOID 1
8	1-LSO-246	CD EMERG DIESEL GENERATOR UPPER VALVE GEAR LUBRICATION CONTROL SOLENOID 2
8	1-MCM-221	MAIN STEAM LEAD 2 TO AUX FEED PUMP TURBINE 4" MOTOR OPERATED SHUTOFF VALVE
8	1-MCM-231	MAIN STEAM LEAD 3 TO AUX FEED PUMP TURBINE 4" MOTOR OPERATED SHUTOFF VALVE
8	1-MMO-210	STEAM STOP VALVE MRV-210 STEAM CYLINDER DUMP 4" MOTOR OPERATED VALVES SELECTOR VALVE
8	1-MMO-220	STEAM STOP VALVE MRV-220 STEAM CYLINDER DUMP 4" MOTOR OPERATED VALVES SELECTOR VALVE
8	1-MMO-230	STEAM STOP VALVE MRV-230 STEAM CYLINDER DUMP VALVES 4" MOTOR OPERATED SELECTOR VALVE
8	1-MMO-240	STEAM STOP VALVE MRV-240 STEAM CYLINDER DUMP VALVE 4" MOTOR OPERATED SELECTOR VALVE
8	1-NMO-151	PRESSURIZER RELIEF VALVE NRV-151 UPSTREAM 3" MOTOR OPERATED SHUTOFF VALVE
8	1-NMO-152	PRESSURIZER RELIEF VALVE NRV-152 UPSTREAM 3" MOTOR OPERATED SHUTOFF VALVE
8	1-NMO-153	PRESSURIZER RELIEF VALVE NRV-153 3" MOTOR OPERATED UPSTREAM SHUTOFF VALVE
8	1-NSO-21	REACTOR VESSEL HEAD VENT 1" SOLENOID VALVE

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
8	1-NSO-22	REACTOR VESSEL HEAD VENT 1" SOLENOID VALVE
8	1-NSO-23	REACTOR VESSEL HEAD VENT 1" SOLENOID VALVE
8	1-NSO-24	REACTOR VESSEL HEAD VENT 1" SOLENOID VALVE
8	1-NSO-61	PRESSURIZER OME-4 POST ACCIDENT VENT 'A' SOLENOID VALVE
8	1-NSO-62	PRESSURIZER OME-4 POST-ACCIDENT VENT 'A' SOLENOID VALVE
8	1-NSO-63	PRESSURIZER OME-4 POST-ACCIDENT VENT 'B' SOLENOID VALVE
8	1-NSO-64	PRESSURIZER OME-4 POST-ACCIDENT VENT 'B' SOLENOID VALVE
8	1-QCM-250	RCP SEAT WATER RETURN 'A' CONTAINMENT ISOLATION 4" MOTOR OPERATED VALVE
8	1-QCM-350	RCP SEAL WATER RETURN 'B' CONTAINMENT ISOLATION 4" MOTOR OPERATED VALVE
8	1-QMO-200	CHARGING TO REGENERATIVE HEAT EXCHANGER 'A' SHUTOFF VALVE
8	1-QMO-201	CHARGING TO REGENERATE HEAT EXCHANGER 'B' SHUTOFF VALVE
8	1-QMO-225	EAST CHRGING PUMP MINI FLOW TO RCP SEAL WATER HEAT EXCHANGER SHUTOFF VALVE
8	1-QMO-226	WEST CHRGING PUMP MINI FLOW TO RCP SEAL WATER HEAT EXCHANGER SHUTOFF VALVE
8	1-QMO-410	EMERG. BORATION TO CHARGING PUMP SUCTION SHUTOFF VALVE
8	1-QMO-451	RC LETDOWN VOLUME CONTROL TANK TK-10 TO CHARGING PUMP 'A' SHUTOFF MOTOR OPERATED VALVE
8	1-QMO-452	RC LETDOWN VOLUME CONTROL TANK TK-10 TO CHARGING PUMP 'B' SHUTOFF MOTOR OPERATED VALVE
8	1-QT-506	TURBINE DRIV AUX FEED PUMP PP-4 TRIP AND THROTTLE VALVE
8	1-WMO-701	EAST ESW PUMP PP-7E DISCHARGE SHUTOFF VALVE
8	1-WMO-702	WEST ESW PUMP PP-7W DISCHARGE SHUTOFF VALVE
8	1-WMO-705	WEST ESW SUPPLY HEADER CROSSTIE TO UNIT 2 20" MOTOR OPERATED SHUTOFF VALVE
8	1-WMO-707	EAST ESW SUPPLY HEADER CROSSTIE TO UNIT 2 20" MOTOR OPERATED SHUTOFF VALVE
8	1-WMO-711	EAST CONTAINMENT SPRAY HEAT EXCHANGER HE-18E ESW INLET 12" MOTOR OPERATED SHUTOFF VALVE
8	1-WMO-713	EAST CONTAINMENT SPRAY HEAT EXCHANGER ESW OUTLET SHUTOFF VALVE
8	1-WMO-715	WEST CONTAINMENT SPRAY HEAT EXCHANGER HE-18W ESW INLET 12" MOTOR OPERATED SHUTOFF VALVE
8	1-WMO-717	WEST CONTAINMENT SPRAY HEAT EXCHANGER ESW OUTLET SHUTOFF VALVE
8	1-WMO-721	WEST ESW SUPPLY HEADER TO AB EMERG DIESEL HEAT EXCHANGER SHUTOFF VALVE
8	1-WMO-723	EAST ESW SUPPLY HEADER TO AB EMERG DIESEL HEAT EXCHANGER SHUTOFF VALVE
8	1-WMO-725	EAST ESW SUPPLY HEADER TO CD EMERG DIESEL HEAT EXCHANGER SHUTOFF VALVE
8	1-WMO-727	WEST ESW SUPPLY HEADER TO CD EMERG DIESEL HEAT EXCHANGER SHUTOFF VALVE
8	1-WMO-731	EAST CCW HEAT EXCHANGER HE-15E ESW INLET 16" MOTOR OPERATED SHUTOFF VALVE
8	1-WMO-733	EAST CCW HEAT EXCHANGER HE 15E ESW OUTLET SHUTOFF VALVE
8	1-WMO-735	WEST CCW HEAT EXCHANGER HE-15W ESW INLET 16" MOTOR OPERATED SHUTOFF VALVE
8	1-WMO-737	WEST CCW HEAT EXCHANGER HE-15W ESW OUTLET SHUTOFF VALVE
8	1-WMO-744	(ESW TO WEST MOTOR DRIV AUX FEEDWATER PUMP) SHUTOFF 4" MOTOR OPERATED VALVE
8	1-WMO-753	(ESW TO TURB DRIV AUX FEED PUMP PP-4) SHUTOFF 6" MOTOR OPERATED VALVE
8	1-WMO-754	(ESW TO EAST MOTOR DRIV AUX FEED PUMP) SHUTOFF 4" MOTOR OPERATED VALVE
9	1-HV-AES-1	AUX BUILDING VENTILATION ENGINEERED SAFETY FEATURE EXHAUST UNIT 1
9	1-HV-AES-1 (FLT)	AUX BUILDING VENTILATION ENGINEERED SAFETY FEATURE EXHAUST AIR FILTER UNIT #1
9	1-HV-AES-2	AUX BUILDING VENTILATION ENGINEERED SAFETY FEATURE EXHAUST UNIT 2
9	1-HV-AES-2 (FLT)	AUX BUILDING VENTILATION ENGINEERED SAFETY FEATURE EXHAUST AIR FILTER UNIT #2
9	1-HV-AFP-BRE-1	'N' BATTERY ROOM EAST EXHAUST FAN
9	1-HV-AFP-BRE-2	TR. 'N' BATTERY ROOM WEST EXHAUST FAN
9	1-HV-AFP-M1	EAST MOTOR DRIV AUX FEEDWATER PUMP ROOM EXHAUST FAN
9	1-HV-AFP-M2	EAST MOTOR DRIV AUX FEED WATER PUMP ROOM SUPPLY FAN
9	1-HV-AFP-T1	TURB DRIV AUX FEED PUMP ROOM SOUTH EXHAUST FAN
9	1-HV-AFP-T2	TURBINE DRIV AUX FEED PUMP ROOM NORTH EXHAUST FAN
9	1-HV-AFP-X1	WEST MOTOR DRIV AUX FEED PUMP ROOM EAST EXHAUST FAN
9	1-HV-AFP-X2	WEST MOTOR DRIV AUX FEEDWATER PUMP ROOM WEST EXHAUST FAN
9	1-HV-CEQ-1	CONTAINMENT HYDROGEN SKIMMER VENTILATION FAN 1
9	1-HV-CEQ-2	CONTAINMENT HYDROGEN SKIMMER VENTILATION FAN 2
9	1-HV-DGS-1	AB EMERG DIESEL GENERATOR VENTILATION SUPPLY FAN
9	1-HV-DGS-2	CD EMERG DIESEL GENERATOR ROOM VENTILATION SUPPLY FAN
9	1-HV-DGS-3	AB EMERG DIESEL GENERATOR ROOM CONTROL PANEL VENTILATION SUPPLY FAN

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT		
CLASS	DEVICE NUMBER	EQUIPMENT DESCRIPTION
9	1-HV-DGS-4	CD EMERG DIESEL GENERATOR ROOM CONTROL PANEL VENTILATION SUPPLY FAN
9	1-HV-DGX-1	AB EMERG DIESEL GENERATOR ROOM VENTILATION EXHAUST FAN
9	1-HV-DGX-2	CD EMERG DIESEL GENERATOR VENTILATION EXHAUST FAN
9	1-HV-SGRS-1A	CONTROL ROD DRIVE EQUIPMENT ROOM AND INVERTER AREA VENTILATION SOUTH SUPPLY FAN
9	1-HV-SGRS-2	4KV ROOM AB 4KV SWITCHGEAR AREA VENTILATION SUPPLY FAN
9	1-HV-SGRS-3	4KV ROOM CD 4KV SWITCHGEAR AREA VENTILATION SUPPLY FAN
9	1-HV-SGRS-4A	CONTROL ROD DRIVE EQUIP ROOM AND INVERTER AREA VENTILATION NORTH SUPPLY FAN
9	1-HV-SGRS-7	4KV ROOM 600V SWITCHGEAR TRANSFORMER TR-11B AND TR-11D AREA VENTILATION SUPPLY FAN
9	1-HV-SGRS-8	4KV ROOM 600V SWITCHGEAR TRANSFORMERS TR11A AND TR11C AREA VENTILATION SUPPLY FAN
9	1-HV-SGRS-9	600VAC MOTOR CONTROL CENTER MEZZANINE AREA VENTILATION SUPPLY FAN
9	1-HV-SGRX-2	4KV ROOM AB 4KV SWITCHGEAR AREA VENTILATION EXHAUST FAN
9	1-HV-SGRX-3	4KV ROOM CD 4KV SWITCHGEAR AREA VENTILATION EXHAUST FAN
9	1-HV-SGRX-5	AB BATTERY EQUIPMENT AREA BATTERY ROOM VENTILATION EXHAUST FAN
9	1-HV-SGRX-6	CD BATTERY EQUIPMENT AREA BATTERY ROOM VENTILATION EXHAUST FAN
9	12-HV-ACCP-1	CCW PUMPS VENTILATION NORTH SUPPLY FAN
9	12-HV-ACCP-2	CCW PUMPS VENTILATION MIDDLE SUPPLY FAN
9	12-HV-ACCP-3	CCW PUMPS VENTILATION SOUTH SUPPLY FAN
9	12-HV-ESW-5	UNIT 1 WEST ESW PUMP ROOM SUPPLY VENTILATION FAN
9	12-HV-ESW-6	UNIT 1 WEST ESW PUMP ROOM SUPPLY VENTILATION FAN
9	12-HV-ESW-7	UNIT #1 EAST ESW PUMP ROOM SUPPLY VENTILATION FAN
9	12-HV-ESW-8	UNIT 1 ESW PUMP ROOM SUPPLY VENTILATION FAN
10	1-HV-ACRA-1	CONTROL ROOM VENTILATION NORTH AIR HANDLER PACKAGE
10	1-HV-ACRA-2	CONTROL ROOM VENTILATION SOUTH AIR HANDLER PACKAGE
11	1-HV-ACR-1	CONTROL ROOM NORTH LIQUID CHILLER PACKAGE
11	1-HV-ACR-2	CONTROL ROOM "SOUTH" LIQUID CHILLER PACKAGE
14	1-AFW	POWER PANEL
14	1-AFWX	120/208 VAC AUXILIARY FEEDWATER DISTR PNL
14	1-CCV-AB	POWER PANEL
14	1-CCV-CD	250VDC TRAIN 'A' CRITICAL SOLENOID VALVES DISTRIBUTION PANEL
14	1-CRAB	POWER PANEL
14	1-CRCD	POWER PANEL
14	1-CRID-I	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION CH-I
14	1-CRID-II	120V AC CONTROL ROOM INSTRUMENT DISTRIBUTION CH-II
14	1-CRID-III	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION CH-III
14	1-CRID-IV	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION CH-IV
14	1-DCN	250VDC POWER PANEL
14	1-ELSC	POWER PANEL
14	1-ELSCX	120/208VAC EMERG LOCAL SHUTDOWN AUXILIARY DISTRIBUTION PANEL
14	1-MCAB	250V DC DISTRIBUTION PANEL MCAB
14	1-MCCD	250V DC DISTRIBUTION POWER PANEL
14	1-MDAB	250 VDC POWER PANEL
14	1-MDCD	POWER PANEL
14	1-SSV-A1	250VDC TRAIN 'A' NUCLEAR SAMPLING FEEDER PANEL #1
14	1-SSV-A2	250VDC NUCLEAR SAMPLING FEEDER PANEL #2
14	1-SSV-B	POWER PANEL
14	1-TDAB	250 VDC POWER PANEL
14	1-TDCD	POWER PANEL, TRAIN A TRANSFER CABINET
14	1-VDAB-1	250V DC VALVE DISTRIBUTION PANEL VDAB-1
14	1-VDAB-2	250V DC VALVE DISTRIBUTION PANEL VDAB-2
14	1-VDCD-1	250V DC VALVE DISTRIBUTION PANEL VDCD-1
14	1-VDCD-2	250V DC DISTRIBUTION PANEL VDCD-2
15	1-BATT-AB	PLANT BATT AB
15	1-BATT-CD	PLANT BATT CD

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
15	1-BATT-N	TRAIN N PLANT BATTERY
16	1-BC-A	BATTERY CHARGER 'A' FOR 'N' TRAIN BATTERY
16	1-BC-AB1	PLANT BATT BATT-AB BATTERY CHARGER #1
16	1-BC-AB2	PLANT BATTERY BATT-AB CHARGER #2
16	1-BC-B	BATTERY CHARGER 'B' FOR 'N' TRAIN BATTERY
16	1-BC-CD1	PLANT BATTERY BATT-CD CHARGER #1
16	1-BC-CD2	PLANT BATTERY BATT-CD CHARGER #2
16	1-CRID-I-INV	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CH-I INVERTER
16	1-CRID-II-INV	120V AC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CH-II INVERTER
16	1-CRID-III-INV	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CH-III INVERTER
16	1-CRID-IV-INV	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CH-IV INVERTER
16	1-DGAB-INV	AB EMERGENCY DIESEL GENERATOR OME-150-AB INVERTER
16	1-DGCD-INV	DIESEL GENERATOR INVERTER
17	1-OME-150-AB	AB EMERG DIESEL GENERATOR
17	1-OME-150-CD	CD EMERG DIESEL GENERATOR
18	1-BLI-110	STEAM GENERATOR OME-3-1 WIDE RANGE LEVEL INDICATOR TRANSMITTER
18	1-BLI-120	STEAM GENERATOR OME-3-2 WIDE RANGE LEVEL TRANSMITTER
18	1-BLI-130	STEAM GENERATOR OME-3-3 WIDE RANGE LEVEL INDICATOR TRANSMITTER
18	1-BLI-140	STEAM GENERATOR OME-3-4 WIDE RANGE LEVEL INDICATOR TRANSMITTER
18	1-CLI-113	CONDENSATE STORAGE TANK TK-32 LEVEL INDICATOR TRANSMITTER
18	1-CLI-114	CONDENSATE STORAGE TANK TK-32 LEVEL INDICATOR TRANSMITTER
18	1-CPS-312	AB EMERG DIESEL JACKET WATER PUMP QT-130-AB1 DISCHARGE PRESSURE SWITCH
18	1-CPS-314	AB EMERG DIESEL JACKET WATER PUMP QT-130-AB2 DISCHARGE PRESSURE SWITCH
18	1-CPS-317	CD EMERG DIESEL JACKET WATER PUMP QT-130-CD1 DISCHARGE PRESSURE SWITCH
18	1-CPS-319	CD EMERG DIESEL JACKET WATER PUMP QT-130-CD2 DISCHARGE PRESSURE SWITCH
18	1-CPS-410	EAST CCW PUMP PP-110E DISCHARGE PRESSURE SWITCH
18	1-CPS-420	WEST CCW PUMP PP-10W DISCHARGE PRESSURE SWITCH
18	1-FFI-210	AUX FEEDWATER TO STEAM GENERATOR OME-3-1 FLOW INDICATOR TRANSMITTER
18	1-FFI-220	AUX FEEDWATER TO STEAM GENERATOR OME-3-2 FLOW INDICATOR TRANSMITTER
18	1-FFI-230	AUX FEEDWATER TO STEAM GENERATOR OME-3-3 FLOW INDICATOR TRANSMITTER
18	1-FFI-240	AUX FEEDWATER TO STEAM GENERATOR OME-3-4 FLOW INDICATOR TRANSMITTER
18	1-IFI-310	EAST RHR HEAT EXCHANGER HE-17E OUTLET LOW RANGE FLOW INDICATOR TRANSMITTER
18	1-IFI-311	EAST RHR HEAT EXCHANGER HE-17E OUTLET HIGH RANGE FLOW INDICATOR TRANSMITTER
18	1-IFI-320	WEST RHR HEAT EXCHANGER HE-17W OUTLET LOW RANGE FLOW INDICATOR TRANSMITTER
18	1-IFI-321	WEST RHR HEAT EXCHANGER HE-17W OUTLET HIGH RANGE FLOW INDICATOR TRANSMITTER
18	1-IFI-335	RHR TO REACTOR COOLANT LOOPS 2 AND 3 COLD LEGS FLOW INDICATING TRANSMITTER
18	1-IFI-51	BORON INJECTION TO REACTOR COOLANT LOOP #1 FLOW INDICATOR TRANSMITTER
18	1-IFI-52	BORON INJECTION TO RC LOOP #2 FLOW INDICATOR TRANSMITTER
18	1-IFI-53	BORON INJECTION TO RC LOOP #3 FLOW INDICATOR TRANSMITTER
18	1-IFI-54	BORON INJECTION TO RC LOOP #4 FLOW INDICATOR TRANSMITTER
18	1-ILS-950	RWST TK-33 EXTREME LOW LEVEL TRANSMITTER
18	1-ILS-951	RWST TK-33 LEVEL TRANSMITTER
18	1-LLS-120	AB EMERG DIESEL FUEL OIL DAY TANK QT-107-AB HIGH LEVEL SWITCH 1
18	1-LLS-121	AB EMERG DIESEL FUEL OIL DAY TANK QT-107-AB LOW LEVEL SWITCH 1
18	1-LLS-122	AB EMERG DIESEL FUEL OIL DAY TANK QT-107-AB HIGH LEVEL SWITCH 2
18	1-LLS-123	AB EMERG DIESEL FUEL OIL DAY TANK QT-107-AB LOW LEVEL SWITCH 2
18	1-LLS-125	CD EMERG DIESEL FUEL OIL DAY TANK QT-107-CD HIGH LEVEL SWITCH 1
18	1-LLS-126	CD EMERG DIESEL FUEL OIL DAY TANK QT-107-CD LOW LEVEL SWITCH 1
18	1-LLS-127	CD EMERG DIESEL FUEL OIL DAY TANK QT-107-CD HIGH LEVEL SWITCH 2
18	1-LLS-128	CD EMERG DIESEL FUEL OIL DAY TANK QT-107-CD LOW LEVEL SWITCH 2
18	1-MPP-210	STEAM GENERATOR OME-3-1 CHANNEL I STEAM PRESSURE TRANSMITTER
18	1-MPP-212	STEAM GENERATOR OME-3-1 CHANNEL IV REACTOR PROTECTION INPUT STEAM PRESSURE TRANSMITTER
18	1-MPP-220	STEAM GENERATOR OME-3-2 CHANNEL I STEAM PRESSURE TRANSMITTER

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
18	1-MPP-222	STEAM GENERATOR OME-3-2 CHANNEL III REACTOR PROTECTION INPUT STEAM PRESSURE TRANSMITTER
18	1-MPP-230	STEAM GENERATOR OME-3-3 CHANNEL I STEAM PRESSURE TRANSMITTER
18	1-MPP-232	STEAM GENERATOR OME-3-3 CHANNEL III REACTOR PROTECTION INPUT STEAM PRESSURE TRANSMITTER
18	1-MPP-240	STEAM GENERATOR OME-3-4 CHANNEL I STEAM PRESSURE TRANSMITTER
18	1-MPP-242	STEAM GENERATOR OME-3-4 CHANNEL IV REACTOR PROTECTION INPUT STEAM PRESSURE TRANSMITTER
18	1-NLI-151	PRESSURIZER LEVEL INDICATOR TRANSMITTER
18	1-NLP-151	PRESSURIZER (OME-4) LEVEL TRANSMITTER
18	1-NLP-152	PRESSURIZER (OME-4) LEVEL TRANSMITTER
18	1-NLP-153	PRESSURIZER (OME-4) LEVEL TRANSMITTER
18	1-NPP-151	PRESSURIZER (OME-4) LEVEL TRANSMITTER
18	1-NPP-152	PRESSURIZER (OME-4) PRESSURE TRANSMITTER
18	1-NPP-153	PRESSURIZER (OME-4) PRESSURE TRANSMITTER
18	1-NPS-121	REACTOR COOLANT LOOP 2 HOT LEG WIDE RANGE PRESSURE TRANSMITTER
18	1-NPS-122	REACTOR COOLANT LOOP 1 HOT LEG WIDE RANGE PRESSURE TRANSMITTER
18	1-NRI-21	NUCLEAR INST. WIDE RANGE RADIATION DETECTOR
18	1-NRI-23	NUCLEAR INST. SOURCE RANGE RADIATION DETECTOR
18	1-PPP-301	LOWER CONT. CH. III PRESSURE PROTECTION TRANSMITTER
18	1-PPP-302	LOWER CONTAINMENT CHANNEL II PRESSURE PROT. TRANSMITTER
18	1-PPP-303	LOWER CONTAINMENT CHANNEL I PRESSURE PROTECTION TRANSMITTER
18	1-QFA-210	RCP WATER INJECTION TO RCP PP-45-1 LOW FLOW ALARM TRANSMITTER
18	1-QFA-220	RCP SEAL WATER INJECTION TO RCP 2 LOW FLOW ALARM TRANSMITTER
18	1-QFA-230	RCP SEAL WATER INJECTION TO RCP 3 LOW FLOW ALARM TRANSMITTER
18	1-QFA-240	RCP SEAL WATER TO RCP 4 LOW FLOW ALARM TRANSMITTER
18	1-QFI-200	CVCS CHG PPS DISCH FLOW INDICATOR
18	1-QLC-451	REACTOR COOLANT LETDOWN VCT TK-10 EXTREME HIGH LEVEL CONTROL TRANSMITTER
18	1-QLC-452	REACTOR COOLANT LETDOWN VCT TK-10 HIGH LEVEL CONTROL TRANSMITTER
18	1-WDS-701	EAST ESW PUMP PP-7E DISCHARGE STRAINER OME-34E HIGH DIFFERENTIAL PRESSURE SWITCH
18	1-WDS-702	WEST ESW PUMP PP-7W DISCHARGE STRAINER OME-34W HIGH DIFFERENTIAL PRESSURE SWITCH
18	1-WPS-701	EAST ESW SUPPLY HEADER PRESSURE SWITCH
18	1-WPS-705	WEST ESW SUPPLY HEADER PRESSURE SWITCH
18	1-XPS-300	AB EMERGENCY DIESEL FRONT BANK AIR CHEST EXTREME HIGH PRESSURE SWITCH
18	1-XPS-305	CD EMERGENCY DIESEL FRONT BANK AIR CHEST EXTREME HIGH PRESSURE SWITCH
18	12-CPS-430	SPARE CCW PUMP DISCHARGE PRESSURE SWITCH
18	12-RLA-500	SPENT FUEL PIT HIGH/LOW LEVEL ALARM SWITCH
19	1-CTR-415	EAST CCW HEAT EXCHANGER HE-15E CCW OUTLET TEMPERATURE RECORDER THERMAL SENSOR
19	1-CTR-425	WEST CCW HEAT EXCHANGER HE-15W CCW OUTLET TEMPERATURE RECORDER THERMAL SENSOR
19	1-ITR-335	RHR TO REACTOR COOLANT LOOP 2 AND 3 COLD LEGS TEMP RECORDER THERMAL SENSOR
19	1-NTR-110	REACTOR COOLANT LOOP 1 HOT LEG WIDE RANGE TEMP RECORDER THERMAL SENSOR
19	1-NTR-120	REACTOR COOLANT LOOP 2 HOT LEG WIDE RANGE TEMP RECORDER THERMAL SENSOR
19	1-NTR-130	REACTOR COOLANT LOOP 3 HOT LEG WIDE RANGE TEMP RECORDER THERMAL SENSOR
19	1-NTR-140	REACTOR COOLANT LOOP 4 HOT LEG WIDE RANGE TEMP RECORDER THERMAL SENSOR
19	1-NTR-210	REACTOR COOLANT LOOP 1 COLD LEG WIDE RANGE TEMP RECORDER THERMAL SENSOR
19	1-NTR-220	REACTOR COOLANT LOOP 2 COLD LEG WIDE RANGE TEMP RECORDER THERMAL SENSOR
19	1-NTR-230	REACTOR COOLANT LOOP 3 COLD LEG WIDE RANGE TEMP RECORDER THERMAL SENSOR
19	1-NTR-240	REACTOR LOOP 4 COLD LEG WIDE RANGE TEMP RECORDER THERMAL SENSOR
19	1-VTS-201	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP ROOM EXHAUST FAN HV-AFP-M1 THERMAL SENSOR
19	1-VTS-203	TURBINE DRIVEN AUXILIARY FEED PUMP ROOM NORTH EXHAUST FAN HV-AFP-T1 THERMAL SENSOR
19	1-VTS-204	TURBINE DRIVEN AUXILIARY FEED PUMP ROOM SOUTH EXHAUST FAN HV-AFP-T2 THERMAL SENSOR
19	1-VTS-206	WEST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP ROOM WEST EXHAUST FAN HV-AFP-X2 THERMAL SENSOR
19	1-VTS-340	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION FANS OUTSIDE AIR THERMOSTAT
19	1-VTS-341	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION FANS HV-DGX-1 AND HV-DGS-1 THERMOSTAT
19	1-VTS-345	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION FANS OUTSIDE AIR THERMOSTAT
19	1-VTS-346	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION FANS HV-DGX-2 AND HV-DGS-2 THERMOSTAT

UNIT 1 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
19	1-VTS-350	CRDM EQUIP ROOM AND INV AREA VENT SOUTH SUPPLY FAN HV-SGRA-1A TEMPERATURE SWITCH
19	1-VTS-351	CRDM EQUIP ROOM AND INV AREA VENT SOUTH SUPPLY FAN HV-SGRS-1A TEMPERATURE SWITCH
19	1-VTS-352	4KV ROOM 600 VOLT SWGR XFMS TR11B AND TR11D AREA VENT SUPPLY FAN HV-SGRS-7 TEMP SWITCH
19	1-VTS-353	600VAC MOTOR CONTROL CENTER MEZZANINE AREA VENT SUPPLY FAN SGRS-9 TEMPERATURE SWITCH
19	1-VTS-354	CRDM EQUIP ROOM AND INV AREA OUTSIDE AIR INLET DAMPER HV-SGR-MD-1 AND 2 TEMP SWITCH
19	1-VTS-355	CRID AND CRDM INV AREA VENT AIR INLET DAMPER HV-SGR-MD-1 AND 2 TEMP SWITCH
19	1-VTS-356	CNTRL ROD DRIVE EQUIP ROOM AND INV AREA VENT NORTH SUPPLY FAN HV-SGRS-4A TEMP SWITCH
19	1-VTS-357	CRDM EQUIP ROOM AND INV AREA VENT NORTH SUPPLY FAN HV-SGRS-4A TEMPERATURE SWITCH
19	1-VTS-802	4KV ROOM AB 4KV SWITCHGEAR AREA VENTILATION SUPPLY FAN HV-SGRS-2 THERMAL SENSOR
19	1-VTS-803	4KV ROOM CD 4KV SWITCHGEAR AREA VENTILATION SUPPLY FAN HV-SGRS-3 THERMAL SENSOR
19	1-VTS-805	4KV ROOM 600V SWGR XFMS TR11B AND TR11D AREA VENT EXHAUST FAN HV-SGRS-7 TEMP SWITCH
19	1-VTS-808	4KV ROOM 600VAC SWGR XFMS TR11A AND TR11C AREA VENT SUPPLY FAN HV-SGRS-8 TEMP SWITCH
19	12-RTA-500	SPENT FUEL PIT TEMPERATURE ALARM THERMAL SENSOR
19	12-RTI-500	SPENT FUEL PIT TEMPERATURE INDICATOR THERMAL SENSOR
19	12-VTS-706	UNIT 1 WEST ESSTIAL SERVICE WATER PUMP ROOM TEMPERATURE SWITCH THERMAL SENSOR
19	12-VTS-708	UNIT 1 EAST ESSENTIAL SERVICE WATER PUMP ROOM TEMPERATURE SWITCH THERMAL SENSOR
0	1-HV-ACFD-1	PLANT PROCESS COMPUTER ROOM VENTILATIOON EXHAUST NORTH FIRE DAMPER
0	1-HV-ACFD-2	PLANT PROCESS COMPUTER ROOM VENTILATION EXHAUST SOUTH FIRE DAMPER
0	1-HV-ACFD-3	CONTROL ROOM VENT UNITS HV-ACRA-1 AND HV-ACRA-2 TO PLANT PROCESS COMPUTER ROOM FIRE DAMPER
0	1-HV-DGS-FD-1	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FIRE DAMPER
0	1-HV-DGS-FD-2	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FIRE DAMPER
0	1-HV-DGX-FD-1	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FIRE DAMPER
0	1-HV-DGX-FD-2	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FIRE DAMPER
0	1-MRV-210	STEAM GENERATOR OME-3-1 STOP VALVE
0	1-MRV-220	STEAM GENERATOR OME3-2 STOP VALVE
0	1-MRV-230	STEAM GENERATOR OME-3-3 STOP VALVE
0	1-MRV-240	STEAM GENERATOR OME-3-4 STOP VALVE
0	1-OME-34E	EAST ESW PUMP PP-7E DISCHARGE STRAINER
0	1-OME-34W	WEST ESW PUMP PP-7W DISCHARGE STRAINER
0	1-QT-100-AB	AB EMERG DIESEL AIR INTAKE FILTER
0	1-QT-100-CD	CD EMERG DIESEL AIR INTAKE FILTER
0	1-QT-118-AB	AB EMERG DIESEL BYPASS LUBE OIL FILTER
0	1-QT-118-CD	CD EMERG DIESEL BYPASS LUBE OIL FILTER

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
1	2-AB-A	600VAC MOTOR CONTROL CENTER AB-A
1	2-AB-D	600VAC MOTOR CONTROL CENTER AB-D
1	2-AB-N	CONTROL CENTER VALVE
1	2-ABD-A	600VAC MOTOR CONTROL CENTER ABD-A
1	2-ABD-B	600VAC MOTOR CONTROL CENTER ABD-B
1	2-ABD-C	600VAC MOTOR CONTROL CENTER ABD-C
1	2-ABD-D	600VAC MOTOR CONTROL CENTER ABD-D
1	2-ABV-A	600VAC VALVE CONTROL CENTER ABV-A
1	2-ABV-D	600VAC VALVE CONTROL CENTER ABV-D
1	2-AM-A	600VAC MOTOR CONTROL CENTER AM-A
1	2-AM-D	600VAC MOTOR CONTROL CENTER AM-D
1	2-AZV-A	600VAC VALVE CONTROL CENTER AZV-A
1	2-EZC-A	600VAC MOTOR CONTROL CENTER EZC-A
1	2-EZC-B	600VAC MOTOR CONTROL CENTER EZC-B
1	2-EZC-C	600VAC MOTOR CONTROL CENTER EZC-C
1	2-EZC-D	600VAC MOTOR CONTROL CENTER EZC-D
1	2-PS-A	600VAC MOTOR CONTROL CENTER PS-A
1	2-PS-D	600VAC MOTOR CONTROL CENTER PS-D
2	2-21A	600V BUS 21A
2	2-21A1	REACTOR ROD CONTROL SOUTH MOTOR-GENERATOR SET CRDMG-2S SUPPLY BREAKER
2	2-21A10	WEST TURBINE AUXILIARY COOLING WATER PUMP PP-14W SUPPLY BREAKER
2	2-21A11	600VAC BUS 21A SUPPLY BREAKER
2	2-21A2	600VAC MCC AM-A SUPPLY BREAKER
2	2-21A4	SOUTH PLANT LIGHTING TRANSFORMER TR-LTG-9S SUPPLY BREAKER
2	2-21A5	600VAC MCC ABD-A SUPPLY BREAKER
2	2-21A6	600VAC MCCS AB-A, PS-A, TTP-A, AND VCCS ABV-A, AZV-A SUPPLY BREAKER
2	2-21A8	600VAC HCC2-BHT-A SUPPLY BREAKER
2	2-21A9	600VAC MCC EZC-A SUPPLY BREAKER
2	2-21AC	600V BUS 21A TO 600V BUS 21C TIE BREAKER
2	2-21B	600V BUS 21B
2	2-21B1	600VAC MCC ABD-B SUPPLY BREAKER (2-ELSC)
2	2-21B10	PLANT AIR COMPRESSOR OME-41 SUPPLY BREAKER
2	2-21B11	600VAC BUS 21B SUPPLY BREAKER
2	2-21B12	SOUTH NON-ESSENTIAL SERVICE WATER PUMP PP-8S SUPPLY BREAKER
2	2-21B13	TURBINE ROOM INDUCTION HEATING, STRESS RELIEF AND BOLT HEATERS SUPPLY BREAKER
2	2-21B2	600VAC MCC EZC-B SUPPLY BREAKER
2	2-21B3	600V BUS 21B SPARE CIRCUIT BREAKER
2	2-21B5	600V MOTOR CONTROL CENTERS TBG-BW AND TBP-BN SUPPLY BREAKER
2	2-21B6	EAST TURBINE AUXILIARY COOLING WATER PUMP PP-14E SUPPLY BREAKER
2	2-21BD	600V BUS 21B TO 600V BUS 21D TIE BREAKER
2	2-21C	600V BUS 21C
2	2-21C1	600V BUS 21C SUPPLY BREAKER
2	2-21C10	600VAC MCC ABD-C AND 2-AFW SUPPLY BREAKER
2	2-21C11	600V BUS 21C SPARE CIRCUIT BREAKER
2	2-21C12	SOUTH SPENT FUEL PIT PUMP 12-PP-31S SUPPLY BREAKER
2	2-21C13	RECIPROCATING CHARGING PUMP PP-49 SUPPLY BREAKER
2	2-21C14	FIRE PROTECTION WATER HIGH DEMAND PUMP PP-11 SUPPLY BREAKER
2	2-21C16	600VAC MOTOR CONTROL CENTER TBC-CN SUPPLY BREAKER
2	2-21C17	NORTH NON-ESSENTIAL SERVICE WATER PUMP PP-8N SUPPLY BREAKER
2	2-21C18	MAIN TURBINE AUXILIARY LUBE OIL PUMP QT-201 SUPPLY BREAKER
2	2-21C2	CONTAINMENT POLAR CRANE QM-4 SUPPLY BREAKER
2	2-21C3	600V BUS 21C SPARE CIRCUIT BREAKER
2	2-21C4	CIRCULATING WATER TRAVELING SCREEN SOUTH WASH PUMP PP-15S SUPPLY BREAKER

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

<u>EQUIPMENT</u>	<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
	2	2-21C6	600VAC MCC EZC-C SUPPLY BREAKER
	2	2-21C7	600V BUS 21C SPARE CIRCUIT BREAKER
	2	2-21C8	PLANT AND CNTMT STANDBY LIGHTING TRANSFORMER TR-LTG-8 SUPPLY BREAKER
	2	2-21C9	MAIN AND SPARE TRANSFORMER AUXILIARIES NORMAL DISTRIBUTION CABINET TCSN SUPPLY BREAKER
	2	2-21D	600V BUS 21D
	2	2-21D1	600V BUS 21D SUPPLY BREAKER
	2	2-21D10	NORTH PLANT LIGHTING TRANSFORMER TR-LTG-9N SUPPLY BREAKER
	2	2-21D11	600VAC HCC 2-BHT-D SUPPLY BREAKER
	2	2-21D13	REACTOR ROD CONTROL NORTH MOTOR-GENERATOR SET CRDMG-2N SUPPLY BREAKER
	2	2-21D14	600VAC MCC 2-AB-D, VCC 2-ABV-D, MCC 2-PS-D SUPPLY BREAKER
	2	2-21D3	CONTAINMENT LIGHTING TRANSFORMER TR-LTG-10 SUPPLY BREAKER
	2	2-21D4	600V BUS 21D SPARE CIRCUIT BREAKER
	2	2-21D5	600VAC MCC ABD-D SUPPLY BREAKER
	2	2-21D6	600VAC MCC EZC-D SUPPLY BREAKER
	2	2-21D8	600VAC MCC AM-D SUPPLY BREAKER
	2	2-21D9	MAIN AND SPARE TRANSFORMER AUXILIARIES EMERGENCY DISTRIBUTION CABINET TCSE SUPPLY BREAKER
	2	2-52-BYA	REACTOR ROD CONTROL TR-A REACTOR TRIP BYPASS CIRCUIT BREAKER
	2	2-52-BYB	REACTOR ROD CONTROL TRAIN B REACTOR TRIP BYPASS CIRCUIT BREAKER
	2	2-52-RTA	REACTOR ROD CONTROL TRAIN 'A' REACTOR TRIP CIRCUIT BREAKER
	2	2-52-RTB	REACTOR ROD CONTROL TRAIN 'B' REACTOR TRIP CIRCUIT BREAKER
	3	2-T21A	4KV BUS T21A SWITCHGEAR
	3	2-T21A1	SOUTH SAFETY INJECTION PUMP SUPPLY BREAKER
	3	2-T21A10	600V BUS 21A SUPPLY TRANSFORMER TR21A SUPPLY BREAKER
	3	2-T21A11	AB EMERGENCY DIESEL GENERATOR TO 4KV BUS T21A SUPPLY BREAKER
	3	2-T21A12	CIRCUIT BREAKER FROM 69KV TO BUS T21A
	3	2-T21A2	WEST MOTOR DRIVEN AUX FEEDWATER PUMP PP-3W SUPPLY BREAKER
	3	2-T21A3	WEST CONTAINMENT SPRAY PUMP SUPPLY BREAKER
	3	2-T21A4	WEST RESIDUAL HEAT REMOVAL PUMP PP-35W SUPPLY BREAKER
	3	2-T21A5	WEST ESSENTIAL SERVICE WATER PUMP PP-7W SUPPLY BREAKER
	3	2-T21A6	PRESSURIZER HEATER TRANSFORMER SUPPLY BREAKER
	3	2-T21A7	WEST COMPONENT COOLING WATER PUMP PP-10W SUPPLY BREAKER
	3	2-T21A8	WEST CENTRIFUGAL CHARGING PUMP PP-50W SUPPLY BREAKER
	3	2-T21A9	4KV BUS 2A TO BUS T21A TIE BREAKER
	3	2-T21B	4KV BUS T21A SWITCHGEAR
	3	2-T21B1	4KV BUS 2B TO 4KV BUS T21B TIE BREAKER
	3	2-T21B2	CIRCUIT BREAKER FROM 69KV BUS TO BUS T21B
	3	2-T21B4	AB EMERGENCY DIESEL GENERATOR TO 4KV BUS T21B SUPPLY BREAKER
	3	2-T21C	4KV BUS T21C SWITCHGEAR
	3	2-T21C1	4KV BUS 2C TO 4KV BUS T21C TIE BREAKER
	3	2-T21C2	CIRCUIT BREAKER - 4KV FROM 69KV TO BUS T21C
	3	2-T21C3	CD EMERGENCY DIESEL GENERATOR TO 4KV BUS T21C SUPPLY BREAKER
	3	2-T21D	4KV BUS T21D SWITCHGEAR
	3	2-T21D1	4KV EMERGENCY POWER BUS EP TO 4KV BUS T21D SUPPLY BREAKER
	3	2-T21D10	EAST ESSENTIAL SERVICE WATER PUMP PP-7E SUPPLY BREAKER
	3	2-T21D11	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP PP-3E SUPPLY BREAKER
	3	2-T21D12	4KV BUS 2D TO 4KV BUS T21D TIE BREAKER
	3	2-T21D2	600V BUS 21D SUPPLY TRANSFORMER TR21D SUPPLY BREAKER
	3	2-T21D3	EAST COMPONENT COOLING WATER PUMP PP-10E SUPPLY BREAKER
	3	2-T21D4	EAST CONTAINMENT SPRAY PUMP SUPPLY BREAKER
	3	2-T21D5	NORTH SAFETY INJECTION PUMP SUPPLY BREAKER
	3	2-T21D6	EAST RHR PUMP PP-35E SUPPLY BREAKER
	3	2-T21D7	EAST CENTRIFUGAL CHARGING PUMP PP-50E SUPPLY BREAKER
	3	2-T21D8	CD EMERGENCY DIESEL GENERATOR TO 4KV BUS T21D SUPPLY BREAKER

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

CLASS	DEVICE NUMBER	EQUIPMENT DESCRIPTION
3	2-T21D9	PRESSURIZER HEATER TRANSFORMER SUPPLY BREAKER
4	2-CRID-I-CVT	10KVA TRANSFORMER - CONSTANT VOLTAGE
4	2-CRID-II-CVT	120V AC CR INST DISTR CH-II ISOL CONT VOLT TRANSFORMER
4	2-CRID-III-CVT	10KVA ISOLIMITER - CONSTANT VOLTAGE - TRANSFORMER
4	2-CRID-IV-CVT	10KVA ISOLIMITER - CONSTANT VOLTAGE - TRANSFORMER
4	2-DGAB-FFCKT	AB EMERGENCY DIESEL GENERATOR OME-150-AB FIELD FLASH CIRCUIT TRANSFORMER
4	2-DGCD-FFCKT	CD EMERGENCY DIESEL GENERATOR OME-150-CD FIELD FLASH CKT TRANSFORMER
4	2-TR-AFW	AUXILIARY FEEDWATER 120/208VAC DISTRIBUTION PANEL AFW SUPPLY TRANSFORMER
4	2-TR-ELSC	120/208VAC EMERGENCY LOCAL SHUTDOWN DISTRIBUTION TRANSFORMER
4	2-TR21A	600V BUS 21A SUPPLY TRANSFORMER
4	2-TR21B	600V BUS 21B SUPPLY TRANSFORMER
4	2-TR21C	600V BUS 21C SUPPLY TRANSFORMER
4	2-TR21D	600V BUS 21D SUPPLY TRANSFORMER
5	2-PP-10E	EAST COMPONENT COOLING WATER PUMP
5	2-PP-10W	WEST COMPONENT COOLING WATER PUMP
5	2-PP-26N	NORTH SAFETY INJECTION PUMP
5	2-PP-26S	SOUTH SAFETY INJECTION PUMP
5	2-PP-3E	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP
5	2-PP-3W	WEST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP
5	2-PP-4	TURBINE DRIVEN AUXILIARY FEED PUMP
5	2-PP-46-3	BORIC ACID STORAGE TANKS TRANSFER PUMP #3
5	2-PP-46-4	BORIC ACID STORAGE TANKS TRANSFER PUMP #4
5	2-PP-49	RECIPROCATING CHARGING PUMP
5	2-PP-50E	EAST CENTRIFUGAL CHARGING PUMP
5	2-PP-50W	WEST CENTRIFUGAL CHARGING PUMP
5	2-PP-82N	CONTROL ROOM AIR CONDITIONING NORTH CHILL WATER CIRCULATION PUMP
5	2-PP-82S	CONTROL ROOM AIR CONDITIONING SOUTH CHILL WATER CIRCULATION PUMP
5	2-QT-106-AB1	AB EMERGENCY DIESEL FUEL OIL TRANSFER PUMP #1
5	2-QT-106-AB2	AB EMERGENCY DIESEL FUEL OIL TRANSFER PUMP #2
5	2-QT-106-CD1	CD EMERGENCY DIESEL FUEL OIL TRANSFER PUMP #1
5	2-QT-106-CD2	CD EMERGENCY DIESEL FUEL OIL TRANSFER PUMP #2
5	2-QT-111-AB	AB EMERGENCY DIESEL LUBE OIL BEFORE AND AFTER PUMP
5	2-QT-111-CD	CD EMERGENCY DIESEL LUBE OIL BEFORE AND AFTER PUMP
5	2-QT-117-AB	AB EMERGENCY DIESEL LUBE OIL HEATER QT-116-AB PUMP
5	2-QT-117-CD	CD EMERGENCY DIESEL LUBE OIL HEATER QT-116-CD PUMP
5	2-QT-119-AB	AB EMERGENCY DIESEL BYPASS LUBE OIL FILTER QT-118-AB PUMP
5	2-QT-119-CD	CD EMERGENCY DIESEL BYPASS LUBE OIL FILTER QT-118-CD PUMP
5	2-QT-130-AB1	AB EMERGENCY DIESEL JACKET WATER PUMP #1
5	2-QT-130-AB2	AB EMERGENCY DIESEL JACKET WATER PUMP #2
5	2-QT-130-CD1	CD EMERGENCY DIESEL JACKET WATER PUMP 1
5	2-QT-130-CD2	CD EMERGENCY DIESEL JACKET WATER PUMP 2
5	2-QT-135-AB	AB EMERGENCY DIESEL AUXILIARY JACKET WATER PUMP
5	2-QT-135-CD	CD EMERGENCY DIESEL AUXILIARY JACKET WATER PUMP
5	12-PP-31S	SOUTH SPENT FUEL PIT PUMP
6	2-PP-35E	EAST RESIDUAL HEAT REMOVAL PUMP
6	2-PP-35W	WEST RESIDUAL HEAT REMOVAL PUMP
6	2-PP-7E	EAST ESSENTIAL SERVICE WATER PUMP
6	2-PP-7W	WEST ESSENTIAL SERVICE WATER PUMP
6	2-PP-9E	EAST CONTAINMENT SPRAY PUMP
6	2-PP-9W	WEST CONTAINMENT SPRAY PUMP
7	2-DCR-301	STEAM GENERATOR #1 BLOWDOWN SAMPLE DSR-301 CONTAINMENT ISOLATION VALVE
7	2-DCR-302	STEAM GENERATOR #2 BLOWDOWN SAMPLE DSR-302 CONTAINMENT ISOLATION VALVE
7	2-DCR-303	STEAM GENERATOR #3 BLOWDOWN SAMPLE DSR-303 CONTAINMENT ISOLATION VALVE

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
7	2-DCR-304	STEAM GENERATOR #4 BLOWDOWN SAMPLE DSR-304 CONTAINMENT ISOLATION VALVE
7	2-DCR-310	STEAM GENERATOR OME-3-1 BLOWDOWN CONTAINMENT ISOLATION VALVE
7	2-DCR-320	STEAM GENERATOR OME-3-2 BLOWDOWN CONTAINMENT ISOLATION VALVE
7	2-DCR-330	STEAM GENERATOR OME-3-3 BLOWDOWN CONTAINMENT ISOLATION VALVE
7	2-DCR-340	STEAM GENERATOR OME-3-4 BLOWDOWN CONTAINMENT ISOLATION VALVE
7	2-DRV-407	MAIN STEAM LEADS CONDENSATION DRAIN TANK TK-150 OUTLET SHUTOFF VALVE
7	2-FRV-245	WEST MOTOR DRIVEN AUXILIARY FEED PUMP PP-3W 2" AIR OPERATED TEST VALVE
7	2-FRV-247	WEST MOTOR DRIVEN AUXILIARY FEED PUMP PP-3W EMERGENCY 1" AIR OPERATED LEAKOFF GLOBE VALVE
7	2-FRV-255	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP PP-3E 2" AIR OPERATED TEST VALVE
7	2-FRV-256	TURBINE DRIVEN AUXILIARY FEED PUMP PP-4 2" AIR OPERATED TEST VALVE
7	2-FRV-257	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP PP-3E EMERGENCY 1" AIR OPERATED LEAKOFF VALVE
7	2-FRV-258	TURBINE DRIVEN AUXILIARY FEED PUMP EMERGENCY 1" AIR OPERATED LEAKOFF GLOBE VALVE
7	2-GCR-314	NITROGEN SUPPLY TO ACCUMULATOR TANKS CONTAINMENT ISOLATION VALVE
7	2-GRV-341	NITROGEN SUPPLY TO ACCUMULATOR TANKS VENT VALVE
7	2-HV-AES-1D1	AUXILIARY BUILDING VENTILATION ESF EXHAUST UNIT HV-AES--1 CHARCOAL FILTER BYPASS DAMPER #1
7	2-HV-AES-1D2	AUXILIARY BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-1 CHARCOAL FILTER BYPASS DAMPER #2
7	2-HV-AES-1D3	AUX BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-1 CHARCOAL FILTER FACE DAMPER
7	2-HV-AES-2D1	AUX BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-2 CHARCOAL FILTER BYPASS DAMPER #1
7	2-HV-AES-2D2	AUX BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-2 CHARCOAL FILTER BYPASS DAMPER #2
7	2-HV-AES-2D3	AUX BUILDING VENTILATION ESF EXHAUST UNIT HV-AES-2 CHARCOAL FILTER FACE DAMPER
7	2-HV-SGR-MD-1	CRDM EQUIP ROOM AND INVERTER AREA VENTILATION RECIRCULATING AIR INLET DAMPER
7	2-HV-SGR-MD-2	CRDM EQUIP ROOM AND INVERTER AREA VENTILATION OUTSIDE AIR INLET DAMPER
7	2-IRV-112	ACCUMULATOR TANK OME-6-1 NITROGEN SUPPLY/VENT VALVE
7	2-IRV-122	ACCUMULATOR TANK OME-6-2 NITROGEN SUPPLY/VENT VALVE
7	2-IRV-132	ACCUMULATOR TANK OME-6-3 NITROGEN SUPPLY/VENT VALVE
7	2-IRV-142	ACCUMULATOR TANK OME-6-4 NITROGEN SUPPLY/VENT VALVE
7	2-IRV-149	WEST RHR TO REACTOR COOLANT LOOPS #2 AND #3 0.75" AIR OPERATED TEST (GLOBE) VALVE
7	2-IRV-150	EAST RHR TO REACTOR COOLANT LOOPS #1 AND #4 0.75" AIR OPERATED TEST VALVE
7	2-IRV-156	ACCUMULATOR TANK OME-6-1 AIR OPERATED OUTLET AND SI TO RC LOOP #1 COLD LEG TEST VALVE
7	2-IRV-157	WEST RHR AND SI TO REACTOR COOLANT LOOPS #2 AND #3 AIR OPERATED TEST VALVE
7	2-IRV-158	EAST RHR AND NORTH SI TO REACTOR COOLANT PUMPS #1 AND #4 AIR OPERATED TEST VALVE
7	2-IRV-166	ACCUMULATOR TANK OME-6-2 AIR OPERATED OUTLET AND SI TO RC LOOP #2 COLD LEG TEST VALVE
7	2-IRV-176	ACCUMULATOR TANK OME-6-3 AIR OPERATED OUTLET AND SI TO RC LOOP #3 COLD LEG TEST VALVE
7	2-IRV-186	ACCUMULATOR TANK OME-6-4 AIR OPERATED OUTLET AND SI TO RC LOOP #4 COLD LEG TEST VALVE
7	2-IRV-260	SAFETY INJECTION TEST LINE SHUTOFF VALVE
7	2-IRV-310	EAST RESIDUAL HEAT REMOVAL HEAT EXCHANGER HE-17E 8" AIR OPERATED OUTLET FLOW CONTROL VALVE
7	2-IRV-311	RESIDUAL HEAT REMOVAL HEAT EXCHANGERS BYPASS FLOW 8" AIR OPERATED CONTROL VALVE
7	2-IRV-320	WEST RESIDUAL HEAT REMOVAL HEAT EXCHANGER HE-17W 8" AIR OPERATED OUTLET FLOW CONTROL VALVE
7	2-IRV-50	BORON INJECTION TO ACCUMULATOR FILL LINE CONTROL VALVE
7	2-IRV-60	SAFETY INJECTION TO ACCUMULATOR FILL LINE CONTROL VALVE
7	2-MCR-251	STEAM GENERATOR #1 STEAM SAMPLE MSX-101 CONTAINMENT ISOLATION VALVE
7	2-MCR-252	STEAM GENERATOR #2 STEAM SAMPLE MSX-102 CONTAINMENT ISOLATION VALVE
7	2-MCR-253	STEAM GENERATOR #3 STEAM SAMPLE MSX-103 CONTAINMENT ISOLATION VALVE
7	2-MCR-254	STEAM GENERATOR #4 STEAM SAMPLE MSX-104 CONTAINMENT ISOLATION VALVE
7	2-MRV-151	STEAM GENERATOR #1 STEAM SAMPLE MSX-101 SAMPLE SHUTOFF VALVE
7	2-MRV-152	STEAM GENERATOR #2 STEAM SAMPLE MSX-102 SAMPLE SHUTOFF VALVE
7	2-MRV-153	STEAM GENERATOR #3 STEAM SAMPLE MSX-103 SAMPLE SHUTOFF VALVE
7	2-MRV-154	STEAM GENERATOR #4 STEAM SAMPLE MSX-104 SAMPLE SHUTOFF VALVE
7	2-MRV-211	STEAM GENERATOR #1 STOP VALVE MRV-210 STEAM CYLINDER TRAIN 'A' DUMP VALVE
7	2-MRV-212	STEAM GENERATOR #1 STOP VALVE MRV-210 STEAM CYLINDER TRAIN 'B' DUMP VALVE
7	2-MRV-213	STEAM GENERATOR OME-3-1 POWER OPERATED RELIEF VALVE
7	2-MRV-221	STEAM GENERATOR #2 STOP VALVE MRV-220 STEAM CYLINDER TRAIN 'A' DUMP VALVE
7	2-MRV-222	STEAM GENERATOR #2 STOP VALVE MRV-220 STEAM CYLINDER TRAIN 'B' DUMP VALVE

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

CLASS	DEVICE NUMBER	EQUIPMENT DESCRIPTION
7	2-MRV-223	STEAM GENERATOR OME-3-2 POWER OPERATED RELIEF VALVE
7	2-MRV-231	STEAM GENERATOR #3 STOP VALVE MRV-230 STEAM CYLINDER TRAIN 'A' DUMP VALVE
7	2-MRV-232	STEAM GENERATOR #3 STOP VALVE MRV-230 STEAM CYLINDER TRAIN 'B' DUMP VALVE
7	2-MRV-233	STEAM GENERATOR OME-3-3 POWER OPERATED RELIEF VALVE
7	2-MRV-241	STEAM GENERATOR #4 STOP VALVE MRV-240 STEAM CYLINDER TRAIN 'A' DUMP VALVE
7	2-MRV-242	STEAM GENERATOR #4 STOP VALVE MRV-240 STEAM CYLINDER TRAIN 'B' DUMP VALVE
7	2-MRV-243	STEAM GENERATOR OME-3-4 POWER OPERATED RELIEF VALVE
7	2-NRV-101	REACTOR COOLANT LOOP #1 HOT LEG SAMPLE NSX-101 SHUTOFF VALVE
7	2-NRV-102	PRESSURIZER LIQUID SPACE SAMPLE NSX-102 SHUTOFF VALVE
7	2-NRV-103	REACTOR COOLANT LOOP #3 HOT LEG SAMPLE NSX-103 SHUTOFF VALVE
7	2-NRV-104	PRESSURIZER STEAM SPACE SAMPLE NSX-104 SHUTOFF VALVE
7	2-NRV-151	PRESSURIZER TRAIN 'B' PRESSURE RELIEF VALVE
7	2-NRV-152	PRESSURIZER TRAIN 'B' PRESSURE RELIEF VALVE
7	2-NRV-153	PRESSURIZER OME-4 TRAIN 'A' PRESSURE RELIEF VALVE
7	2-NRV-163	REACTOR COOLANT LOOP #3 TO PRESSURIZER SPRAY CONTROL 4" AIR OPERATED GLOBE VALVE
7	2-NRV-164	REACTOR COOLANT LOOP #4 TO PRESSURIZER SPRAY CONTROL 4" AIR OPERATED GLOBE VALVE
7	2-QRV-10	RCP #1 SEAL #1 LEAKOFF TO RCP SEAL WATER RETURN FILTER QC-109 2" AIR OPERATED SHUTOFF VALVE
7	2-QRV-111	REACTOR COOLANT NORMAL LETDOWN TRAIN 'A' SHUTOFF VALVE
7	2-QRV-112	REACTOR COOLANT NORMAL LETDOWN TRAIN 'B' SHUTOFF VALVE
7	2-QRV-113	RC EXCESS LETDOWN TO EXCESS LETDOWN HEAT EXCHANGER HE-13 1" AIR OPERATED VALVE
7	2-QRV-114	RC EXCESS LETDOWN TO EXCESS LETDOWN HEAT EXCHANGER HE-13 1" AIR OPERATED VALVE
7	2-QRV-150	RCPS STARTUP SEAL SYSTEM BYPASS TO SEAL WATER RETURN FILTER AIR OPERATED SHUTOFF VALVE
7	2-QRV-170	EXCESS LETDOWN HEAT EXCHANGER HE-13 1" AIR OPERATED OUTLET PRESSURE CONTROL VALVE
7	2-QRV-171	EXCESS LETDOWN HEAT EXCHANGER HE-13 1" AIR OPERATED OUTLET DIVERSION VALVE
7	2-QRV-20	RCP #2 SEAL #1 LEAKOFF TO RCP SEAL WATER RETURN FILTER QC-109 2" AIR OPERATED SHUTOFF VALVE
7	2-QRV-251	CVCS CENTRIFUGAL CHARGING PUMPS DISCHARGE FLOW 3" AIR OPERATED CONTROL GLOBE VALVE
7	2-QRV-30	RCP#3 SEAL #1 LEAKOFF TO RCP SEAL WATER RETURN FILTER QC-109 2" AIR OPERATED SHUTOFF VALVE
7	2-QRV-40	RCP#4 SEAL #1 LEAKOFF TO RCP SEAL WATER RETURN FILTER QC-109 2" AIR OPERATED SHUTOFF VALVE
7	2-QRV-400	SOUTH BORIC ACID BLENDER QP-21 2" AIR OPERATED TO CVCS CHARGING PUMPS SUCTION SHUTOFF VALVE
7	2-QRV-421	SOUTH BA FILTER TO CVCS CHARGING PUMPS AND SOUTH BA BLENDER CONTROL VALVE
7	2-QRV-430	SOUTH BORIC ACID STORAGE TANK TK-12S 2" AIR OPERATED INLET FLOW CONTROL GLOBE VALVE
7	2-QRV-451	SOUTH BORIC ACID BLENDER QP-21 TO REACTOR COOLANT LETDOWN VOLUME CONTROL TANK SHUTOFF VALVE
7	2-VRV-315	CONTROL ROOM VENTILATION UNIT HV-ACRA-1 CHILL WATER INLET/BYPASS VALVE
7	2-VRV-325	CONTROL ROOM VENTILATION UNIT HV-ACRA-2 CHILL WATER INLET/BYPASS VALVE
7	2-WRV-763	EAST ESW PUMP PP-7E DISCHARGE STRAINER WEST BASKET BACKWASH OUTLET SHUTOFF VALVE
7	2-WRV-768	EAST ESW PUMP PP-7E DISCHARGE STRAINER WEST BASKET BACKWASH INLET SHUTOFF VALVE
7	2-WRV-769	WEST ESW PUMP PP-7W DISCHARGE STRAINER WEST BASKET BACKWASH INLET SHUTOFF VALVE
7	2-WRV-773	EAST ESW PUMP PP-7E DISCHARGE STRAINER EAST BASKET BACKWASH OUTLET SHUTOFF VALVE
7	2-WRV-774	WEST ESW PUMP PP-7W DISCHARGE STRAINER EAST BASKET BACKWASH OUTLET SHUTOFF VALVE
7	2-WRV-778	EAST ESW PUMP PP-7E DISCHARGE STRAINER EAST BASKET BACKWASH INLET SHUTOFF VALVE
7	2-WRV-779	WEST ESW PUMP PP-7W DISCHARGE STRAINER EAST BASKET BACKWASH INLET SHUTOFF VALVE
7	2-XRV-220	AB EMERGENCY DIESEL STARTING AIR JET ASSIST CONTROL VALVE
7	2-XRV-221	AB EMERGENCY DIESEL FRONT BANK STARTING AIR SHUTOFF VALVE
7	2-XRV-222	AB EMERGENCY DIESEL REAR BANK STARTING AIR SHUTOFF VALVE
7	2-XRV-225	CD EMERGENCY DIESEL STARTING AIR JET ASSIST CONTROL VALVE
7	2-XRV-226	CD EMERGENCY DIESEL FRONT BANK STARTING AIR SHUTOFF VALVE
7	2-XRV-227	CD EMERGENCY DIESEL REAR BANK STARTING AIR SHUTOFF VALVE
8	2-CCM-451	RC PUMPS BEARING OIL COOLERS CCW RETURN HEADER TRAIN 'A' CONTAINMENT ISOLATION VALVE
8	2-CCM-452	RC PUMPS BEARING OIL COOLERS CCW RETURN HEADER TRAIN 'B' CONTAINMENT ISOLATION VALVE
8	2-CCM-453	RCP THERMAL BARRIER COMPONENT COOLING WATER OUTLET TRAIN 'A' CONTAINMENT ISOLATION VALVE
8	2-CCM-454	RC PUMPS THERMAL BARRIER CCW RETURN HEADER TRAIN 'B' CONTAINMENT ISOLATION VALVE
8	2-CCM-458	COMPONENT COOLING WATER TO REACTOR COOLANT PUMPS TRAIN 'A' CONTAINMENT ISOLATION VALVE
8	2-CCM-459	COMPONENT COOLING WATER TO REACTOR COOLANT PUMPS TRAIN 'B' CONTAINMENT ISOLATION VALVE

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
8	2-CMO-410	EAST CCW HEAT EXCHANGER HE-15E COMPONENT COOLING WATER OUTLET SHUTOFF VALVE
8	2-CMO-411	COMPONENT COOLING WATER PUMPS SUCTION CROSSTIE TRAIN 'A' SHUTOFF VALVE
8	2-CMO-412	COMPONENT COOLING WATER PUMPS DISCHARGE CROSSTIE TRAIN 'A' SHUTOFF VALVE
8	2-CMO-413	COMPONENT COOLING WATER PUMPS SUCTION CROSSTIE TRAIN 'B' SHUTOFF VALVE
8	2-CMO-414	COMPONENT COOLING WATER PUMPS DISCHARGE CROSSTIE TRAIN 'B' SHUTOFF VALVE
8	2-CMO-415	COMPONENT COOLING WATER TO MISCELLANEOUS SERVICE TRAIN 'A' SHUTOFF VALVE
8	2-CMO-416	CCW TO MISCELLANEOUS SERVICE HEADER 'B' 16" MOTOR OPERATED SHUTOFF VALVE
8	2-CMO-419	EAST RHR HEAT EXCHANGER HE-17E COMPONENT COOLING WATER OUTLET SHUTOFF VALVE
8	2-CMO-420	WEST COMPONENT COOLING WATER HEAT EXCHANGER COMPONENT COOLING WATER OUTLET SHUTOFF VALVE
8	2-CMO-429	WEST RHR HEAT EXCHANGER HE-17W CCW OUTLET SHUTOFF VALVE
8	2-FMO-211	TDAFPUMP PP-4 DISCHARGE TO STEAM GENERATOR OME-3-1 4" MOTOR OPERATED CONTROL VALVE
8	2-FMO-212	WEST MDAFPUMP SUPPLY TO STEAM GENERATOR OME-3-1 4" MOTOR OPERATED CONTROL VALVE
8	2-FMO-221	TDAFPUMP PP-4 DISCHARGE TO STEAM GENERATOR OME-3-2 4" MOTOR OPERATED CONTROL VALVE
8	2-FMO-222	EAST MDAFPUMP PP-3E SUPPLY TO STEAM GENERATOR OME-3-2 4" MOTOR OPERATED CONTROL VALVE
8	2-FMO-231	TDAFPUMP SUPPLY TO STEAM GENERATOR OME-3-3 4" MOTOR OPERATED CONTROL VALVE
8	2-FMO-232	EAST MDAFPUMP PP-3E SUPPLY TO STEAM GENERATOR OME-3-3 4" MOTOR OPERATED CONTROL VALVE
8	2-FMO-241	TDAFPUMP SUPPLY TO STEAM GENERATOR OME-3-4 4" MOTOR OPERATED CONTROL VALVE
8	2-FMO-242	WEST MDAFPUMP SUPPLY TO STEAM GENERATOR OME-3-4 4" MOTOR OPERATED CONTROL VALVE
8	2-HV-DDP-AB1	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FAN HV-DGX-2 TEMPERING AIR DAMPER
8	2-HV-DDP-AB2	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FAN HV-DGS-2 TEMPERING AIR DAMPER
8	2-HV-DDP-CD1	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FAN HV-DGX-1 TEMPERING AIR DAMPER
8	2-HV-DDP-CD2	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FAN HV-DGS-1 TEMPERING AIR DAMPER
8	2-HV-DGS-DAB	AB EDG ROOM VENTILATION SUPPLY FAN HV-DGS-1 OUTSIDE AIR SHUTOFF DAMPER
8	2-HV-DGS-DCD	CD EDG ROOM VENTILATION SUPPLY FAN HV-DGS-2 OUTSIDE AIR SHUTOFF DAMPER
8	2-HV-SGR-MD-3	4KV RM 600V SWGR XFORMERS TR21A & TR21C AREA VENT SUPPLY FAN HV-SGRS-8 SUCTION DAMPER
8	2-HV-SGR-MD-4	4KV ROOM 600V SWITCHGEAR TRANSFORMERS AREA VENTILATION SUPPLY FAN HV-SGRS-7 SUCTION DAMPER
8	2-HV-SGR-MD-5	600VAC MOTOR CONTROL CENTER MEZZANINE AREA VENTILATION SUPPLY FAN HV-SGRS-9 VENT DAMPER
8	2-ICM-111	RHR TO REACTOR COOLANT LOOPS #2 & #3 COLD LEGS CONTAINMENT ISOLATION VALVE
8	2-ICM-129	RC LOOP #2 HOT LEG TO RHR PUMPS SUCTION CONTAINMENT ISOLATION VALVE
8	2-ICM-250	BORON INJECTION TANK TRAIN 'A' OUTLET CONTAINMENT ISOLATION VALVE
8	2-ICM-251	BORON INJECTION TANK TRAIN 'B' OUTLET CONTAINMENT ISOLATION VALVE
8	2-ICM-260	NORTH SAFETY INJECTION PUMP PP-26N DISCHARGE CONTAINMENT ISOLATION VALVE
8	2-ICM-265	SOUTH SAFETY INJECTION PUMP PP-26S DISCHARGE CONTAINMENT ISOLATION VALVE
8	2-ICM-305	RECIRCULATION SUMP TO EAST RHR/CTS PUMPS SUCTION CONTAINMENT ISOLATION VALVE
8	2-ICM-306	RECIRCULATION SUMP TO WEST RHR/CTS PUMPS SUCTION CONTAINMENT ISOLATION VALVE
8	2-ICM-311	EAST RESIDUAL HEAT REMOVAL TO RC LOOPS #1 AND #4 COLD LEGS CONTAINMENT ISOLATION VALVE
8	2-ICM-321	WEST RHR TO REACTOR COOLANT LOOPS #2 AND #3 COLD LEGS CONTAINMENT ISOLATION VALVE
8	2-IMO-128	REACTOR COOLANT LOOP #2 HOT LEG TO RESIDUAL HEAT REMOVAL PUMPS SUCTION SHUTOFF VALVE
8	2-IMO-210	EAST CONTAINMENT SPRAY PUMP PP-9E 10" MOTOR OPERATED DISCHARGE SHUTOFF VALVE
8	2-IMO-211	EAST CONTAINMENT SPRAY PUMP PP-9E 10" MOTOR OPERATED DISCHARGE SHUTOFF VALVE
8	2-IMO-212	EAST CS PUMP PP-9E 2" MOTOR OPERATED DISCHARGE TO CS ADDITIVE EDUCTOR SHUTOFF VALVE
8	2-IMO-215	RWST TO EAST CONTAINMENT SPRAY PUMP PP-9E SUCTION 12" MOTOR OPERATED SHUTOFF VALVE
8	2-IMO-220	WEST CONTAINMENT SPRAY PUMP PP-9W 10" MOTOR OPERATED DISCHARGE SHUTOFF VALVE
8	2-IMO-221	WEST CONTAINMENT SPRAY PUMP PP-9W DISCHARGE SHUTOFF 10" MOTOR OPERATED VALVE
8	2-IMO-222	WEST CS PUMP PP-9W DISCHARGE TO CS ADDITIVE EDUCTOR SHUTOFF 2" MOTOR OPERATED VALVE
8	2-IMO-225	RWST TO WEST CONTAINMENT SPRAY PUMP PP-9W SUCTION 12" MOTOR OPERATED SHUTOFF VALVE
8	2-IMO-255	BORON INJECTION TANK TRAIN 'A' INLET SHUTOFF VALVE
8	2-IMO-256	BORON INJECTION TANK TRAIN 'B' INLET SHUTOFF VALVE
8	2-IMO-261	REFUELING WATER STORAGE TANK TK-33 SUPPLY TO SAFETY INJECTION PUMPS SHUTOFF VALVE
8	2-IMO-262	SAFETY INJECTION PUMPS RECIRC TO REFUELING WATER STORAGE TANK TK-33 TRAIN 'A' SHUTOFF VALVE
8	2-IMO-263	SAFETY INJECTION PUMPS RECIRC TO REFUELING WATER STORAGE TANK TK-33 TRAIN 'B' SHUTOFF VALVE
8	2-IMO-270	SAFETY INJECTION PUMPS DISCHARGE CROSSTIE TRAIN 'A' SHUTOFF VALVE
8	2-IMO-275	SAFETY INJECTION PUMPS DISCHARGE CROSSTIE TRAIN 'B' SHUTOFF VALVE

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
8	2-IMO-310	EAST RESIDUAL HEAT REMOVAL PUMP PP-35E SUCTION SHUTOFF VALVE
8	2-IMO-312	EAST RESIDUAL HEAT REMOVAL HEAT EXCHANGER HE-17E OUTLET MINI-FLOW LINE SHUTOFF VALVE
8	2-IMO-314	EAST RESIDUAL HEAT REMOVAL PUMP PP-35E DISCHARGE CROSSTIE SHUTOFF VALVE
8	2-IMO-315	EAST RHR AND NORTH SI TO REACTOR COOLANT LOOPS #1 AND #4 HOT LEGS SHUTOFF VALVE
8	2-IMO-316	EAST RHR AND NORTH SI TO REACTOR COOLANT LOOPS #1 AND #4 COLD LEGS SHUTOFF VALVE
8	2-IMO-320	WEST RESIDUAL HEAT REMOVAL PUMP PP-35W SUCTION SHUTOFF VALVE
8	2-IMO-322	WEST RESIDUAL HEAT REMOVAL HEAT EXCHANGER HE-17W OUTLET MINI-FLOW LINE SHUTOFF VALVE
8	2-IMO-324	WEST RESIDUAL HEAT REMOVAL PUMP PP-35W DISCHARGE CROSSTIE SHUTOFF VALVE
8	2-IMO-325	WEST RHR AND SOUTH SI TO REACTOR COOLANT LOOPS #2 AND #3 HOT LEGS SHUTOFF VALVE
8	2-IMO-326	WEST RHR AND SOUTH SI TO REACTOR COOLANT LOOPS #2 AND #3 COLD LEGS SHUTOFF VALVE
8	2-IMO-330	EAST RESIDUAL HEAT REMOVAL TO UPPER CONTAINMENT SPRAY SHUTOFF VALVE
8	2-IMO-331	WEST RHR TO UPPER CONTAINMENT SPRAY SHUTOFF VALVE
8	2-IMO-340	EAST RESIDUAL HEAT REMOVAL HEAT EXCHANGER TO CHARGING PUMPS SUCTION SHUTOFF VALVE
8	2-IMO-350	WEST RHR HEAT EXCHANGER OUTLET TO SAFETY INJECTION PUMP SUCTION SHUTOFF VALVE
8	2-IMO-360	SAFETY INJECTION PUMPS TO CVCS CHARGING PUMPS SUCTION HEADER CROSSTIE SHUTOFF VALVE
8	2-IMO-361	SAFETY INJECTION PUMPS SUCTION TO AND FROM CHARGING PUMPS SUCTION TRAIN 'A' SHUTOFF VALVE
8	2-IMO-362	SAFETY INJECTION PUMPS SUCTION TO AND FROM CHARGING PUMPS SUCTION TRAIN 'B' SHUTOFF VALVE
8	2-IMO-390	REFUELING WATER STORAGE TANK TK-33 TO RESIDUAL HEAT REMOVAL PUMPS SUCTION SHUTOFF VALVE
8	2-IMO-51	BORON INJECTION TO REACTOR COOLANT LOOP #1 SHUTOFF VALVE
8	2-IMO-52	BORON INJECTION TO REACTOR COOLANT LOOP #2 SHUTOFF VALVE
8	2-IMO-53	BORON INJECTION TO REACTOR COOLANT LOOP #3 SHUTOFF VALVE
8	2-IMO-54	BORON INJECTION TO REACTOR COOLANT LOOP #4 SHUTOFF VALVE
8	2-IMO-910	REFUELING WATER STORAGE TANK TO CVCS CHARGING PUMPS SUCTION HEADER TRAIN 'A' SHUTOFF VALVE
8	2-IMO-911	REFUELING WATER STORAGE TANK TO CVCS CHARGING PUMPS SUCTION HEADER TRAIN 'B' SHUTOFF VALVE
8	2-LSO-240	AB EMERGENCY DIESEL UPPER VALVE GEAR LUBRICATION CONTROL SOLENOID #1
8	2-LSO-241	AB EMERGENCY DIESEL UPPER VALVE GEAR LUBRICATION CONTROL SOLENOID #2
8	2-LSO-245	CD EMER DIESEL GEN UPPER VALVE GEAR LUBRICATION CONTROL SOLENOID #1
8	2-LSO-246	CD EMER DIESEL GEN UPPER VALVE GEAR LUBRICATION CONTROL SOLENOID #2
8	2-MCM-221	MAIN STEAM LEAD #2 TO AUXILIARY FEED PUMP TURBINE 4" MOTOR OPERATED SHUTOFF VALVE
8	2-MCM-231	MAIN STEAM LEAD #3 TO AUXILIARY FEED PUMP TURBINE 4" MOTOR OPERATED SHUTOFF VALVE
8	2-MMO-210	STEAM STOP VALVE MRV-210 STEAM CYLINDER DUMP 4" MOTOR OPERATED VALVES SELECTOR VALVE
8	2-MMO-220	STEAM STOP VALVE MRV-220 STEAM CYLINDER DUMP 4" MOTOR OPERATED VALVES SELECTOR VALVE
8	2-MMO-230	STEAM STOP VALVE MRV-230 STEAM CYLINDER DUMP VALVES 4" MOTOR OPERATED SELECTOR VALVE
8	2-MMO-240	STEAM STOP VALVE MRV-240 STEAM CYLINDER DUMP VALVE 4" MOTOR OPERATED SELECTOR VALVE
8	2-NMO-151	PRESSURIZER RELIEF VALVE NRV-151 UPSTREAM 3" MOTOR OPERATED SHUTOFF VALVE
8	2-NMO-152	PRESSURIZER RELIEF VALVE NRV-152 UPSTREAM 3" MOTOR OPERATED SHUTOFF VALVE
8	2-NMO-153	PRESSURIZER RELIEF VALVE NRV-153 UPSTREAM 3" MOTOR OPERATED SHUTOFF VALVE
8	2-NSO-21	REACTOR VESSEL OME-1 POST-ACCIDENT VENT TRAIN 'A' SOLENOID VALVE
8	2-NSO-22	REACTOR VESSEL OME-1 POST-ACCIDENT VENT TRAIN 'A' SOLENOID VALVE
8	2-NSO-23	REACTOR VESSEL OME-1 POST-ACCIDENT VENT TRAIN 'B' SOLENOID VALVE
8	2-NSO-24	REACTOR VESSEL OME-1 POST-ACCIDENT VENT TRAIN 'B' SOLENOID VALVE
8	2-NSO-61	PRESSURIZER OME-4 POST ACCIDENT VENT TRAIN 'A' SOLENOID VALVE
8	2-NSO-62	PRESSURIZER OME-4 POST-ACCIDENT VENT TRAIN 'A' SOLENOID VALVE
8	2-NSO-63	PRESSURIZER OME-4 POST-ACCIDENT VENT TRAIN 'B' SOLENOID VALVE
8	2-NSO-64	PRESSURIZER OME-4 POST-ACCIDENT VENT TRAIN 'B' SOLENOID VALVE
8	2-QCM-250	RCP SEAL WATER RETURN TRAIN 'A' CONTAINMENT ISOLATION 4" MOTOR OPERATED VALVE
8	2-QCM-350	RCP SEAL WATER RETURN TRAIN 'B' CONTAINMENT ISOLATION 4" MOTOR OPERATED VALVE
8	2-QMO-200	CVCS CHARGING TO REGENERATIVE HEAT EXCHANGER TRAIN 'A' SHUTOFF VALVE
8	2-QMO-201	CVCS CHARGING TO REGENERATIVE HEAT EXCHANGER TRAIN 'B' SHUTOFF VALVE
8	2-QMO-225	EAST CHARGING PUMP MINI-FLOW TO RCP SEAL WATER HEAT EXCHANGER HE-11 SHUTOFF VALVE
8	2-QMO-226	WEST CHARGING PUMP MINI-FLOW TO RCP SEAL WATER HEAT EXCHANGER HE-11 SHUTOFF VALVE
8	2-QMO-420	EMERGENCY BORATION TO CVCS CHARGING PUMPS SUCTION HEADER SHUTOFF VALVE
8	2-QMO-451	RC LETDOWN VOLUME CONTROL TANK TK-10 TO CVCS CHARGING PUMPS TRAIN 'A' SHUTOFF VALVE

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

CLASS	DEVICE NUMBER	EQUIPMENT DESCRIPTION
8	2-QMO-452	RC LETDOWN VOLUME CONTROL TANK TK-10 TO CVCS CHARGING PUMPS TRAIN 'B' SHUTOFF VALVE
8	2-QT-506	TURBINE DRIVEN AUX FEED PUMP PP-4 TRIP AND THROTTLE VALVE
8	2-WMO-703	EAST ESSENTIAL SERVICE WATER PUMP PP-7E DISCHARGE SHUTOFF VALVE
8	2-WMO-704	WEST ESSENTIAL SERVICE WATER PUMP PP-7W DISCHARGE SHUTOFF VALVE
8	2-WMO-706	WEST ESSENTIAL SERVICE WATER SUPPLY HEADER CROSSTIE TO UNIT 1 SHUTOFF VALVE
8	2-WMO-708	EAST ESSENTIAL SERVICE WATER SUPPLY HEADER CROSSTIE TO UNIT 1 SHUTOFF VALVE
8	2-WMO-712	EAST CONTAINMENT SPRAY HEAT EXCHANGER HE-18E ESSENTIAL SERVICE WATER INLET SHUTOFF VALVE
8	2-WMO-714	EAST CONTAINMENT SPRAY HEAT EXCHANGER HE-18E ESSENTIAL SERVICE WATER OUTLET SHUTOFF VALVE
8	2-WMO-716	WEST CONTAINMENT SPRAY HEAT EXCHANGER ESSENTIAL SERVICE WATER INLET SHUTOFF VALVE
8	2-WMO-718	WEST CONTAINMENT SPRAY HEAT EXCHANGER ESSENTIAL SERVICE WATER OUTLET SHUTOFF VALVE
8	2-WMO-722-AB	WEST ESW SUPPLY HEADER TO AB EMERGENCY DIESEL HEAT EXCHANGERS SHUTOFF VALVE
8	2-WMO-724-AB	EAST ESW SUPPLY HEADER TO AB EMERGENCY DIESEL HEAT EXCHANGERS SHUTOFF VALVE
8	2-WMO-726-CD	EAST ESW SUPPLY HEADER TO CD EMERGENCY DIESEL HEAT EXCHANGERS SHUTOFF VALVE
8	2-WMO-728-CD	WEST ESW SUPPLY HEADER TO CD EMERGENCY DIESEL HEAT EXCHANGERS SHUTOFF VALVE
8	2-WMO-732	EAST COMPONENT COOLING WATER HEAT EXCHANGER HE-15E ESW INLET SHUTOFF VALVE
8	2-WMO-734	EAST COMPONENT COOLING WATER HEAT EXCHANGER HE-15E ESW OUTLET SHUTOFF VALVE
8	2-WMO-736	WEST COMPONENT COOLING WATER HEAT EXCHANGER ESSENTIAL SERVICE WATER INLET SHUTOFF VALVE
8	2-WMO-738	WEST COMPONENT COOLING WATER HEAT EXCHANGER ESSENTIAL SERVICE WATER OUTLET SHUTOFF VALVE
8	2-WMO-744	ESW TO WEST MOTOR DRIV AUX FEED PUMP PP-3W SHUTOFF 4" MOTOR OPERATED VALVE
8	2-WMO-753	ESW TO TURB DRIVEN AUX FEED PUMP PP-4 SHUTOFF 6" MOTOR OPERATED VALVE
8	2-WMO-754	ESW TO EAST MOTOR DRIVEN AUXILIARY FEED PUMP PP-3E SHUTOFF 4" MOTOR OPERATED VALVE
9	2-HV-AES-1	AUXILIARY BUILDING VENTILATION ENGINEERED SAFETY FEATURE EXHAUST
9	2-HV-AES-1 (FLT)	AUXILIARY BUILDING VENTILATION ENGINEERED SAFETY FEATURE EXHAUST AIR FILTER
9	2-HV-AES-2	AUXILIARY BUILDING VENTILATION ENGINEERED SAFETY FEATURE EXHAUST
9	2-HV-AES-2 (FLT)	AUXILIARY BUILDING VENTILATION ENGINEERED SAFETY FEATURE EXHAUST AIR FILTER
9	2-HV-AFP-BRE-1	TRAIN 'N' BATTERY ROOM EAST EXHAUST FAN
9	2-HV-AFP-BRE-2	TRAIN 'N' BATTERY ROOM WEST EXHAUST FAN
9	2-HV-AFP-M1	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP ROOM EXHAUST FAN
9	2-HV-AFP-M2	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP ROOM SUPPLY FAN
9	2-HV-AFP-T1	TURBINE DRIVEN AUXILIARY FEED PUMP ROOM NORTH EXHAUST FAN
9	2-HV-AFP-T2	TURBINE DRIVEN AUXILIARY FEED PUMP ROOM SOUTH EXHAUST FAN
9	2-HV-AFP-X1	WEST MOTOR DRIVEN AUXILIARY FEED PUMP ROOM EAST EXHAUST FAN
9	2-HV-AFP-X2	WEST MOTOR DRIVEN AUXILIARY FEED PUMP ROOM WEST EXHAUST FAN
9	2-HV-CEQ-1	CONTAINMENT HYDROGEN SKIMMER VENTILATION FAN #1
9	2-HV-CEQ-2	CONTAINMENT HYDROGEN SKIMMER VENTILATION FAN #2
9	2-HV-DGS-1	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FAN
9	2-HV-DGS-2	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FAN
9	2-HV-DGS-3	AB EMERGENCY DIESEL GENERATOR ROOM CABINET VENTILATION SUPPLY FAN
9	2-HV-DGS-4	CD EMERGENCY DIESEL GENERATOR ROOM CABINET VENTILATION SUPPLY FAN
9	2-HV-DGX-1	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FAN
9	2-HV-DGX-2	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FAN
9	2-HV-SGRS-1A	CONTROL ROD DRIVE EQUIPMENT ROOM AND INVERTER AREA VENTILATION NORTH SUPPLY FAN
9	2-HV-SGRS-2	4KV ROOM AB 4KV SWITCHGEAR AREA VENTILATION SUPPLY FAN
9	2-HV-SGRS-3	4KV ROOM CD 4KV SWITCHGEAR AREA VENTILATION SUPPLY FAN
9	2-HV-SGRS-4A	CONTROL ROD DRIVE EQUIPMENT ROOM AND INVERTER AREA VENTILATION SOUTH SUPPLY FAN
9	2-HV-SGRS-7	4KV ROOM 600 VOLT SWITCHGEAR TRANSFORMERS TR21B AND TR21D AREA VENTILATION SUPPLY FAN
9	2-HV-SGRS-8	4KV ROOM 600 VOLT SWITCHGEAR TRANSFORMERS TR21A AND TR21C AREA VENTILATION SUPPLY FAN
9	2-HV-SGRS-9	600VAC MOTOR CONTROL CENTER MEZZANINE AREA VENTILATION SUPPLY FAN
9	2-HV-SGRX-2	4KV ROOM AB 4KV SWITCHGEAR AREA VENTILATION EXHAUST FAN
9	2-HV-SGRX-3	4KV ROOM CD 4KV SWITCHGEAR AREA VENTILATION EXHAUST FAN
9	2-HV-SGRX-5	AB BATTERY EQUIPMENT AREA BATTERY ROOM VENTILATION EXHAUST FAN
9	2-HV-SGRX-6	CD BATTERY EQUIPMENT AREA BATTERY ROOM VENTILATION EXHAUST FAN
9	12-HV-ESW-1	UNIT 2 EAST ESSENTIAL SERVICE WATER PUMP ROOM SUPPLY VENTILATION FAN

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
9	12-HV-ESW-2	UNIT 2 EAST ESSENTIAL SERVICE WATER PUMP ROOM SUPPLY VENTILATION FAN
9	12-HV-ESW-3	UNIT 2 WEST ESSENTIAL SERVICE WATER PUMP ROOM SUPPLY VENTILATION FAN
9	12-HV-ESW-4	UNIT 2 WEST ESSENTIAL SERVICE WATER PUMP ROOM SUPPLY VENTILATION FAN
10	2-HV-ACRA-1	CONTROL ROOM VENTILATION NORTH AIR CONDITIONING UNIT
10	2-HV-ACRA-2	CONTROL ROOM VENTILATION SOUTH AIR CONDITIONING UNIT
11	2-HV-ACR-1	CONTROL ROOM AIR CONDITIONING NORTH LIQUID CHILLER
11	2-HV-ACR-2	CONTROL ROOM AIR CONDITIONING SOUTH LIQUID CHILLER
14	2-AFW	POWER PANEL
14	2-AFWX	120/208 VAC AUXILIARY FEEDWATER DISTRIBUTION PANEL
14	2-CCV-AB	250VDC TRAIN 'B' CRITICAL SOLENOID VALVES DISTRIBUTION PANEL
14	2-CCV-CD	250VDC TRAIN 'A' CRITICAL SOLENOID VALVES DISTRIBUTION PANEL
14	2-CRAB	250VDC CONTROL ROOM DISTRIBUTION PANEL CRAB
14	2-CRCD	POWER PANEL
14	2-CRID-I	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION CHANNEL I DISTRIBUTION PANEL
14	2-CRID-II	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION CHANNEL II DISTRIBUTION PANEL
14	2-CRID-III	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION CHANNEL III DISTRIBUTION PANEL
14	2-CRID-IV	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION CHANNEL IV DISTRIBUTION PANEL
14	2-DCN	250VDC POWER PANEL
14	2-ELSC	POWER PANEL
14	2-ELSCX	120/208VAC EMERGENCY LOCAL SHUTDOWN AUXILIARY DISTRIBUTION PANEL
14	2-MCAB	250VDC DISTRIBUTION PANEL MCAB
14	2-MCCD	250VDC DISTRIBUTION POWER PANEL
14	2-MDAB	250 VDC POWER PANEL
14	2-MDCD	250VDC DISTRIBUTION PANEL MDCD
14	2-SSV-A1	250VDC TRAIN 'A' NUCLEAR SAMPLING FEEDER PANEL #1
14	2-SSV-A2	250VDC NUCLEAR SAMPLING FEEDER PANEL #2
14	2-SSV-B	POWER PANEL
14	2-TDAB	250 VDC POWER PANEL
14	2-TDCD	POWER PANEL, TRAIN A TRANSFER CABINET
14	2-VDAB-1	250VDC VALVE DISTRIBUTION PANEL VDAB-1
14	2-VDAB-2	250VDC VALVE DISTRIBUTION PANEL VDAB-2
14	2-VDCD-1	250VDC VALVE DISTRIBUTION PANEL VDCD-1
14	2-VDCD-2	250VDC VALVE DISTRIBUTION PANEL VDCD-2
15	2-BATT-AB	PLANT BATTERY AB
15	2-BATT-CD	PLANT BATTERY CD
15	2-BATT-N	TRAIN 'N' PLANT BATTERY
16	2-BC-A	BATTERY CHARGER A FOR N-TRAIN BATTERY
16	2-BC-AB1	PLANT BATTERY BATT-AB BATTERY CHARGER #1
16	2-BC-AB2	PLANT BATTERY BATT-AB CHARGER #2
16	2-BC-B	BATTERY CHARGER B FOR N-TRAIN BATTERY
16	2-BC-CD1	PLANT BATTERY BATT-CD CHARGER #1
16	2-BC-CD2	PLANT BATTERY BATT-CD CHARGER #2
16	2-CRID-I-INV	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER
16	2-CRID-II-INV	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER
16	2-CRID-III-INV	120VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER
16	2-CRID-IV-INV	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER
16	2-DGAB-INV	AB EMERGENCY DIESEL GENERATOR OME-150-AB INVERTER
16	2-DGCD-INV	CD EMERGENCY DIESEL GENERATOR OME-150-CD INVERTER
17	2-OME-150-AB	AB EMERGENCY DIESEL GENERATOR
17	2-OME-150-CD	CD EMERGENCY DIESEL GENERATOR
18	2-BLI-110	STEAM GENERATOR OME-3-1 WIDE RANGE LEVEL INDICATOR TRANSMITTER
18	2-BLI-120	STEAM GENERATOR OME-3-2 WIDE RANGE LEVEL INDICATOR TRANSMITTER
18	2-BLI-130	STEAM GENERATOR OME-3-3 WIDE RANGE LEVEL INDICATOR TRANSMITTER

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
18	2-BLI-140	STEAM GENERATOR OME-3-4 WIDE RANGE LEVEL INDICATOR TRANSMITTER
18	2-CLI-113	CONDENSATE STORAGE TANK TK-32 LEVEL INDICATOR TRANSMITTER
18	2-CLI-114	CONDENSATE STORAGE TANK TK-32 LEVEL INDICATOR TRANSMITTER
18	2-CPS-312	AB EMERGENCY DIESEL JACKET WATER PUMP QT-130-AB1 DISCHARGE PRESSURE SWITCH
18	2-CPS-314	AB EMERGENCY DIESEL JACKET WATER PUMP QT-130-AB2 DISCHARGE PRESSURE SWITCH
18	2-CPS-317	CD EMERGENCY DIESEL JACKET WATER PUMP QT-130-CD1 DISCHARGE PRESSURE SWITCH
18	2-CPS-319	CD EMERGENCY DIESEL JACKET WATER PUMP QT-130-CD2 DISCHARGE PRESSURE SWITCH
18	2-CPS-410	EAST COMPONENT COOLING WATER PUMP PP-10E DISCHARGE PRESSURE SWITCH
18	2-CPS-420	WEST COMPONENT COOLING WATER PUMP PP-10W DISCHARGE PRESSURE SWITCH
18	2-FFI-210	AUXILIARY FEEDWATER TO STEAM GENERATOR OME-3-1 FLOW INDICATOR TRANSMITTER
18	2-FFI-220	AUXILIARY FEEDWATER TO STEAM GENERATOR OME-3-2 FLOW INDICATOR TRANSMITTER
18	2-FFI-230	AUXILIARY FEEDWATER TO STEAM GENERATOR OME-3-3 FLOW INDICATOR TRANSMITTER
18	2-FFI-240	AUXILIARY FEEDWATER TO STEAM GENERATOR OME-3-4 FLOW INDICATOR TRANSMITTER
18	2-IFI-310	EAST RHR HEAT EXCHANGER HE-17E OUTLET LOW RANGE FLOW INDICATOR TRANSMITTER
18	2-IFI-311	EAST RHR HEAT EXCHANGER HE-17E OUTLET HIGH RANGE FLOW INDICATOR TRANSMITTER
18	2-IFI-320	WEST RHR HEAT EXCHANGER HE-17W OUTLET LOW RANGE FLOW INDICATOR TRANSMITTER
18	2-IFI-321	WEST RHR HEAT EXCHANGER HE-17W OUTLET HIGH RANGE FLOW INDICATOR TRANSMITTER
18	2-IFI-335	RHR TO REACTOR COOLANT LOOPS #2 AND #3 COLD LEGS FLOW INDICATOR TRANSMITTER
18	2-IFI-51	BORON INJECTION TO REACTOR COOLANT LOOP #1 FLOW INDICATOR TRANSMITTER
18	2-IFI-52	BORON INJECTION TO REACTOR COOLANT LOOP #2 FLOW INDICATOR TRANSMITTER
18	2-IFI-53	BORON INJECTION TO REACTOR COOLANT LOOP #3 FLOW INDICATOR TRANSMITTER
18	2-IFI-54	BORON INJECTION TO REACTOR COOLANT LOOP #4 FLOW INDICATOR TRANSMITTER
18	2-ILS-950	REFUELING WATER STORAGE TANK TK-33 EXTREME LOW LEVEL TRANSMITTER
18	2-ILS-951	REFUELING WATER STORAGE TANK TK-33 LEVEL TRANSMITTER
18	2-LLS-120	AB EMERGENCY DIESEL FUEL OIL DAY TANK QT-107-AB HIGH LEVEL SWITCH #1
18	2-LLS-121	AB EMERGENCY DIESEL FUEL OIL DAY TANK QT-107-AB LOW LEVEL SWITCH #1
18	2-LLS-122	AB EMERGENCY DIESEL FUEL OIL DAY TANK QT-107-AB HIGH LEVEL SWITCH #2
18	2-LLS-123	AB EMERGENCY DIESEL FUEL OIL DAY TANK QT-107-AB LOW LEVEL SWITCH #2
18	2-LLS-125	CD EMERGENCY DIESEL FUEL OIL DAY TANK QT-107-CD HIGH LEVEL SWITCH #1
18	2-LLS-126	CD EMERGENCY DIESEL FUEL OIL DAY TANK QT-107-CD LOW LEVEL SWITCH #1
18	2-LLS-127	CD EMERGENCY DIESEL FUEL OIL DAY TANK QT-107-CD HIGH LEVEL SWITCH #2
18	2-LLS-128	CD EMERGENCY DIESEL FUEL OIL DAY TANK QT-107-CD LOW LEVEL SWITCH #2
18	2-MPP-210	STEAM GENERATOR OME-3-1 CHANNEL I STEAM PRESSURE TRANSMITTER
18	2-MPP-212	STEAM GENERATOR OME-3-1 CHANNEL IV REACTOR PROTECTION INPUT STEAM PRESSURE TRANSMITTER
18	2-MPP-220	STEAM GENERATOR OME-3-2 CHANNEL I STEAM PRESSURE TRANSMITTER
18	2-MPP-222	STEAM GENERATOR OME-3-2 CHANNEL III REACTOR PROTECTION INPUT STEAM PRESSURE TRANSMITTER
18	2-MPP-230	STEAM GENERATOR OME-3-3 CHANNEL I STEAMPRESSURE TRANSMITTER
18	2-MPP-232	STEAM GENERATOR OME-3-3 CHANNEL III REACTOR PROTECTION INPUT STEAM PRESSURE TRANSMITTER
18	2-MPP-240	STEAM GENERATOR OME-3-4 CHANNEL I STEAMPRESSURE TRANSMITTER
18	2-MPP-242	STEAM GENERATOR OME-3-4 CHANNEL IV REACTOR PROTECTION INPUT STEAM PRESSURE TRANSMITTER
18	2-NLI-151	PRESSURIZER OME-4 LEVEL INDICATOR TRANSMITTER
18	2-NLP-151	PRESSURIZER OME-4 PROTECTION CHANNEL I LEVEL TRANSMITTER
18	2-NLP-152	PRESSURIZER OME-4 PROTECTION CHANNEL II LEVEL TRANSMITTER
18	2-NLP-153	PRESSURIZER OME-4 PROTECTION CHANNEL III LEVEL TRANSMITTER
18	2-NPP-151	PRESSURIZER OME-4 PROTECTION CHANNEL I PRESSURE TRANSMITTER
18	2-NPP-152	PRESSURIZER OME-4 PROTECTION CHANNEL II PRESSURE TRANSMITTER
18	2-NPP-153	PRESSURIZER OME-4 PROTECTION CHANNEL III PRESSURE TRANSMITTER
18	2-NPS-121	REACTOR COOLANT LOOP #2 HOT LEG WIDE RANGE PRESSURE TRANSMITTER
18	2-NPS-122	REACTOR COOLANT LOOP #1 HOT LEG WIDE RANGE PRESSURE TRANSMITTER
18	2-NRI-21	NUCLEAR INSTRUMENTATION SOURCE RADIATION DETECTOR
18	2-NRI-23	NUCLEAR INSTRUMENTATION SOURCE RANGE RADIATION DETECTOR
18	2-PPP-301	LOWER CONTAINMENT CHANNEL III PRESSURE PROTECTION TRANSMITTER
18	2-PPP-302	LOWER CONTAINMENT CH.II PRESSURE PROT. TRANSMITTER

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

<u>EQUIPMENT</u>	<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
	18	2-PPP-303	LOWER CONTAINMENT CH. 1 PRESSURE PROTECTION TRANSMITTER
	18	2-QFA-210	RCP SEAL WATER INJECTION TO REACTOR COOLANT PUMP PP-45-1 LOW FLOW ALARM TRANSMITTER
	18	2-QFA-220	RCP SEAL WATER INJECTION TO REACTOR COOLANT PUMP PP-45-2 LOW FLOW ALARM TRANSMITTER
	18	2-QFA-230	RCP SEAL WATER INJECTION TO REACTOR COOLANT PUMP PP-45-3 LOW FLOW ALARM TRANSMITTER
	18	2-QFA-240	RCP SEAL WATER INJECTION TO REACTOR COOLANT PUMP PP-45-4 LOW FLOW ALARM TRANSMITTER
	18	2-QFI-200	CVCS CHARGING PUMPS DISCHARGE FLOW INDICATOR TRANSMITTER
	18	2-QLC-451	REACTOR COOLANT LETDOWN VOLUME CONTROL TANK TK-10 EXTREME HIGH LEVEL CONTROL TRANSMITTER
	18	2-QLC-452	REACTOR COOLANT LETDOWN VOLUME CONTROL TANK TK-10 HIGH LEVEL CONTROL TRANSMITTER
	18	2-WDS-703	EAST ESW PUMP PP-7E DISCHARGE STRAINER OME-34E HIGH DIFFERENTIAL PRESSURE SWITCH
	18	2-WDS-704	WEST ESW PUMP 99-7W DISCHARGE STRAINER OME-34W HIGH DIFFERENTIAL PRESSURE SWITCH
	18	2-WPS-702	EAST ESSENTIAL SERVICE WATER SUPPLY HEADER PRESSURE SWITCH
	18	2-WPS-706	WEST ESSENTIAL SERVICE WATER SUPPLY HEADER PRESSURE SWITCH
	18	2-XPS-300	AB EMERGENCY DIESEL FRONT BANK AIR CHEST EXTREME HIGH PRESSURE SWITCH
	18	2-XPS-305	CD EMERGENCY DIESEL FRONT BANK AIR CHEST EXTREME HIGH PRESSURE SWITCH
	19	2-CTR-415	EAST CCW HEAT EXCHANGER HE-15E CCW OUTLET TEMPERATURE RECORDER THERMAL SENSOR
	19	2-CTR-425	WEST CCW HEAT EXCHANGER CCW OUTLET TEMPERATURE RECORDER THERMAL SENSOR
	19	2-ITR-335	RHR TO REACTOR COOLANT LOOPS #2 & #3 COLD LEGS TEMPERATURE RECORDER THERMAL SENSOR
	19	2-NTR-110	REACTOR COOLANT LOOP #1 HOT LEG WIDE RANGE TEMPERATURE RECORDER THERMAL SENSOR
	19	2-NTR-120	REACTOR COOLANT LOOP #2 HOT LEG WIDE RANGE TEMPERATURE RECORDER THERMAL SENSOR
	19	2-NTR-130	REACTOR COOLANT LOOP #3 HOT LEG WIDE RANGE TEMPERATURE RECORDER THERMAL SENSOR
	19	2-NTR-140	REACTOR COOLANT LOOP #4 HOT LEG WIDE RANGE TEMPERATURE RECORDER THERMAL SENSOR
	19	2-NTR-210	REACTOR COOLANT LOOP #1 COLD LEG WIDE RANGE TEMPERATURE RECORDER THERMAL SENSOR
	19	2-NTR-220	REACTOR COOLANT LOOP #2 COLD LEG WIDE RANGE TEMPERATURE RECORDER THERMAL SENSOR
	19	2-NTR-230	REACTOR COOLANT LOOP #3 COLD LEG WIDE RANGE TEMPERATURE RECORDER THERMAL SENSOR
	19	2-NTR-240	REACTOR COOLANT LOOP #4 COLD LEG WIDE RANGE TEMPERATURE RECORDER THERMAL SENSOR
	19	2-VTS-201	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP ROOM EXHAUST FAN HV-AFP-M1
	19	2-VTS-203	TURBINE DRIVEN AUXILIARY FEED PUMP ROOM NORTH EXHAUST FAN HV-AFP-T1
	19	2-VTS-204	TURBINE DRIVEN AUXILIARY FEED PUMP ROOM SOUTH EXHAUST FAN HV-AFP-T2
	19	2-VTS-206	WEST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP ROOM WEST EXHAUST FAN HV-AFP-X2
	19	2-VTS-340	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FAN HV-DGS-2 OUTSIDE AIR THERMOSTAT
	19	2-VTS-341	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION FANS HV-DGX-2 THERMOSTAT
	19	2-VTS-345	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FAN HV-DGS-1 OUTSIDE AIR THERMOSTAT
	19	2-VTS-346	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FAN HV-DGX-1 THERMOSTAT
	19	2-VTS-350	CRDM EQUIP ROOM AND INV AREA VENT NORTH SUPPLY FAN HV-SGRS-1A TEMPERATURE SWITCH
	19	2-VTS-351	CRDM EQUIP ROOM AND INV AREA VENT NORTH SUPPLY FAN HV-SGRS-1A TEMPERATURE SWITCH
	19	2-VTS-352	4KV ROOM 600V SWGR XFMRs TR21B AND TR21D AREA VENT SUPPLY FAN HV-SGRS-7 TEMP SWITCH
	19	2-VTS-353	600VAC MOTOR CONTROL CENTER MEZZANINE AREA VENT SUPPLY FAN HV-SGRS-9 TEMPERATURE SWITCH
	19	2-VTS-354	CRDM EQUIP ROOM AND INV AREA VENT OUTSIDE AIR INLET DAMPER HV-SGR-MD-2 TEMP SWITCH
	19	2-VTS-355	CRDM EQUIP ROOM AND INV AREA VENT RECIRC AIR INLET DAMPER HV-SGR-MD-1 TEMP SWITCH
	19	2-VTS-356	CRDM EQUIPMENT ROOM AND INVERTER AREA VENTILATION NORTH SUPPLY FAN HV-SGRS-4A TEMP SWITCH
	19	2-VTS-357	CRDM EQUIP ROOM AND INV AREA VENTILATION SOUTH SUPPLY FAN HV-SGRS-4A TEMP SWITCH
	19	2-VTS-702	UNIT 2 EAST ESW PUMP ROOM TEMPERATURE SWITCH
	19	2-VTS-704	UNIT 2 WEST ESW PUMP ROOM TEMPERATURE SWITCH
	19	2-VTS-802	4KV ROOM AB 4KV SWITCHGEAR AREA VENTILATION SUPPLY FAN HV-SGRS-2 THERMAL SENSOR
	19	2-VTS-803	4KV ROOM CD 4KV SWITCHGEAR AREA VENTILATION SUPPLY FAN HV-SGRS-3 THERMAL SENSOR
	19	2-VTS-805	4KV ROOM 600V SWGR XFMRs TR21B AND TR21D AREA VENT SUPPLY FAN HV-SGRS-7 TEMP SWITCH
	19	2-VTS-808	4KV ROOM 600V SWGR XFMRs TR21A AND TR21C AREA VENT SUPPLY FAN HV-SGRS-8 TEMP SWITCH
	0	2-HV-ACFD-1	PLANT PROCESS COMPUTER ROOM VENTILATION EXHAUST NORTH FIRE DAMPER\
	0	2-HV-ACFD-2	PLANT PROCESS COMPUTER ROOM VENTILATION EXHAUST SOUTH FIRE DAMPER
	0	2-HV-ACFD-3	CONTROL ROOM VENT UNITS HV-ACRA-1 & HV-ACRA-2 TO PLANT PROCESS COMPUTER ROOM FIRE DAMPER
	0	2-HV-DGS-FD-1	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FIRE DAMPER
	0	2-HV-DGS-FD-2	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FIRE DAMPER
	0	2-HV-DGX-FD-1	CD EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FIRE DAMPER

UNIT 2 SAFE SHUTDOWN EQUIPMENT LIST FOR RELAY EVALUATION

EQUIPMENT

<u>CLASS</u>	<u>DEVICE NUMBER</u>	<u>EQUIPMENT DESCRIPTION</u>
0	2-HV-DGX-FD-2	AB EMERGENCY DIESEL GENERATOR ROOM VENTILATION EXHAUST FIRE DAMPER
0	2-MRV-210	STEAM GENERATOR OME-3-1 STOP VALVE
0	2-MRV-220	STEAM GENERATOR OME-3-2 STOP VALVE
0	2-MRV-230	STEAM GENERATOR OME-3-3 STOP VALVE
0	2-MRV-240	STEAM GENERATOR OME-3-4 STOP VALVE
0	2-OME-34E	EAST ESSENTIAL SERVICE WATER PUMP PP-7E DISCHARGE STRAINER
0	2-OME-34W	WEST ESSENTIAL SERVICE WATER PUMP PP-7W DISCHARGE STRAINER
0	2-QT-100-AB	AB EMERGENCY DIESEL AIR INTAKE FILTER
0	2-QT-100-CD	CD EMERGENCY DIESEL AIR INTAKE FILTER
0	2-QT-118-AB	AB EMERGENCY DIESEL BYPASS LUBE OIL FILTER
0	2-QT-118-CD	CD EMERGENCY DIESEL BYPASS LUBE OIL FILTER

APPENDIX B

EPRI NP-7148 G.4 FORMS (SUMMARY OF CIRCUIT ANALYSIS)

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UNIT 1 COMPONENT COOLING WATER	PAGES 7-10
UNIT 1 MOTOR DRIVEN AUXILIARY FEEDWATER	PAGES 11-15
UNIT 1 TURBINE DRIVEN AUXILIARY FEEDWATER	PAGES 16-19
UNIT 1 CHEMICAL VOLUME AND CONTROL	PAGES 20-24
UNIT 1 RESIDUAL HEAT REMOVAL	PAGES 25-27
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UNIT 1 CONTAINMENT SPRAY	PAGES 31-32
UNIT 1 EMERGENCY DIESEL GENERATOR CD	PAGES 33-38
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UNIT 2 AUXILIARY ELECTRICAL	PAGES 119-124
UNIT 2 REACTOR TRIP BREAKERS	PAGE 125
UNIT 2 SOLID STATE PROTECTION SYSTEM	PAGE 126
UNIT 2 MISCELLANEOUS HVAC	PAGES 127-129
UNIT 2 INSTRUMENTATION	PAGES 130-135
UNIT 2 REACTOR COOLANT/PRESSURIZER	PAGES 136-137
UNIT 2 STEAM GENERATOR	PAGES 138-139
UNIT 2 NUCLEAR SAMPLING	PAGE 140
UNIT 2 SPENT FUEL PIT COOLING	PAGE 141

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Essential Service Water

Page 1 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-PP-7W West Essential Service Water Pump	1-98415-38	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		1-51-TA5	G.E. IAC	(2)
		1-50/50N-TA5	G.E. PJC T11A SWGR	
		1-62-BOS-TA5	Agastats	(2)
		1-62-SIS-TA5	T11A SWGR	
		1-SI-X-TA5	G.E. HFA T11A SWGR	(2)
		1-5-TA5	G.E. HFA Pan. SSR	(2)
		1-59-TA5-1	G.E. HGA	(2)
		1-59-TA5-2	T11A SWGR	
		1-59-TA5-3		
		SWGR Anti Pump Relay	ITE	(3)
		1-5X3-T11A		(2,4)
		1-42-2-DGAB		
		1-K610-X1		
		1-K610-X1-X		
All Others		CA(5)		

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 1-5X3-T11A and 1-42-2-DGAB
See SSPS G.4 form for 1-K610-X1 and 1-K-610-X1-X
- (5) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RGA Date 5-12-95
Reviewed by Joe B. B. Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Essential Service Water

Page 2 of 6

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
1-PP-7E East Essential Service Water Pump	1-98415-38	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		1-51-TD10	G.E. IAC	(2)
		1-50/50N-TD10	G.E. PJC T11D SWGR	
		1-62-BOS-TD10	Agastats	(2)
		1-62-SIS-TD10	T11D SWGR	
		1-SI-X-TD10	G.E. HFA T11D SWGR	(2)
		1-5-TD10	G.E. HFA Pan. SSR	(2)
		1-59-TD10-1	G.E. HGA	(2)
		1-59-TD10-2	T11D SWGR	
		1-59-TD10-3		
		SWGR Anti Pump Relay	ITE	(3)
		1-5X3-T11D		(2,4)
		1-42-2-DGCD		
		1-K611-A		
		1-K611-X-A		
All Others		CA(5)		

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 1-5X3-T11D and 1-42-2-DGCD
See SSPS G.4 form for 1-K611 and 1-K-611-X
- (5) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stack / Date 5-12-95
Reviewed by Jen Butcher / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Essential Service Water

Page 3 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
ESW MOVs	1-98415-38	Manual Control	G.E. SB-1	NV(1)
1-WMO-701	1-98416-25	Switches		
1-WMO-702				
1-WMO-705		Valve Limit/Torque	Limiterorque	NV(1)
1-WMO-707		Switches		
1-WMO-711				
1-WMO-713		Thermal Overloads	Cutler Hammer	NV(1)
1-WMO-715				
1-WMO-717		MCC Contactor and	Cutler Hammer	(2)
1-WMO-721		Aux contacts		
1-WMO-723				
1-WMO-725		Switchgear Aux		NV(1)
1-WMO-727		Contacts		
1-WMO-731				
1-WMO-733		1-33X-WMO-721	C.H. D26	(3)
1-WMO-735		1-33X-WMO-723	Pan. DGAB	
1-WMO-737		1-33X-WMO-725	Pan. DGCD	
		1-33X-WMO-727		
		1-K-AUX-WMO-713	G.E. HFA	(3)
		1-K-AUX-WMO-717	Pan. SSR	
		1-K-AUX-WMO-733		
		1-K-AUX-WMO-737		
		1-K604-A (B)		(3,4)
		1-K644-A (B)		
		All Others		CA(5)

- (1) General Electric type SB-1 switches, Limitorque limit and torque switches, Cutler Hammer thermal overloads, and ITE switchgear auxiliary contacts are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential and their capacity > demand (see Appendix E).
- (3) Capacity > Demand, see Appendix E.
- (4) See SSPS G.4 form for 1-K604-A, 1-K604-B, 1-K644-A and 1-K644-B.
- (5) Chatter of any other relays will not misposition valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RC Steep Date 5-12-95
 Reviewed by Jess Bellack Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Essential Service Water

Page 4 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-OME-34-W West ESW Strainer including 1-WRV-762 1-WRV-767 1-WRV-772 1-WRV-777	1-98415-38	Manual Control Switches	G.E. SB-1 Cutler Hammer	NV(1)
		Limit Switches	Namco	NV(1)
		24 hour timer	Luminite	NV(1)
		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactor and aux contacts	Cutler Hammer	(2)
		1-20X-SWL 1-20X-SWR 1-63X-S1W	G.E. HFA Pan. SSR	(2)
		1-62-S1W	Agastat Pan. SSR	(2)
		All Others		CA(3)

- (1) General Electric type SB-1, Cutler Hammer type 10250T switches, Namco limit switches, Luminite timers, and Cutler Hammer overloads are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Chatter by any other contacts will not cause strainer malfunction.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Staley / Date 5-12-95
Reviewed by Jim Bettel / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Essential Service Water

Page 5 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-OME-34-E East ESW Strainer including 1-WRV-761 1-WRV-766 1-WRV-771 1-WRV-776	1-98415-38	Manual Control Switches	G.E. SB-1 Cutler Hammer	NV(1)
		Limit Switches	Namco	NV(1)
		24 hour timer	Luminite	NV(1)
		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactor and aux contacts	Cutler Hammer	(2)
		1-20X-SEL 1-20X-SER 1-63X-S1E	G.E. HFA Pan. SSR	(2)
		1-62-S1E	Agastat Pan. SSR	(2)
		All Others		CA(3)

- (1) General Electric type SB-1, Cutler Hammer type 10250T switches, Namco limit switches, Luminite timers, and Cutler Hammer overloads are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Chatter by any other contacts will not cause strainer malfunction.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. A. Hale Date 5-12-95
Reviewed by Jim B. Hall Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Essential Service Water

Page 6 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
ESW HVAC	1-98415-38	Manual Control	Westinghouse	NV(1)
12-HV-ESW-5		Switches		
12-HV-ESW-6				
12-HV-ESW-7		Switchgear Aux	ITE	NV(1)
12-HV-ESW-8		Contacts		
		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactor and aux contacts		CA(2)
		Temperature Switches		CA(2)

- (1) Westinghouse type OT switches, Cutler Hammer overload relays, and ITE switchgear auxiliary contacts are rugged.
- (2) Cycling of fan during seismic event is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Hall / Date 5-12-95
Reviewed by Jean Bellack / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Component Cooling Water

Page 1 of 4

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
1-PP-10W West Component Cooling Water Pump	1-98405-28	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		1-51-TA7	G.E. IAC	(2)
		1-50/50N-TA7	G.E. PJC T11A SWGR	
		1-62-BOS-TA7	Agastats	(2)
		1-62-SIS-TA7	T11A SWGR	
		1-SI-X-TA7	G.E. HFA T11A SWGR	(2)
		1-5-TA7	G.E. HFA Pan. SSR	(2)
		1-59-TA7-1	G.E. HGA	(2)
		1-59-TA7-2	T11A SWGR	
		1-59-TA7-3		
		SWGR Anti Pump Relay	ITE	(3)
		1-5X2-T11A		(2,4)
		1-42-2-DGAB		
		1-K610-B		
All Others		CA(5)		

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 1-5X2-T11A and 1-42-2-DGAB
See SSPS G.4 form for 1-K610-B
- (5) Chatter of other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Herb / Date 5-12-95
Reviewed by Jim Bottardi / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Component Cooling Water

Page 2 of 4

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
1-PP-10E East Component Cooling Water Pump	1-98405-28	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		1-51-TD3	G.E. IAC	(2)
		1-50/50N-TD3	G.E. PJC T11D SWGR	
		1-62-BOS-TD3	Agastats	(2)
		1-62-SIS-TD3	T11D SWGR	
		1-SI-X-TD3	G.E. HFA T11D SWGR	(2)
		1-5-TD3	G.E. HFA Pan. SSR	(2)
		1-59-TD3-1	G.E. HGA	(2)
		1-59-TD3-2	T11D SWGR	
		1-59-TD3-3		
		SWGR Anti Pump Relay	ITE	(3)
		1-5X2-T11D		(2,4)
		1-42-2-DGCD		
		1-K610-A		
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 1-5X2-T11D and 1-42-2-DGCD
See SSPS G.4 form for 1-K610-A
- (5) Chatter of other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by R. H. Ab Date 5-12-95
 Reviewed by Jan. B. B. B. Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Component Cooling Water

Page 3 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
CCW MOVs	1-98405-28	Manual Control	G.E. SB-1	NV(1)
1-CCM-451	1-98406-18	Switches		
1-CCM-452				
1-CCM-453		Valve Limit/Torque	Limiterorque	NV(1)
1-CCM-454		Switches		
1-CCM-458				
1-CCM-459		Thermal Overloads	Cutler Hammer	NV(1)
1-CMO-410				
1-CMO-411		MCC Contactor and	Cutler Hammer	(2)
1-CMO-412		Aux contacts		
1-CMO-413				
1-CMO-414		1-K611-X1-A (B)		(3,4)
1-CMO-415		1-K618-A (B)		
1-CMO-416		1-K619-A (B)		
1-CMO-419				
1-CMO-420		1-KAUX-CMO-419	G.E. HFAs	(4)
1-CMO-429		1-KAUX-CMO-429	PAN. SSR	
		All Others		CA(5)

- (1) General Electric type SB-1 switches, Limitorque limit and torque switches and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential and their capacity > demand (see Appendix E).
- (3) See SSPS G.4 form for 1-K-611-X1, 1-K618 and 1-K619
- (4) Capacity > demand, see Appendix E.
- (5) Chatter of any other contacts will not misposition any of the valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Alab / Date 5-12-95
Reviewed by James Bettel / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Component Cooling Water

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
CCW AOVs 1-CRV-410 1-CRV-411	1-98405-28	Manual Control Switches	G.E. SB-1	NV(1)
		Limit Switches	Namco	NV(1)
CCW HVAC 12-HV-ACCP-2 12-HV-ACCP-3	1-98406-18	Manual Control Switches	G.E. SB-1	NV(1)
		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactors and Aux Contacts	Cutler Hammer	CA(2)
		Load Conservation Relays		CA(3)

- (1) General Electric type SB-1 switches, Cutler Hammer thermal overload relays, and Namco limit switches are rugged.
- (2) Chatter by these contacts could cycle the fans on and off during the DBE which is acceptable.
- (3) Chatter by these contacts could start fans, which is desired state.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. Stech / Date 5-12-95
Reviewed by Gen. Betts / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Motor Driven Aux Feedwater

Page 1 of 5

<u>Subsystem/Component</u>	<u>Ref Dwq(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
1-PP-3W West Motor Driven Auxiliary Feedwater Pump	1-98218-31	Manual Control, Test and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		1-51-TA2	G.E. IAC	(2)
		1-50/50N-TA2	G.E. PJC T11A SWGR	
		1-62-BOS-TA2	AGASTATS	(2)
		1-62-SIS-TA2	T11A SWGR	
		1-SI-X-TA2	GE HFA T11A SWGR	(2)
		1-5-TA2	GE HFA Pan. GRB	(2)
		1-59-TA2-1	GE HGA	(2)
		1-59-TA2-2	T11A SWGR	
		1-59-TA2-3		
		SWGR Anti Pump Relay	ITE	(3)
		1-5X7-T11A		(2,4)
		1-42-2-DGAB		
		1-K611-B		
All Others		CA(5)		

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 1-5X7-T11A and 1-42-2-DGAB
See SSPS G.4 form for 1-K611-B.
- (5) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RC Stab / Date 5-12-95
 Reviewed by Jan Bethke / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Motor Driven Aux Feedwater

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-PP-3E East Motor Driven Auxiliary Feedwater Pump	1-98214-48	Manual Control, Test and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		1-51-TD11	G.E. IAC	(2)
		1-50/50N-TD11	G.E. PJC T11D SWGR	
		1-62-BOS-TD11	AGASTATS	(2)
		1-62-SIS-TD11	T11D SWGR	
		1-SI-X-TD11	GE HFA T11D SWGR	(2)
		1-5-TD11	GE HFA Pan. SSR	(2)
		1-59-TD11-1	GE HGA	(2)
		1-59-TD11-2	T11D SWGR	
		1-59-TD11-3		
		SWGR Anti Pump Relay	ITE	(3)
		1-5X3-T11D		(2,4)
		1-42-2-DGCD		
		1-K611-A		
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 1-5X3-T11D and 1-42-2-DGCD
See SSPS G.4 form for 1-K611-A.
- (5) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RGH Date 5-12-95
Reviewed by Jess Beth Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Motor Driven Aux Feedwater

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
MDAFP to Steam Gen. Supply Valves 1-FMO-212 1-FMO-222 1-FMO-232 1-FMO-242	1-98217-18	Manual Control Switches	G.E. SB-1	NV(1)
		Valve Limit/Torque Switches	Limitorque	NV(1)
		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactor and Aux contacts		(2)
		1-63X1-SG1M (2M,3M,4M)	G.E. HGAs PAN. HSD1R	(3)
		All Others		CA(4)
ESW to MDAFP Supply Valves 1-WMO-744 1-WMO-754	1-98214-48 1-98218-31	Manual Control Switches	G.E. SB-1	NV(1)
		Valve Limit/Torque Switches	Limitorque	NV(1)
		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactor and Aux Contacts	Cutler Hammer	(5)
		All Others		CA(6)

- (1) General Electric type SB-1 switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) The open contactors are chatter acceptable, the close contactors are essential, and their capacity > demand, see Appendix E.
- (3) Capacity > demand, see Appendix E.
- (4) Rugged limit switches would prevent the valves from closing more than 3/8". This amount of closure is acceptable.
- (5) The close contactors and aux contacts are chatter acceptable, the open contactors and aux contacts are essential, and their capacity > demand.
- (6) Chatter of these contacts would not misposition valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by PK/Tab Date 5-12-95
Reviewed by Gen-Bell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Motor Driven Aux Feedwater

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Test Valves	1-98214-48	Manual Control	G.E. SB-1	NV(1)
1-FRV-245	1-98218-31	Switches	Cutler Hammer	
1-FRV-255		Limit Switches	Namco	NV(1)
		All Others		CA(2)
Emerg Leak Off Valves	1-98214-48	Manual Control	G.E. SB-1	NV(1)
1-FRV-247	1-98218-31	Switches	Cutler Hammer	
1-FRV-257		Pressure Switch		CA(3)
		Limit Switches	Namco	NV(1)
		All Others		CA(2)

- (1) G. E. type SB-1 switches, Cutler Hammer 10250T selector switches, and Namco limit switches are rugged.
- (2) Chatter of any other relays will not misposition valves
- (3) Partial and temporary closing of valve is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. H. H. H. Date 5-12-85
Reviewed by Gen. B. H. H. Date 5-17-85

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Motor Driven Aux Feedwater

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Vent Fans	1-98214-48	Manual Control	Westinghouse	NV(1)
1-HV-AFPM1	1-98218-31	Switches	Cutler Hammer	
1-HV-AFPM2				
1-HV-AFPX1		Thermal Overloads	Cutler Hammer	NV(1)
1-HV-AFPX2				
		SWGR Aux Contacts	ITE	NV(1)
		MCC Contactors and Aux Contacts	Cutler Hammer	CA(2)
		Temperature Switches		CA(2)

- (1) Westinghouse OT selector switches, Cutler Hammer 10250T selector switches, Cutler Hammer thermal overloads, and ITE switchgear aux contacts are rugged.
- (2) Chatter of these contacts could cause cycling of the fans which is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by D. K. Lab Date 5-12-85
Reviewed by Jim Bettan Date 5-17-85

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Turbine Driven Aux Feedwater

Page 1 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-PP-4	1-98215-61	Auto Start Relays		CA(1)
Turbine Driven Aux Feedwater Pump		Trip Push Button	Cutler Hammer	NV(2)
		Overspeed Limit Switches	Namco	NV(2)
		1-4TDTV	Asco 2506 Pan. TFP	(3)
		1-12X-TPFP	G.E. HFA Pan. TRB	(3)
		1-EOM-AUX	G.E. HFA Pan. TFP	(3)
		1-TDAFP-OSM	Dynalco SS2200 Pan. TFP	(3)
		All Others		CA(4)

- (1) Chatter acceptable since Turbine Aux Feedwater Pump start is desired.
- (2) Cutler Hammer push buttons and Namco limit switches are rugged.
- (3) Capacity > demand, see Appendix E.
- (4) Chatter of any other relays will not trip or prevent the start of the the turbine driven auxiliary feedwater pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. H. H. H. Date 5-12-95
Reviewed by Jen. B. H. H. Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Turbine Driven Aux Feedwater

Page 2 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
TDAFP MOVs	1-98215-61	Manual Control	G.E. SB-1	NV(1)
1-TDTV	1-98216-19	Switches		
1-FMO-211		Valve Limit/Torque	Limiterorque	NV(1)
1-FMO-221		Switches		
1-FMO-231				
1-FMO-241				
1-MCM-221		Thermal Overloads	Cutler Hammer	NV(1)
1-MCM-231				
1-WMO-753		MCC Contactors and aux contacts	Cutler Hammer	(2)
		1-63X1-SG1T	G.E. HGAs	(3)
		1-63X1-SG2T	Pan. TRB	
		1-63X1-SG3T		
		1-63X1-SG4T		
		TDTV Auto Open Contacts		CA(4)
		FMO Auto Close Circuitry		CA(5)
		All Others		CA(6)

- (1) General Electric type SB-1 control switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential and their capacity > demand (see Appendix E).
- (3) Capacity > demand, see Appendix E.
- (4) TDAFP Trip and Throttle Valve is desired to be open.
- (5) Rugged limit switch would prevent the valve from closing more than 3/8". This amount of closure is acceptable.
- (6) Chatter of any other relays will not misposition any valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stebbins Date 5-12-95
Reviewed by Jen. Butcher Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Turbine Driven Aux Feedwater

Page 3 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
TDAFP Test Valve 1-FRV-256	1-98215-61	Manual Control Switches	Cutler Hammer	NV(1)
		Limit Switches	Namco	NV(1)
		1-4X3-TDFP		CA(2)
TDAFP Emerg Leak Off Valve 1-FRV-258	1-98215-61	Manual Control Switches	G.E. SB-1 Cutler Hammer	NV(1)
		Limit Switches	Namco	NV(1)
		Pressure Switch Relays		CA(3)

- (1) G. E. type SB-1 control switches, Namco limit switches, and Cutler Hammer 10250T selector switches are rugged.
- (2) Chatter of this contact would not open the valve.
- (3) Chatter of these contacts could cause partial and temporary closing of the valve which is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DC Stealy Date 5-12-95
Reviewed by Jan. Butcher Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Turbine Driven Aux Feedwater

Page 4 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
TDAFP Fans	1-98216-19	Manual Control	Westinghouse	NV(1)
1-HV-AFPT1		Switches		
1-HV-AFPT2				
1-HV-AFP-BRE-1		Thermal Overloads	Cutler Hammer	NV(1)
1-HV-AFP-BRE-2				
		MCC Contactor and Aux Switches		CA(2)
		Temperature Switches		CA(2)
		1-27-BR1		CA(3)
		1-27-BR2		

- (1) Westinghouse type OT-1 switches and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of these contacts could cause cycling of the fan during the seismic event which is acceptable.
- (3) Relays perform alarm function only.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. G. H. 6 / Date 5-12-95
Reviewed by Jan. Pittman / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Chemical & Volume Control

Page 1 of 5

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
1-PP-50W West Centrifugal Charging Pump	1-98273-33	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		1-51-TA8	G.E. IAC	(2)
		1-50/50N-TA8	G.E. PJC T11A SWGR	
		1-62-SIS-TA8	Agastat T11A SWGR	(2)
		1-5-TA8	G.E. HFA PAN. SSR	(2)
		1-K610-B 1-5X5-T11A		(2,3)
		All Others		CA(4)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) See SSPS G.4 Form for 1-K610-B, see Diesel G.4 forms for 1-5X5-T11A.
- (4) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. Stroh / Date 5-12-95
Reviewed by Jim Butts / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Chemical & Volume Control

Page 2 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-PP-50E East Centrifugal Charging Pump	1-98273-33	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		1-51-TD7	G.E. IAC	(2)
		1-50/50N-TD7	G.E. PJC T11D SWGR	
		1-62-SIS-TD7	Agastat T11D SWGR	(2)
		1-5-TD7	G.E. HFA PAN. SSR	(2)
		1-K610-A 1-5X5-T11D		(2,3)
		All Others		CA(4)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) See SSPS G.4 Form for 1-K610-A, see Diesel G.4 forms for 1-5X5-T11D.
- (4) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stebbins Date 5-12-95
Reviewed by Jan B. Balthus Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Chemical and Volume Control

Page 3 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-PP-49 Reciprocating Charging Pump	1-98273-33	Manual Control Switch All Others	G.E. SB-1	NV(1) CA(2)
1-PP-46-1 1-PP-46-2 Boric Acid Transfer Pumps	1-98272-13	Manual Control Switches Thermal Overloads MCC contactor and aux contacts All Others	G.E. SB-1 Cutler Hammer Cutler Hammer	NV(1) NV(1) CA(3) CA(3)

- (1) General Electric type SB-1 switches, Cutler Hammer 10250T switches and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of any other contacts will not start the pump. Only the manual control switch can start the pump.
- (3) Chatter of these contacts could cause cycling the pumps during the seismic event which is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DC Steel Date 5-12-95
Reviewed by John Bethune Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Chemical & Volume Control

Page 4 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
CVCS MOVs	1-98266-28	Manual Control	G.E. SB-1	NV(1)
1-IMO-340	1-98271-23	Switches		
1-IMO-910	1-98273-33			
1-IMO-911	1-98274-21	Valve Limit/Torque	Limitorque	NV(1)
1-QCM-250		Switches		
1-QCM-350				
1-QMO-200		Thermal Overloads	Cutler Hammer	NV(1)
1-QMO-201				
1-QMO-225		MCC Contactors and	Cutler Hammer	(2)
1-QMO-226		Aux Contacts		
1-QMO-410				
1-QMO-451		1-LB-112-BX1	West. AR	(3)
1-QMO-452		1-LB-112-BX2	RPSX-A	
		1-LB-185-BX1	RPSX-B	
		1-LB-185-BX2		
		1-PB-455-X1	G.E. HFAs	(3)
		1-PB-457-X1	Pans. SR3, WRR	
		1-K608-X2-A (B)		(3,4)
		1-K606-A (B)		
		1-K609-X1-A (B)		
		All Others		CA(5)

- (1) General Electric type SB-1 switches, Limitorque limit and torque switches and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential and their capacity > demand (see Appendix E).
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 form for 1-K608-X2, 1-K606, and 1-K609-X1
- (5) Chatter by any other contacts would not misposition valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RC Fleck Date 5-12-95
 Reviewed by John Butcher Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Chemical and Volume Control

Page 5 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
CVCS AOVs	1-98271-23	Manual Control	G.E. SB-1	NV(1)
1-QRV-111	1-98274-21	Switches	Cutler Hammer	
1-QRV-112			Westinghouse	
1-QRV-113				
1-QRV-114		Limit Switches	Namco	NV(1)
1-QRV-171				
1-QRV-400		1-MUX-4-2	West. AR	(2)
1-QRV-411		1-LB-112-DX	PAN. ARA-2	
1-QRV-451				
		All Others		CA(3)
1-QRV-170	1-985612-2	All Devices		NV(4)
1-QRV-410	1-985591-3			
12-QRV-420	1-985592-2			
1-QRV-251	1-985542-4	1-43-QFI-200	CH 10250T	NV(1)
		1-43X-QFI-200		CA(3)
		1-43-PLC	G.E. SB-1	NV(1)
		Defeat Relays		CA(3)
		Test Switches	C&K 7401	NV(1)
		Sliding Link Term	Multiamp	NV(1)
		All Other Devices		NV(4)

- (1) General Electric type SB-1, Cutler Hammer 10250T, C&K test switches, Namco limit switches, Multiamp sliding link terminal blocks, and Westinghouse OT selector switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Partial and temporary mispositioning of the valves during the seismic event is acceptable. No valves will be sealed-in in the incorrect position.
- (4) Devices are solidstate and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. Steeb / Date 5-12-95
Reviewed by Gen. Butcher / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Residual Heat Removal

Page 1 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-PP-35W West Residual Heat Removal Pump	1-98284-42	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co, ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		CA(2)
		1-62-SIS-TA4	Agastat T11A SWGR	(3)
		1-SI-X-TA4	G.E. HFA T11A SWGR	(3)
		1-5-TA4	G.E. HFA Pan. WRR	(3)
		1-K610-B 1-5X5-T11A		(3,4)
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) RHR Pumps are not required to start until after the DBE, therefore, chatter of the tripping relays is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 Form for 1-K610-B.
See Diesel Generator G.4 forms for 1-5X5-T11A
- (5) Chatter of any other relays will not inadvertently start the pump, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by PC/Alb Date 5-12-95
 Reviewed by Jan Bell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Residual Heat Removal

Page 2 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-PP-35E East Residual Heat Removal Pump	1-98284-42	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co, ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		CA(2)
		1-62-SIS-TD6	Agastat T11D SWGR	(3)
		1-SI-X-TD6	G.E. HFA T11D SWGR	(3)
		1-5-TD6	G.E. HFA Pan. SSR	(3)
		1-K610-A 1-5X5-T11D		(3,4)
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) RHR Pumps are not required to start until after the DBE, therefore, chatter of the tripping relays is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 Form for 1-K610-A.
See Diesel Generator G.4 forms for 1-5X5-T11D.
- (5) Chatter of any other relays will not inadvertently start the pump, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RK Hef Date 5-12-95
Reviewed by Jen Butcher Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Residual Heat Removal

Page 3 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
RHR MOVs	1-98284-42	Manual Control	G.E. SB-1	NV(1)
1-ICM-111	1-98287-20	Switches		
1-ICM-129				
1-ICM-305		Valve Limit/Torque	Limiterorque	NV(1)
1-ICM-306		Switches		
1-ICM-311				
1-ICM-321		Thermal Overloads	Cutler Hammer	NV(1)
1-IMO-128				
1-IMO-310		MCC Contactor/Aux	Cutler Hammer	(2)
1-IMO-312		Switches		
1-IMO-314				
1-IMO-315		All Others		CA(3)
1-IMO-316				
1-IMO-320				
1-IMO-322				
1-IMO-324				
1-IMO-325				
1-IMO-326				
1-IMO-390				

RHR AOVs	1-985661-3	All Devices		NV(4)
1-IRV-310				
1-IRV-311				
1-IRV-320				

- (1) General Electric type SB-1 control switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential, and their capacity > demand (see Appendix E).
- (3) Chatter by any other contacts will not misposition valves.
- (4) Devices are solidstate and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RC Stab Date 5-12-95
 Reviewed by Jess. Bettis Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Safety Injection

Page 1 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-PP-26N 1-PP-26S Safety Injection Pumps	1-98281-34	Manual Control, Test and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		CA(2)
		1-62-SIS-TA1	Agastat T11A SWGR	(3)
		1-SI-X-TA1	GE HFA T11A SWGR	(3)
		1-62-SIS-TD5	Agastat T11D SWGR	(3)
		1-SI-X-TD5	GE HFA T11D SWGR	(3)
		1-K610-A 1-K610-B		(3,4)
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Pumps are not required to run, therefore trips are acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 form for 1-K610A and 1-K610B.
- (5) Chatter of any other relays will not start pumps.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Hlub Date 5-12-95
Reviewed by Jess Bellard Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Safety Injection

Page 2 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Safety Injection	1-98281-34	Manual Control	G.E. SB-1	NV(1)
MOVs	1-98282-19	Switches		
1-ICM-250	1-98288-8			
1-ICM-251		Valve Limit/Torque	Limiterorque	NV(1)
1-ICM-260		Switches		
1-ICM-265				
1-IMO-51		Thermal Overloads	Cutler Hammer	NV(1)
1-IMO-52				
1-IMO-53		MCC Contactor Aux	Cutler Hammer	(2)
1-IMO-54		Contacts		
1-IMO-255				
1-IMO-256		1-K608-X1-A		(3,4)
1-IMO-261		1-K608-X1-B		
1-IMO-262		1-K609-X1-A		
1-IMO-263		1-K609-X1-B		
1-IMO-270				
1-IMO-275		All Others		CA(5)
1-IMO-350				
1-IMO-360				
1-IMO-361				
1-IMO-362				

- (1) General Electric type SB-1 control switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential, and their capacity > demand (see Appendix E).
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 form for these relays.
- (5) Contact chatter by any other relays will not cause valves to move to an undesired position.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RC Steel Date 5-12-95
 Reviewed by Jan. Bellah Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Safety Injection

Page 3 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Safety Injection	1-98281-34	Manual Control	G.E. SB-1	NV(1)
AOVs	1-98283-18	Switches	Cutler Hammer	
1-IRV-50				
1-IRV-60		Limit Switches	Namco	NV(1)
1-IRV-112				
1-IRV-122		All Others		CA(2)
1-IRV-132				
1-IRV-142				
1-IRV-116				
1-IRV-126				
1-IRV-136				
1-IRV-146				
1-IRV-147				
1-IRV-148				
1-IRV-149				
1-IRV-150				
1-IRV-260				
1-GCR-314				
1-GRV-341	1-985691-2	All Devices		NV(3)

- (1) General Electric type SB-1 control switches, Cutler Hammer 10250T selector switches, and Namco limit switches are rugged.
- (2) Chatter of any other contacts would not cause any of the valves to move to an undesired position.
- (3) Control devices are solidstate, and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Steif / Date 5-12-95
Reviewed by Jan Bittick / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Containment Spray

Page 1 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-PP-9W 1-PP-9E Containment Spray Pumps	1-98285-24	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		CA(2)
		1-62-CS-TA3	Agastat T11A SWGR	(3)
		1-CS-X-TA3	G.E. HFA T11A SWGR	(3)
		1-62-CS-TD4	Agastat T11D SWGR	(3)
		1-CS-X-TD4	G.E. HFA T11D SWGR	(3)
		1-K626-X3-A 1-K626-X3-B		(3,4)
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Pumps are not required to run, therefore trips are acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 Form for 1-K626-X3-A and 1-K626-X3-B
- (5) Chatter of any other relays will not start the pumps.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Webb Date 5-12-95
Reviewed by Jan B. Bittell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Containment Spray

Page 2 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Containment Spray MOVs	1-98285-24	Manual Control Switches	G.E. SB-1	NV(1)
1-IMO-210				
1-IMO-211		Limit/Torque Switches	Limitorque	NV(1)
1-IMO-212				
1-IMO-215		Thermal Overloads	Cutler Hammer	NV(1)
1-IMO-220				
1-IMO-221		MCC Contactor/Aux	Cutler Hammer	(2)
1-IMO-222		Contacts		
1-IMO-225				
1-IMO-330		1-K643-A		(3)
1-IMO-331		1-K643-B		
		All Others		CA(4)

- (1) General Electric type SB-1 switches, Limitorque limit and torque switches and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential and their capacity > demand (see Appendix E).
- (3) See SSPS G.4 form for 1-K643-A and 1-K643-B
Capacity > demand, see Appendix E.
- (4) Chatter of any other relays will not misposition valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Heib Date 5-12-95
Reviewed by Jan. B. Smith Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-CD

Page 1 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Diesel Trip Circuitry	1-98044-38	Trip Push Buttons	Cutler Hammer	NV(1)
		Diesel Differential Relays	ABB 87M Pan. A-13	(2)
		Diesel Overcurrent Relays	G.E. IACs Pan. A-13	(2)
		Air Chest Pressure 1-63-ACP-EH	Mercoird Pan. DGCD	(2)
		Fuel Manifold Pressure Lube Oil Pressure Bearing Temp High		CA(3)
		Overspeed Circuitry CO ₂ System Activated Incomplete Start		(4)
		1-1X-DGCD 1-5X-CD	G.E. HFAs Pan. SR4	(2)
		1-62-2X-DGCD	Agastat Pan. SR4	(2)
		1-87X-DGCD	G.E. HEA Pan. SA	(2)
		1-6-2-DGCD		(5)
		All Others		CA(6)

- (1) Cutler Hammer push buttons are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) These trips are blocked by 1-42-3-DGCD before diesel start and by 1-1X-DGCD after diesel start.
- (4) These circuits are seismically adequate, see pages 4 of 6 and 6 of 6.
- (5) See page 2 of 6.
- (6) Chatter of any other relays will not cause or prevent a diesel trip.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Heel / Date 5-12-95
Reviewed by John Butcher / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-CD

Page 2 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Diesel Starting Circuitry	1-98035-20	Undervoltage Relays	ITE 27N	CA(1)
		U.V. Aux Relays	G.E. HFAs	CA(1)
		1-27X-T11C	G.E. HFAs	(2)
		1-27X-T11D	Pans SR4, GR1	
		1-62-T11CU	Agastats	(2)
		1-62-T11DU	Pans SR3, GR1	
		1-87X-T11C	GE HEA/Pan SA	(2)
		Manual Control Sw.	G.E. SB-1	NV(3)
		Switchgear Aux Contacts	ITE	NV(3)
		1-5X5-T11C	G.E. HFAs	(2)
		1-5X6-T11D	Pans SR4, GR1	
		Diesel Starting Relays	G.E. HFAs	
		1-6-DGCD	Pan. DGCD	(2)
		1-6-1-DGCD	Pan. SA	CR(4)
		1-6-3-DGCD	Pan. DGCD-X	(2)
		1-6-2-DGCD	C.H. M600	(2)
			Pan. DGCD	
		1-K609-A		(2,5)
		All Others		(6)

- (1) Since a 2 second time delay is utilized in the undervoltage circuitry, chatter of the undervoltage and interposing relays is acceptable.
- (2) Capacity > demand, see Appendix E.
- (3) G.E. SB-1 switches, Cutler Hammer push buttons, and ITE switchgear aux contacts are rugged.
- (4) Relay capacity does not exceed demand. The relay will be relocated to reduce the demand.
- (5) See SSPS G.4 form for 1-K609-A
- (6) Chatter of any other contacts will not cause or prevent a diesel start.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stahl Date 5-12-95
Reviewed by Jesse Beltrich Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-CD

Page 3 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Starting Air Relays	1-98035-20	1-19-DGCD 1-19-1-DGCD	G.E. HFAs Pan. DGCD	(1)
Jet Assist Timer	1-98035-20	1-62-2-DGCD	Agastat Pan. DGCD	(1)
Throttle Signal Circuitry	1-98035-20	1-62-3X-DGCD 1-62-3-DGCD		CA(2)
Field Flashing Circuitry	1-98033-38	Push Button	Cutler Hammer	NV(3)
		1-53-DGSCD	ASCO 2516C	(1)
		1-43X1-DGSCD 1-12X-SPSA-2 1-6-1-DGCD		(4)
Regulation Circuitry	1-98033-38	Manual Control Switches	G.E. SB-1	NV(3)
		Switchgear Aux Contacts	ITE	NV(3)
		1-65X-DGCD	G.E. HFA Pan. DGCD	(1)
		1-43X-DGCD-CT 1-43X1-DGCD-CT	Cutler Hammer Pan. DGCD-X	(1)
		1-100-CR	Air Pax Pan. DGCD	(1)
		1-10-LR	G.E. TOL	NV(3)
		All Others		CA(2)

- (1) Capacity > demand, see Appendix E.
- (2) Chatter of these contacts would not adversely affect diesel operation.
- (3) Cutler Hammer push buttons, G.E. SB-1 switches, ITE switchgear aux contacts, and G.E. thermal overload devices are rugged.
- (4) See pages 4 of 6 and 2 of 6 for these relays.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. Stebbins Date 10-25-95
Reviewed by Jess. Bell Date 11-1-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-CD

Page 4 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Diesel Engine Running Relays	1-98035-20	1-42-2-DGCD 1-42-3-DGCD 1-42-4-DGCD 1-42-5-DGCD 1-42-6-DGCD 1-42-7-DGCD 1-42-8-DGCD	G.E. HFAs Pan. DGCD	(1)
Load Shedding Relays	1-98035-20	1-5X3-T11C 1-5X5-T11C 1-5X2-T11D 1-5X3-T11D 1-5X5-T11D 1-5X6-T11D	G.E. HFAs PANs. GR-1, SR-4	(1)
Overspeed Circuitry		1-12-SPSA-1 1-12-SPSA-2 1-12-OSTA 1-12X-SPSA2	G.E. HFAs Pan. DGCD-X G.E. HFA Pan. DGCD	(1) (1)
Incomplete Start Circuitry	1-98035-20	1-FBCST 1-RBCST 1-62-1X-DGCD 1-62-2-DGSCD 1-62-1-DGCD	Dynalco SS2200 Pan. DGCD G.E. HFA Agastat Agastat Pan. DGCD	(1) (1)
Slow Start Circuitry	1-98035-20	1-43-X1-DGSCD 1-43-X3-DBSCD 1-43-X4-DGSCD	G.E. HFAs Pan. DGCD-X	(1)
		Manual Control Switch	G.E. SB-1	NV(2)
		All Others		CA(3)

- (1) Capacity > demand, see Appendix E.
- (2) General Electric type SB-1 switches are rugged.
- (3) Chatter of other diesel engine running, load shedding, and slow start circuitry relays will not adversely affect diesel operation.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Hieb / Date 5-12-95
Reviewed by John P. Brown / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-CD

Page 5 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
EDG 1-CD Output Breakers 1-T11C3 1-T11D8	1-98044-38	Manual Control, Test, and Disconnect Switches	G.E. SB-1 Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		(2)
		1-87X-DGCD 1-87X-T11C 1-51X-TD8	G.E. HEAs PAN. SA	(2)
		SWGR Anti Pump Relays		(3)
		1-42-4-DGCD		(2,4)
		All Others		CA(5)
EDG Inverter	1-98033-38	Inverter Relays	SCI	(2)
		1-83-TILA	G.E. HFA PAN. DGCD-X	(2)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Relays directly control switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 form page 4 of 6 for 1-42-4-DGCD
- (5) Chatter of other contacts will not cause breaker misoperation.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RQ Stee / Date 10-25-95
Reviewed by Jess B. B. B. / Date 11-1-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-CD

Page 6 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
1-DGCD Auxiliaries	1-98014-37	Manual Control Switches	G.E. SB-1	NV(1)
1-QT-117-CD				
1-QT-106-CD1				
1-QT-106-CD2		Thermal Overloads	Cutler Hammer	NV(1)
1-QT-119-CD				
1-QT-111-CD		All Others		CA(2)
1-QT-116-CD				
1-QT-130-CD1				
1-QT-130-CD2				
1-QT-135-CD				
1-QT-134-CD				
1-QT-100-CD				
1-QT-118-CD				
1-DGCD HVAC	1-98017-31	Manual Control Switches	G.E. SB-1	NV(1)
1-HV-DGS-2				
1-HV-DGX-2				
1-HV-DGS-4		Valve Limit/Torque Switches	Limitorque	NV(1)
1-HV-DDP-CD1				
1-HV-DDP-CD2				
1-HV-DGS-DCD		Thermal Overloads	Cutler Hammer	NV(1)
		All Others		CA(2)
1-DGCD Fire Dampers	1-98033-38	1-23X2-DGCD	G.E. HFA	(3)
1-HV-DGS-FD2	1-98981-28		Pan. DGCD	
1-HV-DGX-FD2		1-63-DGCD	Cardox	NV(1)
Upper Valve Gear	1-98014-37	All Contacts		CA(4)
Lube Oil Solenoids				
1-LSO-245				
1-LSO-246				

- (1) General Electric type SB-1 switches, Cardox pressure switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of other contacts could cause temporary cycling of the loads during the SSE however this is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) Chatter of any contact will not close valves when diesel is running.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RC Hobb Date 5-12-95
 Reviewed by Jan Bottel Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-AB

Page 1 of 6

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
Diesel Trip Circuitry	1-98043-45	Trip Push Buttons	Cutler Hammer	NV(1)
		Diesel Differential Relays	ABB 87M Pan. A-11	(2)
		Diesel Overcurrent Relays	G.E. IACs Pan. A-11	(2)
		Air Chest Pressure 1-63-ACP-EH	Mercoid Pan. DGAB	(2)
		Fuel Manifold Pressure Lube Oil Pressure Bearing Temp High		CA(3)
		Overspeed Circuitry CO ₂ System Activated Incomplete Start		(4)
		1-1X-DGAB 1-5X-AB	G.E. HFAs Pan. SR2	(2)
		1-62-2X-DGAB	Agastat Pan. SR2	(2)
		1-87X-DGAB	G.E. HEA Pan. SA	(2)
		1-6-2-DGAB		(5)
		All Others		CA(6)

- (1) Cutler Hammer push buttons are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) These trips are blocked by 1-42-3-DGAB before diesel start and by 1-1X-DGAB after diesel start.
- (4) These circuits are seismically adequate, see pages 4 of 6 and 6 of 6.
- (5) See page 2 of 6.
- (6) Chatter of any other relays will not cause or prevent a diesel trip.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Steel Date 5-12-95
Reviewed by Jan Bittler Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-AB

Page 2 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Diesel Starting Circuitry	1-98034-20	Undervoltage Relays	ITE 27N	CA(1)
		U.V. Aux Relays	G.E. HFAs	CA(1)
		1-27X-T11A	G.E. HFAs	(2)
		1-27X-T11B	Pans SR1,2	
		1-62-T11AU	Agastats	(2)
		1-62-T11BU	Pan SR2	
		1-87X-T11B	GE HEA/Pan SA	(2)
		Manual Control Sw.	G.E. SB-1	NV(3)
		Switchgear Aux Contacts	ITE	NV(3)
		1-5X1-T11A	G.E. HFAs	(2)
		1-5X1-T11B	Pans SR1,2	
		Diesel Starting Relays	G.E. HFAs	
		1-6-DGAB	Pan. DGAB	(2)
		1-6-1-DGAB	Pan. SA	CR(4)
		1-6-3-DGAB	Pan. DGAB-X	(2)
		1-6-2-DGAB	C.H. M600	(2)
			Pan. DGAB	
1-K609-B		(2,5)		
All Others		(6)		

- (1) Since a 2 second time delay is utilized in the undervoltage circuitry, chatter of the undervoltage and interposing relays is acceptable.
- (2) Capacity > demand, see Appendix E.
- (3) G.E. SB-1 switches, Cutler Hammer push buttons, and ITE switchgear aux contacts are rugged.
- (4) Relay capacity does not exceed demand. The relay will be relocated to reduce the demand.
- (5) See SSPS G.4 form for 1-K609-B
- (6) Chatter of any other contacts will not cause or prevent a diesel start.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RGH Date 5-12-95
Reviewed by Jim Bell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-AB

Page 3 of 6

Subsystem/Component	Ref Dwq(s)	Contact/Contact Group	Relay Type and Location	SAT*
Starting Air Relays	1-98034-20	1-19-DGAB 1-19-1-DGAB	G.E. HFAs Pan. DGAB	(1)
Jet Assist Timer	1-98034-20	1-62-2-DGAB	Agastat Pan. DGAB	(1)
Throttle Signal Circuitry	1-98034-20	1-62-3X-DGAB 1-62-3-DGAB		CA(2)
Field Flashing Circuitry	1-98032-37	Push Button	Cutler Hammer	NV(3)
		1-53-DGSAB	ASCO 2516C	(1)
		1-43X1-DGSAB 1-12X-SPSB-2 1-6-1-DGAB		(4)
Regulation Circuitry	1-98032-37	Manual Control Switches	G.E. SB-1	NV(3)
		Switchgear Aux Contacts	ITE	NV(3)
		1-65X-DGAB	G.E. HFA Pan. DGAB	(1)
		1-43X-DGAB-CT 1-43X1-DGAB-CT	Cutler Hammer Pan. DGAB-X	(1)
		1-100-CR	Air Pax Pan. DGAB	(1)
		1-10-LR	G.E. TOL	NV(3)
		All Others		CA(2)

- (1) Capacity > demand, see Appendix E.
- (2) Chatter of these contacts would not adversely affect diesel operation.
- (3) Cutler Hammer push buttons, G.E. SB-1 switches, ITE switchgear aux contacts, and G.E. thermal overload devices are rugged.
- (4) See pages 4 of 6 and 2 of 6 for these relays.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DC Steach / Date 10-25-95
Reviewed by Jess Ballash / Date 11-1-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-AB

Page 4 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Diesel Engine Running Relays	1-98034-20	1-42-2-DGAB 1-42-3-DGAB 1-42-4-DGAB 1-42-5-DGAB 1-42-6-DGAB 1-42-7-DGAB 1-42-8-DGAB	G.E. HFAs Pan. DGAB	(1)
Load Shedding Relays	1-98034-20	1-5X1-T11A 1-5X2-T11A 1-5X3-T11A 1-5X5-T11A 1-5X7-T11A 1-5X1-T11B	G.E. HFAs PANs. SR-1, SR-2	(1)
Overspeed Circuitry		1-12-SPSB-1 1-12-SPSB-2 1-12-OSTB 1-12X-SPSB2	G.E. HFAs Pan. DGAB-X G.E. HFA Pan. DGAB	(1) (1)
Incomplete Start Circuitry	1-98034-20	1-FBCST 1-RBCST 1-62-1X-DGAB 1-62-2-DGSAB 1-62-1-DGAB	Dynalco SS2200 Pan. DGAB G.E. HFA Agastat Agastat Pan. DGAB	(1) (1)
Slow Start Circuitry	1-98034-20	1-43-X1-DGSAB 1-43-X3-DBSAB 1-43-X4-DGSAB	G.E. HFAs Pan. DGAB-X	(1)
		Manual Control Switch	G.E. SB-1	NV(2)
		All Others		CA(3)

- (1) Capacity > demand, see Appendix E.
- (2) General Electric type SB-1 switches are rugged.
- (3) Chatter of other diesel engine running, load shedding, and slow start circuitry relays will not adversely affect diesel operation.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by John H. H. 6 Date 5-12-95
Reviewed by John B. H. 6 Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-AB

Page 5 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
EDG 1-AB Output Breakers 1-T11A11 1-T11B4	1-98043-45	Manual Control, Test, and Disconnect Switches	G.E. SB-1 Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		(2)
		1-87X-DGAB	G.E. HEAs	(2)
		1-87X-T11B	PAN. SA	
		1-51X-TA11		
		SWGR Anti Pump Relays		(3)
		1-42-4-DGAB		(2,4)
		All Others		CA(5)
EDG Inverter	1-98032-37	Inverter Relays	SCI	(2)
		1-83-TILB	G.E. HFA PAN. DGAB-X	(2)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Relays directly control switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 form page 4 of 6 for 1-42-4-DGAB
- (5) Chatter of other contacts will not cause breaker misoperation.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by John Stuck / Date 10-25-95
Reviewed by Jess Ballack / Date 11-1-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Emergency Diesel Generator 1-AB

Page 6 of 6

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
1-DGAB Auxiliaries	1-98013-41	Manual Control	G.E. SB-1	NV(1)
1-QT-117-AB		Switches		
1-QT-106-AB1				
1-QT-106-AB2		Thermal Overloads	Cutler Hammer	NV(1)
1-QT-119-AB				
1-QT-111-AB		All Others		CA(2)
1-QT-116-AB				
1-QT-130-AB1				
1-QT-130-AB2				
1-QT-135-AB				
1-QT-134-AB				
1-QT-100-AB				
1-QT-118-AB				
1-DGAB HVAC	1-98016-29	Manual Control	G.E. SB-1	NV(1)
1-HV-DGS-1		Switches		
1-HV-DGX-1				
1-HV-DGS-3		Valve Limit/Torque	Limiterorque	NV(1)
1-HV-DDP-AB1		Switches		
1-HV-DDP-AB2				
1-HV-DGS-DAB		Thermal Overloads	Cutler Hammer	NV(1)
		All Others		CA(2)
1-DGAB Fire Dampers	1-98032-37	1-23X2-DGAB	G.E. HFA	(3)
1-HV-DGS-FD1	1-98981-28		Pan. DGAB	
1-HV-DGX-FD1		1-63-DGAB	Cardox	NV(1)
Upper Valve Gear	1-98013-41	All Contacts		CA(4)
Lube Oil Solenoids				
1-LSO-240				
1-LSO-241				

- (1) General Electric type SB-1 switches, Cardox pressure switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of other contacts could cause temporary cycling of the loads during the SSE however this is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) Chatter of any contact would not close valves when the diesel is running.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RG Stealy / Date 5-12-75
 Reviewed by John Bellamy / Date 5-17-75

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Load Shedding/Conservation

Page 1 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
4kV Bus Feed	1-98045-17	Manual Control	G.E. SB-1	NV(1)
Breakers	1-98046-19	Switches		
1-T11A9				
1-T11A12		All Others		CA(2)
1-T11B1				
1-T11B2				
1-T11C1				
1-T11C2				
1-T11D1				
1-T11D12				
4kV Feed Breakers to Pressurizer	1-98199-7	Manual Control	G.E. SB-1	NV(1)
Heater Transformer	1-98200-8	Switches		
1-T11A6		All Others		CA(2)
1-T11D9				

- (1) General Electric type SB-1 switches are rugged.
- (2) Chatter by any other relays would not inadvertently close the breakers. The breakers can only be closed with the manual control switches.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by JD Kell Date 5-12-95
Reviewed by Jon Betts Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Load Shedding/Conservation

Page 2 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
600 Volt Load Shedding Breakers	1-98047-16	Manual Control	G.E. SB-1	NV(1)
1-11A1, 1-11A4	1-98111-19	Switches	West. W-2	
1-11A7, 1-11A10	1-98222-18			
1-11A13, 1-11B3	1-98223-18	Tripping Relays		CA(2)
1-11B5, 1-11B6	1-98402-11			
1-11B7, 1-11B8	1-98408-19	Lock Out Relays:		
1-11B10, 1-11B12	1-98701-23	1-5A10, 1-5B6	G.E. HFA	(3)
1-11B13, 1-11C2	12-98473-14	1-5B10	Pan. GR-2	
1-11C3, 1-11C4	12-98711-15			
1-11C5, 1-11C8		1-5C4	GE HFA	(3)
1-11C9, 1-11C15			Pan. EFR	
1-11C16, 1-11C17		1-5B12	GE HFA	(3)
1-11C18, 1-11D3			Pan. TRE	
1-11D9, 1-11D10				
1-11D13		1-5C17	GE HFA	(3)
			Pan. TRD	
		1-62-SIS-B12	AGASTAT	(3)
		1-62-BOS-B12	Pan. TRE	
		1-62-SIS-C17	AGASTAT	(3)
		1-62-BOS-C17	Pan. TRD	

- (1) Rugged G.E. type SB-1 and Westinghouse type W-2 switches will prevent inadvertent closure of breakers which have no auto start contacts.
- (2) Contact chatter is acceptable in the breaker tripping circuits since the desire state of the breakers is open.
- (3) Capacity > demand, see Appendix E.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DC Haly Date 5-12-95
Reviewed by Jim Betts Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Load Shedding/Conservation

Page 3 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Train A Load Conservation Relays	1-98033-38	1-LCSI-A-AUX	G.E. HFA Pan. NSR	(1)
		1-5Y-LCTA	Asco 2506 Pan. NSR	(1)
		1-5A6-LCTA	G.E. HFA Pan. NSR	(1)
		1-5A13-LCTA	G.E. HFA Pan. TRD	(1)
		1-K602-A		(1,2)
		All Others		CA(3)
Train B Load Conservation Relays	1-98032-37	1-LCSI-B-AUX	G.E. HFA Pan. NSR	(1)
		1-5Y-LCTB	Asco 2506 Pan. NSR	(1)
		1-5A6-LCTB	G.E. HFA Pan. NSR	(1)
		1-K602-B		(1,2)
		All Others		CA(3)

- (1) Capacity > demand, see Appendix E.
- (2) See SSPS G.4 form for 1-K602-A and 1-K602-B.
- (3) Chatter by any other relays will not cause an inadvertent load conservation signal.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stebbins Date 5-12-95
Reviewed by Jan B. Bickel Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Auxiliary Electrical

Page 1 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
600 Volt Bus	1-98045-17	Manual Control,	G.E. SB-1,	NV(1)
Feed Breakers	1-98046-19	Test, and Disconnect	Meter Devices	
1-11A11		Switches	Co., ITE	
1-11B11				
1-11C1		SWGR Aux contacts	ITE	NV(1)
1-11D1				
1-T11A10		Transformer	G.E. IACs	(2)
1-T11D2		Overload Relays	PAN. A-11,13	
		Transformer	ABB 87T	(2)
		Differential Relays	PAN. A-11,13	
		1-50N-T11A	G.E. PJCs	(2)
		1-50N-T11B	4kV SWGR	
		1-50N-T11C		
		1-50N-T11D		
		1-87X-T11A	G.E. HEA	(2)
		1-87X-T11B	PAN. SA	
		1-87X-T11C		
		1-87X-T11D		
		1-51N-T11B	G.E. IAC	(2)
		1-51N-T11C	PAN. A11,A13	
		Time Delay Relays		CA(3)
		SWGR Anti Pump Relays		CA(3)
		All Others		CA(3)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and switchgear breaker charging motor disconnect switches are rugged.
- (2) Capacity > demand, see Appendix E..
- (3) Contact chatter will not cause breakers to open.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Helt Date 5-12-45
Reviewed by John Bottom Date 5-17-45

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Auxiliary Electrical

Page 2 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
600 Volt Bus	1-98045-17	Manual Control,	G.E. SB-1,	NV(1)
Tie Breakers	1-98046-19	Test, and Disconnect	Meter Devices	
1-11AC		Switches	Co., ITE	
1-11BD		SWGR Aux Contacts	ITE	NV(1)
		All Others		CA(2)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and switchgear breaker charging motor disconnect switches are rugged.
- (2) Contact chatter would not cause the bus tie breakers to close.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. H. H. H. Date 5-12-95
Reviewed by John Bell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Auxiliary Electrical

Page 3 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
250 VDC System (A & B Trains)	1-98055-23 1-98057-18	Battery Charger Relays All Others		(1) CA(2)

- (1) The battery chargers were purchased fully qualified from Solidstate Controls, Inc (SCI), including seismic testing in accordance with IEEE 344-1975. There are several relays installed within the battery chargers for which it is difficult to determine the effects of relay chatter. Instead of investigating the effect of each relay's contact chatter, all of the relays within the battery chargers were included on the essential relay list. Since each relay's output contacts were not monitored during the seismic testing, it is not possible to determine whether or not a particular relay is seismically adequate, or if the relay chattered during the seismic testing, but had no adverse affect on the operation of the battery charger. In either case, the operation of the battery chargers would not be affected by a seismic event.

- (2) Chatter of any other relay would not adversely affect the 250 VDC system

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
GERS - Seismically adequate based on GERS ____; include GERS number.
NA - Component not affected by relays.
CR - Corrective Action Required.
OA - Operator Action.
- - No entry necessary.

Prepared by RG Hall / date 5-12-95
Reviewed by Jon Betts / date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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System Auxiliary Electrical

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
250 VDC System (N-Train)	1-98210-14	Battery Charger Relays		(1)
		Manual Control Switches	G.E. SB-1	NV(2)
		Thermal Overload	Cutler Hammer	NV(2)
		MCC contactors and aux contacts	Cutler Hammer	(3)
		1-88X1-BC-A 1-88X1-BC-B	Cutler Hammer 1-BC-A-PNL (B)	(3)
		1-88X2-BC-A 1-88X2-BC-B	Cutler Hammer MCC AM-D MCC ABD-B	(3)
		1-5X1-T11B 1-5X6-T11D 1-K602-A 1-K602-B	GE HFAs West ARs	(3,4)
		All Others		CA(5)

- (1) The battery chargers were purchased fully qualified from Power Conversion Products, including seismic testing in accordance with IEEE 344-1975. There are several relays installed within the battery chargers for which it is difficult to determine the effects of relay chatter. Instead of investigating the effect of each relay's contact chatter, all of the relays within the battery chargers were included on the essential relay list. Since each relay's output contacts were not monitored during the seismic testing, it is not possible to determine whether or not a particular relay is seismically adequate, or if the relay chattered during the seismic testing but had no adverse affect on the operation of the battery charger. In either case, the operation of the battery chargers would not be affected by a seismic event.
- (2) General Electric type SB-1 switches and Cutler Hammer TOLs are rugged.
- (3) Capacity > demand, see Appendix E.
- (4) See Diesel Generator G.4 forms for 1-5X6-T11D and 1-5X1-T11B
See SSPS G.4 form for 1-K602's
- (5) Chatter by any other relays would not adversely affect the system.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by PC/Kab Date 5-12-95
Reviewed by Jim Bottom Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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System Auxiliary Electrical

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
120 Vac Vital Bus	1-98077-17	Inverter Relays		(1)
System Inverters	1-98081-17			
1-CRID-I-INV	1-98085-20	Output Voltage Relays		CA(2)
1-CRID-II-INV	1-98089-14			
1-CRID-III-INV	1-980792-2	1-86-ICC1	G.E. HEA	(3)
1-CRID-IV-INV	1-980832-2	1-86-ICC2	RPCs 1,2,3,4	
	1-980872-2	1-86-ICC3		
	1-980912-2	1-86-ICC4		
		All Others		CA(2)

- (1) The CRID inverters were purchased fully qualified from Solidstate Controls, Inc. (SCI), including seismic testing in accordance with IEEE 344-1975. There are several relays installed within the inverters for which it is difficult to determine the effects of relay chatter. Instead of investigating the effect of each relay's contact chatter, all of the relays within the inverters were included on the essential relay list. Since each relay's contacts were not monitored during the seismic testing, it is not possible to determine whether a particular relay is seismically adequate, or if the relay chattered during the seismic testing but had no adverse affect on the operation of the inverter. In either case, the operation of the inverters would not be affected by a seismic event.
- (2) Chatter of these relays would not adversely affect the operation of the 120 Vac Vital Bus System.
- (3) Capacity > demand, see Appendix E.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Steel Date 5-12-95
Reviewed by John Betts Date 5-17-95



A-46 RELAY SCREENING AND EVALUATION
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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Motor Control Centers				NA(1)
Distribution Panels				

- (1) Motor Control Centers and Distribution Panels are not affected by relays. Each of the control circuits for the devices fed from the MCCs and distribution panels has been evaluated separately, however the MCCs and distribution panels themselves are not affected by relays.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DC Stub / Date 5-12-95
Reviewed by Jean Bettel / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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System Reactor Trip Breakers

Page 1 of 1

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Reactor Trip Breakers	1-98222-18	Manual Control	G.E. SB-1	NV(1)
1-52-RTA	1-98223-18	Switches		
1-52-RTB		Circuit Breaker	Westinghouse	NV(1)
1-52-BYA		Aux Contacts		
1-52-BYB		All Others		CA(2)

- (1) General Electric type SB-1 switches and Westinghouse DB-50 aux contacts are rugged.
- (2) Chatter of any other relays would not cause the breakers to inadvertently close or prevent the breakers from tripping.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Stebbins Date 5-12-95
Reviewed by John Rothwell Date 5-17-95



A-46 RELAY SCREENING AND EVALUATION
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PLANT Cook Nuclear Plant Unit 1

System Solid State Protection (ESFAS)

Page 1 of 1

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
Engineered	1-98367-20	Input Relays	Clare, Midtex	(1)
Safeguard Features	1-98377-33	(K100's, K200's	or Potter &	
Actuation System	1-98387-23	K300's and K400's)	Brumfield	
	1-98397-26		1-RPS-A	
			1-RPS-B	
		Master Output Relays (K500's)	Clare, Midtex	(1)
			or Potter &	
			Brumfield	
			1-RPS-A	
			1-RPS-B	
		Slave Output Relays (K600's)	West. type AR	(1)
			1-RPS-A	
			1-RPS-B	
			1-RPSX-A	
			1-RPSX-B	
		Manual Control Switches and Push Buttons	G.E. SB-1	NV(2)
			Cutler Hammer	
		RPS Output Isolators	Sigma 42JO	(1)
		RPS Test Switches	C&K 7401	NV(2)
		SSPS Logic		NV(3)
		RPS Logic		NV(3)
		All Others		CA(4)

- (1) Capacity > demand, see Appendix E. The relay types are as follows:
Clare type GP1, Midtex type 156, and Potter & Brumfield type KHU.
- (2) General Electric type SB-1 switches, Cutler Hammer push buttons, and C&K test switches are rugged.
- (3) All components are solid state and, therefore, not vulnerable.
- (4) Chatter by any other relays would not cause inadvertent safety injection, containment spray, or containment isolation signals.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. G. Steel Date 5-12-95
Reviewed by Jan Betts Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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PLANT Cook Nuclear Plant Unit 1

System Miscellaneous HVAC

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Switchgear Area Fans	1-98741-28	Manual Control Switches	West. OT-1 Cutler Hammer	NV(1)
1-HV-SGRS1A				
1-HV-SGRS2				
1-HV-SGRS3		MCC Contactor, Control Relay and aux contacts	Cutler Hammer	(2)
1-HV-SGRS4A				
1-HV-SGRS7				
1-HV-SGRS8		1-5-SGRS2		OA(3)
1-HV-SGRS9		1-5-SGRS3		
1-HV-SGRX2		1-5X-TDS2		
1-HV-SGRX3		1-5X-TDS4		
1-HV-SGRX5				
1-HV-SGRX6		All Others		(2)
Switchgear Area Dampers		MCC Aux contacts	Cutler Hammer	(2)
1-HV-SGRMD1				
1-HV-SGRMD2		Temperature Switch		CA(4)
1-HV-SGRMD3				
1-HV-SGRMD4				
1-HV-SGRMD5				

- (1) Westinghouse type OT-1 and Cutler Hammer 10250T selector switches are rugged.
- (2) Chatter of these relays could cause temporary cycling of the fans and dampers during the seismic event, however this is acceptable.
- (3) Fans 1-HV-SGRS2 and 1-HV-SGRS3 could be locked out due to chatter in the main transformer fire detection circuitry. A step is included in the Operations Department Procedure, Response to a Design Basis Earthquake, to verify that these fans have not been locked out.
- (4) Chatter of the temperature switch could cause temporary and partial closing of the damper however this is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. Steinhilber Date 5-12-95
Reviewed by John R. Beller Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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PLANT Cook Nuclear Plant Unit 1

System Miscellaneous HVAC

Page 2 of 3

Subsystem/Component	Ref Dwq(s)	Contact/Contact Group	Relay Type and Location	SAT*
Control Room HVAC including: 1-HV-ACRA-1 1-HV-ACRA-2 1-HV-ACR-1 1-HV-ACR-2 1-PP-82N 1-PP-82S 1-VRV-315 1-VRV-325	1-98742-22	Manual Control Switches	G.E. SB-1 Cutler Hammer	NV(1)
		Thermal Overloads	Cutler Hammer	NV(1)
		Limit Switches	Namco	NV(1)
		MCC Contactor and Aux contacts	Cutler Hammer	(2)
		1-5-ACRA1 1-5-ACRA2	G.E. HFA Pan. ACRA1,2	(3)
		1-5A6-LCTA 1-5A6-LCTB	G.E. HFA Pan. NSR	(3,4)
		All Others		CA(2)
1-HV-ACFD-1 1-HV-ACFD-2 1-HV-ACFD-3	12-98997-8			OA(5)

- (1) General Electric type SB-1 control switches, Cutler Hammer selector switches, Namco limit switches, and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of these contacts could cause cycling of the system, however this is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See Load Conservation G.4 form, for 1-5A6-LCTA and 1-5A6-LCTB
- (5) These dampers could close due to relay chatter in the Halon system. A step is included in the Operations Department Procedure, Response to a Design Basis Earthquake, to verify that these dampers have not closed.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Steib, Date 5-12-95
Reviewed by Jan Bethus, Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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PLANT Cook Nuclear Plant Unit 1

System Miscellaneous HVAC

Page 3 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Hydrogen Skimmer Fans	1-98266-28	Manual Control Switches	G.E. SB-1	NV(1)
1-HV-CEQ1		Thermal Overloads	Cutler Hammer	NV(1)
1-HV-CEQ2		1-CIB-A-AUX	G.E. HFA	(3)
		1-CIB-B-AUX	Pan. SSR	
		1-CIB-A-AUX1	C.H. M600	(3)
		1-CIB-B-AUX1	Pan. SSR	
		1-K619-A (B)		(3,4)
		All Others		CA(2)
ESS Area Fans		Manual Control Switches	G.E. SB-1	NV(1)
1-HV-AES1		Thermal Overloads	Cutler Hammer	NV(1)
1-HV-AES2		SWGR Aux Contacts	ITE	NV(1)
		All Others		CA(2)
AES Fan Filters		Manual Control Switches	G.E. SB-1 Cutler Hammer	NV(1)
		1-5X-AES1D		CA(5)
		1-5X-AES2D		

- (1) General Electric type SB-1 switches, Cutler Hammer selector switches, ITE switchgear auxiliary contacts and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of these contacts could cause momentary cycling of the fans which is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 form for 1-K619-A and 1-K619-B.
- (5) Chatter of these contacts would not cause the filter to be bypassed.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Stab / Date 5-12-95
Reviewed by Jim Battaglia / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Instrumentation

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Steam Generator	1-98573-35	Selector Switches	CH 10250T	NV(1)
Wide Range Level	1-985831-2			
1-BLI-110	1-985832-2	1-43X-BLI-110	CH Powereed	(2)
1-BLI-120		1-43X-BLI-120	1-LSI-1,2	
1-BLI-130		1-43X-BLI-130		
1-BLI-140		1-43X-BLI-140		
		Test Switches	C & K 7401	NV(1)
		All Other Devices		NV(3)
Condensate Storage	1-984241-3	Test Switches	C & K 7401	NV(1)
Tank Level	1-985741-3			
1-CLI-113		All Other Devices		NV(3)
1-CLI-114				
Aux Feedwater to	1-985742-4	Test Switches	C & K 7401	NV(1)
Steam Gen Flow	1-984521-2			
1-FFI-210	1-985791-3	All Other Devices		NV(3)
1-FFI-220	1-985522-3			
1-FFI-230				
1-FFI-240				
RHR Heat Exchanger	1-985672-1	Test Switches	C & K 7401	NV(1)
Discharge Flow				
1-IFI-310		All Other Devices		NV(3)
1-IFI-311				
1-IFI-320				
1-IFI-321				

- (1) The Cutler Hammer 10250T selector switches and the C&K test switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Devices are solidstate, and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stale Date 5-12-95
Reviewed by John Butcher Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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PLANT Cook Nuclear Plant Unit 1

System Instrumentation

Page 2 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Boron Injection	1-985671-2	Test Switches	C & K 7401	NV(1)
Tank Flow				
1-IFI-51		All Other Devices		NV(2)
1-IFI-52				
1-IFI-53				
1-IFI-54				
RHR Return Flow	1-985662-2	Test Switches	C & K 7401	NV(1)
1-IFI-335		All Other Devices		NV(2)
RWST Level	1-985675-3	Test Switches	C & K 7401	NV(1)
1-ILS-950	1-985676-3			
1-ILS-951	1-985792-3	All Others		NV(2)
	1-985522-3			
RHR Loop Return Temperature	1-985661-3	All Devices		NV(2)
1-ITR-335				

- (1) The C&K 7401 test switches are rugged.
- (2) Devices are solidstate, and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RG Keib Date 5-12-95
 Reviewed by Jan Bethell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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PLANT Cook Nuclear Plant Unit 1

System Instrumentation

Page 3 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Steam Generator	1-985753-3	Test Switches	C & K 7401	NV(1)
Pressure	1-985763-3			
1-MPP-210	1-985843-4	All Other Devices		NV(3)
1-MPP-212	1-985844-4			
1-MPP-220				
1-MPP-222				
1-MPP-230				
1-MPP-232				
1-MPP-240				
1-MPP-242				
Pressurizer Level	1-98573-35	Selector Switch	CH 10250T	NV(1)
1-NLI-151	1-985541-2	1-43X-NLI-151	CH Powereed 1-LSI-3	(2)
		Test Switches	C & K 7401	NV(1)
		All Other Devices		NV(3)

- (1) Cutler Hammer 10250T selector switches and C&K test switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Devices are solidstate and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. Stuck / Date 5-12-95
Reviewed by Jan. R. Stuck / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Instrumentation

Page 4 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Pressurizer Level	1-985501-4	Test Switches	C & K 7401	NV(1)
1-NLP-151	1-985511-2			
1-NLP-152	1-985521-3	All Other Devices		NV(2)
1-NLP-153				
Pressurizer	1-985501-4	Test Switches	C & K 7401	NV(1)
Pressure	1-985511-2			
1-NPP-151	1-985521-3	All Other Devices		NV(2)
1-NPP-152				
1-NPP-153				
Reactor Coolant	1-98573-35	Selector Switch	Cutler Hammer	NV(1)
Wide Range Pressure	1-985742-4			
1-NPS-121	1-985711-4	1-43X-NPS-122	CH Powereed	(3)
1-NPS-122	1-985792-3		1-LSI-3	
		Test Switches	C & K 7401	NV(1)
		All Other Devices		NV(2)
Nuclear	1-98524-2	All Relays	Gamma Metrics	(3)
Instrumentation			SWR, NIS,	
1-NRI-21			N-21 Rack,	
1-NRI-23			N-23 Rack	
		All Other Devices		NV(2)

- (1) Cutler Hammer 10250T selector switches and C&K test switches are rugged.
- (2) Devices are solidstate and therefore not vulnerable.
- (3) Capacity > demand, see Appendix E.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RGH Date 5-12-95
Reviewed by John Betts Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Instrumentation

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Reactor Coolant	1-985421-1	Test Switches	C & K 7401	NV(1)
Wide Range Temp	1-985422-2			
1-NTR-110	1-98592-8	Sliding Link	Multiamp	NV(1)
1-NTR-120				
1-NTR-130		All Other Devices		NV(2)
1-NTR-140				
1-NTR-210				
1-NTR-220				
1-NTR-230				
1-NTR-240				
Containment Press	1-985931-2	Test Switches	C & K 7401	NV(1)
1-PPP-301	1-985932-2			
1-PPP-302	1-985793-3			
1-PPP-303				
		All Other Devices		NV(2)

- (1) C&K test switches and Multiamp sliding link terminal blocks are rugged.
- (2) Devices are solidstate and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RGH Date 5-12-95
Reviewed by Jim Butcher Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Instrumentation

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
RCP Seal Water	1-985621-3	Test Switches	C & K 7401	NV(1)
Injection Flow	1-985622-3			
1-QFA-210	1-985631-2	All Other Devices		NV(2)
1-QFA-220	1-985632-3			
1-QFA-230				
1-QFA-240				
Charging Pump	1-98573-35	Selector Switch	CH 10250T	NV(1)
Discharge Flow	1-985542-4			
1-QFI-200		1-43X-QFI-200	CH Powereed 1-LSI-3	(3)
		Test Switches	C & K 7401	NV(1)
		All Other Devices		NV(2)
Volume Control	1-985561-3	Test Switches	C & K 7401	NV(1)
Tank Level				
1-QLC-451		All Other Devices		NV(2)
1-QLC-452				

- (1) Cutler Hammer 10250T selector switches and C&K test switches are rugged.
- (2) Devices are solidstate and therefore not vulnerable.
- (3) Capacity > demand, see Appendix E.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Steel Date 5-12-95
Reviewed by Jim Betts Date 5-17-95



A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Reactor Coolant/Pressurizer

Page 1 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Pressurizer MOVs	1-98204-26	Manual Control Switches	G.E. SB-1	NV(1)
1-NMO-151				
1-NMO-152				
1-NMO-153		Valve Limit Switches	Limitorque	NV(1)
		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactor and aux contacts	Cutler Hammer	(2)
RCP Seal Water AOVs	1-98201-14	Manual Control Switches	G.E. SB-1	NV(1)
1-QRV-10				
1-QRV-20				
1-QRV-30		Limit Switches	Namco	NV(1)
1-QRV-40				
1-QRV-150				

- (1) General Electric type SB-1 control switches, Limitorque limit and torque switches, Namco limit switches, and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential, and their capacity > demand (see Appendix E).

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Hal / Date 5-12-95
Reviewed by John Petlack / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Reactor Coolant/Pressurizer

Page 2 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Pressurizer AOVs	1-98204-26	Manual Control Switches	G.E. SB-1	NV(1)
1-NRV-151				
1-NRV-152				
1-NRV-153		Limit Switches	Namco	NV(1)
1-NRV-251		All Others		CA(2)
Head Vent Valves	1-98307-6	Manual Control Switches	Cutler Hammer	NV(1)
1-NSO-21				
1-NSO-22				
1-NSO-23				
1-NSO-24				
1-NSO-61				
1-NSO-62				
1-NSO-63				
1-NSO-64				
1-NRV-163	1-985531-4	Control Switch	G.E. SB-1	NV(1)
1-NRV-164	1-985532-4	Test Switches	C&K	NV(1)
		All Other Devices		NV(3)

- (1) General Electric type SB-1 switches, Namco limit switches, Cutler Hammer selector switches and C&K test switches are rugged.
- (2) Chatter of any other contacts will not prevent the valves from achieving their desired position.
- (3) Devices are solidstate and, therefore, not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Herb Date 5-12-95
Reviewed by Jim Betta Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Steam Generator

Page 1 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
SG Blowdown Isolation Valves	1-98208-19	Manual Control Switches	G.E. SB-1	NV(1)
1-DCR-310				
1-DCR-320		Limit Switches	Namco	NV(1)
1-DCR-330				
1-DCR-340		All Others		CA(2)
SG PORVs	1-985841-3	Test Switches	C&K 7401	NV(1)
1-MRV-213	1-985842-3			
1-MRV-223		All Other Devices		NV(3)
1-MRV-233				
1-MRV-243				
SG Stop Valve Dump Valves	1-98538-12	Manual Control Switches	G.E. SB-1	NV(1)
1-MRV-211				
1-MRV-212		Limit Switches	Namco	NV(1)
1-MRV-221				
1-MRV-222		All Others		CA(4)
1-MRV-231				
1-MRV-232				
1-MRV-241				
1-MRV-242				

- (1) General Electric type SB-1 switches, Namco limit switches, and C&K test switches are rugged.
- (2) Chatter by other contacts could only close the valves, which is the desired state.
- (3) Devices are solidstate and, therefore, not vulnerable
- (4) Chatter by other contacts could temporarily open valves which is the desired state of the valves. Chatter could not prevent manual valve opening.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by R. K. H. 6 Date 5-12-95
 Reviewed by J. M. Bell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Steam Generator

Page 2 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
SG Stop Valve	1-98538-12	Manual Control	G.E. SB-1	NV(1)
Air Open Valves		Switches		
1-MMO-210				
1-MMO-220		Limit/Torque Switches	Limitorque	NV(1)
1-MMO-230				
1-MMO-240		Thermal Overload	Cutler Hammer	NV(1)
		MCC Contactor and Aux Contacts	Cutler Hammer	CA(2)
		All Others		CA(3)
SG Stop Valve	1-98538-12	Manual Control	G.E. SB-1	NV(1)
Drain Pot Valve		Switch		
1-DRV-407				
		All Others		CA(4)

- (1) General Electric type SB-1 control switches, Limitorque limit and torque switches and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of the main contacts could cause slight mispositioning of the valve, however since there are redundant dump valves this is acceptable.
- (3) Chatter by any other contacts will not mispositions valves.
- (4) The valves normal position is open and the desired position is closed. Since the valve must be manually closed, either position at the conclusion of the DBE is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Hall Date 5-12-95
Reviewed by Jean Butcher Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Nuclear Sampling

Page 1 of 1

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Nuclear Sampling	1-98463-12	Manual Control	G.E. SB-1	NV(1)
AOVs	1-98464-16	Switches		
1-NRV-101				
1-NRV-102		Limit Switches	Namco	NV(1)
1-NRV-103			Microswitch	
1-NRV-104			Telemecanique	
1-MRV-151		All Others		CA(2)
1-MRV-152				
1-MRV-153				
1-MRV-154				
1-MCR-251				
1-MCR-252				
1-MCR-253				
1-MCR-254				
1-DCR-301				
1-DCR-302				
1-DCR-303				
1-DCR-304				

- (1) General Electric type SB-1 control switches, Namco limit switches, Microswitch limit switches, and Telemecanique limit switches are rugged.
- (2) Chatter of other contacts will not misposition valves or prevent the valves from achieving their desired position.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by PG Steel / Date 5-12-95
Reviewed by John Bellardi / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Condensate

Page 1 of 1

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Condensate Storage Tank Cross Tie Valve	1-98421-8	Manual Control Switch	G.E. SB-1	NV(1)
12-CRV-51		Limit Switches	Namco	NV(1)

(1) General Electric type SB-1 switches and Namco limit switches are rugged.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Keel / Date 5-12-95
Reviewed by Jon Bettack / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 1

System Spent Fuel Pit Cooling

Page 1 of 1

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Spent Fuel Pit	12-98315-10	Manual Control	G.E. SB-1	NV(1)
Cooling Pump		Switches		
12-PP-31N		1-5X3-T11C		(2,4)
		1-5A13-LCTA		
		All Others		CA(3)

- (1) General Electric type SB-1 control switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Chatter of any other contacts will not trip the pump, or prevent the pump from starting on demand. Note that pump is not required to start during the DBE.
- (4) See Load Conservation G.4 form for 1-5A13-LCTA
See Diesel Generator G.4 form for 1-5X3-T11C.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Steib Date 5-12-95
Reviewed by Jean Butcher Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Essential Service Water

Page 1 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-PP-7W West Essential Service Water Pump	2-98415-39	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		2-51-TA5	G.E. IAC	(2)
		2-50/50N-TA5	G.E. PJC T21A SWGR	
		2-62-BOS-TA5	Agastats	(2)
		2-62-SIS-TA5	T21A SWGR	
		2-SI-X-TA5	G.E. HFA T21A SWGR	(2)
		2-5-TA5	G.E. HFA Pan. SSR	(2)
		2-59-TA5-1	G.E. HGA	(2)
		2-59-TA5-2	T21A SWGR	
		2-59-TA5-3		
		SWGR Anti Pump Relay	ITE	(3)
		2-5X3-T21A		(2,4)
		2-42-2-DGAB		
		2-K610-X1		
		2-K610-X1-X		
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 2-5X3-T21A and 2-42-2-DGAB .
See SSPS G.4 form for 2-K610-X1 and 2-K-610-X1-X
- (5) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RGH / Date 5-12-95
 Reviewed by Jan Butlach / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Essential Service Water

Page 2 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-PP-7E East Essential Service Water Pump	2-98415-39	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		2-51-TD10	G.E. IAC	(2)
		2-50/50N-TD10	G.E. PJC T21D SWGR	
		2-62-BOS-TD10	Agastats	(2)
		2-62-SIS-TD10	T21D SWGR	
		2-SI-X-TD10	G.E. HFA T21D SWGR	(2)
		2-5-TD10	G.E. HFA Pan. SSR	(2)
		2-59-TD10-1	G.E. HGA	(2)
		2-59-TD10-2	T21D SWGR	
		2-59-TD10-3		
		SWGR Anti Pump Relay	ITE	(3)
		2-5X3-T21D		(2,4)
		2-42-2-DGCD		
		2-K611-A		
		2-K611-X-A		
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 2-5X3-T21D and 2-42-2-DGCD
See SSPS G.4 form for 2-K611-X and 2-K611
- (5) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS _____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by R. Stagg / Date 5-12-95
 Reviewed by Jim Butcher / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Essential Service Water

Page 3 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
ESW MOVs	2-98415-39	Manual Control	G.E. SB-1	NV(1)
2-WMO-703	2-98416-21	Switches		
2-WMO-704				
2-WMO-706		Valve Limit/Torque	Limiterorque	NV(1)
2-WMO-708		Switches		
2-WMO-712				
2-WMO-714		Thermal Overloads	Cutler Hammer	NV(1)
2-WMO-716				
2-WMO-718		MCC Contactor and	Cutler Hammer	(2)
2-WMO-722		Aux contacts		
2-WMO-724				
2-WMO-726		Switchgear Aux		NV(1)
2-WMO-728		Contacts		
2-WMO-732				
2-WMO-734		2-33X-WMO-722	C.H. D26	(3)
2-WMO-736		2-33X-WMO-724	Pan. DGAB	
2-WMO-738		2-33X-WMO-726	Pan. DGCD	
		2-33X-WMO-728		
		2-K-AUX-WMO-714	G.E. HFA	(3)
		2-K-AUX-WMO-718	Pan. SSR	
		2-K-AUX-WMO-734		
		2-K-AUX-WMO-738		
		2-K604-A (B)		(3,4)
		2-K644-A (B)		
		All Others		CA(5)

- (1) General Electric type SB-1 switches, Limitorque limit and torque switches, Cutler Hammer thermal overloads, and ITE switchgear auxiliary contacts are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential and their capacity > demand (see Appendix E).
- (3) Capacity > Demand, see Appendix E.
- (4) See SSPS G.4 form for 2-K604-A, 2-K604-B, 2-K644-A and 2-K644-B.
- (5) Chatter of any other relays will not misposition valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Heib / Date 5-12-95
Reviewed by Jan Butcher / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Essential Service Water

Page 4 of 6

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
2-OME-34-W West ESW Strainer including	2-98415-39	Manual Control Switches	G.E. SB-1 Cutler Hammer	NV(1)
2-WRV-764		Limit Switches	Namco	NV(1)
2-WRV-769		24 hour timer	Luminite	NV(1)
2-WRV-774		Thermal Overloads	Cutler Hammer	NV(1)
2-WRV-779		MCC Contactor and aux contacts	Cutler Hammer	(2)
		2-20X-SWL	G.E. HFA	(2)
		2-20X-SWR	Pan. SSR	
		2-63X-S2W		
		2-62-S2W	Agastat Pan. SSR	(2)
		All Others		CA(3)

- (1) General Electric type SB-1, Cutler Hammer type 10250T switches, Namco limit switches, Luminite timers, and Cutler Hammer overloads are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Chatter by any other contacts will not cause strainer malfunction.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Stab / Date 5-12-95
Reviewed by Jim Bellach / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Essential Service Water

Page 5 of 6

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
2-OME-34-E East ESW Strainer including 2-WRV-763 2-WRV-768 2-WRV-773 2-WRV-778	2-98415-39	Manual Control Switches	G.E. SB-1 Cutler Hammer	NV(1)
		Limit Switches	Namco	NV(1)
		24 hour timer	Luminite	NV(1)
		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactor and aux contacts	Cutler Hammer	(2)
		2-20X-SEL 2-20X-SER 2-63X-S2E	G.E. HFA Pan. SSR	(2)
		2-62-S2E	Agastat Pan. SSR	(2)
		All Others		CA(3)

- (1) General Electric type SB-1, Cutler Hammer type 10250T switches, Namco limit switches, Luminite timers, and Cutler Hammer overloads are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Chatter by any other contacts will not cause strainer malfunction.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RGH / Date 5-12-95
Reviewed by Jan B. Hark / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Essential Service Water

Page 6 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
ESW HVAC	2-98415-39	Manual Control	Westinghouse	NV(1)
12-HV-ESW-1		Switches		
12-HV-ESW-2				
12-HV-ESW-3		Switchgear Aux	ITE	NV(1)
12-HV-ESW-4		Contacts		
		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactor and aux contacts		CA(2)
		Temperature Switches		CA(2)

- (1) Westinghouse type OT switches, Cutler Hammer overload relays, and ITE switchgear auxiliary contacts are rugged.
- (2) Cycling of fans during seismic event is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Hall / Date 5-12-95
Reviewed by Gen Butcher / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Component Cooling Water

Page 1 of 4

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
2-PP-10W West Component Cooling Water Pump	2-98405-24	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		2-51-TA7	G.E. IAC	(2)
		2-50/50N-TA7	G.E. PJC T21A SWGR	
		2-62-BOS-TA7	Agastats	(2)
		2-62-SIS-TA7	T21A SWGR	
		2-SI-X-TA7	G.E. HFA T21A SWGR	(2)
		2-5-TA7	G.E. HFA Pan. SSR	(2)
		2-59-TA7-1	G.E. HGA	(2)
		2-59-TA7-2	T21A SWGR	
		2-59-TA7-3		
		SWGR Anti Pump Relay	ITE	(3)
		2-5X2-T21A		(2,4)
		2-42-2-DGAB		
		2-K610-B		
All Others		CA(5)		

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 2-5X2-T21A and 2-42-2-DGAB
See SSPS G.4 form for 2-K610-B
- (5) Chatter of other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RGH/ab / Date 5-12-95
Reviewed by Jim Butta / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Component Cooling Water

Page 2 of 4

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
2-PP-10E East Component Cooling Water Pump	2-98405-24	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		2-51-TD3	G.E. IAC	(2)
		2-50/50N-TD3	G.E. PJC T21D SWGR	
		2-62-BOS-TD3	Agastats	(2)
		2-62-SIS-TD3	T21D SWGR	
		2-SI-X-TD3	G.E. HFA T21D SWGR	(2)
		2-5-TD3	G.E. HFA Pan. SSR	(2)
		2-59-TD3-1	G.E. HGA	(2)
		2-59-TD3-2	T21D SWGR	
		2-59-TD3-3		
		SWGR Anti Pump Relay	ITE	(3)
		2-5X2-T21D		(2,4)
		2-42-2-DGCD		
		2-K610-A		
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 2-5X2-T21D and 2-42-2-DGCD
See SSPS G.4 form for 2-K610-A
- (5) Chatter of other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS _____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by DG Steel / Date 5-12-95
 Reviewed by Jan Betts / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Component Cooling Water

Page 3 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
CCW MOVs	2-98405-24	Manual Control	G.E. SB-1	NV(1)
2-CCM-451	2-98406-17	Switches		
2-CCM-452				
2-CCM-453		Valve Limit/Torque	Limiterorque	NV(1)
2-CCM-454		Switches		
2-CCM-458				
2-CCM-459		Thermal Overloads	Cutler Hammer	NV(1)
2-CMO-410				
2-CMO-411		MCC Contactor and	Cutler Hammer	(2)
2-CMO-412		Aux contacts		
2-CMO-413				
2-CMO-414		2-K611-X1-A (B)		(3,4)
2-CMO-415		2-K618-A (B)		
2-CMO-416		2-K619-A (B)		
2-CMO-419				
2-CMO-420		2-KAUX-CMO-419	G.E. HFAs	(4)
2-CMO-429		2-KAUX-CMO-429	PAN. SSR	
		All Others		CA(5)

- (1) General Electric type SB-1 switches, Limitorque limit and torque switches and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential and their capacity > demand (see Appendix E).
- (3) See SSPS G.4 form for 2-K-611-X1, 2-K618 and 2-K619
- (4) Capacity > demand, see Appendix E.
- (5) Chatter of any other contacts will not misposition any of the valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Hall / Date 5-12-95
Reviewed by Jen Bellard / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Component Cooling Water

Page 4 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
CCW HVAC 12-HV-ACCP-1	2-98406-17	Manual Control Switch	G.E. SB-1	NV(1)
		Thermal Overload	Cutler Hammer	NV(1)
		MCC Contactor and Aux Contacts	Cutler Hammer	CA(2)
		Load Conservation Relay		CA(3)

- (1) General Electric type SB-1 switches, and Cutler Hammer thermal overloads are rugged.
- (2) Chatter by these contacts could cycle the fans on and off during the DBE which is acceptable.
- (3) Chatter by these contacts could start fans, which is desired state.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by DC Hall / Date 5-12-95
 Reviewed by Jean Betts / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Motor Driven Aux Feedwater

Page 1 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-PP-3W West Motor Driven Auxiliary Feedwater Pump	2-98220-26	Manual Control, Test and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		2-51-TA2	G.E. IAC	(2)
		2-50/50N-TA2	G.E. PJC T21A SWGR	
		2-62-BOS-TA2	AGASTATS	(2)
		2-62-SIS-TA2	T21A SWGR	
		2-SI-X-TA2	GE HFA T21A SWGR	(2)
		2-5-TA2	GE HFA Pan. SSR	(2)
		2-59-TA2-1	GE HGA	(2)
		2-59-TA2-2	T21A SWGR	
		2-59-TA2-3		
		SWGR Anti Pump Relay	ITE	(3)
		2-5X3-T21A		(2,4)
		2-42-2-DGAB		
		2-K611-B		
All Others		CA(5)		

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 2-5X3-T21A and 2-42-2-DGAB
See SSPS G.4 form for 2-K611-B.
- (5) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RC Steeb / Date 5-12-95
 Reviewed by Joe Betts / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Motor Driven Aux Feedwater

Page 2 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-PP-3E East Motor Driven Auxiliary Feedwater Pump	2-98214-42	Manual Control, Test and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		2-51-TD11	G.E. IAC	(2)
		2-50/50N-TD11	G.E. PJC T21D SWGR	
		2-62-BOS-TD11	AGASTATS	(2)
		2-62-SIS-TD11	T21D SWGR	
		2-SI-X-TD11	GE HFA T21D SWGR	(2)
		2-5-TD11	GE HFA Pan. SSR	(2)
		2-59-TD11-1	GE HGA	(2)
		2-59-TD11-2	T21D SWGR	
		2-59-TD11-3		
		SWGR Anti Pump Relay	ITE	(3)
		2-5X3-T21D		(2,4)
		2-42-2-DGCD		
		2-K611-A		
All Others		CA(5)		

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > Demand, see Appendix E.
- (3) Relay directly controls switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 forms for 2-5X3-T21D and 2-42-2-DGCD
See SSPS G.4 form for 2-K611-A.
- (5) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by DC Steel Date 5-12-95
 Reviewed by Jen Bethell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Motor Driven Aux Feedwater

Page 3 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
MDAFP to Steam Gen. Supply Valves	2-98219-19	Manual Control Switches	G.E. SB-1	NV(1)
2-FMO-212		Valve Limit/Torque Switches	Limiterorque	NV(1)
2-FMO-222		Thermal Overloads	Cutler Hammer	NV(1)
2-FMO-232		MCC Contactor and Aux contacts		(2)
2-FMO-242		2-63X1-SG1M (2M, 3M, 4M)	G.E. HGAs PAN. HSD2R	(3)
		All Others		CA(4)
ESW to MDAFP Supply Valves	2-98214-42 2-98220-26	Manual Control Switches	G.E. SB-1	NV(1)
2-WMO-744		Valve Limit/Torque Switches	Limiterorque	NV(1)
2-WMO-754		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactor and Aux Contacts	Cutler Hammer	(5)
		All Others		CA(6)

- (1) General Electric type SB-1 switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) The open contactors are chatter acceptable, the close contactors are essential, and their capacity > demand, see Appendix E.
- (3) Capacity > demand, see Appendix E.
- (4) Rugged limit switches would prevent the valves from closing more than 3/8". This amount of closure is acceptable.
- (5) The close contactors and aux contacts are chatter acceptable, the open contactors and aux contacts are essential, and their capacity > demand.
- (6) Chatter of these contacts would not misposition valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Herb / Date 5-12-95
Reviewed by Jim Betts / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Motor Driven Aux Feedwater

Page 4 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Test Valves	2-98214-42	Manual Control	G.E. SB-1	NV(1)
2-FRV-245	2-98220-26	Switches	Cutler Hammer	
2-FRV-255		Limit Switches	Namco	NV(1)
		All Others		CA(2)
Emerg Leak Off Valves	2-98214-42	Manual Control	G.E. SB-1	NV(1)
2-FRV-247	2-98220-26	Switches	Cutler Hammer	
2-FRV-257		Pressure Switch		CA(3)
		Limit Switches	Namco	NV(1)
		All Others		CA(2)

- (1) G. E. type SB-1 switches, Cutler Hammer 10250T selector switches, and Namco limit switches are rugged.
- (2) Chatter of any other relays will not misposition valves
- (3) Partial and temporary closing of valve is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. Stueb / Date 5-12-95
Reviewed by Jim Bethall / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Motor Driven Aux Feedwater

Page 5 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Vent Fans	2-98214-42	Manual Control	Westinghouse	NV(1)
2-HV-AFPM1	2-98220-26	Switches		
2-HV-AFPM2				
2-HV-AFPX1		Thermal Overloads	Cutler Hammer	NV(1)
2-HV-AFPX2				
		SWGR Aux Contacts	ITE	NV(1)
		MCC Contactors and Aux Contacts	Cutler Hammer	CA(2)
		Temperature Switches		CA(2)

- (1) Westinghouse OT selector switches, Cutler Hammer thermal overloads, and ITE switchgear aux contacts are rugged.
- (2) Chatter of these contacts could cause cycling of the fans which is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RC Stubb / Date 5-12-95
 Reviewed by Jon Bitts / Date 5-17-95



A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Turbine Driven Aux Feedwater

Page 1 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-PP-4 Turbine Driven Aux Feedwater Pump	2-98215-59	Auto Start Relays		CA(1)
		Trip Push Button	Cutler Hammer	NV(2)
		Overspeed Limit Switches	Namco	NV(2)
		2-4TDTV	Asco 2506 Pan. TFP	(3)
		2-12X-TPFP	G.E. HFA Pan. TRB	(3)
		2-EOM-AUX	G.E. HFA Pan. TFP	(3)
		2-TDAFP-OSM	Dynalco SS2200 Pan. TFP	(3)
		All Others		CA(4)

- (1) Chatter acceptable since Turbine Aux Feedwater Pump start is desired.
- (2) Cutler Hammer push buttons and Namco limit switches are rugged.
- (3) Capacity > demand, see Appendix E.
- (4) Chatter of any other relays will not trip or prevent the start of the the turbine driven auxiliary feedwater pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RS Steeb / Date 5-12-85
 Reviewed by Jean Bellard / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Turbine Driven Aux Feedwater

Page 2 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
TDAFP MOVs	2-98215-59	Manual Control	G.E. SB-1	NV(1)
2-TDTV	2-98216-17	Switches		
2-FMO-211				
2-FMO-221		Valve Limit/Torque	Limiterorque	NV(1)
2-FMO-231		Switches		
2-FMO-241				
2-MCM-221		Thermal Overloads	Cutler Hammer	NV(1)
2-MCM-231				
2-WMO-753		MCC Contactors and aux contacts	Cutler Hammer	(2)
		2-63X1-SG1T	G.E. HGAs	(3)
		2-63X1-SG2T	Pan. TRB	
		2-63X1-SG3T		
		2-63X1-SG4T		
		TDTV Auto Open Contacts		CA(4)
		FMO Auto Close Circuitry		CA(5)
		All Others		CA(6)

- (1) General Electric type SB-1 control switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential and their capacity > demand (see Appendix E).
- (3) Capacity > demand, see Appendix E.
- (4) TDAFP Trip and Throttle Valve is desired to be open.
- (5) Rugged limit switch would prevent the valve from closing more than 3/8". This amount of closure is acceptable.
- (6) Chatter of any other relays will not misposition any valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stebbins Date 5-12-95
Reviewed by Jess Betts Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Turbine Driven Aux Feedwater

Page 3 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
TDAFP Test Valve 2-FRV-256	2-98215-59	Manual Control Switches	Cutler Hammer	NV(1)
		Limit Switches	Namco	NV(1)
		2-4X3-TDFP		CA(2)
TDAFP Emerg Leak Off Valve 2-FRV-258	2-98215-59	Manual Control Switches	G.E. SB-1 Cutler Hammer	NV(1)
		Limit Switches	Namco	NV(1)
		Pressure Switch Relays		CA(3)

- (1) G. E. type SB-1 control switches, Namco limit switches, and Cutler Hammer 10250T selector switches are rugged.
- (2) Chatter of this contact would not open the valve.
- (3) Chatter of these contacts could cause partial and temporary closing of the valve which is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by R. G. Stubb / Date 5-12-95
 Reviewed by Jose Beltrán / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Turbine Driven Aux Feedwater

Page 4 of 4

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
TDAFP Fans	2-98216-17	Manual Control	Westinghouse	NV(1)
2-HV-AFPT1		Switches		
2-HV-AFPT2				
2-HV-AFP-BRE-1		Thermal Overloads	Cutler Hammer	NV(1)
2-HV-AFP-BRE-2				
		MCC Contactor and Aux Switches		CA(2)
		Temperature Switches		CA(2)
		2-27-BR1		CA(3)
		2-27-BR2		

- (1) Westinghouse type OT-1 switches and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of these contacts could cause cycling of the fan during the seismic event which is acceptable.
- (3) Relays perform alarm function only.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RC Hlub Date 5-12-95
 Reviewed by Jim Bell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Chemical & Volume Control

Page 1 of 5

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
2-PP-50W West Centrifugal Charging Pump	2-98273-23	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		2-51-TA8	G.E. IAC	(2)
		2-50/50N-TA8	G.E. PJC T21A SWGR	
		2-62-SIS-TA8	Agastat T21A SWGR	(2)
		2-5-TA8	G.E. HFA PAN. SSR	(2)
		2-K610-B 2-5X5-T21A		(2,3)
		All Others		CA(4)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) See SSPS G.4 Form for 2-K610-B, see Diesel G.4 forms for 2-5X5-T21A.
- (4) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. Carter / Date 5-12-85
Reviewed by John Bettel / Date 5-17-85

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Chemical & Volume Control

Page 2 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-PP-50E East Centrifugal Charging Pump	2-98273-23	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		2-51-TD7	G.E. IAC	(2)
		2-50/50N-TD7	G.E. PJC T21D SWGR	
		2-62-SIS-TD7	Agastat T21D SWGR	(2)
		2-5-TD7	G.E. HFA PAN. SSR	(2)
		2-K610-A 2-5X5-T21D		(2,3)
		All Others		CA(4)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) See SSPS G.4 Form for 2-K610-A, see Diesel G.4 forms for 2-5X5-T21D.
- (4) Chatter of any other relays will not inadvertently start the pump during a LOOP, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Atch / Date 5-12-95
Reviewed by Jean Bell / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Chemical and Volume Control

Page 3 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-PP-49 Reciprocating Charging Pump	2-98273-23	Manual Control Switch All Others	G.E. SB-1	NV(1) CA(2)
2-PP-46-3 2-PP-46-4 Boric Acid Transfer Pumps	2-98272-10	Manual Control Switches Thermal Overloads MCC contactor and aux contacts All Others	G.E. SB-1 Cutler Hammer Cutler Hammer	NV(1) NV(1) CA(3) CA(3)

- (1) General Electric type SB-1 switches, Cutler Hammer 10250T switches and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of any other contacts will not start the pump. Only the manual control switch can start the pump.
- (3) Chatter of these contacts could cause cycling the pumps during the seismic event which is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stub / Date 5-12-95
Reviewed by Jose Betlach / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Chemical & Volume Control

Page 4 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
CVCS MOVs	2-98266-27	Manual Control	G.E. SB-1	NV(1)
2-IMO-340	2-98271-21	Switches		
2-IMO-910	2-98273-23			
2-IMO-911	2-98274-23	Valve Limit/Torque	Limiterorque	NV(1)
2-QCM-250		Switches		
2-QCM-350				
2-QMO-200		Thermal Overloads	Cutler Hammer	NV(1)
2-QMO-201				
2-QMO-225		MCC Contactors and	Cutler Hammer	(2)
2-QMO-226		Aux Contacts		
2-QMO-420				
2-QMO-451		2-LB-112-BX1	West. AR	(3)
2-QMO-452		2-LB-112-BX2	RPSX-A	
		2-LB-185-BX1	RPSX-B	
		2-LB-185-BX2		
		2-PB-455-X1	G.E. HFAs	(3)
		2-PB-457-X1	Pans. SR2, SR3	
		2-K608-X2-A (B)		(3,4)
		2-K606-A (B)		
		2-K609-X1-A (B)		
		All Others		CA(5)

- (1) General Electric type SB-1 switches, Limitorque limit and torque switches and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential and their capacity > demand (see Appendix E).
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 form for 2-K608-X2, 2-K606, and 2-K609-X1
- (5) Chatter by any other contacts would not misposition valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DC Stueb / Date 5-12-95
Reviewed by John Bell / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Chemical and Volume Control

Page 5 of 5

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
CVCS AOVs	2-98271-21	Manual Control	G.E. SB-1	NV(1)
2-QRV-111	2-98274-23	Switches	Cutler Hammer	
2-QRV-112			Westinghouse	
2-QRV-113				
2-QRV-114		Limit Switches	Namco	NV(1)
2-QRV-171				
2-QRV-400		2-MUX-4-2	West. AR	(2)
2-QRV-421		2-LB-112-DX	PAN. ARA-2	
2-QRV-451				
		All Others		CA(3)
2-QRV-170	2-985612-2	All Devices		NV(4)
2-QRV-430	2-985591-3			
2-QRV-251	2-985542-6	2-43-QFI-200	CH 10250T	NV(1)
		2-43X-QFI-200		CA(3)
		2-43-PLC	G.E. SB-1	NV(1)
		Defeat Relays		CA(3)
		Test Switches	C&K 7401	NV(1)
		Sliding Link Term	Multiamp	NV(1)
		All Other Devices		NV(4)

- (1) General Electric type SB-1, Cutler Hammer 10250T, C&K test switches, Namco limit switches, Multiamp sliding link terminal blocks and Westinghouse OT selector switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Partial and temporary mispositioning of the valves during the seismic event is acceptable. No valves will be sealed-in in the incorrect position.
- (4) Devices are solidstate and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DG Steink / Date 5-12-95
Reviewed by Jerry Bell / Date 5-17-95

**A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2**

System Residual Heat Removal

Page 1 of 3

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
2-PP-35W West Residual Heat Removal Pump	2-98284-36	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co, ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		CA(2)
		2-62-SIS-TA4	Agastat T21A SWGR	(3)
		2-SI-X-TA4	G.E. HFA T21A SWGR	(3)
		2-5-TA4	G.E. HFA Pan. WRR	(3)
		2-K610-B 2-5X5-T21A		(3,4)
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) RHR Pumps are not required to start until after the DBE, therefore, chatter of the tripping relays is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 Form for 2-K610-B.
See Diesel Generator G.4 forms for 2-5X5-T21A
- (5) Chatter of any other relays will not inadvertently start the pump, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS _____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RC Atch / Date 5-12-95
 Reviewed by J. M. Beatty / Date 5-17-95



A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Residual Heat Removal

Page 2 of 3

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
2-PP-35E East Residual Heat Removal Pump	2-98284-36	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co, ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		CA(2)
		2-62-SIS-TD6	Agastat T21D SWGR	(3)
		2-SI-X-TD6	G.E. HFA T21D SWGR	(3)
		2-5-TD6	G.E. HFA Pan. SSR	(3)
		2-K610-A 2-5X5-T21D		(3,4)
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) RHR Pumps are not required to start until after the DBE, therefore, chatter of the tripping relays is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 Form for 2-K610-A.
See Diesel Generator G.4 forms for 2-5X5-T21D.
- (5) Chatter of any other relays will not inadvertently start the pump, prevent the pump from starting on demand, or trip the pump.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by DC / Date 5-12-95
 Reviewed by Joe Bettlich / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Residual Heat Removal

Page 3 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
RHR MOVs	2-98284-36	Manual Control	G.E. SB-1	NV(1)
2-ICM-111	2-98287-18	Switches		
2-ICM-129				
2-ICM-305		Valve Limit/Torque	Limiterorque	NV(1)
2-ICM-306		Switches		
2-ICM-311				
2-ICM-321		Thermal Overloads	Cutler Hammer	NV(1)
2-IMO-128				
2-IMO-310		MCC Contactor/Aux	Cutler Hammer	(2)
2-IMO-312		Switches		
2-IMO-314				
2-IMO-315		All Others		CA(3)
2-IMO-316				
2-IMO-320				
2-IMO-322				
2-IMO-324				
2-IMO-325				
2-IMO-326				
2-IMO-390				

RHR AOVs	2-985661-4	All Devices		NV(4)
2-IRV-310				
2-IRV-311				
2-IRV-320				

- (1) General Electric type SB-1 control switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential, and their capacity > demand (see Appendix E).
- (3) Chatter by any other contacts will not misposition valves.
- (4) Devices are solidstate and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by RCJ/tdc Date 5-12-95
 Reviewed by Jon Bell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Safety Injection

Page 1 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-PP-26N 2-PP-26S Safety Injection Pumps	2-98281-28	Manual Control, Test and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		CA(2)
		2-62-SIS-TA1	Agastat T21A SWGR	(3)
		2-SI-X-TA1	GE HFA T21A SWGR	(3)
		2-62-SIS-TD5	Agastat T21D SWGR	(3)
		2-SI-X-TD5	GE HFA T21D SWGR	(3)
		2-K610-A 2-K610-B		(3,4)
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Pumps are not required to run, therefore trips are acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 form for 2-K610A and 2-K610B.
- (5) Chatter of any other relays will not start pumps.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Atch / Date 5-12-95
Reviewed by Jess B. Bell / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Safety Injection

Page 2 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Safety Injection	2-98281-28	Manual Control	G.E. SB-1	NV(1)
MOVs	2-98282-19	Switches		
2-ICM-250	2-98288-6			
2-ICM-251		Valve Limit/Torque	Limitorque	NV(1)
2-ICM-260		Switches		
2-ICM-265				
2-IMO-51		Thermal Overloads	Cutler Hammer	NV(1)
2-IMO-52				
2-IMO-53		MCC Contactor Aux	Cutler Hammer	(2)
2-IMO-54		Contacts		
2-IMO-255				
2-IMO-256		2-K608-X1-A		(3,4)
2-IMO-261		2-K608-X1-B		
2-IMO-262		2-K609-X1-A		
2-IMO-263		2-K609-X1-B		
2-IMO-270				
2-IMO-275		All Others		CA(5)
2-IMO-350				
2-IMO-360				
2-IMO-361				
2-IMO-362				

- (1) General Electric type SB-1 control switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential, and their capacity > demand (see Appendix E).
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 form for these relays.
- (5) Contact chatter by any other relays will not cause valves to move to an undesired position.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Atty / Date 5-12-95
Reviewed by Jen Bellach / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Safety Injection

Page 3 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Safety Injection	2-98281-28	Manual Control	G.E. SB-1	NV(1)
AOVs	2-98283-14	Switches	Cutler Hammer	
2-IRV-50				
2-IRV-60		Limit Switches	Namco	NV(1)
2-IRV-112				
2-IRV-122		All Others		CA(2)
2-IRV-132				
2-IRV-142				
2-IRV-156				
2-IRV-166				
2-IRV-176				
2-IRV-186				
2-IRV-157				
2-IRV-158				
2-IRV-149				
2-IRV-150				
2-IRV-260				
2-GCR-314				
2-GRV-341	2-985691-3	All Devices		NV(3)

- (1) General Electric type SB-1 control switches, Cutler Hammer 10250T selector switches, and Namco limit switches are rugged.
- (2) Chatter of any other contacts would not cause any of the valves to move to an undesired position.
- (3) Control devices are solidstate, and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RGH / Date 5-12-95
Reviewed by John Bell / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Containment Spray

Page 1 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-PP-9W 2-PP-9E Containment Spray Pumps	2-98285-24	Manual Control, Test, and Disconnect Switches	G.E. SB-1, Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		CA(2)
		2-62-CS-TA3	Agastat T21A SWGR	(3)
		2-CS-X-TA3	G.E. HFA T21A SWGR	(3)
		2-62-CS-TD4	Agastat T21D SWGR	(3)
		2-CS-X-TD4	G.E. HFA T21D SWGR	(3)
		2-K626-X3-A 2-K626-X3-B		(3,4)
		All Others		CA(5)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Pumps are not required to run, therefore trips are acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 Form for 2-K626-X3-A and 2-K626-X3-B
- (5) Chatter of any other relays will not start the pumps.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DCM/ Date 5-12-95
Reviewed by John Butcher Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Containment Spray

Page 2 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Containment Spray MOVs	2-98285-24	Manual Control Switches	G.E. SB-1	NV(1)
2-IMO-210		Limit/Torque Switches	Limitorque	NV(1)
2-IMO-211				
2-IMO-212		Thermal Overloads	Cutler Hammer	NV(1)
2-IMO-215				
2-IMO-220		MCC Contactor/Aux Contacts	Cutler Hammer	(2)
2-IMO-221				
2-IMO-222		2-K643-A		(3)
2-IMO-225				
2-IMO-330		2-K643-B		
2-IMO-331		All Others		CA(4)

- (1) General Electric type SB-1 switches, Limitorque limit and torque switches and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential and their capacity > demand (see Appendix E).
- (3) See SSPS G.4 form for 2-K643-A and 2-K643-B Capacity > demand, see Appendix E.
- (4) Chatter of any other relays will not misposition valves.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Huby / Date 5-12-95
Reviewed by Joe Bellack / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-CD

Page 1 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Diesel Trip Circuitry	2-98044-29	Trip Push Buttons	Cutler Hammer	NV(1)
		Diesel Differential Relays	ABB 87M Pan. A-13	(2)
		Diesel Overcurrent Relays	G.E. IACs Pan. A-13	(2)
		Air Chest Pressure 2-63-ACP-EH	Mercoird Pan. DGCD	(2)
		Fuel Manifold Pressure Lube Oil Pressure Bearing Temp High		CA(3)
		Overspeed Circuitry CO ₂ System Activated Incomplete Start		(4)
		2-1X-DGCD 2-5X-CD	G.E. HFAs Pan. SR4	(2)
		2-62-2X-DGCD	Agastat Pan. SR4	(2)
		2-87X-DGCD	G.E. HEA Pan. SA	(2)
		2-6-2-DGCD		(5)
		All Others		CA(6)

- (1) Cutler Hammer push buttons are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) These trips are blocked by 2-42-3-DGCD before diesel start and by 2-1X-DGCD after diesel start.
- (4) These circuits are seismically adequate, see pages 4 of 6 and 6 of 6.
- (5) See page 2 of 6.
- (6) Chatter of any other relays will not cause or prevent a diesel trip.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Steeb / Date 5-12-95
Reviewed by Jen Ballach / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-CD

Page 2 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Diesel Starting Circuitry	2-98035-16	Undervoltage Relays	ITE 27N	CA(1)
		U.V. Aux Relays	G.E. HFAs	CA(1)
		2-27X-T21C	G.E. HFAs	(2)
		2-27X-T21D	Pans SR4, GR1	
		2-62-T21CU	Agastats	(2)
		2-62-T21DU	Pans SR3, GR1	
		2-87X-T21C	GE HEA/Pan SA	(2)
		Manual Control Sw.	G.E. SB-1	NV(3)
		Switchgear Aux Contacts	ITE	NV(3)
		2-5X5-T21C	G.E. HFAs	(2)
		2-5X6-T21D	Pans SR4, GR1	
		Diesel Starting Relays	G.E. HFAs	
		2-6-DGCD	Pan. DGCD	(2)
		2-6-1-DGCD	Pan. SA	CR(4)
		2-6-3-DGCD	Pan. DGCD-X	(2)
		2-6-2-DGCD	G.E. HGA	CR(4)
			Pan. DGCD	
		2-K609-A		(2,5)
		All Others		(6)

- (1) Since a 2 second time delay is utilized in the undervoltage circuitry, chatter of the undervoltage and interposing relays is acceptable.
- (2) Capacity > demand, see Appendix E.
- (3) G.E. SB-1 switches, Cutler Hammer push buttons, and ITE switchgear aux contacts are rugged.
- (4) Relay capacity does not exceed demand. 2-6-1-DGCD will be relocated, 2-6-2-DGCD will be replaced with a Cutler Hammer M600 relay.
- (5) See SSPS G.4 form for 2-K609-A
- (6) Chatter of any other contacts will not cause or prevent a diesel start.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Stebb / Date 5-12-95
Reviewed by Jan. B. B. B. / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-CD

Page 3 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Starting Air Relays	2-98035-16	2-19-DGCD 2-19-1-DGCD	G.E. HFAs Pan. DGCD	(1)
Jet Assist Timer	2-98035-16	2-62-2-DGCD	Agastat Pan. DGCD	(1)
Throttle Signal Circuitry	2-98035-16	2-62-3X-DGCD 2-62-3-DGCD		CA(2)
Field Flashing Circuitry	2-98033-27	Push Button	Cutler Hammer	NV(3)
		2-53-DGSCD	ASCO 2516C	(1)
		2-43X1-DGSCD 2-12X-SPSA-2 2-6-1-DGCD		(4)
Regulation Circuitry	2-98033-27	Manual Control Switches	G.E. SB-1	NV(3)
		Switchgear Aux Contacts	ITE	NV(3)
		2-65X-DGCD	G.E. HFA Pan. DGCD	(1)
		2-43X-DGCD-CT 2-43X1-DGCD-CT	Cutler Hammer Pan. DGCD-X	(1)
		2-100-CR	Air Pax Pan. DGCD	(1)
		2-10-LR	G.E. TOL	NV(3)
		All Others		CA(2)

- (1) Capacity > demand, see Appendix E.
- (2) Chatter of these contacts would not adversely affect diesel operation.
- (3) Cutler Hammer push buttons, G.E. SB-1 switches, ITE switchgear aux contacts, and G.E. thermal overload devices are rugged.
- (4) See pages 4 of 6 and 2 of 6 for these relays.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RLH / Date 10-25-95
Reviewed by Jess Butler / Date 11-1-95



A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-CD

Page 4 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Diesel Engine Running Relays	2-98035-16	2-42-2-DGCD 2-42-3-DGCD 2-42-4-DGCD 2-42-5-DGCD 2-42-6-DGCD 2-42-7-DGCD 2-42-8-DGCD	G.E. HFAs Pan. DGCD	(1)
Load Shedding Relays	2-98035-16	2-5X3-T21C 2-5X5-T21C 2-5X2-T21D 2-5X3-T21D 2-5X5-T21D 2-5X6-T21D	G.E. HFAs PANs. GR-1, SR-4	(1)
Overspeed Circuitry		2-12-SPSA-1 2-12-SPSA-2 2-12-OSTA 2-12X-SPSA2	G.E. HFAs Pan. DGCD-X G.E. HFA Pan. DGCD	(1) (1)
		2-FBCST 2-RBCST	Dynalco SS2200 Pan. DGCD	(1)
Incomplete Start Circuitry	2-98035-16	2-62-1X-DGCD 2-62-2-DGSCD 2-62-1-DGCD	G.E. HFA Agastat Agastat Pan. DGCD	(1)
Slow Start Circuitry	2-98035-16	2-43-X1-DGSCD 2-43-X3-DBSCD 2-43-X4-DGSCD	G.E. HFAs Pan. DGCD-X	(1)
		Manual Control Switch	G.E. SB-1	NV(2)
		All Others		CA(3)

- (1) Capacity > demand, see Appendix E.
- (2) General Electric type SB-1 switches are rugged.
- (3) Chatter of other diesel engine running, load shedding, and slow start circuitry relays will not adversely affect diesel operation.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Hark / Date 5-12-95
Reviewed by Jean Bellard / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-CD

Page 5 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
EDG 2-CD Output Breakers 2-T21C3 2-T21D8	2-98044-29	Manual Control, Test, and Disconnect Switches	G.E. SB-1 Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		(2)
		2-87X-DGCD 2-87X-T21C 2-51X-TD8	G.E. HEAs PAN. SA	(2)
		SWGR Anti Pump Relays		(3)
		2-42-4-DGCD		(2,4)
		All Others		CA(5)
EDG Inverter	2-98033-27	Inverter Relays	SCI	(2)
		2-83-TILA	G.E. HFA PAN. DGCD-X	(2)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Relays directly control switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 form page 4 of 6 for 2-42-4-DGCD
- (5) Chatter of other contacts will not cause breaker misoperation.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stubb / Date 10-25-95
Reviewed by Jess Butcher / Date 11-1-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-CD

Page 6 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-DGCD Auxiliaries	2-98014-26	Manual Control Switches	G.E. SB-1	NV(1)
2-QT-117-CD				
2-QT-106-CD1				
2-QT-106-CD2		Thermal Overloads	Cutler Hammer	NV(1)
2-QT-119-CD				
2-QT-111-CD		All Others		CA(2)
2-QT-116-CD				
2-QT-130-CD1				
2-QT-130-CD2				
2-QT-135-CD				
2-QT-134-CD				
2-QT-100-CD				
2-QT-118-CD				
2-DGCD HVAC	2-98017-29	Manual Control Switches	G.E. SB-1	NV(1)
2-HV-DGS-1				
2-HV-DGX-1				
2-HV-DGS-4		Valve Limit/Torque Switches	Limiterorque	NV(1)
2-HV-DDP-CD1				
2-HV-DDP-CD2				
2-HV-DGS-DCD		Thermal Overloads	Cutler Hammer	NV(1)
		All Others		CA(2)
2-DGCD Fire Dampers	2-98033-27	2-23X2-DGCD	G.E. HFA	(3)
2-HV-DGS-FD1	2-98981-29		Pan. DGCD	
2-HV-DGX-FD1		2-63-DGCD	Cardox	NV(1)
Upper Valve Gear	2-98014-26	All Contacts		CA(4)
Lube Oil Solenoids				
2-LSO-245				
2-LSO-246				

- (1) General Electric type SB-1 switches, Cardox pressure switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of other contacts could cause temporary cycling of the loads during the SSE however this is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) Chatter of any contact will not close valves when diesel is running.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Atch / Date 5-12-75
Reviewed by John Beltrich / Date 5-17-75

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-AB

Page 1 of 6

<u>Subsystem/Component</u>	<u>Ref Dwg(s)</u>	<u>Contact/Contact Group</u>	<u>Relay Type and Location</u>	<u>SAT*</u>
Diesel Trip Circuitry	2-98043-31	Trip Push Buttons	Cutler Hammer	NV(1)
		Diesel Differential Relays	ABB 87M Pan. A-11	(2)
		Diesel Overcurrent Relays	G.E. IACs Pan. A-11	(2)
		Air Chest Pressure 2-63-ACP-EH	Mercoild Pan. DGAB	(2)
		Fuel Manifold Pressure Lube Oil Pressure Bearing Temp High		CA(3)
		Overspeed Circuitry CO ₂ System Activated Incomplete Start		(4)
		2-1X-DGAB 2-5X-AB	G.E. HFAs Pan. SR1	(2)
		2-62-2X-DGAB	Agastat Pan. SR1	(2)
		2-87X-DGAB	G.E. HEA Pan. SA	(2)
		2-6-2-DGAB		(5)
		All Others		CA(6)

- (1) Cutler Hammer push buttons are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) These trips are blocked by 2-42-3-DGAB before diesel start and by 2-1X-DGAB after diesel start.
- (4) These circuits are seismically adequate, see pages 4 of 6 and 6 of 6.
- (5) See page 2 of 6.
- (6) Chatter of any other relays will not cause or prevent a diesel trip.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Steub / Date 5-12-75
Reviewed by Jim Ballou / Date 5-17-75

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-AB

Page 2 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Diesel Starting Circuitry	2-98034-16	Undervoltage Relays	ITE 27N	CA(1)
		U.V. Aux Relays	G.E. HFAs	CA(1)
		2-27X-T21A	G.E. HFAs	(2)
		2-27X-T21B	Pans SR1,2	
		2-62-T21AU	Agastats	(2)
		2-62-T21BU	Pan SR2	
		2-87X-T21B	GE HEA/Pan SA	(2)
		Manual Control Sw.	G.E. SB-1	NV(3)
		Switchgear Aux Contacts	ITE	NV(3)
		2-5X1-T21A	G.E. HFAs	(2)
		2-5X1-T21B	Pans SR1,2	
		Diesel Starting Relays	G.E. HFAs	
		2-6-DGAB	Pan. DGAB	(2)
		2-6-1-DGAB	Pan. SA	CR(4)
		2-6-3-DGAB	Pan. DGAB-X	(2)
		2-6-2-DGAB	G.E. HGA Pan. DGAB	CR(4)
		2-K609-B		(2,5)
		All Others		(6)

- (1) Since a 2 second time delay is utilized in the undervoltage circuitry, chatter of the undervoltage and interposing relays is acceptable.
- (2) Capacity > demand, see Appendix E.
- (3) G.E. SB-1 switches, Cutler Hammer push buttons, and ITE switchgear aux contacts are rugged.
- (4) Relay capacity does not exceed demand. 2-6-1-DGAB will be relocated, 2-6-2-DGAB will be replaced with a Cutler Hammer M600 relay.
- (5) See SSPS G.4 form for 2-K609-B
- (6) Chatter of any other contacts will not cause or prevent a diesel start.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RGH/ab Date 5-12-95
Reviewed by Jim Betts Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-AB

Page 3 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Starting Air Relays	2-98034-16	2-19-DGAB 2-19-1-DGAB	G.E. HFAs Pan. DGAB	(1)
Jet Assist Timer	2-98034-16	2-62-2-DGAB	Agastat Pan. DGAB	(1)
Throttle Signal Circuitry	2-98034-16	2-62-3X-DGAB 2-62-3-DGAB		CA(2)
Field Flashing Circuitry	2-98032-29	Push Button	Cutler Hammer	NV(3)
		2-53-DGSAB	ASCO 2516C	(1)
		2-43X1-DGSAB 2-12X-SPSB-2 2-6-1-DGAB		(4)
		Manual Control Switches	G.E. SB-1	NV(3)
		Switchgear Aux Contacts	ITE	NV(3)
		2-65X-DGAB	G.E. HFA Pan. DGAB	(1)
		2-43X-DGAB-CT 2-43X1-DGAB-CT	Cutler Hammer Pan. DGAB-X	(1)
Regulation Circuitry	2-98032-29	2-100-CR	Air Pax Pan. DGAB	(1)
		2-10-LR	G.E. TOL	NV(3)
		All Others		CA(2)

- (1) Capacity > demand, see Appendix E.
- (2) Chatter of these contacts would not adversely affect diesel operation.
- (3) Cutler Hammer push buttons, G.E. SB-1 switches, ITE switchgear aux contacts, and G.E. thermal overload devices are rugged.
- (4) See pages 4 of 6 and 2 of 6 for these relays.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Itub / Date 10-25-95
Reviewed by Jan B. Litch / Date 11-1-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-AB

Page 4 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Diesel Engine Running Relays	2-98034-16	2-42-2-DGAB 2-42-3-DGAB 2-42-4-DGAB 2-42-5-DGAB 2-42-6-DGAB 2-42-7-DGAB 2-42-8-DGAB	G.E. HFAs Pan. DGAB	(1)
Load Shedding Relays	2-98034-16	2-5X1-T21A 2-5X2-T21A 2-5X3-T21A 2-5X5-T21A 2-5X1-T21B	G.E. HFAs PANs. SR-1, SR-2	(1)
Overspeed Circuitry		2-12-SPSB-1 2-12-SPSB-2 2-12-OSTB 2-12X-SPSB2	G.E. HFAs Pan. DGAB-X G.E. HFA Pan. DGAB	(1) (1)
		2-FBCST 2-RBCST	Dynalco SS2200 Pan. DGAB	(1)
Incomplete Start Circuitry	2-98034-16	2-62-1X-DGAB 2-62-2-DGSAB 2-62-1-DGAB	G.E. HFA Agastat Agastat Pan. DGAB	(1)
Slow Start Circuitry	2-98034-16	2-43-X1-DGSAB 2-43-X3-DBSAB 2-43-X4-DGSAB	G.E. HFAs Pan. DGAB-X	(1)
		Manual Control Switch	G.E. SB-1	NV(2)
		All Others		CA(3)

- (1) Capacity > demand, see Appendix E.
- (2) General Electric type SB-1 switches are rugged.
- (3) Chatter of other diesel engine running, load shedding, and slow start circuitry relays will not adversely affect diesel operation.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RL Steeb / Date 5-12-45
Reviewed by James Betts / Date 5-17-45

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-AB

Page 5 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
EDG 2-AB Output Breakers 2-T21A11 2-T21B4	2-98043-31	Manual Control, Test, and Disconnect Switches	G.E. SB-1 Meter Devices Co., ITE	NV(1)
		SWGR Aux Contacts	ITE	NV(1)
		Tripping Relays		(2)
		2-87X-DGAB 2-87X-T21B 2-51X-TA11	G.E. HEAs PAN. SA	(2)
		SWGR Anti Pump Relays		(3)
		2-42-4-DGAB		(2,4)
		All Others		CA(5)
EDG Inverter	2-98032-29	Inverter Relays	SCI	(2)
		2-83-TILB	G.E. HFA PAN. DGAB-X	(2)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and charging motor disconnect switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Relays directly control switchgear; capacity > demand (See Appendix E).
- (4) See diesel generator G.4 form page 4 of 6 for 2-42-4-DGAB
- (5) Chatter of other contacts will not cause breaker misoperation.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Hurl / Date 10-25-95
Reviewed by Jim Bell / Date 11-1-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Emergency Diesel Generator 2-AB

Page 6 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
2-DGAB Auxiliaries	2-98013-28	Manual Control	G.E. SB-1	NV(1)
2-QT-117-AB		Switches		
2-QT-106-AB1				
2-QT-106-AB2		Thermal Overloads	Cutler Hammer	NV(1)
2-QT-119-AB				
2-QT-111-AB		All Others		CA(2)
2-QT-116-AB				
2-QT-130-AB1				
2-QT-130-AB2				
2-QT-135-AB				
2-QT-134-AB				
2-QT-100-AB				
2-QT-118-AB				
2-DGAB HVAC	2-98016-28	Manual Control	G.E. SB-1	NV(1)
2-HV-DGS-2		Switches		
2-HV-DGX-2				
2-HV-DGS-3		Valve Limit/Torque	Limitorque	NV(1)
2-HV-DDP-AB1		Switches		
2-HV-DDP-AB2				
2-HV-DGS-DAB		Thermal Overloads	Cutler Hammer	NV(1)
		All Others		CA(2)
2-DGAB Fire Dampers	2-98032-29	2-23X2-DGAB	G.E. HFA	(3)
2-HV-DGS-FD2	2-98981-29		Pan. DGAB	
2-HV-DGX-FD2		2-63-DGAB	Cardox	NV(1)
Upper Valve Gear	2-98013-28	All Contacts		CA(4)
Lube Oil Solenoids				
2-LSO-240				
2-LSO-241				

- (1) General Electric type SB-1 switches, Cardox pressure switches, Limitorque limit and torque switches, and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of other contacts could cause temporary cycling of the loads during the SSE however this is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) Chatter of any contact would not close valves when the diesel is running.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by DG Miller / Date 5-12-95
 Reviewed by Jean Bethune / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Load Shedding/Conservation

Page 1 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
4kV Bus Feed	2-98045-19	Manual Control	G.E. SB-1	NV(1)
Breakers	2-98046-19	Switches		
2-T21A9				
2-T21A12		All Others		CA(2)
2-T21B1				
2-T21B2				
2-T21C1				
2-T21C2				
2-T21D1				
2-T21D12				
4kV Feed Breakers to Pressurizer	2-98199-6	Manual Control	G.E. SB-1	NV(1)
Heater Transformer	2-98200-8	Switches		
2-T21A6		All Others		CA(2)
2-T21D9				

- (1) General Electric type SB-1 switches are rugged.
- (2) Chatter by any other relays would not inadvertently close the breakers. The breakers can only be closed with the manual control switches.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Herb / Date 5-12-95
Reviewed by Jim Bellack / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Load Shedding/Conservation

Page 2 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
600 Volt Load Shedding Breakers	2-98047-12	Manual Control	G.E. SB-1	NV(1)
2-21A1, 2-21A4	2-98111-18	Switches	West. W-2	
2-21A10, 2-21B3	2-98222-18			
2-21B5, 2-21B6	2-98223-15	Tripping Relays		CA(2)
2-21B10, 2-21B12	2-98402-8			
2-21B13, 2-21C2	2-98408-20	Lock Out Relays:		
2-21C3, 2-21C4	2-98701-17	2-5A10, 2-5B6	G.E. HFA	(3)
2-21C7, 2-21C8		2-5B10	Pan. GR-2	
2-21C9, 2-21C11		2-5C4	GE HFA	(3)
2-21C14, 2-21C16			Pan. EFR	
2-21C17, 2-21D3				
2-21D4, 2-21D9		2-5B12	GE HFA	(3)
2-21D10, 2-21D13			Pan. TRE	
		2-5C17	GE HFA	(3)
			Pan. TRD	
		2-62-SIS-B12	AGASTAT	(3)
		2-62-BOS-B12	Pan. TRE	
		2-62-SIS-C17	AGASTAT	(3)
		2-62-BOS-C17	Pan. TRD	

- (1) Rugged G.E. type SB-1 and Westinghouse type W-2 switches will prevent inadvertent closure of breakers which have no auto start contacts.
- (2) Contact chatter is acceptable in the breaker tripping circuits since the desire state of the breakers is open.
- (3) Capacity > demand, see Appendix E.

*. Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by D. C. Steeb / Date 5-12-95
Reviewed by James Bell / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Load Shedding/Conservation

Page 3 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Train A Load Conservation Relays	2-98033-27	2-LCSI-A-AUX	G.E. HFA Pan. NSR	(1)
		2-5Y-LCTA	Asco 2506 Pan. NSR	(1)
		2-5A6-LCTA	G.E. HFA Pan. NSR	(1)
		2-K602-A		(1,2)
		All Others		CA(3)
Train B Load Conservation Relays	2-98032-29	2-LCSI-B-AUX	G.E. HFA Pan. NSR	(1)
		2-5Y-LCTB	Asco 2506 Pan. NSR	(1)
		2-5A6-LCTB	G.E. HFA Pan. NSR	(1)
		2-K602-B		(1,2)
		All Others		CA(3)

- (1) Capacity > demand, see Appendix E.
(2) See SSPS G.4 form for 2-K602-A and 2-K602-B.
(3) Chatter by any other relays will not cause an inadvertent load conservation signal.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
GERS - Seismically adequate based on GERS ____; include GERS number.
NA - Component not affected by relays.
CR - Corrective Action Required.
OA - Operator Action.
- - No entry necessary.

Prepared by DC Stuebe Date 5-12-95
Reviewed by Joe Bellack Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Auxiliary Electrical

Page 1 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
600 Volt Bus	2-98045-19	Manual Control,	G.E. SB-1,	NV(1)
Feed Breakers	2-98046-19	Test, and Disconnect	Meter Devices	
2-21A11		Switches	Co., ITE	
2-21B11				
2-21C1		SWGR Aux contacts	ITE	NV(1)
2-21D1				
2-T21A10		Transformer	G.E. IACs	(2)
2-T21D2		Overload Relays	PAN. A-11,13	
		Transformer	ABB 87T	(2)
		Differential Relays	PAN. A-11,13	
		2-50N-T21A	G.E. PJCs	(2)
		2-50N-T21B	4kV SWGR	
		2-50N-T21C		
		2-50N-T21D		
		2-87X-T21A	G.E. HEA	(2)
		2-87X-T21B	PAN. SA	
		2-87X-T21C		
		2-87X-T21D		
		2-51N-T21B	G.E. IAC	(2)
		2-51N-T21C	PAN. A11,A13	
		Time Delay Relays		CA(3)
		SWGR Anti Pump Relays		CA(3)
		All Others		CA(3)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and switchgear breaker charging motor disconnect switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Contact chatter will not cause breakers to open.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Hab / Date 5-12-95
Reviewed by John Betlach / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Auxiliary Electrical

Page 2 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
600 Volt Bus	2-98045-19	Manual Control,	G.E. SB-1,	NV(1)
Tie Breakers	2-98046-19	Test, and Disconnect	Meter Devices	
2-21AC		Switches	Co., ITE	
2-21BD		SWGR Aux Contacts	ITE	NV(1)
		All Others		CA(2)

- (1) General Electric type SB-1 control switches, Meter Devices Co. test switches, and ITE auxiliary contacts and switchgear breaker charging motor disconnect switches are rugged.
- (2) Contact chatter would not cause the bus tie breakers to close.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Steib / Date 5-12-95
Reviewed by Jan Petlack / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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PLANT Cook Nuclear Plant Unit 2

System Auxiliary Electrical

Page 3 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
250 VDC System (A & B Trains)	2-98055-19 2-98057-16	Battery Charger Relays		(1)
		All Others		CA(2)

- (1) The battery chargers were purchased fully qualified from Solidstate Controls, Inc (SCI), including seismic testing in accordance with IEEE 344-1975. There are several relays installed within the battery chargers for which it is difficult to determine the effects of relay chatter. Instead of investigating the effect of each relay's contact chatter, all of the relays within the battery chargers were included on the essential relay list. Since each relay's output contacts were not monitored during the seismic testing, it is not possible to determine whether or not a particular relay is seismically adequate, or if the relay chattered during the seismic testing, but had no adverse affect on the operation of the battery charger. In either case, the operation of the battery chargers would not be affected by a seismic event.

- (2) Chatter of any other relay would not adversely affect the 250 VDC system

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DC Stork Date 5-12-95
Reviewed by John B. Walsh Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Auxiliary Electrical

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
250 VDC System (N-Train)	2-98210-14	Battery Charger Relays		(1)
		Manual Control Switches	G.E. SB-1	NV(2)
		Thermal Overload	Cutler Hammer	NV(2)
		MCC contactors and aux contacts	Cutler Hammer	(3)
		2-88X1-BC-A 2-88X1-BC-B	Cutler Hammer 2-BC-A-PNL (B)	(3)
		2-88X2-BC-A 2-88X2-BC-B	Cutler Hammer MCC AM-D MCC ABD-B	(3)
		2-5X1-T21B 2-5X6-T21D 2-K602-A 2-K602-B	GE HFAs West ARs	(3,4)
		All Others		CA(5)

- (1) The battery chargers were purchased fully qualified from Power Conversion Products, including seismic testing in accordance with IEEE 344-1975. There are several relays installed within the battery chargers for which it is difficult to determine the effects of relay chatter. Instead of investigating the effect of each relay's contact chatter, all of the relays within the battery chargers were included on the essential relay list. Since each relay's output contacts were not monitored during the seismic testing, it is not possible to determine whether or not a particular relay is seismically adequate, or if the relay chattered during the seismic testing but had no adverse affect on the operation of the battery charger. In either case, the operation of the battery chargers would not be affected by a seismic event.
- (2) General Electric type SB-1 switches and Cutler Hammer TOLs are rugged.
- (3) Capacity > demand, see Appendix E.
- (4) See Diesel Generator G.4 forms for 2-5X6-T21D and 2-5X1-T21B
See SSPS G.4 form for 2-K602's
- (5) Chatter by any other relays would not adversely affect the system.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Stebbins Date 5-12-95
Reviewed by John Bell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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PLANT Cook Nuclear Plant Unit 2

System Auxiliary Electrical

Page 5 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
120 Vac Vital Bus	2-98077-20	Inverter Relays		(1)
System Inverters	2-98081-20			
2-CRID-I-INV	2-98085-23	Output Voltage Relays		CA(2)
2-CRID-II-INV	2-98089-18			
2-CRID-III-INV	2-980792-3	2-86-ICC1	G.E. HEA RPCs 1,2,3,4	(3)
2-CRID-IV-INV	2-980832-3	2-86-ICC2		
	2-980872-4	2-86-ICC3		
	2-980912-3	2-86-ICC4		
		All Others		CA(2)

- (1) The CRID inverters were purchased fully qualified from Solidstate Controls, Inc. (SCI), including seismic testing in accordance with IEEE 344-1975. There are several relays installed within the inverters for which it is difficult to determine the effects of relay chatter. Instead of investigating the effect of each relay's contact chatter, all of the relays within the inverters were included on the essential relay list. Since each relay's contacts were not monitored during the seismic testing, it is not possible to determine whether a particular relay is seismically adequate, or if the relay chattered during the seismic testing but had no adverse affect on the operation of the inverter. In either case, the operation of the inverters would not be affected by a seismic event.
- (2) Chatter of these relays would not adversely affect the operation of the 120 Vac Vital Bus System.
- (3) Capacity > demand, see Appendix E.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RGH / Date 5-12-95
Reviewed by Jess. Bellack / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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PLANT Cook Nuclear Plant Unit 2

System Auxiliary Electrical

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Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Motor Control Centers				NA(1)
Distribution Panels				

- (1) Motor Control Centers and Distribution Panels are not affected by relays. Each of the control circuits for the devices fed from the MCCs and distribution panels has been evaluated separately, however the MCCs and distribution panels themselves are not affected by relays.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
GERS - Seismically adequate based on GERS ____; include GERS number.
NA - Component not affected by relays.
CR - Corrective Action Required.
OA - Operator Action.
- - No entry necessary.

Prepared by PGH/terg Date 5-12-95
Reviewed by John Bellack Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
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PLANT Cook Nuclear Plant Unit 2

System Reactor Trip Breakers

Page 1 of 1

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Reactor Trip Breakers	2-98222-18	Manual Control	G.E. SB-1	NV(1)
2-52-RTA	2-98223-15	Switches		
2-52-RTB		Circuit Breaker	Westinghouse	NV(1)
2-52-BYA		Aux Contacts		
2-52-BYB		All Others		CA(2)

- (1) General Electric type SB-1 switches and Westinghouse DB-50 aux contacts are rugged.
- (2) Chatter of any other relays would not cause the breakers to inadvertently close or prevent the breakers from tripping.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DG Atter Date 5-12-95
Reviewed by Jim Balluch Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Solid State Protection (ESFAS)

Page 1 of 1

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Engineered Safeguard Features Actuation System	2-98367-22 2-98377-32 2-98387-21 2-98397-31	Input Relays (K100's, K200's K300's and K400's)	Clare, Midtex or Potter & Brumfield 2-RPS-A 2-RPS-B	(1)
		Master Output Relays (K500's)	Clare, Midtex or Potter & Brumfield 2-RPS-A 2-RPS-B	(1)
		Slave Output Relays (K600's)	West. type AR 2-RPS-A 2-RPS-B 2-RPSX-A 2-RPSX-B	(1)
		Manual Control Switches and Push Buttons	G.E. SB-1 Cutler Hammer	NV(2)
		RPS Output Isolators	Sigma 42JO	(1)
		RPS Test Switches	C&K 7401	NV(2)
		SSPS Logic		NV(3)
		RPS Logic		NV(3)
		All Others		CA(4)

- (1) Capacity > demand, see Appendix E. The relay types are as follows: Clare type GP1, Midtex type 156, and Potter & Brumfield type KHU.
- (2) General Electric type SB-1 switches, Cutler Hammer push buttons, and C&K test switches are rugged.
- (3) All components are solid state and, therefore, not vulnerable.
- (4) Chatter by any other relays would not cause inadvertent safety injection, containment spray, or containment isolation signals.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Atch Date 5-12-95
Reviewed by Jon Bellack Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Miscellaneous HVAC

Page 1 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Switchgear Area Fans	2-98741-26	Manual Control Switches	West. OT-1 Cutler Hammer	NV(1)
2-HV-SGRS1A				
2-HV-SGRS2				
2-HV-SGRS3		MCC Contactor, Control Relay and aux contacts	Cutler Hammer	(2)
2-HV-SGRS4A				
2-HV-SGRS7				
2-HV-SGRS8		2-5-SGRS2		OA(3)
2-HV-SGRS9		2-5-SGRS3		
2-HV-SGRX2		2-5X-TDS2		
2-HV-SGRX3		2-5X-TDS3		
2-HV-SGRX5				
2-HV-SGRX6		All Others		(2)
Switchgear Area Dampers		MCC Aux contacts	Cutler Hammer	(2)
2-HV-SGRMD1				
2-HV-SGRMD2		Temperature Switch		CA(4)
2-HV-SGRMD3				
2-HV-SGRMD4				
2-HV-SGRMD5				

- (1) Westinghouse type OT-1 and Cutler Hammer 10250T selector switches are rugged.
- (2) Chatter of these relays could cause temporary cycling of the fans and dampers during the seismic event, however this is acceptable.
- (3) Fans 2-HV-SGRS2 and 2-HV-SGRS3 could be locked out due to chatter in the main transformer fire detection circuitry. A step is included in the Operations Department Procedure, Response to a Design Basis Earthquake, to verify that the fans have not been locked out.
- (4) Chatter of the temperature switch could cause temporary and partial closing of the damper however this is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

CA - Chatter acceptable.
 NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
 GERS - Seismically adequate based on GERS ____; include GERS number.
 NA - Component not affected by relays.
 CR - Corrective Action Required.
 OA - Operator Action.
 - - No entry necessary.

Prepared by R. G. Tetter / Date 5-12-95
 Reviewed by Jean Ballach / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Miscellaneous HVAC

Page 2 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Control Room HVAC including: 2-HV-ACRA-1 2-HV-ACRA-2 2-HV-ACR-1 2-HV-ACR-2 2-PP-82N 2-PP-82S 2-VRV-315 2-VRV-325	2-98742-18	Manual Control Switches	G.E. SB-1 Cutler Hammer	NV(1)
		Thermal Overloads	Cutler Hammer	NV(1)
		Limit Switches	Namco	NV(1)
		MCC Contactor and Aux contacts	Cutler Hammer	(2)
		2-5-ACRA1 2-5-ACRA2	G.E. HFA Pan. ACRA1,2	(3)
		2-5A6-LCTA 2-5A6-LCTB	G.E. HFA Pan. NSR	(3,4)
		All Others		CA(2)
2-HV-ACFD-1 2-HV-ACFD-2 2-HV-ACFD-3	12-98997-8			OA(5)

- (1) General Electric type SB-1 control switches, Cutler Hammer selector switches, Namco limit switches, and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of these contacts could cause cycling of the system, however this is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See Load Conservation G.4 form, for 2-5A6-LCTA and 2-5A6-LCTB
- (5) These dampers could close due to relay chatter in the Halon system. A step is included in the Operations Department Procedure, Response to a Design Basis Earthquake, to verify that these dampers have not closed.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Atty 6 / Date 5-12-95
Reviewed by John Bellack / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Miscellaneous HVAC

Page 3 of 3

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Hydrogen Skimmer Fans	2-98266-27	Manual Control Switches	G.E. SB-1	NV(1)
2-HV-CEQ1		Thermal Overloads	Cutler Hammer	NV(1)
2-HV-CEQ2		2-CIB-A-AUX	G.E. HFA	(3)
		2-CIB-B-AUX	Pan. SSR	
		2-CIB-A-AUX1	C.H. M600	(3)
		2-CIB-B-AUX1	Pan. SSR	
		2-K619-A (B)		(3,4)
		All Others		CA(2)
ESS Area Fans		Manual Control Switches	G.E. SB-1	NV(1)
2-HV-AES1		Thermal Overloads	Cutler Hammer	NV(1)
2-HV-AES2		SWGR Aux Contacts	ITE	NV(1)
		All Others		CA(2)
AES Fan Filters		Manual Control Switches	G.E. SB-1	NV(1)
		2-5X-AES1D	Cutler Hammer	
		2-5X-AES2D		CA(5)

- (1) General Electric type SB-1 switches, Cutler Hammer selector switches, ITE switchgear auxiliary contacts and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of these contacts could cause momentary cycling of the fans which is acceptable.
- (3) Capacity > demand, see Appendix E.
- (4) See SSPS G.4 form for 2-K619-A and 2-K619-B.
- (5) Chatter of these contacts would not cause the filter to be bypassed.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by R. G. Hark / Date 5-12-95
Reviewed by John B. Hark / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Instrumentation

Page 1 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Steam Generator	2-98573-34	Selector Switches	CH 10250T	NV(1)
Wide Range Level	2-985831-4			
2-BLI-110	2-985832-4	2-43X-BLI-110	CH Powereed	(2)
2-BLI-120		2-43X-BLI-120	2-LSI-1,2	
2-BLI-130		2-43X-BLI-130		
2-BLI-140		2-43X-BLI-140		
		Test Switches	C & K 7401	NV(1)
		All Other Devices		NV(3)
Condensate Storage	2-984261-1	Test Switches	C & K 7401	NV(1)
Tank Level	2-985741-5			
2-CLI-113		All Other Devices		NV(3)
2-CLI-114				
Aux Feedwater to	2-985742-3	Test Switches	C & K 7401	NV(1)
Steam Gen Flow	2-984521-5			
2-FFI-210	2-985791-3	All Other Devices		NV(3)
2-FFI-220	2-985522-4			
2-FFI-230				
2-FFI-240				
RHR Heat Exchanger	2-985672-2	Test Switches	C & K 7401	NV(1)
Discharge Flow				
2-IFI-310		All Other Devices		NV(3)
2-IFI-311				
2-IFI-320				
2-IFI-321				

- (1) The Cutler Hammer 10250T selector switches and the C&K test switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Devices are solidstate, and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stab / Date 5-12-95
Reviewed by Jerry Bell / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Instrumentation

Page 2 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Boron Injection	2-985671-3	Test Switches	C & K 7401	NV(1)
Tank Flow				
2-IFI-51		All Other Devices		NV(2)
2-IFI-52				
2-IFI-53				
2-IFI-54				
RHR Return Flow	2-985662-4	Test Switches	C & K 7401	NV(1)
2-IFI-335				
		All Other Devices		NV(2)
RWST Level	2-985675-4	Test Switches	C & K 7401	NV(1)
2-ILS-950	2-985676-4			
2-ILS-951	2-985792-4	All Others		NV(2)
	2-985522-4			
RHR Loop Return Temperature	2-985661-4	All Devices		NV(2)
2-ITR-335				

(1) The C&K 7401 test switches are rugged.

(2) Devices are solidstate, and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

CA - Chatter acceptable.
NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
GERS - Seismically adequate based on GERS ____; include GERS number.
NA - Component not affected by relays.
CR - Corrective Action Required.
OA - Operator Action.
- - No entry necessary.

Prepared by RGH Date 5-12-95
Reviewed by John Bell Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Instrumentation

Page 3 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Steam Generator	2-985753-4	Test Switches	C & K 7401	NV(1)
Pressure	2-985763-5			
2-MPP-210	2-985843-3	All Other Devices		NV(3)
2-MPP-212	2-985844-4			
2-MPP-220				
2-MPP-222				
2-MPP-230				
2-MPP-232				
2-MPP-240				
2-MPP-242				
Pressurizer Level	2-98573-34	Selector Switch	CH 10250T	NV(1)
2-NLI-151	2-985541-3	2-43X-NLI-151	CH Powereed 2-LSI-3	(2)
		Test Switches	C & K 7401	NV(1)
		All Other Devices		NV(3)

- (1) Cutler Hammer 10250T selector switches and C&K test switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Devices are solidstate and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DC Stebbins Date 5-12-95
Reviewed by Jen Bittman Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Instrumentation

Page 4 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Pressurizer Level	2-985501-6	Test Switches	C & K 7401	NV(1)
2-NLP-151	2-985511-3			
2-NLP-152	2-985521-5	All Other Devices		NV(2)
2-NLP-153				
Pressurizer	2-985501-6	Test Switches	C & K 7401	NV(1)
Pressure	2-985511-3			
2-NPP-151	2-985521-5	All Other Devices		NV(2)
2-NPP-152				
2-NPP-153				
Reactor Coolant	2-98573-34	Selector Switch	Cutler Hammer	NV(1)
Wide Range Pressure	2-985742-3			
2-NPS-121	2-985711-5	2-43X-NPS-122	CH Powereed	(3)
2-NPS-122	2-985792-4		2-LSI-3	
		Test Switches	C & K 7401	NV(1)
		All Other Devices		NV(2)
Nuclear Instrumentation	2-98524-2	All Relays	Gamma Metrics	(3)
2-NRI-21			SWR, NIS,	
2-NRI-23			N-21 Rack,	
			N-23 Rack	
		All Other Devices		NV(2)

- (1) Cutler Hammer 10250T selector switches and C&K test switches are rugged.
- (2) Devices are solidstate and therefore not vulnerable.
- (3) Capacity > demand, see Appendix E.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Atch / date 5-12-95
Reviewed by Jim Bell / date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Instrumentation

Page 5 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Reactor Coolant	2-985421-3	Test Switches	C & K 7401	NV(1)
Wide Range Temp	2-985422-4			
2-NTR-110	2-98592-5	Sliding Link	Multiamp	NV(1)
2-NTR-120				
2-NTR-130		All Other Devices		NV(2)
2-NTR-140				
2-NTR-210				
2-NTR-220				
2-NTR-230				
2-NTR-240				
Containment Press	2-985931-3	Test Switches	C & K 7401	NV(1)
2-PPP-301	2-985932-6			
2-PPP-302	2-985793-5			
2-PPP-303				
		All Other Devices		NV(2)

- (1) C&K test switches and Multiamp sliding link terminal blocks are rugged.
- (2) Devices are solidstate and therefore not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS _____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Theob / Date 5-12-95
Reviewed by Jon Ballant / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Instrumentation

Page 6 of 6

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
RCP Seal Water	2-985621-5	Test Switches	C & K 7401	NV(1)
Injection Flow	2-985622-4			
2-QFA-210	2-985631-4	All Other Devices		NV(2)
2-QFA-220	2-985632-4			
2-QFA-230				
2-QFA-240				
Charging Pump	2-98573-34	Selector Switch	CH 10250T	NV(1)
Discharge Flow	2-985542-6			
2-QFI-200		2-43X-QFI-200	CH Powereed 2-LSI-3	(3)
		Test Switches	C & K 7401	NV(1)
		All Other Devices		NV(2)
Volume Control	2-985561-4	Test Switches	C & K 7401	NV(1)
Tank Level				
2-QLC-451		All Other Devices		NV(2)
2-QLC-452				

- (1) Cutler Hammer 10250T selector switches and C&K test switches are rugged.
- (2) Devices are solidstate and therefore not vulnerable.
- (3) Capacity > demand, see Appendix E.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Stueb / Date 5-12-95
Reviewed by Jim Betta / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Reactor Coolant/Pressurizer

Page 1 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Pressurizer MOVs	2-98204-23	Manual Control	G.E. SB-1	NV(1)
2-NMO-151		Switches		
2-NMO-152				
2-NMO-153		Valve Limit Switches	Limitorque	NV(1)
		Thermal Overloads	Cutler Hammer	NV(1)
		MCC Contactor and aux contacts	Cutler Hammer	(2)
RCP Seal Water AOVs	2-98201-8	Manual Control	G.E. SB-1	NV(1)
2-QRV-10		Switches		
2-QRV-20				
2-QRV-30		Limit Switches	Namco	NV(1)
2-QRV-40				
2-QRV-150				

- (1) General Electric type SB-1 control switches, Limitorque limit and torque switches, Namco limit switches, and Cutler Hammer thermal overloads are rugged.
- (2) MCC contactors and auxiliary contacts which would tend to drive the valve to its desired position are chatter acceptable. MCC contactors which would tend to drive the valve to an undesired position are considered to be essential, and their capacity > demand (see Appendix E).

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Steep Date 5-12-95
Reviewed by John Bollich Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Reactor Coolant/Pressurizer

Page 2 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Pressurizer AOVs	2-98204-23	Manual Control Switches	G.E. SB-1	NV(1)
2-NRV-151				
2-NRV-152				
2-NRV-153		Limit Switches	Namco	NV(1)
		All Others		CA(2)
Head Vent Valves	2-98307-6	Manual Control Switches	Cutler Hammer	NV(1)
2-NSO-21				
2-NSO-22				
2-NSO-23				
2-NSO-24				
2-NSO-61				
2-NSO-62				
2-NSO-63				
2-NSO-64				
2-NRV-163	2-985531-6	Control Switch	G.E. SB-1	NV(1)
2-NRV-164	2-985532-6	Test Switches	C&K 7401	NV(1)
		All Other Devices		NV(3)

- (1) General Electric type SB-1 switches, Namco limit switches, Cutler Hammer selector switches and C&K test switches are rugged.
- (2) Chatter of any other contacts will not prevent the valves from achieving their desired position.
- (3) Devices are solidstate and, therefore, not vulnerable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by DC Steh Date 5-12-95
Reviewed by Jean Bellack Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Steam Generator

Page 1 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
SG Blowdown Isolation Valves	2-98208-16	Manual Control Switches	G.E. SB-1	NV(1)
2-DCR-310				
2-DCR-320		Limit Switches	Namco	NV(1)
2-DCR-330				
2-DCR-340		All Others		CA(2)
SG PORVs	2-985841-3	Test Switches	C&K 7401	NV(1)
2-MRV-213	2-985842-3			
2-MRV-223		All Other Devices		NV(3)
2-MRV-233				
2-MRV-243				
SG Stop Valve Dump Valves	2-98538-11	Manual Control Switches	G.E. SB-1	NV(1)
2-MRV-211				
2-MRV-212		Limit Switches	Namco	NV(1)
2-MRV-221				
2-MRV-222		All Others		CA(4)
2-MRV-231				
2-MRV-232				
2-MRV-241				
2-MRV-242				

- (1) General Electric type SB-1 switches, Namco limit switches, and C&K test switches are rugged.
- (2) Chatter by other contacts could only close the valves, which is the desired state.
- (3) Devices are solidstate and, therefore, not vulnerable
- (4) Chatter by other contacts could temporarily open valves which is the desired state of the valves. Chatter could not prevent manual valve opening.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Stebbins Date 5-12-95
Reviewed by Joe Beltrami Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Steam Generator

Page 2 of 2

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
SG Stop Valve	2-98538-11	Manual Control	G.E. SB-1	NV(1)
Air Open Valves		Switches		
2-MMO-210				
2-MMO-220		Limit/Torque Switches	Limitorque	NV(1)
2-MMO-230				
2-MMO-240		Thermal Overload	Cutler Hammer	NV(1)
		MCC Contactor and Aux Contacts	Cutler Hammer	CA(2)
		All Others		CA(3)
SG Stop Valve	2-98538-11	Manual Control	G.E. SB-1	NV(1)
Drain Pot Valve		Switch		
2-DRV-407				
		All Others		CA(4)

- (1) General Electric type SB-1 control switches, Limitorque limit and torque switches and Cutler Hammer thermal overloads are rugged.
- (2) Chatter of the main contacts could cause slight mispositioning of the valve, however since there are redundant dump valves this is acceptable.
- (3) Chatter by any other contacts will not mispositions valves.
- (4) The valves normal position is open and the desired position is closed. Since the valve must be manually closed, either position at the conclusion of the DBE is acceptable.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RC Atch / Date 5-12-95
Reviewed by Jim Bettlach / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Nuclear Sampling

Page 1 of 1

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Nuclear Sampling	2-98463-12	Manual Control	G.E. SB-1	NV(1)
AOVs	2-98464-15	Switches		
2-NRV-101				
2-NRV-102		Limit Switches	Namco	NV(1)
2-NRV-103			Microswitch	
2-NRV-104			Telemecanique	
2-MRV-151		All Others		CA(2)
2-MRV-152				
2-MRV-153				
2-MRV-154				
2-MCR-251				
2-MCR-252				
2-MCR-253				
2-MCR-254				
2-DCR-301				
2-DCR-302				
2-DCR-303				
2-DCR-304				

- (1) General Electric type SB-1 control switches, Namco limit switches, Microswitch limit switches and Telemecanique limit switches are rugged.
- (2) Chatter of other contacts will not misposition valves or prevent the valves from achieving their desired position.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by RG Stealy / Date 5-12-95
Reviewed by John Bell / Date 5-17-95

A-46 RELAY SCREENING AND EVALUATION
FORM G.4 - RELAY TABULATION
PLANT Cook Nuclear Plant Unit 2

System Spent Fuel Pit Cooling

Page 1 of 1

Subsystem/Component	Ref Dwg(s)	Contact/Contact Group	Relay Type and Location	SAT*
Spent Fuel Pit Cooling Pump 12-PP-31S	12-98315-10	Manual Control Switches	G.E. SB-1	NV(1)
		2-5X3-T21C		(2,4)
		2-5A6-LCTA		
		All Others		CA(3)

- (1) General Electric type SB-1 control switches are rugged.
- (2) Capacity > demand, see Appendix E.
- (3) Chatter of any other contacts will not trip the pump, or prevent the pump from starting on demand. Note that pump is not required to start during the DBE.
- (4) See Load Conservation G.4 form for 2-5A6-LCTA
See Diesel Generator G.4 form for 2-5X3-T21C.

* Identify reason for Contact/Contact Group being satisfactory or unsatisfactory

- CA - Chatter acceptable.
- NV - Not vulnerable (mechanically-actuated contacts and solid state relays).
- GERS - Seismically adequate based on GERS ____; include GERS number.
- NA - Component not affected by relays.
- CR - Corrective Action Required.
- OA - Operator Action.
- - No entry necessary.

Prepared by D. C. Hub Date 5-12-95
Reviewed by Jen. Bell Date 5-17-95

APPENDIX C

ESSENTIAL RELAY LISTS

UNIT 1 ESSENTIAL RELAY LIST	PAGES 1-15
UNIT 2 ESSENTIAL RELAY LIST	PAGES 16-30

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-100CR-AB	EMERGENCY DIESEL GENERATOR 1-AB VOLTAGE REGULATOR AUTO BUILD UP RELAY
1-100CR-CD	EMERGENCY DIESEL GENERATOR 1-CD VOLTAGE REGULATOR AUTO BUILD UP RELAY
1-12-OSTA	EMERGENCY DIESEL GENERATOR 1-CD OVERSPEED TRIP RELAY
1-12-OSTB	EMERGENCY DIESEL GENERATOR 1-AB OVERSPEED TRIP RELAY
1-12-SPSA1	EMERGENCY DIESEL GENERATOR 1-CD OVERSPEED CONTROL 95% SPEED RELAY
1-12-SPSA2	EMERGENCY DIESEL GENERATOR 1-CD OVERSPEED CONTROL 80% SPEED RELAY
1-12-SPSB1	EMERGENCY DIESEL GENERATOR 1-AB OVERSPEED CONTROL 95% SPEED RELAY
1-12-SPSB2	EMERGENCY DIESEL GENERATOR 1-AB OVERSPEED CONTROL 80% SPEED RELAY
1-12X-SPSA2	EMERGENCY DIESEL GENERATOR 1-CD OVERSPEED CONTROL AUX RELAY
1-12X-SPSB2	EMERGENCY DIESEL GENERATOR 1-AB OVERSPEED CONTROL AUX RELAY
1-12X-TDFF	TURBINE DRIVEN AUXILIARY FEED PUMP PP-4 TRIP OVERSPEED LIMIT SWITCH AUXILIARY RELAY
1-19-1-DGAB	EMERGENCY DIESEL GENERATOR 1-AB STARTING AIR VALVE CONTROL RELAY
1-19-1-DGCD	EMERGENCY DIESEL GENERATOR 1-CD STARTING AIR VALVE CONTROL RELAY
1-19-DGAB	EMERGENCY DIESEL GENERATOR 1-AB STARTING AIR VALVE CONTROL RELAY
1-19-DGCD	EMERGENCY DIESEL GENERATOR 1-CD STARTING AIR VALVE CONTROL RELAY
1-1X-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB TRIP CONTROL AUXILIARY RELAY
1-1X-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD TRIP CONTROL AUXILIARY RELAY
1-20X-CCM-451-CL	RCP BEARING OIL COOLERS CCW RETURN HEADER CNTMT ISOL VLV CCM-451 STARTER CLOSE CONTACTOR
1-20X-CCM-452-CL	RC PPS BEARING OIL COOLERS CCW RET HDR TRAIN 'B' CNTMT ISOL VALVE CCM-452 STARTER CONTACTOR
1-20X-CCM-453-CL	RCP THERM BARR CCW OUTLET TR 'A' CNTMT ISOLATION VALVE CCM-453 STARTER CLOSE CONTACTOR
1-20X-CCM-454-CL	RCP THERMAL BARRIER CCW RETURN HDR TRAIN 'B' CNTMT ISOL VALVE CCM-454 STARTER CLOSE CONTACTOR
1-20X-CCM-458-CL	CCW TO RCP TRAIN 'A' CONTAINMENT ISOLATION VALVE CCM-458 STARTER CLOSE CONTACTOR
1-20X-CCM-459-CL	CCW TO REACTOR COOLANT PUMPS TRAIN 'B' CONTAINMENT ISOL VALVE CCM-459 STARTER CLOSE CONTACTOR
1-20X-CMO-410-CL	EAST CCW HEAT EXCHANGER CCW OUTLET SHUTOFF VALVE CMO-410 STARTER CLOSE CONTACTOR
1-20X-CMO-410-OP	EAST CCW HEAT EXCHANGER CCW OUTLET SHUTOFF VALVE CMO-410 STARTER OPEN CONTACTOR
1-20X-CMO-411-CL	CMPT COOLING WATER PUMPS SUCTION CROSSTIE SHUTOFF VALVE CMO-411 STARTER CLOSE CONTACTOR
1-20X-CMO-412-CL	CCW PUMPS DISCHARGE CROSSTIE SHUTOFF VALVE CMO-412 STARTER CLOSE CONTACTOR
1-20X-CMO-413-CL	CCW PUMPS SUCTION CROSSTIE TRAIN 'B' SHUTOFF VALVE CMO-413 STARTER CLOSE CONTACTOR
1-20X-CMO-414-CL	CCW PUMPS DISCHARGE CROSSTIE TRAIN 'B' SHUTOFF VALVE CMO-414 STARTER CLOSED CONTACTOR
1-20X-CMO-415-CL	CCW TO MISCELLANEOUS SERVICE SHUTOFF VALVE CMO-415 STARTER CLOSE CONTACTOR
1-20X-CMO-416-CL	CCW TO MISCELLANEOUS SERVICE TRAIN 'B' SHUTOFF VALVE CMO-416 STARTER CLOSE CONTACTOR
1-20X-CMO-419-OP	EAST RHR HEAT EXCHANGER CCW OUTLET SHUTOFF VALVE CMO-419 STARTER OPEN CONTACTOR
1-20X-CMO-420-CL	WEST CCW HEAT EXCHANGER OUTLET SHUTOFF VALVE CMO-420 STARTER CONTACTOR
1-20X-CMO-420-OP	WEST CCW HEAT EXCHANGER OUTLET SHUTOFF VALVE CMO-420 STARTER OPEN CONTACTOR
1-20X-CMO-429-OP	WEST RHR HEAT EXCHANGER CCW OUTLET SHUTOFF VALVE CMO-429 STARTER OPEN CONTACTOR
1-20X-FMO-211-CL	TURBINE DRIVEN AUX FEED PUMP DISCHARGE TO STEAM GEN CTRL VALVE FMO-211 STARTER CONTACTOR
1-20X-FMO-212-CL	AUXILIARY FEEDWATER CONTROL VALVE FMO-212 STARTER CLOSE CONTACTOR
1-20X-FMO-221-CL	TURBINE DRIVEN AUX FEED PUMP DISCHARGE TO STEAM GEN CTRL VALVE FMO-221 STARTER CONTACTOR
1-20X-FMO-222-CL	AUXILIARY FEEDWATER CONTROL VALVE FMO-222 STARTER CLOSE CONTACTOR
1-20X-FMO-231-CL	TURBINE DRIVEN AUX FEED PUMP DISCHARGE TO STEAM GEN CTRL VALVE FMO-231 STARTER CONTACTOR
1-20X-FMO-232-CL	AUXILIARY FEEDWATER CONTROL VALVE FMO-232 STARTER CLOSE CONTACTOR
1-20X-FMO-241-CL	TURBINE DRIVEN AUX FEED PUMP DISCHARGE TO STEAM GEN CTRL VALVE FMO-241 STARTER CONTACTOR
1-20X-FMO-242-CL	AUXILIARY FEEDWATER CONTROL VALVE FMO-242 STARTER CLOSE CONTACTOR
1-20X-ICM-111-OP	RHR CONTAINMENT ISOLATION VALVE ICM-111 STARTER OPEN CONTACTOR
1-20X-ICM-129-OP	RHR CONTAINMENT ISOLATION VALVE ICM-129 STARTER OPEN CONTACTOR
1-20X-ICM-250-OP	BORON INJECTION TANK TRAIN 'A' OUTLET CONTAINMENT ISOL VALVE ICM-250 STARTER OPEN CONTACTOR
1-20X-ICM-251-OP	BORON INJECTION CONTAINMENT ISOLATION VALVE ICM-251 STARTER OPEN CONTACTOR
1-20X-ICM-260-CL	SAFETY INJECTION CONTAINMENT ISOLATION VALVE ICM-260 STARTER CLOSE CONTACTOR
1-20X-ICM-265-CL	SOUTH SI PUMP DISCHARGE CONTAINMENT ISOLATION VALVE ICM-265 STARTER CLOSE CONTACTOR
1-20X-ICM-305-OP	RESIDUAL HEAT REMOVAL CONTAINMENT ISOLATION VALVE ICM-305 STARTER OPEN CONTACTOR
1-20X-ICM-306-OP	RESIDUAL HEAT REMOVAL CONTAINMENT ISOLATION VALVE ICM-306 STARTER OPEN CONTACTOR
1-20X-ICM-311-CL	RESIDUAL HEAT REMOVAL CONTAINMENT ISOLATION VALVE ICM-311 STARTER CLOSE CONTACTOR
1-20X-ICM-321-CL	RHR CONTAINMENT ISOLATION VALVE ICM-321 STARTER CLOSE CONTACTOR

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-20X-IMO-314-OP	RESIDUAL HEAT REMOVAL SHUTOFF VALVE IMO-314 STARTER OPEN CONTACTOR
1-20X-IMO-128-OP	RHR SHUTOFF VALVE IMO-128 STARTER OPEN CONTACTOR
1-20X-IMO-210-OP	EAST CNTMT SPRAY PUMP DISCHARGE SHUTOFF VALVE IMO-210 STARTER OPEN CONTACTOR
1-20X-IMO-211-OP	EAST CNTMT SPRAY PUMP DISCHARGE SHUTOFF VALVE IMO-211 STARTER OPEN CONTACTOR
1-20X-IMO-215-CL	EAST CONTAINMENT SPRAY PUMP SUCTION SHUTOFF VALVE IMO-215 STARTER CLOSE CONTACTOR
1-20X-IMO-220-OP	CONTAINMENT SPRAY SHUTOFF VALVE IMO-220 STARTER OPEN CONTACTOR
1-20X-IMO-221-OP	CONTAINMENT SPRAY SHUTOFF VALVE IMO-221 STARTER OPEN CONTACTOR
1-20X-IMO-225-CL	CONTAINMENT SPRAY SHUTOFF VALVE IMO-225 STARTER CLOSE CONTACTOR
1-20X-IMO-255-OP	BORON INJECTION TANK TRAIN 'A' INLET SHUTOFF VALVE IMO-255 STARTER OPEN CONTACTOR
1-20X-IMO-256-OP	BORON INJECTION TANK INLET SHUTOFF VALVE IMO-256 STARRTER OPEN CONTACTOR
1-20X-IMO-261-CL	REFUELING WATER STORAGE TANK SUPPLY SHUTOFF VALVE IMO-261 STARTER CLOSE CONTACTOR
1-20X-IMO-262-CL	REFUELING WATER STORAGE TANK SUPPLY SHUTOFF VALVE IMO-262 STARTER CLOSE CONTACTOR
1-20X-IMO-263-CL	REFUELING WATER STORAGE TANK SUPPLY SHUTOFF VALVE IMO-263 STARTER CLOSE CONTACTOR
1-20X-IMO-270-CL	SAFETY INJECTION SHUTOFF VALVE IMO-270 STARTER CLOSE CONTACTOR
1-20X-IMO-275-CL	SAFETY INJECTION SHUTOFF VALVE IMO-275 STARTER CLOSE CONTACTOR
1-20X-IMO-310-CL	RESIDUAL HEAT REMOVAL SHUTOFF VALVE IMO-310 STARTER CLOSE CONTACTOR
1-20X-IMO-315-OP	RHR SHUTOFF VALVE IMO-315 STARTER OPEN CONTACTOR
1-20X-IMO-316-CL	RHR SHUTOFF VALVE IMO-316 STARTER CLOSE CONTACTOR
1-20X-IMO-320-CL	WEST RHR PUMP SUCTION SHUTOFF VALVE IMO-320 STARTER CLOSE CONTACTOR
1-20X-IMO-324-OP	RESIDUAL HEAT REMOVAL SHUTOFF VALVE IMO-324 STARTER OPEN CONTACTOR
1-20X-IMO-325-OP	RHR SHUTOFF VALVE IMO-325 STARTER OPEN CONTACTOR
1-20X-IMO-326-CL	RHR SHUTOFF VALVE IMO-326 STARTER CLOSE CONTACTOR
1-20X-IMO-330-OP	EAST RHR TO UPPER CNTMT SPRAY SHUTOFF VALVE IMO-330 STARTER OPEN CONTACTOR
1-20X-IMO-331-OP	WEST RHR TO UPPER CONTAINMENT SPRAY SHUTOFF VALVE IMO-331 STARTER OPEN CONTACTOR
1-20X-IMO-340-OP	EAST RHR HX TO CHARGING PUMPS SUCTION SHUTOFF VALVE IMO-340 STARTER OPEN CONTACTOR
1-20X-IMO-350-OP	WEST RHR HEAT EXR OUTLET SI PUMP SUCTION SHUTOFF VALVE IMO-350 STARTER OPEN CONTACTOR
1-20X-IMO-360-OP	SAFETY INJECTION SHUTOFF VALVE IMO-360 STARTER OPEN CONTACTOR
1-20X-IMO-361-OP	SAFETY INJECTION SHUTOFF VALVE IMO-361 STARTER OPEN CONTACTOR
1-20X-IMO-362-OP	SAFETY INJECTION SHUTOFF VALVE IMO-362 STARTER OPEN CONTACTOR
1-20X-IMO-390-CL	RESIDUAL HEAT REMOVAL SHUTOFF VALVE IMO-390 STARTER CLOSE CONTACTOR
1-20X-IMO-51-CL	BORON INJECTION TO REACTOR COOLANT LOOP #1 SHUTOFF VALVE IMO-51 STARTER CLOSE CONTACTOR
1-20X-IMO-52-CL	BORON INJECTION TO REACTOR COOLANT LOOP #2 SHUTOFF VALVE IMO-52 STARTER CLOSE CONTACTOR
1-20X-IMO-53-CL	BORON INJECTION TO REACTOR COOLANT LOOP #3 SHUTOFF VALVE IMO-250 STARTER CLOSE CONTACTOR
1-20X-IMO-54-CL	BORON INJECTION TO REACTOR COOLANT LOOP #4 SHUTOFF VALVE IMO-54 STARTER CLOSE CONTACTOR
1-20X-MCM-221-CL	MAIN STEAM LEAD #2 TO AUX FEED PUMP TURB SHUTOFF VALVE MCM-221 STARTER CLOSE CONTACTOR
1-20X-MCM-231-CL	MAIN STEAM LEAD #3 TO AUX FEED PUMP TURB SHUTOFF VALVE MCM-231 STARTER CLOSE CONTACTOR
1-20X-NMO-151-CL	PRESSURIZER RELIEF VALVE UPSTREAM SHUTOFF VALVE NMO-151 STARTER CLOSE CONTACTOR
1-20X-NMO-152-CL	PRESSURIZER RELIEF VALVE UPSTREAM SHUTOFF VALVE NMO-152 STARTER CLOSE CONTACTOR
1-20X-NMO-153-CL	PRESSURIZER SHUTOFF VALVE NMO-153 STARTER CLOSE CONTACTOR
1-20X-QCM-250-CL	RCP SEAL WATER RETURN CONTAINMENT ISOLATION VALVE QCM-250 STARTER CLOSE CONTACTOR
1-20X-QCM-350-CL	RCP SEAL WATER RETURN CONTAINMENT ISOLATION VALVE QCM-350 STARTER CLOSE CONTACTOR
1-20X-QMO-225-CL	CVCS CHARGING SHUTOFF VALVE QMO-225 STARTER CLOSE CONTACTOR
1-20X-QMO-226-CL	CVCS CHARGING SHUTOFF VALVE QMO-226 STARTER CLOSE CONTACTOR
1-20X-QMO-410-OP	BORON MAKEUP CVCS SHUTOFF VALVE QMO-410 STARTER OPEN CONTACTOR
1-20X-QMO-451-CL	RC LETDOWN VCT TO CVCS CHARGING PUMPS SHUTOFF VALVE QMO-451 STARTER CLOSE CONTACTOR
1-20X-QMO-452-CL	CVCS LETDOWN SHUTOFF VALVE QMO-452 STARTER CLOSE CONTACTOR
1-20X-SEL	EAST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34E LEFT LIMIT SWITCH AUX RELAY
1-20X-SER	EAST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34E RIGHT LIMIT SWITCH AUX RELAY
1-20X-SIE-L	EAST ESW PUMP DISCHARGE STRAINER OME-34E STARTER INLET GATE STARTER LEFT CONTACTOR
1-20X-SIE-R	EAST ESW PUMP DISCHARGE STRAINER OME-34E INLET GATE STARTER RIGHT CONTACTOR
1-20X-SIW-L	WEST ESW PUMP DISCHARGE STRAINER OME-34W INLET GATE STARTER LEFT CONTACTOR
1-20X-SIW-R	WEST ESW PUMP DISCHARGE STRAINER OME-34W INLET GATE STARTER RIGHT CONTACTOR
1-20X-SOE-L	EAST ESW PUMP DISCHARGE STRAINER OME-34E OUTLET GATE STARTER LEFT CONTACTOR

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-20X-SOE-R	EAST PUMP DISCHARGE STRAINER OME-34-E OUTLET GATE STARTER RIGHT CONTACTOR
1-20X-SOW-L	WEST ESW PUMP DISCHARGE STRAINER OME-34W OUTLET GATE STARTER LEFT CONTACTOR
1-20X-SOW-R	WEST ESW PUMP DISCHARGE STRAINER OME-34W OUTLET GATE STARTER RIGHT CONTACTOR
1-20X-SWL	WEST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34-W LEFT LIMIT SWITCH AUX RELAY
1-20X-SWR	WEST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34-W LEFT LIMIT SWITCH AUX RELAY
1-20X-TDTV-CL	AUXILIARY FEED PUMP TURBINE TRIP AND THROTTLE VALVE QT-506 STARTER CONTACTOR
1-20X-WMO-701-CL	EAST ESW PUMP DISCHARGE SHUTOFF VALVE WMO-701 STARTER CLOSE CONTACTOR
1-20X-WMO-701-OP	EAST ESW PUMP DISCHARGE SHUTOFF VALVE WMO-701 STARTER OPEN CONTACTOR
1-20X-WMO-702-CL	ESW PUMP DISCHARGE SHUTOFF VALVE WMO-702 STARTER CLOSE CONTACTOR
1-20X-WMO-702-OP	WEST ESW PUMP DISCHARGE SHUTOFF VALVE WMO-702 STARTER OPEN CONTACTOR
1-20X-WMO-705-CL	WEST ESW SUPPLY HEADER CROSSTIE TO UNIT 2 SHUTOFF VALVE WMO-705 STARTER CLOSE CONTACTOR
1-20X-WMO-707-CL	EAST ESW SUPPLY HEADER CROSSTIE TO UNIT 2 SHUTOFF VALVE WMO-707 STARTER CLOSE CONTACTOR
1-20X-WMO-711-CL	EAST CNMT SPRAY HEAT EXCHANGER ESW INLET SHUTOFF VALVE WMO-711 STARTER CLOSE CONTACTOR
1-20X-WMO-713-OP	EAST CNMT SPRAY HEAT EXCHANGER ESW OUTLET SHUTOFF VALVE WMO-713 STARTER OPEN CONTACTOR
1-20X-WMO-715-CL	ESSENTIAL SERVICE WATER INLET SHUTOFF VALVE WMO-715 STARTER CLOSE CONTACTOR
1-20X-WMO-717-OP	ESSENTIAL SERVICE WATER OUTLET SHUTOFF VALVE WMO-717 STARTER OPEN CONTACTOR
1-20X-WMO-721-CL	WEST ESW SUPPLY HEADER TO AB EMER DSL HX SHUTOFF VALVE WMO-721 STARTER CLOSE CONTACTOR
1-20X-WMO-723-CL	EAST ESW SUPPLY HEADER TO AB EMER DSL HX SHUTOFF VALVE WMO-723 STARTER CLOSE CONTACTOR
1-20X-WMO-725-CL	LAST ESW SUPPLY HEADER TO CD EMER DSL HX SHUTOFF VALVE WMO-725 STARTER CLOSE CONTACTOR
1-20X-WMO-727-CL	WEST ESW SUPPLY HEADER TO CD EMER DSL HX SHUTOFF VALVE WMO-727 STARTER CLOSE CONTACTOR
1-20X-WMO-731-CL	EAST COMPONENT CLG WATER HX ESW INLET SHUTOFF VALVE WMO-731 STARTER CLOSE CONTACTOR
1-20X-WMO-733-CL	CCW HEAT EXCHANGER ESW OUTLET SHUTOFF VALVE WMO-733 STARTER CLOSE CONTACTOR
1-20X-WMO-733-OP	EAST CCW HEAT EXCHANGER ESW OUTLET SHUTOFF VALVE WMO-733 STARTER OPEN CONTACTOR
1-20X-WMO-735-CL	ESSENTIAL SERVICE WATER INLET SHUTOFF VALVE WMO-735 STARTER CLOSE CONTACTOR
1-20X-WMO-737-CL	ESSENTIAL SERVICE WATER OUTLET SHUTOFF VALVE WMO-737 STARTER CLOSE CONTACTOR
1-20X-WMO-737-OP	ESSENTIAL SERVICE WATER OUTLET SHUTOFF VALVE WMO-737 STARTER OPEN CONTACTOR
1-20X-WMO-744-OP	ESSENTIAL SERVICE WATER TO WEST MDAFP SHUTOFF VALVE WMO-744 STARTER OPEN CONTACTOR
1-20X-WMO-753-OP	ESSENTIAL SERVICE WATER TO TDAFP SHUTOFF VALVE WMO-753 STARTER CONTACTOR
1-20X-WMO-754-OP	ESW TO EAST MDAFP SHUTOFF VALVE WMO-754 STARTER OPEN CONTACTOR
1-23X2-DGAB	AB EMERGENCY DIESEL GENERATOR ROOM CO2 SYSTEM HAZARD #2 AUXILIARY ALARM RELAY #2
1-23X2-DGCD	CD EMERGENCY DIESEL GENERATOR ROOM CO2 SYSTEM HAZARD #1 AUXILIARY ALARM RELAY #2
1-27X-T11A	4KV BUS T11A UNDERVOLTAGE AUXILIARY RELAY
1-27X-T11B	4KV BUS T11B UNDERVOLTAGE AUXILIARY RELAY
1-27X-T11C	4KV BUS T11C UNDERVOLTAGE AUXILIARY RELAY
1-27X-T11D	4KV BUS T11D UNDERVOLTAGE AUXILIARY RELAY
1-33X-WMO-721	WEST ESW SUPPLY HEADER TO AB EDG HEAT EXR SHUTOFF VALVE WMO-721 LIMIT SWITCH AUX RELAY
1-33X-WMO-723	EAST ESW SUP HDR TO EMER DSL AB HX SHUTOFF VALVE WMO-723 LIMIT SWITCH AUXILIARY RELAY
1-33X-WMO-725	EAST ESW SUP HDR TO EMER DSL CD HX SHUTOFF VALVE WMO-725 LIMIT SWITCH AUXILIARY RELAY
1-33X-WMO-727	WEST ESW SUPPLY HEADER TO CD EDG HEAT EXR SHUTOFF VALVE WMO-727 LIMIT SWITCH AUX RELAY
1-4-TDTV	TURBINE DRIVEN AUXILIARY FEED PUMP PP-4 TRIP AND THROTTLE VALVE QT-506 START AUXILIARY RELAY
1-42-2-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #2
1-42-2-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #2
1-42-3-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #3
1-42-3-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #3
1-42-4-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #4
1-42-4-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #4
1-42-5-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #5
1-42-5-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #5
1-42-6-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #6
1-42-6-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #6
1-42-7-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #7
1-42-7-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #7
1-42-8-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #8

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-42-8-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #8
1-43X-BLI-110	SG #1 WIDE RANGE LEVEL TRANSMITTER REMOTE/LOCAL INDICATION SELECTOR SWITCH AUXILIARY RELAY
1-43X-BLI-120	SG #2 WIDE RANGE LEVEL TRANSMITTER REMOTE/LOCAL INDICATION SELECTOR SWITCH AUXILIARY RELAY
1-43X-BLI-130	SG #3 WIDE RANGE LEVEL TRANSMITTER REMOTE/LOCAL INDICATION SELECTOR SWITCH AUXILIARY RELAY
1-43X-BLI-140	SG #4 WIDE RANGE LEVEL TRANSMITTER REMOTE/LOCAL INDICATION SELECTOR SWITCH AUXILIARY RELAY
1-43X-DGABCT	AB EMERGENCY DIESEL GENERATOR CONTROL SELECTOR SWITCH 43-DGABCT AUXILIARY RELAY
1-43X-DGCDCT	CD EMERGENCY DIESEL GENERATOR CONTROL SELECTOR SWITCH 43-DGCDCT AUXILIARY RELAY
1-43X-NLI-151	PRESSURIZER LEVEL TRANSMITTER REMOTE/LOCAL INDICATION SELECTOR SWITCH AUXILIARY RELAY
1-43X-NPS-122	RC LOOP #1 HOT LEG WR PRESS TRANS REMOTE/LOCAL INDICATION SELECTOR SWITCH AUX RELAY
1-43X-QFI-200	CVCS CHARGING PUMPS DISCHARGE FLOW TRANS REMOTE/LOCAL INDICATION SEL SWITCH AUX RELAY
1-43X1-DGABCT	AB EMERGENCY DIESEL GENERATOR CONTROL SELECTOR SWITCH 43-DGABCT AUXILIARY RELAY
1-43X1-DGCDCT	CD EMERGENCY DIESEL GENERATOR CONTROL SELECTOR SWITCH 43-DGCDCT AUXILIARY RELAY
1-43X1-DGSAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB SLOW START RELAY #1
1-43X1-DGSCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD SLOW START RELAY #1
1-43X3-DGSAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB SLOW START RELAY #3
1-43X3-DGSCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD SLOW START RELAY #3
1-43X4-DGSAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB SLOW START RELAY #4
1-43X4-DGSCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD SLOW START RELAY #4
1-5-ACRA1	CONTROL ROOM VENTILATION NORTH AIR CONDITIONING UNIT HV-ACRA-1 TRIP AND LOCKOUT RELAY
1-5-ACRA2	CONTROL ROOM VENTILATION SOUTH AIR CONDITIONING UNIT HV-ACRA-2 TRIP AND LOCKOUT RELAY
1-5-TA2	WEST MOTOR DRIVEN AUXILIARY FEED PUMP SUPPLY BREAKER T11A2 LOCKOUT RELAY
1-5-TA4	WEST RESIDUAL HEAT REMOVAL PUMP SUPPLY BREAKER T11A4 LOCKOUT RELAY
1-5-TA5	WEST ESW PUMP SUPPLY BREAKER T11A5 LOCKOUT RELAY
1-5-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11A7 BLOCKING RELAY
1-5-TA8	WEST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T11A8 LOCKOUT RELAY
1-5-TD10	EAST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T11D10 LOCKOUT RELAY
1-5-TD11	EAST MOTOR DRIVEN AUXILIARY FEED PUMP SUPPLY BREAKER T11D11 LOCKOUT RELAY
1-5-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11D3 BLOCKING RELAY
1-5-TD6	EAST RESIDUAL HEAT REMOVAL PUMP SUPPLY BREAKER T11D6 LOCKOUT RELAY
1-5-TD7	EAST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T11D7 LOCKOUT RELAY
1-50/50N-TA2	WEST MOTOR DRIVEN AUX FEED PUMP SUPPLY BREAKER T11A2 NEUTRAL INST OVERCURRENT RELAY
1-50/50N-TA5	WEST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T11A5 NEUTRAL INST OVERCURRENT RELAY
1-50/50N-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11A7 NEUTRAL INST OVERCURRENT RELAY
1-50/50N-TA8	WEST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T11A8 NEUTRAL INST OVERCURRENT RELAY
1-50/50N-TD10	EAST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T11D10 NEUTRAL INST OVERCURRENT RELAY
1-50/50N-TD11	EAST MOTOR DRIVEN AUX FEEDWATER PUMP SUPPLY BREAKER T11D11 NEUTRAL INST OVERCURRENT RELAY
1-50/50N-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11D3 NEUTRAL INST OVERCURRENT RELAY
1-50/50N-TD7	EAST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T11D7 NEUTRAL INST OVERCURRENT RELAY
1-50N-T11A	TRANSFORMER TR11A 4KV SIDE NEUTRAL GROUND INST OVERCURRENT RELAY
1-50N-T11B	TRANSFORMER TR11B 4KV BUS T11B SIDE NEUTRAL GROUND INST OVERCURRENT RELAY
1-50N-T11C	600V BUS 11C SUPPLY TRANSFORMER TR11C 4KV BUS T11C SIDE NEUT GROUND INST OVERCURRENT RELAY
1-50N-T11D	TRANSFORMER TR11D 4KV SIDE NEUTRAL GROUND INST OVERCURRENT RELAY
1-51-DGAB-1	AB EMERGENCY DIESEL GENERATOR OME-150-AB PHASE #1 OVERCURRENT RELAY
1-51-DGAB-3	AB EMERGENCY DIESEL GENERATOR OME-150-AB PHASE #3 OVERCURRENT RELAY
1-51-DGCD-1	CD EMERGENCY DIESEL GENERATOR OME-150-CD PHASE #1 TIME OVERCURRENT RELAY
1-51-DGCD-3	CD EMERGENCY DIESEL GENERATOR OME-150-CD PHASE #3 TIME OVERCURRENT RELAY
1-51-T11A-1	TRANSFORMER TR11A 4KV SIDE PHASE #1 OVERCURRENT RELAY
1-51-T11A-3	TRANSFORMER TR11A 4KV SIDE PHASE #3 OVERCURRENT RELAY
1-51-T11B-1	TRANSFORMER TR11B 4KV SIDE PHASE #1 TIME OVERCURRENT RELAY
1-51-T11B-3	TRANSFORMER TR11B 4KV SIDE PHASE #3 TIME OVERCURRENT RELAY
1-51-T11C-1	TRANSFORMER TR11C 4KV SIDE PHASE #1 TIME OVERCURRENT RELAY
1-51-T11C-3	TRANSFORMER TR11C 4KV SIDE PHASE #3 TIME OVERCURRENT RELAY
1-51-T11D-1	TRANSFORMER TR11D 4KV SIDE PHASE #1 TIME OVERCURRENT RELAY

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-51-T11D-3	TRANSFORMER TR11D 4KV SIDE PHASE #3 TIME OVERCURRENT RELAY
1-51-TA11-1	4KV BUS T11A EMERGENCY FEED PHASE #1 TIME OVERCURRENT RELAY
1-51-TA11-3	4KV BUS T11A EMERGENCY FEED PHASE #3 TIME OVERCURRENT RELAY
1-51-TA2	WEST MOTOR DRIVEN AUXILIARY FEED PUMP SUPPLY BREAKER T11A2 TIME OVERCURRENT TRIP RELAY
1-51-TA5	WEST ESW PUMP SUPPLY BREAKER T11A5 TIME OVERCURRENT RELAY
1-51-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11A7 TIME OVERCURRENT TRIP RELAY
1-51-TA8	WEST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T11A8 TIME OVERCURRENT TRIP RELAY
1-51-TD10	EAST ESW PUMP SUPPLY BREAKER T11D10 TIME OVERCURRENT RELAY
1-51-TD11	EAST MOTOR DRIVEN AUXILIARY FEED PUMP SUPPLY BREAKER T11D11 TIME OVERCURRENT RELAY
1-51-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11D3 TIME OVERCURRENT TRIP RELAY
1-51-TD7	EAST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T11D7 TIME OVERCURRENT TRIP RELAY
1-51-TD8-1	4KV BUS T11D EMERGENCY FEED PHASE #1 TIME OVERCURRENT RELAY
1-51-TD8-3	4KV BUS T11D EMERGENCY FEED PHASE #3 TIME OVERCURRENT RELAY
1-51-X-TD8	4KV BUS T11D EMERGENCY FEED OVERCURRENT LOCKOUT HAND RESET RELAY
1-51N-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB NEUTRAL GROUND OVERCURRENT RELAY
1-51N-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD NEUTRAL GROUND OVERCURRENT RELAY
1-51N-T11B	TRANSFORMER TR11B NEUTRAL GROUND OVERCURRENT RELAY
1-51N-T11C	TRANSFORMER TR11C NEUTRAL GROUND OVERCURRENT RELAY
1-51X-TA11	4KV BUS T11A EMERGENCY FEED OVERCURRENT LOCKOUT HAND RESET RELAY
1-52Y-TA11	EMERGENCY DIESEL GENERATOR 1-AB SUPPLY BREAKER T11A11 ANTIPUMP RELAY
1-52Y-TA2	WEST MOTOR DRIVEN AUX FEEDWATER PUMP SUPPLY BREAKER T11A2 ANTIPUMP RELAY
1-52Y-TA5	WEST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T11A5 ANTIPUMP RELAY
1-52Y-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11A7 ANTIPUMP RELAY
1-52Y-TB4	EMERGENCY DIESEL GENERATOR 1-AB SUPPLY BREAKER T11B4 ANTIPUMP RELAY
1-52Y-TC3	EMERGENCY DIESEL GENERATOR 1-CDSUPPLY BREAKER T11C3 ANTIPUMP RELAY
1-52Y-TD10	EAST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T11D10 ANTIPUMP RELAY
1-52Y-TD11	EAST MOTOR DRIVEN AUX FEEDWATER PUMP SUPPLY BREAKER T11D11 ANTIPUMP RELAY
1-52Y-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11D3 ANTIPUMP RELAY
1-52Y-TD8	EMERGENCY DIESEL GENERATOR 1-CD PUMP SUPPLY BREAKER T11D8 ANTIPUMP RELAY
1-53-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB FIELD FLASHING CIRCUIT CONTACTOR
1-53-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD FIELD FLASHING CIRCUIT CONTACTOR
1-59-TA2-1	4KV CIRCUIT BREAKER T11A2 PHASE #1 VOLTAGE AVAILABLE RELAY
1-59-TA2-2	4KV CIRCUIT BREAKER T11A2 PHASE #2 VOLTAGE AVAILABLE RELAY
1-59-TA2-3	4KV CIRCUIT BREAKER T11A2 PHASE #3 VOLTAGE AVAILABLE RELAY
1-59-TA5-1	4KV CIRCUIT BREAKER T11A5 PHASE #1 VOLTAGE AVAILABLE RELAY
1-59-TA5-2	4KV CIRCUIT BREAKER T11A5 PHASE #2 VOLTAGE AVAILABLE RELAY
1-59-TA5-3	4KV CIRCUIT BREAKER T11A5 PHASE #3 VOLTAGE AVAILABLE RELAY
1-59-TA7-1	4KV CIRCUIT BREAKER T11A7 PHASE #1 VOLTAGE AVAILABLE RELAY
1-59-TA7-2	4KV CIRCUIT BREAKER T11A7 PHASE #2 VOLTAGE AVAILABLE RELAY
1-59-TA7-3	4KV CIRCUIT BREAKER T11A7 PHASE #3 VOLTAGE AVAILABLE RELAY
1-59-TD10-1	4KV CIRCUIT BREAKER T11D10 PHASE #1 VOLTAGE AVAILABLE RELAY
1-59-TD10-2	4KV CIRCUIT BREAKER T11D10 PHASE #2 VOLTAGE AVAILABLE RELAY
1-59-TD10-3	4KV CIRCUIT BREAKER T11D10 PHASE #3 VOLTAGE AVAILABLE RELAY
1-59-TD11-1	4KV CIRCUIT BREAKER T11D11 PHASE #1 VOLTAGE AVAILABLE RELAY
1-59-TD11-2	4KV CIRCUIT BREAKER T11D11 PHASE #2 VOLTAGE AVAILABLE RELAY
1-59-TD11-3	4KV CIRCUIT BREAKER T11D11 PHASE #3 VOLTAGE AVAILABLE RELAY
1-59-TD3-1	4KV CIRCUIT BREAKER T11D3 PHASE #1 VOLTAGE AVAILABLE RELAY
1-59-TD3-2	4KV CIRCUIT BREAKER T11D3 PHASE #2 VOLTAGE AVAILABLE RELAY
1-59-TD3-3	4KV CIRCUIT BREAKER T11D3 PHASE #3 VOLTAGE AVAILABLE RELAY
1-5A10	WEST TURBINE AUX COOLING WATER PUMP SUPPLY BREAKER 11A10 AUXILIARY LOCKOUT RELAY
1-5A13-LCTA	CD EMERGENCY DIESEL GENERATOR OME-150-CD LOAD CONSERVATION TRIP RELAY
1-5A6-LCTA	CD EMERGENCY DIESEL GENERATOR OME-150-CD LOAD CONSERVATION TRIP RELAY #6
1-5A6-LCTB	AB EMERGENCY DIESEL GENERATOR OME-150-AB LOAD CONSERVATION TRIP RELAY #6

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-5B10	600V CIRCUIT BREAKER 11B10 AUXILIARY LOCKOUT RELAY
1-5B12	600V CIRCUIT BREAKER 11B12 AUXILIARY LOCKOUT RELAY
1-5B6	600V CIRCUIT BREAKER 11B6 AUXILIARY LOCKOUT RELAY
1-5C17	600V CIRCUIT BREAKER 11C17 AUXILIARY LOCKOUT RELAY
1-5C4	600V CIRCUIT BREAKER 11C4 AUXILIARY LOCKOUT RELAY
1-5X-AB	AB EMERGENCY DIESEL GENERATOR OME-150-AB TRIP CONT AUXILIARY RELAY
1-5X-CD	CD EMERGENCY DIESEL GENERATOR OME-150-CD TRIP CONTROL AUXILIARY RELAY
1-5X1-T11A	4KV BUS T11A MASTER LOAD SHEDDING RELAY
1-5X1-T11B	4KV BUS T11B MASTER LOAD SHEDDING RELAY
1-5X2-T11A	4KV BUS T11A MASTER LOAD SHEDDING RELAY
1-5X2-T11D	4KV BUS T11D MASTER LOAD SHEDDING RELAY
1-5X3-T11A	4KV BUS T11A MASTER LOAD SHEDDING RELAY
1-5X3-T11C	4KV BUS T11C MASTER LOAD SHEDDING RELAY
1-5X3-T11D	4KV BUS T11D MASTER LOAD SHEDDING RELAY
1-5X5-T11A	4KV BUS T11A MASTER LOAD SHEDDING RELAY
1-5X5-T11C	4KV BUS T11C MASTER LOAD SHEDDING RELAY
1-5X5-T11D	4KV BUS T11D MASTER LOAD SHEDDING RELAY
1-5X6-T11D	4KV BUS T11D MASTER LOAD SHEDDING RELAY
1-5X7-T11A	4KV BUS T11A MASTER LOAD SHEDDING RELAY
1-5Y-LCTA	CD EMERGENCY DIESEL GENERATOR OME-150-CD LOAD CONSERVATION TRIP RELAYS CONTACTOR
1-5Y-LCTB	AB EMERGENCY DIESEL GENERATOR OME-150-AB LOAD CONSERVATION TRIP RELAYS CONTACTOR
1-6-1-DGAB	EMERGENCY DIESEL GENERATOR 1-AB STARTING RELAY
1-6-1-DGCD	EMERGENCY DIESEL GENERATOR 1-CD STARTING RELAY
1-6-2-DGAB	EMERGENCY DIESEL GENERATOR 1-AB STARTING RELAY
1-6-2-DGCD	EMERGENCY DIESEL GENERATOR 1-CD STARTING RELAY
1-6-3-DGAB	EMERGENCY DIESEL GENERATOR 1-AB STARTING RELAY
1-6-3-DGCD	EMERGENCY DIESEL GENERATOR 1-CD STARTING RELAY
1-6-DGAB	EMERGENCY DIESEL GENERATOR 1-AB STARTING RELAY
1-6-DGCD	EMERGENCY DIESEL GENERATOR 1-CD STARTING RELAY
1-62-1-DGAB	AB EMERGENCY DIESEL INCOMPLETE START (CRANKING TIME LIMIT) TIME DELAY RELAY
1-62-1-DGCD	CD EMERGENCY DIESEL INCOMPLETE START (CRANKING TIME LIMIT) TIME DELAY RELAY
1-62-1X-DGAB	AB EMERGENCY DIESEL INCOMPLETE START AUXILIARY RELAY
1-62-1X-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD INCOMPLETE START AUXILIARY RELAY
1-62-2-DGAB	AB EMERGENCY DIESEL STARTING AIR JET ASSIST CONTROL VALVE XRV-220 CONTROL TIME DELAY RELAY
1-62-2-DGCD	CD EMERGENCY DIESEL STARTING AIR JET ASSIST CONTROL VALVE XRV-225 CONTROL TIME DELAY RELAY
1-62-2-DGSAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB STARTING RELAY #2
1-62-2-DGSCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD STARTING RELAY #2
1-62-2X-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB TRIP CONTROL AUXILIARY RELAY TIME DELAY RELAY
1-62-2X-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD TRIP CONTROL AUXILIARY RELAY TIME DELAY RELAY
1-62-BOS-B12	SOUTH NON-ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER 11B12 BLACKOUT SEQUENTIAL TIMING RELAY
1-62-BOS-C17	NORTH NON-ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER 11C17 BLACKOUT SEQUENTIAL TIMING RELAY
1-62-BOS-TA2	WEST MOTOR DRIVEN AUX FEED PUMP SUPPLY BREAKER T11A2 BLACKOUT SEQUENTIAL TIME DELAY RELAY
1-62-BOS-TA5	WEST ESW PUMP SUPPLY BREAKER T11A5 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
1-62-BOS-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11A7 BLACKOUT TIME DELAY RELAY
1-62-BOS-TD10	EAST ESW PUMP SUPPLY BREAKER T11D10 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
1-62-BOS-TD11	EAST MOTOR DRIVEN AUX FEED PUMP SUPPLY BREAKER T11D11 BLACKOUT SEQUENTIAL TIME DELAY RELAY
1-62-BOS-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11D3 BLACKOUT TIME DELAY RELAY
1-62-CS-TA3	4KV CIRCUIT BREAKER T11A3 CONTAINMENT ISOLATION PHASE 'B' RESET TIME DELAY RELAY
1-62-CS-TD4	4KV CIRCUIT BREAKER T11D4 CONTAINMENT ISOLATION PHASE 'B' RESET TIME DELAY RELAY
1-62-S1E	EAST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34E OPERATION TIME DELAY RELAY
1-62-S1W	WEST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34W OPERATION TIME DELAY RELAY
1-62-SIS-B12	SOUTH NON-ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER 11B12 SI SEQUENTIAL TIMING RELAY
1-62-SIS-C17	NORTH NON-ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER 11C17 SI SEQUENTIAL TIMING RELAY

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-62-SIS-TA1	SOUTH SAFETY INJECTION PUMP SUPPLY BREAKER T11A1 SEQUENTIAL TIMING RELAY
1-62-SIS-TA2	WEST MTR DRIVEN AUX FEED PUMP SUPPLY BREAKER T11A2 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
1-62-SIS-TA4	WEST RHR PUMP SUPPLY BREAKER T11A4 SEQUENTIAL TIMER AUXILIARY TIME DELAY RELAY
1-62-SIS-TA5	WEST ESW PUMP SUPPLY BREAKER T11A5 BLACKOUT SEQUENTIAL TIME DELAY RELAY
1-62-SIS-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11A7 SEQUENTIAL START TIME RELAY
1-62-SIS-TA8	WEST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T21A8 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
1-62-SIS-TD10	EAST ESW PUMP SUPPLY BREAKER T11D10 BLACKOUT SEQUENTIAL TIME DELAY RELAY
1-62-SIS-TD11	EAST MOTOR DRIVEN AUX FEED PUMP SUPPLY BREAKER T11D11 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
1-62-SIS-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11D3 SEQUENTIAL START TIME DELAY RELAY
1-62-SIS-TD5	NORTH SAFETY INJECTION PUMP SUPPLY BREAKER T11D5 SEQUENTIAL TIMING RELAY
1-62-SIS-TD6	EAST RHR PUMP SUPPLY BREAKER T11D6 SEQUENTIAL TIMER AUXILIARY TIME DELAY RELAY
1-62-SIS-TD7	EAST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T11D7 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
1-62-T11AU	4KV BUS T11A AUXILIARY UNDERVOLTAGE RELAY 27X-T11A TIME DELAY RELAY
1-62-T11BU	4KV BUS T11B AUXILIARY UNDERVOLTAGE RELAY 27X-T11B TIME DELAY RELAY
1-62-T11CU	4KV BUS T11C AUXILIARY UNDERVOLTAGE RELAY 27X-T11C TIME DELAY RELAY
1-62-T11DU	4KV BUS T11D AUXILIARY UNDERVOLTAGE RELAY 27X-T11D TIME DELAY RELAY
1-63-ACP-EH-DGAB	EMERGENCY DIESEL GENERATOR 1-AB FRONT BANK AIR CHEST EXTREME HIGH PRESSURE SWITCH
1-63-ACP-EH-DGCD	EMERGENCY DIESEL GENERATOR 1-CD FRONT BANK AIR CHEST EXTREME HIGH PRESSURE SWITCH
1-63X-S1E	EAST ESW PUMP DISCHARGE STRAINER HIGH DIFFERENTIAL PRESSURE SWITCH WDS-701 AUXILIARY RELAY
1-63X-S1W	WEST ESW PUMP DISCHARGE STRAINER HIGH DIFFERENTIAL PRESSURE SWITCH WDS-702 AUXILIARY RELAY
1-63X1-SG1M	WEST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP DISCHARGE FLOW SWITCH FFS-244 AUXILIARY RELAY #2
1-63X1-SG1T	TDAPP SUPPLY TO STEAM GENERATOR #1 CONTROL VALVE FMO-211 AUXILIARY RELAY
1-63X1-SG2M	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP DISCHARGE FLOW SWITCH FFS-254 AUXILIARY RELAY #2
1-63X1-SG2T	TDAPP SUPPLY TO STEAM GENERATOR #2 CONTROL VALVE FMO-221 AUXILIARY RELAY
1-63X1-SG3M	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP DISCHARGE FLOW SWITCH FFS-255 AUXILIARY RELAY #2
1-63X1-SG3T	TDAPP SUPPLY TO STEAM GENERATOR #3 CONTROL VALVE FMO-231 AUXILIARY RELAY
1-63X1-SG4M	WEST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP DISCHARGE FLOW SWITCH FFS-245 AUXILIARY RELAY #2
1-63X1-SG4T	TDAPP SUPPLY TO STEAM GENERATOR #4 CONTROL VALVE FMO-241 AUXILIARY RELAY
1-65X-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB GOVERNOR DROOP CIRCUIT RELAY
1-65X-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD GOVERNOR DROOP CIRCUIT RELAY
1-83-TILA	CD EMERGENCY DIESEL GENERATOR INVERTER DGCD-INV LOAD TRANSFER RELAY
1-83-TILB	AB EMERGENCY DIESEL GENERATOR INVERTER DGAB-INV LOAD TRANSFER RELAY
1-86-ICC1	REACTOR PROTECTION SET I INRUSH CONTROL CIRCUIT LOCKOUT RELAY
1-86-ICC2	REACTOR PROTECTION SET II INRUSH CONTROL CIRCUIT LOCKOUT RELAY
1-86-ICC3	REACTOR PROTECTION SET III INRUSH CONTROL CIRCUIT LOCKOUT RELAY
1-86-ICC4	REACTOR PROTECTION SET IV INRUSH CONTROL CIRCUIT LOCKOUT RELAY
1-87-DGAB-1	AB EMERGENCY DIESEL GENERATOR OME-150-AB PHASE #1 DIFFERENTIAL RELAY
1-87-DGAB-2	AB EMERGENCY DIESEL GENERATOR OME-150-AB PHASE #2 DIFFERENTIAL RELAY
1-87-DGAB-3	AB EMERGENCY DIESEL GENERATOR OME-150-AB PHASE #3 DIFFERENTIAL RELAY
1-87-DGCD-1	CD EMERGENCY DIESEL GENERATOR OME-150-CD PHASE #1 DIFFERENTIAL RELAY
1-87-DGCD-2	CD EMERGENCY DIESEL GENERATOR OME-150-CD PHASE #2 DIFFERENTIAL RELAY
1-87-DGCD-3	CD EMERGENCY DIESEL GENERATOR OME-150-CD PHASE #3 DIFFERENTIAL RELAY
1-87-T11A-1	TRANSFORMER TR11A PHASE #1 DIFFERENTIAL RELAY
1-87-T11A-2	TRANSFORMER TR11A PHASE #2 DIFFERENTIAL RELAY
1-87-T11A-3	TRANSFORMER TR11A PHASE #3 DIFFERENTIAL RELAY
1-87-T11B-1	TRANSFORMER TR11B PHASE #1 DIFFERENTIAL RELAY
1-87-T11B-2	TRANSFORMER TR11B PHASE #2 DIFFERENTIAL RELAY
1-87-T11B-3	TRANSFORMER TR11B PHASE #3 DIFFERENTIAL RELAY
1-87-T11C-1	TRANSFORMER TR11C PHASE #1 DIFFERENTIAL RELAY
1-87-T11C-2	TRANSFORMER TR11C PHASE #2 DIFFERENTIAL RELAY
1-87-T11C-3	TRANSFORMER TR11C PHASE #3 DIFFERENTIAL RELAY
1-87-T11D-1	TRANSFORMER TR11D PHASE #1 DIFFERENTIAL RELAY
1-87-T11D-2	TRANSFORMER TR11D PHASE #2 DIFFERENTIAL RELAY

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-87-T11D-3	TRANSFORMER TR11D PHASE #3 DIFFERENTIAL RELAY
1-87X-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB TRIP LOCKOUT HAND RESET RELAY
1-87X-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD TRIP LOCKOUT HAND RESET RELAY
1-87X-T11A	600VAC BUS 11A SUPPLY TRANSFORMER TR11A LOCKOUT HAND RESET RELAY
1-87X-T11B	600VAC BUS 11B SUPPLY TRANSFORMER TR11B LOCKOUT HAND RESET RELAY
1-87X-T11C	600VAC BUS 11C SUPPLY TRANSFORMER TR11C LOCKOUT HAND RESET RELAY
1-87X-T11D	600VAC BUS 11D SUPPLY TRANSFORMER TR11D LOCKOUT HAND RESET RELAY
1-88X-BC-A	TRAIN N BATTERY CHARGER BC-A STARTER CONTACTOR
1-88X-BC-B	TRAIN N BATTERY CHARGER BC-B STARTER CONTACTOR
1-88X1-BCA	TRAIN N BATTERY DISTRIBUTION TRAIN A BATTERY CHARGER BC-A AUXILIARY RELAY
1-88X1-BCB	TRAIN N BATTERY DISTRIBUTION TRAIN B BATTERY CHARGER BC-B AUXILIARY RELAY
1-88X2-BC-A	TRAIN N BATTERY DISTRIBUTION TRAIN A BATTERY CHARGER BC-A AUXILIARY RELAY
1-88X2-BC-B	TRAIN N BATTERY DISTRIBUTION TRAIN B BATTERY CHARGER BC-B AUXILIARY RELAY
1-AT6-23-WMSP	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-BC-A-F10	N TRAIN BATTERY CHARGER 1-BC-A RELAY
1-BC-A-F8	N TRAIN BATTERY CHARGER 1-BC-A RELAY
1-BC-A-F9	N TRAIN BATTERY CHARGER 1-BC-A RELAY
1-BC-A-K2	N TRAIN BATTERY CHARGER 1-BC-A RELAY
1-BC-A-TIMER	N TRAIN BATTERY CHARGER 1-BC-A RELAY
1-BC-B-F10	N TRAIN BATTERY CHARGER 1-BC-B RELAY
1-BC-B-F8	N TRAIN BATTERY CHARGER 1-BC-B RELAY
1-BC-B-F9	N TRAIN BATTERY CHARGER 1-BC-B RELAY
1-BC-B-K2	N TRAIN BATTERY CHARGER 1-BC-B RELAY
1-BC-B-TIMER	N TRAIN BATTERY CHARGER 1-BC-B RELAY
1-CIB-A-AUX	PHASE 'B' CONTAINMENT ISOLATION TRAIN 'A' AUXILIARY RELAY #1
1-CIB-A-AUX1	PHASE 'B' CONTAINMENT ISOLATION TRAIN 'A' AUXILIARY RELAY #2
1-CIB-B-AUX	PHASE 'B' CONTAINMENT ISOLATION TRAIN 'B' AUXILIARY RELAY #1
1-CIB-B-AUX1	PHASE 'B' CONTAINMENT ISOLATION TRAIN 'B' AUXILIARY RELAY #2
1-CSX-TA3	WEST CONTAINMENT SPRAY PUMP SUPPLY BREAKER T11A3 CS TRIP AUXILIARY RELAY
1-CSX-TD4	EAST CONTAINMENT SPRAY PUMP SUPPLY BREAKER T11D4 CS TRIP AUXILIARY RELAY
1-DGAB-INV-OB	EMERGENCY DIESEL GENERATOR 1-AB INVERTER RELAY
1-DGAB-INV-SB	EMERGENCY DIESEL GENERATOR 1-AB INVERTER RELAY
1-DGAB-INV-SY1	EMERGENCY DIESEL GENERATOR 1-AB INVERTER RELAY
1-DGAB-INV-SY2	EMERGENCY DIESEL GENERATOR 1-AB INVERTER RELAY
1-DGCD-INV-OB	EMERGENCY DIESEL GENERATOR 1-CD INVERTER RELAY
1-DGCD-INV-SB	EMERGENCY DIESEL GENERATOR 1-CD INVERTER RELAY
1-DGCD-INV-SY1	EMERGENCY DIESEL GENERATOR 1-CD INVERTER RELAY
1-DGCD-INV-SY2	EMERGENCY DIESEL GENERATOR 1-CD INVERTER RELAY
1-EOM-AUX	TURBINE DRIVEN AUXILIARY FEED PUMP PF-4 OVERSPEED TRIP AUXILIARY RELAY
1-FBCST-AB	EMERGENCY DIESEL GENERATOR 1-AB FRONT BANK CAMSHAFT SPEED TRANSMITTER
1-FBCST-CD	EMERGENCY DIESEL GENERATOR 1-CD FRONT BANK CAMSHAFT SPEED TRANSMITTER
1-FBX-512B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-513B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-522B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-523B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-532B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-533B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-542B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-543B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-K-301-AB1	PLANT BATTERY BATT-AB BATTERY CHARGER #1 RELAY
1-K-301-AB2	PLANT BATTERY BATT-AB BATTERY CHARGER #2 RELAY
1-K-301-CD1	PLANT BATTERY BATT-CD BATTERY CHARGER #1 RELAY
1-K-301-CD2	PLANT BATTERY BATT-CD BATTERY CHARGER #2 RELAY

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-K-303-AB1	PLANT BATTERY BATT-AB BATTERY CHARGER #1 RELAY
1-K-303-AB2	PLANT BATTERY BATT-AB BATTERY CHARGER #2 RELAY
1-K-303-CD1	PLANT BATTERY BATT-CD BATTERY CHARGER #1 RELAY
1-K-303-CD2	PLANT BATTERY BATT-CD BATTERY CHARGER #2 RELAY
1-K-304-AB1	PLANT BATTERY BATT-AB BATTERY CHARGER #1 RELAY
1-K-304-AB2	PLANT BATTERY BATT-AB BATTERY CHARGER #2 RELAY
1-K-304-CD1	PLANT BATTERY BATT-CD BATTERY CHARGER #1 RELAY
1-K-304-CD2	PLANT BATTERY BATT-CD BATTERY CHARGER #2 RELAY
1-K-644-A	CONTAINMENT SPRAY MOTOR OPERATED VALVES REACTOR PROTECTION OUTPUT RELAY
1-K-644-B	CONTAINMENT SPRAY MOTOR OPERATED VALVES REACTOR PROTECTION OUTPUT RELAY
1-K-AUX-CMO-419	EAST RHR HX CCW OUTLET SHUTOFF VALVE CMO-419 AUTO OPERATION ON SAFETY INJECTION AUX RELAY
1-K-AUX-CMO-429	WEST RHR HX CCW OUTLET SHUTOFF VALVE CMO-429 AUTO OPERATION ON SAFETY INJECTION AUX RELAY
1-K-AUX-WMO-713	WEST CNTMT SPRAY HX ESW OUTLET SHUTOFF VALVE WMO-713 AUTOMATIC OPERATION AUXILIARY RELAY
1-K-AUX-WMO-717	EAST CNTMT SPRAY HX ESW OUTLET SHUTOFF VALVE WMO-717 AUTOMATIC OPERATION AUXILIARY RELAY
1-K-AUX-WMO-733	EAST CCW HX ESW OUTLET SHUTOFF VALVE WMO-733 AUTOMATIC OPERATION AUXILIARY RELAY
1-K-AUX-WMO-737	WEST CCW HX ESW OUTLET SHUTOFF VALVE WMO-737 AUTOMATIC OPERATION AUXILIARY RELAY
1-K1-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-K1-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-K1-21WMSP	NUCLEAR INSTRUMENTATION CHANNEL I WIDE RANGE RADIATION DETECTOR RELAY
1-K1-21WMSBPT	NUCLEAR INSTRUMENTATION CHANNEL I WIDE RANGE RADIATION DETECTOR RELAY
1-K1-21WRAMP	NUCLEAR INSTRUMENTATION CHANNEL I WIDE RANGE RADIATION DETECTOR RELAY
1-K1-23RMSP	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K1-23RMSP-DDA1	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K1-23RMSP-DDA2	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K1-23RMSP-DDA3	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K1-23RMSP-DDA4	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K1-23WMSP	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K1-23WRAMP	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K1-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-K1-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-K101-21WMSBPT	NUCLEAR INSTRUMENTATION CHANNEL I WIDE RANGE RADIATION DETECTOR RELAY
1-K107-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #1 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K107-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #2 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K115-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #2 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K115-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #2 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K116-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #3 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K116-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #3 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K117-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #4 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K117-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #4 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K118-A	STEAM GENERATOR STEAM LINE DIFFERENTIAL PRESSURE LOOP #4 CHANNEL I REACTOR PROT INPUT RELAY
1-K118-B	STEAM GENERATOR STEAM LINE DIFFERENTIAL PRESSURE LOOP #4 CHANNEL I REACTOR PROT INPUT RELAY
1-K119-A	STEAM GENERATOR STEAM LINE DIFFERENTIAL PRESSURE LOOP #3 CHANNEL I REACTOR PROT INPUT RELAY
1-K119-B	STEAM GENERATOR STEAM LINE DIFFERENTIAL PRESSURE LOOP #3 CHANNEL I REACTOR PROT INPUT RELAY
1-K131-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K131-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K133-A	STEAM GENERATOR STEAM LINE DIFFERENTIAL PRESSURE LOOP #1 CHANNEL I REACTOR PROT INPUT RELAY
1-K133-B	STEAM GENERATOR STEAM LINE DIFFERENTIAL PRESSURE LOOP #1 CHANNEL I REACTOR PROT INPUT RELAY
1-K134-A	STEAM GENERATOR STEAM LINE DIFFERENTIAL PRESSURE LOOP #2 CHANNEL I REACTOR PROT INPUT RELAY
1-K134-B	STEAM GENERATOR STEAM LINE DIFFERENTIAL PRESSURE LOOP #2 CHANNEL I REACTOR PROT INPUT RELAY
1-K137-A	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K137-B	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL I REACTOR PROTECTION OUTPUT RELAY
1-K148-A	REACTOR COOLANT LOOP #1 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K148-B	REACTOR COOLANT LOOP #1 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-K2-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-K2-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-K2-21WMSF	NUCLEAR INSTRUMENTATION CHANNEL I WIDE RANGE RADIATION DETECTOR RELAY
1-K2-23RMSP	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K2-23RMSP-DDA1	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K2-23RMSP-DDA2	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K2-23RMSP-DDA3	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K2-23RMSP-DDA4	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
1-K2-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-K2-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-K201-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K201-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K203-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL II REACTOR PROT INPUT RELAY
1-K203-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL II REACTOR PROT INPUT RELAY
1-K204-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL II REACTOR PROT INPUT RELAY
1-K204-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL II REACTOR PROT INPUT RELAY
1-K216-A	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K216-B	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION OUTPUT RELAY
1-K217-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K217-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION OUTPUT RELAY
1-K229-A	REACTOR COOLANT LOOP #2 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K229-B	REACTOR COOLANT LOOP #2 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K243-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #1 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K243-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #1 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K244-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #3 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K244-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #3 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K245-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #4 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K245-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #4 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K246-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #2 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K246-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #2 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K247-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL II REACTOR PROT INPUT RELAY
1-K247-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL II REACTOR PROT INPUT RELAY
1-K248-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL II REACTOR PROT INPUT RELAY
1-K248-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL II REACTOR PROT INPUT RELAY
1-K3-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-K3-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-K3-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-K3-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-K306-A	REACTOR COOLANT LOOP #3 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K306-B	REACTOR COOLANT LOOP #3 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K317-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL III REACTOR PROT INPUT RELAY
1-K317-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL III REACTOR PROT INPUT RELAY
1-K318-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL III REACTOR PROT INPUT RELAY
1-K318-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL III REACTOR PROT INPUT RELAY
1-K319-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #2 CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K319-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #2 CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K320-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #3 CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K320-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #3 CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K329-A	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K329-B	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION OUTPUT RELAY
1-K330-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K330-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION OUTPUT RELAY
1-K344-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL III REACTOR PROTECTION INPUT RELAY

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-K344-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K4-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-K4-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-K4-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-K4-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-K406-A	REACTOR COOLANT LOOP #4 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K406-B	REACTOR COOLANT LOOP #4 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K417-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL IV REACTOR PROT INPUT RELAY
1-K417-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL IV REACTOR PROT INPUT RELAY
1-K418-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL IV REACTOR PROT INPUT RELAY
1-K418-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL IV REACTOR PROT INPUT RELAY
1-K419-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #1 CHANNEL IV REACTOR PROTECTION INPUT RELAY
1-K419-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #1 CHANNEL IV REACTOR PROTECTION INPUT RELAY
1-K420-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #4 CHANNEL IV REACTOR PROTECTION INPUT RELAY
1-K420-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #4 CHANNEL IV REACTOR PROTECTION INPUT RELAY
1-K429-A	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL IV REACTOR PROTECTION INPUT RELAY
1-K429-B	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL IV REACTOR PROTECTION OUTPUT RELAY
1-K430-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL IV PROTECTION INPUT RELAY
1-K430-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL IV PROTECTION OUTPUT RELAY
1-K5-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-K5-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-K5-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-K5-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-K501-A	SAFETY INJECTION CIRCUIT REACTOR PROTECTION TEST RELAY
1-K501-B	SAFETY INJECTION CIRCUIT REACTOR PROTECTION TEST RELAY
1-K505-A	CONTAINMENT SPRAY ACTUATION REACTOR PROTECTION OUTPUT RELAY
1-K505-B	CONTAINMENT SPRAY ACTUATION REACTOR PROTECTION OUTPUT RELAY
1-K506-A	CONTAINMENT ISOLATION PHASE 'B' REACTOR PROTECTION OUTPUT RELAY
1-K506-B	CONTAINMENT ISOLATION PHASE 'B' REACTOR PROTECTION OUTPUT RELAY
1-K521-A	SAFETY INJECTION ACTUATION CIRCUIT REACTOR PROTECTION TEST RELAY
1-K521-B	SAFETY INJECTION ACTUATION CIRCUIT REACTOR PROTECTION TEST RELAY
1-K522-A	CONTAINMENT ISOLATION PHASE 'A' VALVES REACTOR PROTECTION OUTPUT RELAY
1-K522-B	CONTAINMENT ISOLATION PHASE 'A' VALVES REACTOR PROTECTION OUTPUT RELAY
1-K6-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-K6-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-K6-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-K6-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-K602-A	SAFETY INJECTION ACTUATION CIRCUIT TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
1-K602-B	SAFETY INJECTION ACUTATION CIRCUIT TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
1-K604-A	EAST CCP HX HE-15E ESW OUTLET SHUTOFF VALVE WMO-733 TEST BLOCK REACTOR PROT OUTPUT RELAY
1-K604-B	EAST CCP HX HE-15E ESW OUTLET SHUTOFF VALVE WMO-733 TEST BLOCK REACTOR PROT OUTPUT RELAY
1-K606-A	CONTAINMENT ISOLATION PHASE 'A' VALVES TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
1-K606-B	CONTAINMENT ISOLATION PHASE 'A' VALVES TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
1-K608-A	SAFETY INJECTION BLACKOUT INTAKE REACTOR PROTECTION OUTPUT RELAY
1-K608-B	SAFETY INJECTION BLACKOUT INTAKE REACTOR PROTECTION OUTPUT RELAY
1-K608-X1-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
1-K608-X1-B	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
1-K608-X2-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
1-K608-X2-B	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
1-K609-A	EMERGENCY DIESEL GENERATOR START REACTOR PROTECTION OUTPUT RELAY
1-K609-B	EMERGENCY DIESEL GENERATOR START REACTOR PROTECTION OUTPUT RELAY
1-K609-X1-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
1-K609-X1-B	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY

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<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-K610-A	ENGINEERED SAFETY SYSTEM SAFETY INJECTION PUMPS START REACTOR PROTECTION OUTPUT RELAY
1-K610-B	ENGINEERED SAFETY SYSTEM INJECTION PUMPS START REACTOR PROTECTION OUTPUT RELAY
1-K610-X1-B	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
1-K610-X1-X-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
1-K611-A	ESW & AUXILIARY FEEDWATER PUMPS START REACTOR PROTECTION OUTPUT RELAY
1-K611-B	ESW & AUXILIARY FEEDWATER PUMPS START REACTOR PROTECTION OUTPUT RELAY
1-K611-X-B	UNIT 1 ESW & AUX FEEDWATER PUMPS START REACTOR PROTECTION OUTPUT RELAY UNIT 2 AUXILIARY RELAY
1-K611-X1-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
1-K611-X1-B	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
1-K618-A	CONTAINMENT ISOLATION PHASE 'B' CIRCUIT TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
1-K618-B	CONTAINMENT ISOLATION PHASE 'B' CIRCUIT TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
1-K619-A	CONTAINMENT ISOLATION PHASE 'B' CIRCUIT TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
1-K619-B	CONTAINMENT ISOLATION PHASE 'B' CIRCUIT TEST BLOCK REACTOR PROTECTION OUPUT RELAY
1-K626-A	CONTAINMENT ISOLATION PHASE 'B' REACTOR PROTECTION OUTPUT RELAY
1-K626-B	CONTAINMENT ISOLATION PHASE 'B' REACTOR PROTECTION OUTPUT RELAY
1-K626-X3-A	REACTOR PROTECTION CONTAINMENT ISOLATION PHASE 'B' AUXILIARY RELAY
1-K626-X3-B	REACTOR PROTECTION CONTAINMENT ISOLATION PHASE 'B' AUXILIARY RELAY
1-K643-A	CONTAINMENT SPRAY SAFETY INJECTION ACTUATION REACTOR PROTECTION OUTPUT RELAY
1-K643-B	CONTAINMENT SPRAY SAFETY INJECTION ACTUATION REACTOR PROTECTION OUTPUT RELAY
1-LB-112-BX1	REACTOR COOLANT LETDOWN VCT EXTREME HIGH LEVEL CTRL TRANSMITTER AUX RELAY
1-LB-112-BX2	REACTOR COOLANT LETDOWN VCT EXTREME HIGH LEVEL CTRL TRANSMITTER AUX RELAY
1-LB-112-DX	REACTOR COOLANT LETDOWN VCT EXTREME HIGH LEVEL CTRL TRANSMITTER AUX RELAY
1-LB-185-BX1	REACTOR COOLANT LETDOWN VCT EXTREME HIGH LEVEL CTRL TRANSMITTER AUX RELAY
1-LB-185-BX2	REACTOR COOLANT LETDOWN VCT EXTREME HIGH LEVEL CTRL TRANSMITTER AUX RELAY
1-LCSI-A-AUX	CD EMERGENCY DIESEL GENERATOR OME-150-CD SAFETY INJECTION LOAD CONSERVATION TRIP RELAY
1-LCSI-B-AUX	AB EMERGENCY DIESEL GENERATOR OME-150-AB SAFETY INJECTION LOAD CONSERVATION TRIP RELAY
1-MUX-4-2	REACTOR COOLANT MAKEUP CONTROL AUTOMATIC OPERATION AUXILIARY RELAY #2
1-PB-455-X1	EAST CCP MINI-FLOW TO RCP SEAL WATER HEAT EXCHANGER SHUTOFF VALVE CONTROL RELAY
1-PB-457-X1	WEST CCP MINI FLOW TO RCP SEAL WATER HEAT EXCHANGER SHUTOFF VALVE CONTROL RELAY
1-PBX-455D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-456D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-457D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-514A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-514B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-515A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-515B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-516A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-516C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-516D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-525A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-525B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-526A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-526C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-526D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-534A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-534B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-536A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-546A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-934A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-934B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-935A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-935B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-936A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY

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<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-PBX-936B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-937A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-RBCST-AB	EMERGENCY DIESEL GENERATOR 1-AB REAR BANK CAMSHAFT SPEED TRANSMITTER
1-RBCST-CD	EMERGENCY DIESEL GENERATOR 1-CD REAR BANK CAMSHAFT SPEED TRANSMITTER
1-RL1-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-RL1-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-RL1-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-RL1-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-RL1-ACVS-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-RL1-ACVS-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-RL1-ACVS-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-RL1-ACVS-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-RL1-OSCBD-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-RL1-OSCBD-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-RL1-OSCBD-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-RL1-OSCBD-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-RL1-SYBD-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-RL1-SYBD-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-RL1-SYBD-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-RL1-SYBD-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-RL1SS-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-RL1SS-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-RL1SS-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-RL1SS-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-RL2-SYBD-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-RL2-SYBD-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-RL2-SYBD-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-RL2-SYBD-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-RL2SS-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-RL2SS-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-RL2SS-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-RL2SS-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-RL3-SYBD-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-RL3-SYBD-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-RL3-SYBD-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-RL3-SYBD-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-RR1-1	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
1-RR1-2	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
1-RR1-3	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
1-RR1-4	120VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
1-SI-X-TA2	WEST MOTOR DRIVEN AUX FEED WATER PUMP SUPPLY BREAKER T11A2 SI TRIP AUXILIARY RELAY
1-SI-X-TD11	EAST MOTOR DRIVEN AUX FEEDWATER PUMP SUPPLY BREAKER T11D11 SI TRIP AUXILIARY RELAY
1-SIX-TA1	SOUTH SAFETY INJECTION PUMP SUPPLY BREAKER T11A1 SI TRIP AUXILIARY RELAY
1-SIX-TA4	WEST RESIDUAL HEAT REMOVAL PUMP SUPPLY BREAKER T11A4 SI TRIP AUXILIARY RELAY
1-SIX-TA5	WEST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T11A5 SI TRIP AUXILIARY RELAY
1-SIX-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11A7 SI TRIP AUXILIARY RELAY
1-SIX-TD10	EAST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T11D10 SI TRIP AUXILIARY RELAY
1-SIX-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T11D3 SI TRIP AUXILIARY RELAY
1-SIX-TD5	NORTH SAFETY INJECTION PUMP SUPPLY BREAKER T11D5 SI TRIP AUXILIARY RELAY
1-SIX-TD6	EAST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T11D6 SI TRIP AUXILIARY RELAY
1-TBX-412D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-TBX-422D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-TBX-432D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY

UNIT 1 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-TBX-442D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-TDAFF-OSM	TURBINE DRIVEN AUXILIARY FEED PUMP PP-4 OVERSPEED MONITOR
2-K118-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL I REACTOR PROT INPUT RELAY
2-K118-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL I REACTOR PROT INPUT RELAY
2-K119-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL I REACTOR PROT INPUT RELAY
2-K119-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL I REACTOR PROT INPUT RELAY
2-K131-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL I REACTOR PROTECTION INPUT RELAY
2-K131-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL I REACTOR PROTECTION INPUT RELAY
2-K133-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL I REACTOR PROT INPUT RELAY
2-K133-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL I REACTOR PROT INPUT RELAY
2-K134-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL I REACTOR PROT INPUT RELAY
2-K134-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL I REACTOR PROT INPUT RELAY
2-K150-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #1 CHANNEL I REACTOR PROTECTION INPUT RELAY
2-K150-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #1 CHANNEL I REACTOR PROTECTION INPUT RELAY
2-K201-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL II REACTOR PROTECTION INPUT RELAY
2-K201-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL II REACTOR PROTECTION INPUT RELAY
2-K203-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL II REACTOR PROT INPUT RELAY
2-K203-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL II REACTOR PROT INPUT RELAY
2-K204-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL II REACTOR PROT INPUT RELAY
2-K204-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL II REACTOR PROT INPUT RELAY
2-K217-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION INPUT RELAY
2-K217-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION OUTPUT RELAY
2-K247-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL II REACTOR PROT INPUT RELAY
2-K247-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL II REACTOR PROT INPUT RELAY
2-K248-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL II REACTOR PROT INPUT RELAY
2-K248-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL II REACTOR PROT INPUT RELAY
2-K250-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #2 CHANNEL II REACTOR PROTECTION INPUT RELAY
2-K250-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #2 CHANNEL II REACTOR PROTECTION INPUT RELAY
2-K317-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL III REACTOR PROT INPUT RELAY
2-K317-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL III REACTOR PROT INPUT RELAY
2-K318-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL III REACTOR PROT INPUT RELAY
2-K318-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL III REACTOR PROT INPUT RELAY
2-K320-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #3 CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K320-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #3 CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K330-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K330-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION OUTPUT RELAY
2-K344-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K344-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K417-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL IV REACTOR PROT INPUT RELAY
2-K417-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL IV REACTOR PROT INPUT RELAY
2-K418-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL IV REACTOR PROT INPUT RELAY
2-K418-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL IV REACTOR PROT INPUT RELAY
2-K420-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #4 CHANNEL IV REACTOR PROTECTION INPUT RELAY
2-K420-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #4 CHANNEL IV REACTOR PROTECTION INPUT RELAY
2-K430-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL IV PROTECTION INPUT RELAY
2-K430-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL IV PROTECTION OUTPUT RELAY
2-K501-A	SAFETY INJECTION CIRCUIT REACTOR PROTECTION TEST RELAY
2-K521-B	SAFETY INJECTION ACTUATION CIRCUIT REACTOR PROTECTION TEST RELAY
2-K610-A	ENGINEERED SAFETY SYSTEM SAFETY INJECTION PUMPS START REACTOR PROTECTION OUTPUT RELAY
2-K610X1-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K611-B	ESW & AUXILIARY FEEDWATER PUMPS START REACTOR PROTECTION OUTPUT RELAY
2-PBX-455D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-456D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY

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<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-PBX-457D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-514A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-514B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-514C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-515A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-515B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-516C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-516D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-525A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-525B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-525C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-526C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-526D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-534A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-534B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-536A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-546A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-934B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-935B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-936B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-100CR-AB	EMERGENCY DIESEL GENERATOR 2-AB VOLTAGE REGULATOR AUTO BUILD UP RELAY
2-100CR-CD	EMERGENCY DIESEL GENERATOR 2-CD VOLTAGE REGULATOR AUTO BUILD UP RELAY
2-12-OSTA	EMERGENCY DIESEL GENERATOR 2-CD OVERSPEED TRIP RELAY
2-12-OSTB	EMERGENCY DIESEL GENERATOR 2-AB OVERSPEED TRIP RELAY
2-12-SPSA1	EMERGENCY DIESEL GENERATOR 2-CD OVERSPEED CONTROL 95% SPEED RELAY
2-12-SPSA2	EMERGENCY DIESEL GENERATOR 2-CD OVERSPEED CONTROL 80% SPEED RELAY
2-12-SPSB1	EMERGENCY DIESEL GENERATOR 2-AB OVERSPEED CONTROL 95% SPEED RELAY
2-12-SPSB2	EMERGENCY DIESEL GENERATOR 2-AB OVERSPEED CONTROL 80% SPEED RELAY
2-12X-SPSA2	EMERGENCY DIESEL GENERATOR 2-CD OVERSPEED CONTROL AUXILIARY RELAY
2-12X-SPSB2	EMERGENCY DIESEL GENERATOR 2-AB OVERSPEED CONTROL AUXILIARY RELAY
2-12X-TDFP	TURBINE DRIVEN AUXILIARY FEED PUMP PP-4 TRIP OVERSPEED LIMIT SWITCH AUXILIARY RELAY
2-19-1-DGAB	EMERGENCY DIESEL GENERATOR 2-AB STARTING AIR VALVE CONTROL RELAY
2-19-1-DGCD	EMERGENCY DIESEL GENERATOR 2-CD STARTING AIR VALVE CONTROL RELAY
2-19-DGAB	EMERGENCY DIESEL GENERATOR 2-AB STARTING AIR VALVE CONTROL RELAY
2-19-DGCD	EMERGENCY DIESEL GENERATOR 2-CD STARTING AIR VALVE CONTROL RELAY
2-1X-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB TRIP CONTROL AUXILIARY RELAY
2-1X-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD TRIP CONTROL AUXILIARY RELAY
2-20X-CCM-451-CL	COMPONENT COOLING WATER CONTAINMENT ISOLATION VALVE CCM-451 STARTER CLOSE CONTACTOR
2-20X-CCM-452-CL	COMPONENT COOLING WATER CONTAINMENT ISOLATION VALVE CCM-452 STARTER CLOSE CONTACTOR
2-20X-CCM-453-CL	COMPONENT COOLING WATER CONTAINMENT ISOLATION VALVE CCM-453 STARTER CLOSE CONTACTOR
2-20X-CCM-454-CL	COMPONENT COOLING WATER CONTAINMENT ISOLATION VALVE CCM-454 STARTER CLOSE CONTACTOR
2-20X-CCM-458-CL	COMPONENT COOLING WATER CONTAINMENT ISOLATION VALVE CCM-458 STARTER CLOSE CONTACTOR
2-20X-CCM-459-CL	COMPONENT COOLING WATER CONTAINMENT ISOLATION VLAVE CCM-459 STARTER CLOSE CONTACTOR
2-20X-CMO-410-CL	COMPONENT COOLING WATER SHUTOFF VALVE CMO-410 STARTER CLOSE CONTACTOR
2-20X-CMO-410-OP	COMPONENT COOLING WATER SHUTOFF VALVE CMO-410 STARTER OPEN CONTACTOR
2-20X-CMO-411-CL	COMPONENT COOLING WATER SHUTOFF VALVE CMO-411 STARTER CLOSE CONTACTOR
2-20X-CMO-412-CL	COMPONENT COOLING WATER SHUTOFF VALVE CMO-412 STARTER CLOSE CONTACTOR
2-20X-CMO-413-CL	COMPONENT COOLING WATER SHUTOFF VALVE CMO-413 STARTER CLOSE CONTACTOR
2-20X-CMO-414-CL	CCW PUMPS DISCH CROSSTIE TRAIN 'B' SHUTOFF VALVE CMO-414 STARTER CLOSE CONTACTOR
2-20X-CMO-415-CL	COMPONENT COOLING WATER SHUTOFF VALVE CMO-415 STARTER CLOSE CONTACTOR
2-20X-CMO-416-CL	COMPONENT COOLING WATER SHUTOFF VALVE CMO-416 STARTER CLOSE CONTACTOR
2-20X-CMO-419-OP	COMPONENT COOLING WATER SHUTOFF VALVE CMO-419 STARTER OPEN CONTACTOR
2-20X-CMO-420-CL	COMPONENT COOLING WATER SHUTOFF VALVE CMO-420 STARTER CLOSE CONTACTOR
2-20X-CMO-420-OP	COMPONENT COOLING WATER SHUTOFF VALVE CMO-420 STARTER OPEN CONTACTOR
2-20X-CMO-429-OP	COMPONENT COOLING WATER SHUTOFF VALVE CMO-429 STARTER OPEN CONTACTOR
2-20X-FMO-211-CL	TURBINE DRIVEN AUX FEED PUMP DISCHARGE TO STEAM GEN CTRL VALVE FMO-211 STARTER CONTACTOR
2-20X-FMO-212-CL	AUXILIARY FEEDWATER CONTROL VALVE FMO-212 STARTER CLOSE CONTACTOR
2-20X-FMO-221-CL	TURBINE DRIVEN AUX FEED PUMP DISCHARGE TO STEAM GEN CTRL VALVE FMO-221 STARTER CONTACTOR
2-20X-FMO-222-CL	AUXILIARY FEEDWATER CONTROL VALVE FMO-222 STARTER CLOSE CONTACTOR
2-20X-FMO-231-CL	TURBINE DRIVEN AUX FEED PUMP DISCHARGE TO STEAM GEN CTRL VALVE FMO-231 STARTER CONTACTOR
2-20X-FMO-232-CL	AUXILIARY FEEDWATER CONTROL VALVE FMO-232 STARTER CLOSE CONTACTOR
2-20X-FMO-241-CL	TURBINE DRIVEN AUX FEED PUMP DISCHARGE TO STEAM GEN CTRL VALVE FMO 241 STARTER CONTACTOR
2-20X-FMO-242-CL	AUXILIARY FEEDWATER CONTROL VALVE FMO-242 STARTER CLOSE CONTACTOR
2-20X-ICM-111-OP	RHR CONTAINMENT ISOLATION VALVE ICM-111 STARTER OPEN CONTACTOR
2-20X-ICM-129-OP	RHR CONTAINMENT ISOLATION VALVE ICM-129 STARTER OPEN CONTACTOR
2-20X-ICM-250-OP	BORON INJECTION CONTAINMENT ISOLATION VALVE ICM-250 STARTER OPEN CONTACTOR
2-20X-ICM-251-OP	BORON INJECTION CONTAINMENT ISOLATION VALVE ICM-251 STARTER OPEN CONTACTOR
2-20X-ICM-260-CL	SAFETY INJECTION CONTAINMENT ISOLATION VALVE ICM-260 STARTER CLOSE CONTACTOR
2-20X-ICM-265-CL	SOUTH SI PUMP DISCHARGE CONTAINMENT ISOLATION VALVE ICM-265 STARTER CLOSE CONTACTOR
2-20X-ICM-305-OP	RESIDUAL HEAT REMOVAL CONTAINMENT ISOLATION VALVE ICM-305 STARTER OPEN CONTACTOR
2-20X-ICM-306-OP	RESIDUAL HEAT REMOVAL CONTAINMENT ISOLATION VALVE ICM-306 STARTER OPEN CONTACTOR
2-20X-ICM-311-CL	RESIDUAL HEAT REMOVAL CONTAINMENT ISOLATION VALVE ICM-311 STARTER CLOSE CONTACTOR
2-20X-ICM-321-CL	RESIDUAL HEAT REMOVAL CONTAINMENT ISOLATION VALVE ICM-321 STARTER CLOSE CONTACTOR

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-20X-IMO-225-CL	WEST CONTAINMENT SPRAY PUMP SUCTION SHUTOFF VALVE IMO-225 STARTER CLOSE CONTACTOR
2-20X-IMO-314-OP	EAST RHR PUMP DISCHARGE CROSSTIE SHUTOFF VALVE IMO-314 STARTER OPEN CONTACTOR
2-20X-IMO-128-OP	RESIDUAL HEAT REMOVAL SHUTOFF VALVE IMO-128 STARTER OPEN CONTACTOR
2-20X-IMO-210-OP	EAST CONTAINMENT SPRAY PUMP DISCHARGE SHUTOFF VALVE IMO-210 STARTER OPEN CONTACTOR
2-20X-IMO-211-OP	EAST CONTAINMENT SPRAY PUMP DISCHARGE SHUTOFF VALVE IMO-211 STARTER OPEN CONTACTOR
2-20X-IMO-215-CL	EAST CONTAINMENT SPRAY SHUTOFF VALVE IMO-215 STARTER CLOSE CONTACTOR
2-20X-IMO-220-OP	WEST CONTAINMENT SPRAY PUMP DISCHARGE SHUTOFF VALVE IMO-220 STARTER OPEN CONTACTOR
2-20X-IMO-221-OP	CONTAINMENT SPRAY SHUTOFF VALVE IMO-221 STARTER OPEN CONTACTOR
2-20X-IMO-255-OP	BORON INJECTION SHUTOFF VALVE IMO-255 STARTER OPEN CONTACTOR
2-20X-IMO-256-OP	BORON INJECTION TANK INLET SHUTOFF VALVE IMO-256 STARTER CLOSE CONTACTOR
2-20X-IMO-261-CL	REFUELING STORAGE WATER TANK SUPPLY SHUTOFF VALVE IMO-261 STARTER CLOSE CONTACTOR
2-20X-IMO-262-CL	REFUELING WATER STORAGE TANK SUPPLY SHUTOFF VALVE IMO-262 STARTER CLOSE CONTACTOR
2-20X-IMO-263-CL	REFUELING WATER STORAGE TANK SUPPLY SHUTOFF VALVE IMO-263 STARTER CLOSE CONTACTOR
2-20X-IMO-270-CL	SAFETY INJECTION SHUTOFF VALVE IMO-270 STARTER CLOSE CONTACTOR
2-20X-IMO-275-CL	SAFETY INJECTION SHUTOFF VALVE IMO-275 STARTER CLOSE CONTACTOR
2-20X-IMO-310-CL	EAST RHR PUMP SUCTION SHUTOFF VALVE IMO-310 STARTER CLOSE CONTACTOR
2-20X-IMO-315-OP	RHR SHUTOFF VALVE IMO-315 STARTER OPEN CONTACTOR
2-20X-IMO-316-CL	RHR SHUTOFF VALVE IMO-316 STARTER CLOSE CONTACTOR
2-20X-IMO-320-CL	WEST RHR PUMP SUCTION SHUTOFF VALVE IMO-320 STARTER CLOSE CONTACTOR
2-20X-IMO-324-OP	RESIDUAL HEAT REMOVAL SHUTOFF VALVE IMO-324 STARTER OPEN CONTACTOR
2-20X-IMO-325-OP	RHR SHUTOFF VALVE IMO-325 STARTER OPEN CONTACTOR
2-20X-IMO-326-CL	RHR SHUTOFF VALVE IMO-326 STARTER CLOSE CONTACTOR
2-20X-IMO-330-OP	RESIDUAL HEAT REMOVAL SHUTOFF VALVE IMO-330 STARTER OPEN CONTACTOR
2-20X-IMO-331-OP	WEST RHR SHUTOFF VALVE IMO-331 STARTER OPEN CONTACTOR
2-20X-IMO-340-OP	RHR SHUTOFF VALVE IMO-340 STARTER OPEN CONTACTOR
2-20X-IMO-350-OP	RHR SHUTOFF VALVE IMO-350 STARTER OPEN CONTACTOR
2-20X-IMO-360-OP	SAFETY INJECTION SHUTOFF VALVE IMO-360 STARTER OPEN CONTACTOR
2-20X-IMO-361-OP	SAFETY INJECTION SHUTOFF VALVE IMO-361 STARTER OPEN CONTACTOR
2-20X-IMO-362-OP	SAFETY INJECTION SHUTOFF VALVE IMO-362 STARTER OPEN CONTACTOR
2-20X-IMO-390-CL	RESIDUAL HEAT REMOVAL SHUTOFF VALVE IMO-390 STARTER CLOSE CONTACTOR
2-20X-IMO-51-CL	BORON INJECTION SHUTOFF VALVE IMO-51 STARTER CLOSE CONTACTOR
2-20X-IMO-52-CL	BORON INJECTION SHUTOFF VALVE IMO-52 STARTER CLOSE CONTACTOR
2-20X-IMO-53-CL	BORON INJECTION SHUTOFF VALVE IMO-53 STARTER CLOSE CONTACTOR
2-20X-IMO-54-CL	BORON INJECTION SHUTOFF VALVE IMO-54 STARTER CLOSE CONTACTOR
2-20X-MCM-221-CL	MAIN STEAM LEAD #2 TO AFPT SHUTOFF VALVE MCM-221 STARTER CLOSE CONTACTOR
2-20X-MCM-231-CL	MAIN STEAM SHUTOFF VALVE MCM-231 STARTER CLOSE CONTACTOR
2-20X-NMO-151-CL	PRESSURIZER SHUTOFF VALVE NMO-151 STARTER CLOSE CONTACTOR
2-20X-NMO-152-CL	PRESSURIZER SHUTOFF VALVE NMO-152 STARTER CLOSE CONTACTOR
2-20X-NMO-153-CL	PRESSURIZER SHUTOFF VALVE NMO-153 STARTER CLOSE CONTACTOR
2-20X-QCM-250-CL	RCP SEAL WATER RETURN TRAIN 'A' CNMT ISOLATION VALVE QCM-250 STAR CLOSE CONTACTOR
2-20X-QCM-350-CL	REACTOR COOLANT PUMP SEAL WATER CNMT ISOLATION VALVE QCM-350 STARTER CLOSE CONTACTOR
2-20X-QMO-225-CL	CVCS CHARGING SHUTOFF VALVE QMO-225 STARTER CLOSE CONTACTOR
2-20X-QMO-226-CL	CVCS CHARGING SHUTOFF VALVE QMO-226 STARTER CLOSE CONTACTOR
2-20X-QMO-420-OP	CVCS BORON MAKEUP SHUTOFF VALVE QMO-420 STARTER OPEN CONTACTOR
2-20X-QMO-451-CL	CVCS SHUTOFF VALVE QMO-451 STARTER CLOSE CONTACTOR
2-20X-QMO-452-CL	CVCS LETDOWN SHUTOFF VALVE QMO-452 STARTER CLOSE CONTACTOR
2-20X-SEL	EAST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34E LEFT LIMIT SWITCH AUX RELAY
2-20X-SER	EAST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34E RIGHT LIMIT SWITCH AUX RELAY
2-20X-SIE-L	EAST ESW PUMP DISCHARGE STRAINER OME-34E INLET STARTER LEFT CONTACTOR
2-20X-SIE-R	EAST ESW PUMP DISCHARGE STRAINER OME-34E INLET STARTER RIGHT CONTACTOR
2-20X-SIW-L	WEST ESW PUMP DISCHARGE STRAINER OME-34W INLET STARTER LEFT CONTACTOR
2-20X-SIW-R	WEST ESW PUMP DISCHARGE STRAINER OME-34W INLET STARTER RIGHT CONTACTOR
2-20X-SOE-L	EAST ESW PUMP DISCHARGE STRAINER OME-34E OUTLET STARTER LEFT CONTACTOR

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-20X-SOE-R	EAST ESW PUMP DISCHARGE STRAINER OME-34E OUTLET STARTER RIGHT CONTACTOR
2-20X-SOW-L	WEST ESW PUMP DISCHARGE STRAINER OME-34W OUTLET STARTER LEFT CONTACTOR
2-20X-SOW-R	WEST ESW PUMP DISCHARGE STRAINER OME-34W OUTLET STARTER RIGHT CONTACTOR
2-20X-SWL	WEST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34-W LEFT LIMIT SWITCH AUX RELAY
2-20X-SWR	WEST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34-W RIGHT LIMIT SWITCH AUX RELAY
2-20X-TDTV-CL	AUXILIARY FEED PUMP TURBINE TRIP AND THROTTLE VALVE QT-506 STARTER CONTACTOR
2-20X-WMO-703-CL	EAST ESW PUMP DISCHARGE SHUTOFF VALVE WMO-703 STARTER CLOSE CONTACTOR
2-20X-WMO-703-OP	EAST ESW PUMP DISCHARGE SHUTOFF VALVE WMO-703 STARTER OPEN CONTACTOR
2-20X-WMO-704-CL	WEST ESW PUMP DISCHARGE SHUTOFF VALVE WMO-704 STARTER CLOSE CONTACTOR
2-20X-WMO-704-OP	WEST ESW PUMP DISCHARGE SHUTOFF VALVE WMO-704 STARTER OPEN CONTACTOR
2-20X-WMO-706-CL	WEST ESW SUPPLY HEADER CROSSTIE SHUTOFF VALVE WMO-706 STARTER CLOSE CONTACTOR
2-20X-WMO-708-CL	EAST ESW SUPPLY HEADER CROSSTIE TO UNIT 1 SHUTOFF VALVE WMO-708 STARTER CLOSE CONTACTOR
2-20X-WMO-712-CL	ESSENTIAL SERVICE WATER SHUTOFF VALVE WMO-712 STARTER CLOSE CONTACTOR
2-20X-WMO-714-OP	ESSENTIAL SERVICE WATER SHUTOFF VALVE WMO-714 STARTER OPEN CONTACTOR
2-20X-WMO-716-CL	ESSENTIAL SERVICE WATER INLET SHUTOFF VALVE WMO-716 STARTER CLOSE CONTACTOR
2-20X-WMO-718-OP	ESSENTIAL SERVICE WATER OUTLET SHUTOFF VALVE WMO-718 STARTER OPEN CONTACTOR
2-20X-WMO-722-CL	WEST ESW SUPPLY HEADER TO AB EMER DSL HX SHUTOFF VALVE WMO-722 STARTER CLOSE CONTACTOR
2-20X-WMO-724-CL	EAST ESW SUPPLY HDR TO AB EMER DSL HEAT EXRS S/O VALVE WMO-724 STARTER CLOSE CONTACTOR
2-20X-WMO-726-CL	ESSENTIAL SERVICE WATER SHUTOFF VALVE WMO-726 STARTER CLOSE CONTACTOR
2-20X-WMO-728-CL	WEST ESW SUPPLY HEADER TO CD EMER DSL HX SHUTOFF VALVE WMO-728 STARTER CLOSE CONTACTOR
2-20X-WMO-732-CL	ESSENTIAL SERVICE WATER SHUTOFF VALVE WMO-732 STARTER CLOSE CONTACTOR
2-20X-WMO-734-OP	ESSENTIAL SERVICE WATER SHUTOFF VALVE WMO-734 STARTER OPEN CONTACTOR
2-20X-WMO-734CL	ESSENTIAL SERVICE WATER SHUTOFF VALVE WMO 734 STARTER CLOSE CONTACTOR
2-20X-WMO-736-CL	ESSENTIAL SERVICE WATER OUTLET SHUTOFF VALVE WMO-736 STARTER CLOSE CONTACTOR
2-20X-WMO-738-CL	ESSENTIAL SERVICE WATER OUTLET SHUTOFF VALVE WMO-738 STARTER CLOSE CONTACTOR
2-20X-WMO-738-OP	ESSENTIAL SERVICE WATER OUTLET SHUTOFF VALVE WMO-738 STARTER OPEN CONTACTOR
2-20X-WMO-744-OP	ESSENTIAL SERVICE WATER SHUTOFF VALVE WMO-744 STARTER OPEN CONTACTOR
2-20X-WMO-753-OP	ESSENTIAL SERVICE WATER SHUTOFF VALVE WMO-753 STARTER OPEN CONTACTOR
2-20X-WMO-754-OP	ESW TO EAST MDAPP SHUTOFF VALVE WMO-754 STARTER OPEN CONTACTOR
2-23X2-DGAB	AB EMERGENCY DIESEL GENERATOR ROOM CO2 SYSTEM HAZARD #2 AUXILIARY ALARM RELAY #2
2-23X2-DGCD	CD EMERGENCY DIESEL GENERATOR ROOM CO2 SYSTEM HAZARD #1 AUXILIARY ALARM RELAY #2
2-27X-T21A	4KV BUS T21A UNDERVOLTAGE AUXILIARY RELAY
2-27X-T21B	4KV BUS T21B UNDERVOLTAGE AUXILIARY RELAY
2-27X-T21C	4KV BUS T21C UNDERVOLTAGE AUXILIARY RELAY
2-27X-T21D	4KV BUS T21D UNDERVOLTAGE AUXILIARY RELAY
2-33X-WMO-722	WEST ESW SUP HDR TO AB EDG HEAT EXCHANGER SHUTOFF VALVE WMO-722 LIMIT SWITCH AUX RELAY
2-33X-WMO-724	EAST ESW SUPPLY HDR TO AB EDG HEAT EXCH SHUTOFF VALVE WMO-724 LIMIT SWITCH AUX RELAY
2-33X-WMO-726	EAST ESW SUPPLY HDR TO CD EDG HEAT EXCH SHUTOFF VALVE WMO-726 LIMIT SWITCH AUX RELAY
2-33X-WMO-728	WEST ESW SUP HDR TO CD EDG HEAT EXCHANGER SHUTOFF VALVE WMO-728 LIMIT SWITCH AUX RELAY
2-4-TDTV	TURBINE DRIVEN AUXILIARY FEED PUMP PP-4 TRIP AND THROTTLE VALVE QT-506 START AUXRELAY
2-42-2-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #2
2-42-2-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #2
2-42-3-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #3
2-42-3-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #3
2-42-4-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #4
2-42-4-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #4
2-42-5-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #5
2-42-5-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #5
2-42-6-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #6
2-42-6-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #6
2-42-7-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #7
2-42-7-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #7
2-42-8-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB RUNNING RELAY #8

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-42-8-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD RUNNING RELAY #8
2-43X-BLI-110	SG #1 WIDE RANGE LEVEL TRANSMITTER REMOTE/LOCAL INDICATION SELECTOR SWITCH AUXILIARY RELAY
2-43X-BLI-120	SG #2 WIDE RANGE LEVEL TRANSMITTER REMOTE/LOCAL INDICATION SELECTOR SWITCH AUXILIARY RELAY
2-43X-BLI-130	SG #3 WIDE RANGE LEVEL TRANSMITTER REMOTE/LOCAL INDICATION SELECTOR SWITCH AUXILIARY RELAY
2-43X-BLI-140	SG #4 WIDE RANGE LEVEL TRANSMITTER REMOTE/LOCAL INDICATION SELECTOR SWITCH AUXILIARY RELAY
2-43X-DGABCT	AB EMERGENCY DIESEL GENERATOR CONTROL SELECTOR SWITCH 43-DGABCT AUXILIARY RELAY
2-43X-DGCDCT	CD EMERGENCY DIESEL GENERATOR CONTROL SELECTOR SWITCH 43-DGCDCT AUXILIARY RELAY
2-43X-NLI-151	PRESSURIZER LEVEL TRANSMITTER REMOTE/LOCAL INDICATION SELECTOR SWITCH AUXILIARY RELAY
2-43X-NPS-122	RC LOOP #1 HOT LEG WR PRESS TRANS REMOTE/LOCAL INDICATION SEL SWITCH AUX RELAY
2-43X-QFI-200	CVCS CHARGING PUMPS DISCHARGE FLOW TRANS REMOTE/LOCAL INDICATION SEL SWITCH AUX RELAY
2-43X1-DGABCT	AB EMERGENCY DIESEL GENERATOR CONTROL SELECTOR SWITCH 43-DGABCT AUXILIARY RELAY
2-43X1-DGCDCT	CD EMERGENCY DIESEL GENERATOR CONTROL SELECTOR SWITCH 43-DGCDCT AUXILIARY RELAY
2-43X1-DGSAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB SLOW START RELAY #1
2-43X1-DGSCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD SLOW START RELAY #1
2-43X3-DGSAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB SLOW START RELAY #3
2-43X3-DGSCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD SLOW START RELAY #3
2-43X4-DGSAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB SLOW START RELAY #4
2-43X4-DGSCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD SLOW START RELAY #4
2-5-ACRA1	CONTROL ROOM VENTILATION NORTH AIR CONDITIONING UNIT HV-ACRA-1 TRIP AND LOCKOUT RELAY
2-5-ACRA2	CONTROL ROOM VENTILATION SOUTH AIR CONDITIONING UNIT HV-ACRA-2 TRIP AND LOCKOUT RELAY
2-5-TA4	WEST RESIDUAL HEAT REMOVAL PUMP SUPPLY BREAKER T21A4 LOCKOUT RELAY
2-5-TA5	WEST ESW PUMP SUPPLY BREAKER T21A5 LOCKOUT RELAY
2-5-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21A7 BLOCKING RELAY
2-5-TA8	WEST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T21A8 LOCKOUT RELAY
2-5-TD10	EAST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T21D10 LOCKOUT RELAY
2-5-TD11	EAST MOTOR DRIVEN AUXILIARY FEED PUMP SUPPLY BREAKER T21D11 LOCKOUT RELAY
2-5-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21D3 BLOCKING RELAY
2-5-TD6	EAST RESIDUAL HEAT REMOVAL PUMP SUPPLY BREAKER T21D6 LOCKOUT RELAY
2-5-TD7	EAST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T21D7 LOCKOUT RELAY
2-50/50N-TA2	WEST MOTOR DRIVEN AUX FEED PUMP SUPPLY BREAKER T21A2 NEUTRAL INST OVERCURRENT RELAY
2-50/50N-TA5	WEST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T21A5 NEUTRAL INST OVERCURRENT RELAY
2-50/50N-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21A7 NEUTRAL INST OVERCURRENT RELAY
2-50/50N-TA8	WEST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T21A8 NEUTRAL INST OVERCURRENT RELAY
2-50/50N-TD10	EAST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T21D10 NEUTRAL INST OVERCURRENT RELAY
2-50/50N-TD11	EAST MOTOR DRIVEN AUX FEED PUMP SUPPLY BREAKER T21D11 NEUTRAL INST OVERCURRENT RELAY
2-50/50N-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21D3 NEUTRAL INST OVERCURRENT RELAY
2-50/50N-TD7	EAST CENTRIFUGAL CHARGING PUMPS SUPPLY BREAKER T21D7 NEUTRAL INST OVERCURRENT RELAY
2-50N-T21A	600V BUS 21A SUPPLY TRANSFORMER TR21A 4KV SIDE NEUTRAL GROUND INST OVERCURRENT RELAY
2-50N-T21B	4KV BUS T21B SUPPLY TO TRANSFORMER TR21B NEUTRAL GROUND INST OVERCURRENT RELAY
2-50N-T21C	600V BUS 21C SUPPLY TRANSFORMER TR21C 4KV SIDE NEUTRAL GROUND INST OVERCURRENT RELAY
2-50N-T21D	600V BUS 21D SUPPLY TRANSFORMER TR21D 4KV SIDE NEUTRAL GROUND INST OVERCURRENT RELAY
2-51-DGAB-1	AB EMERGENCY DIESEL GENERATOR OME-150-AB PHASE #1 OVERCURRENT RELAY
2-51-DGAB-3	AB EMERGENCY DIESEL GENERATOR OME-150-AB PHASE #3 OVERCURRENT RELAY
2-51-DGCD-1	CD EMERGENCY DIESEL GENERATOR OME-150-CD PHASE #1 TIME OVERCURRENT RELAY
2-51-DGCD-3	CD EMERGENCY DIESEL GENERATOR OME-150-CD PHASE #3 TIME OVERCURRENT RELAY
2-51-T21A-1	600V BUS 21A SUPPLY TRANSFORMER TR21A 4KV SIDE PHASE #1 OVERCURRENT RELAY
2-51-T21A-3	600V BUS 21A SUPPLY TRANSFORMER TR21A 4KV SIDE PHASE #3 OVERCURRENT RELAY
2-51-T21B-1	600V BUS 21B SUPPLY TRANSFORMER TR21B PHASE #1 OVERCURRENT RELAY
2-51-T21B-3	600V BUS 21B SUPPLY TRANSFORMER TR21B PHASE #3 OVERCURRENT RELAY
2-51-T21C-1	600V BUS 21C SUPPLY TRANSFORMER TR21C PHASE #1 OVERCURRENT RELAY
2-51-T21C-3	600V BUS 21C SUPPLY TRANSFORMER TR21C PHASE #3 OVERCURRENT RELAY
2-51-T21D-1	600V BUS 21D SUPPLY TRANSFORMER TR21D 4KV SIDE PHASE #1 OVERCURRENT RELAY
2-51-T21D-3	600V BUS 21D SUPPLY TRANSFORMER TR21D 4KV SIDE PHASE #3 OVERCURRENT RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-51-TA11-1	4KV BUS T21A EMERGENCY FEED PHASE #1 TIME OVERCURRENT RELAY
2-51-TA11-3	4KV BUS T21A EMERGENCY FEED PHASE #3 TIME OVERCURRENT RELAY
2-51-TA2	WEST MOTOR DRIVEN AUXILIARY FEED PUMP SUPPLY BREAKER T21A2 TIME OVERCURRENT TRIP RELAY
2-51-TA5	WEST ESW PUMP SUPPLY BREAKER T21A5 TIME OVERCURRENT RELAY
2-51-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21A7 TIME OVERCURRENT TRIP RELAY
2-51-TA8	WEST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T21A8 TIME OVERCURRENT TRIP RELAY
2-51-TD10	EAST ESW PUMP SUPPLY BREAKER T21D10 TIME OVERCURRENT RELAY
2-51-TD11	EAST MOTOR DRIVEN AUXILIARY FEED PUMP SUPPLY BREAKER T21D11 TIME OVERCURRENT RELAY
2-51-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21D3 TIME OVERCURRENT TRIP RELAY
2-51-TD7	EAST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T21D7 TIME OVERCURRENT TRIP RELAY
2-51-TD8-1	4KV BUS T21D EMERGENCY FEED PHASE #1 TIME OVERCURRENT RELAY
2-51-TD8-3	4KV BUS T21D EMERGENCY FEED PHASE #3 TIME OVERCURRENT RELAY
2-51-X-TD8	4KV BUS T21D EMERGENCY FEED OVERCURRENT LOCKOUT HAND RESET RELAY
2-51N-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB NEUTRAL GROUND OVERCURRENT RELAY
2-51N-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD NEUTRAL GROUND OVERCURRENT RELAY
2-51N-T21B	600V BUS 21B SUPPLY TRANSFORMER TR21B NEUTRAL GROUND OVERCURRENT RELAY
2-51N-T21C	600V BUS 21C SUPPLY TRANSFORMER TR21C NEUTRAL GROUND OVERCURRENT RELAY
2-51X-TA11	4KV BUS T21A EMERGENCY FEED OVERCURRENT LOCKOUT HAND RESET RELAY
2-52Y-TA11	EMERGENCY DIESEL GENERATOR 2-AB SUPPLY BREAKER T21A11 ANTIPUMP RELAY
2-52Y-TA2	WEST MOTOR DRIVEN AUX FEED PUMP SUPPLY BREAKER T21A2 ANTIPUMP RELAY
2-52Y-TA5	WEST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T21A5 ANTIPUMP RELAY
2-52Y-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21A7 ANTIPUMP RELAY
2-52Y-TB4	EMERGENCY DIESEL GENERATOR 2-AB SUPPLY BREAKER T21B4 ANTIPUMP RELAY
2-52Y-TC3	EMERGENCY DIESEL GENERATOR 2-CD SUPPLY BREAKER T21C3 ANTIPUMP RELAY
2-52Y-TD10	EAST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T21D10 ANTIPUMP RELAY
2-52Y-TD11	EAST MOTOR DRIVEN AUX FEEDWATER PUMP SUPPLY BREAKER T21D11 ANTIPUMP RELAY
2-52Y-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21D3 ANTIPUMP RELAY
2-52Y-TD8	EMERGENCY DIESEL GENERATOR SUPPLY BREAKER T21D8 ANTIPUMP RELAY
2-53-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB FIELD FLASHING CIRCUIT CONTACTOR
2-53-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD FIELD FLASHING CIRCUIT CONTACTOR
2-59-TA2-1	4KV CIRCUIT BREAKER T21A2 PHASE #1 VOLTAGE AVAILABLE RELAY
2-59-TA2-2	4KV CIRCUIT BREAKER T21A2 PHASE #2 VOLTAGE AVAILABLE RELAY
2-59-TA2-3	4KV CIRCUIT BREAKER T21A2 PHASE #3 VOLTAGE AVAILABLE RELAY
2-59-TA5-1	4KV CIRCUIT BREAKER T21A5 PHASE #1 VOLTAGE AVAILABLE RELAY
2-59-TA5-2	4KV CIRCUIT BREAKER T21A5 PHASE #2 VOLTAGE AVAILABLE RELAY
2-59-TA5-3	4KV CIRCUIT BREAKER T21A5 PHASE #3 VOLTAGE AVAILABLE RELAY
2-59-TA7-1	4KV CIRCUIT BREAKER T21A7 PHASE #1 VOLTAGE AVAILABLE RELAY
2-59-TA7-2	4KV CIRCUIT BREAKER T21A7 PHASE #2 VOLTAGE AVAILABLE RELAY
2-59-TA7-3	4KV CIRCUIT BREAKER T21A7 PHASE #3 VOLTAGE AVAILABLE RELAY
2-59-TD10-1	4KV CIRCUIT BREAKER T21D10 PHASE #1 VOLTAGE AVAILABLE RELAY
2-59-TD10-2	4KV CIRCUIT BREAKER T21D10 PHASE #2 VOLTAGE AVAILABLE RELAY
2-59-TD10-3	4KV CIRCUIT BREAKER T21D10 PHASE #3 VOLTAGE AVAILABLE RELAY
2-59-TD11-1	4KV CIRCUIT BREAKER T21D11 PHASE #1 VOLTAGE AVAILABLE RELAY
2-59-TD11-2	4KV CIRCUIT BREAKER T21D11 PHASE #2 VOLTAGE AVAILABLE RELAY
2-59-TD11-3	4KV CIRCUIT BREAKER T21D11 PHASE #3 VOLTAGE AVAILABLE RELAY
2-59-TD3-1	4KV CIRCUIT BREAKER T21D3 PHASE #1 VOLTAGE AVAILABLE RELAY
2-59-TD3-2	4KV CIRCUIT BREAKER T21D3 PHASE #2 VOLTAGE AVAILABLE RELAY
2-59-TD3-3	4KV CIRCUIT BREAKER T21D3 PHASE #3 VOLTAGE AVAILABLE RELAY
2-5A10	WEST TURBINE AUX COOLING WATER PUMP SUPPLY BREAKER 21A10 AUXILIARY LOCKOUT RELAY
2-5A6-LCTA	CD EMERGENCY DIESEL GENERATOR OME-150-CD LOAD CONSERVATION TRIP RELAY #6
2-5A6-LCTB	AB EMERGENCY DIESEL GENERATOR OME-150-AB LOAD CONSERVATION TRIP RELAY #6
2-5B10	600V CIRCUIT BREAKER 21B10 AUXILIARY LOCKOUT RELAY
2-5B12	600V CIRCUIT BREAKER 21B12 AUXILIARY LOCKOUT RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-5B6	600V CIRCUIT BREAKER 21B6 AUXILIARY LOCKOUT RELAY
2-5C17	600V CIRCUIT BREAKER 21C17 AUXILIARY LOCKOUT RELAY
2-5C4	600V CIRCUIT BREAKER 21C4 AUXILIARY LOCKOUT RELAY
2-5TA2	WEST MOTOR DRIVEN AUXILIARY FEED PUMP SUPPLY BREAKER T21A2 LOCKOUT RELAY
2-5X-AB	AB EMERGENCY DIESEL GENERATOR OME-150-AB TRIP CONT AUXILIARY RELAY
2-5X-CD	CD EMERGENCY DIESEL GENERATOR OME-150-CD TRIP CONTROL AUXILIARY RELAY
2-5X1-T21A	4KV BUS T21A MASTER LOAD SHEDDING RELAY
2-5X1-T21B	4KV BUS T21B MASTER LOAD SHEDDING RELAY
2-5X2-T21A	4KV BUS T21A MASTER LOAD SHEDDING RELAY
2-5X2-T21D	4KV BUS T21D MASTER LOAD SHEDDING RELAY
2-5X3-T21A	4KV BUS T21A MASTER LOAD SHEDDING RELAY
2-5X3-T21C	4KV BUS T21C MASTER LOAD SHEDDING RELAY
2-5X3-T21D	4KV BUS T21D MASTER LOAD SHEDDING RELAY
2-5X5-T21A	4KV BUS T21A MASTER LOAD SHEDDING RELAY
2-5X5-T21C	4KV BUS T21C MASTER LOAD SHEDDING RELAY
2-5X5-T21D	4KV BUS T21D MASTER LOAD SHEDDING RELAY
2-5X6-T21D	4KV BUS T21D MASTER LOAD SHEDDING RELAY
2-5Y-LCTA	CD EMERGENCY DIESEL GENERATOR OME-150-CD LOAD CONSERVATION TRIP RELAYS CONTACTOR
2-5Y-LCTB	AB EMERGENCY DIESEL GENERATOR OME-150-AB LOAD CONSERVATION TRIP RELAYS CONTACTOR
2-6-1-DGAB	EMERGENCY DIESEL GENERATOR 2-AB STARTING RELAY
2-6-1-DGCD	EMERGENCY DIESEL GENERATOR 2-CD STARTING RELAY
2-6-2-DGAB	EMERGENCY DIESEL GENERATOR 2-AB STARTING RELAY
2-6-2-DGCD	EMERGENCY DIESEL GENERATOR 2-CD STARTING RELAY
2-6-3-DGAB	EMERGENCY DIESEL GENERATOR 2-AB STARTING RELAY
2-6-3-DGCD	EMERGENCY DIESEL GENERATOR 2-CD STARTING RELAY
2-6-DGAB	EMERGENCY DIESEL GENERATOR 2-AB STARTING RELAY
2-6-DGCD	EMERGENCY DIESEL GENERATOR 2-CD STARTING RELAY
2-62-1-DGAB	AB EMERGENCY DIESEL INCOMPLETE START (CRANKING TIME LIMIT) TIME DELAY RELAY
2-62-1-DGCD	CD EMERGENCY DIESEL INCOMPLETE START (CRANKING TIME LIMIT) TIME DELAY RELAY
2-62-1X-DGAB	AB EMERGENCY DIESEL INCOMPLETE START AUXILIARY RELAY
2-62-1X-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD INCOMPLETE START AUXILIARY RELAY
2-62-2-DGAB	AB EMERGENCY DIESEL STARTING AIR JET ASSIST CONTROL VALVE XRV-220 CONTROL TIME DELAY RELAY
2-62-2-DGCD	CD EMERGENCY DIESEL STARTING AIR JET ASSIST CONTROL VALVE XRV-225 CONTROL TIME DELAY RELAY
2-62-2-DGSAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB STARTING RELAY #2
2-62-2-DGSCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD STARTING RELAY #2
2-62-2X-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB TRIP CONTROL AUXILIARY RELAY TIME DELAY RELAY
2-62-2X-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD TRIP CONTROL AUXILIARY RELAY TIME DELAY RELAY
2-62-BOS-B12	SOUTH NON ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER 21B12 BLACKOUT SEQUENTIAL TIMING RELAY
2-62-BOS-C17	NORTH NON ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER 21C17 BLACKOUT SEQUENTIAL TIMING RELAY
2-62-BOS-TA2	WEST MTR DRIVEN AUX FEED PUMP SUPPLY BREAKER T21A2 BLACKOUT SEQUENTIAL TIME DELAY RELAY
2-62-BOS-TA5	WEST ESW PUMP SUPPLY BREAKER T21A5 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
2-62-BOS-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21A7 BLACKOUT TIME DELAY RELAY
2-62-BOS-TD10	EAST ESW PUMP SUPPLY BREAKER T21D10 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
2-62-BOS-TD11	EAST MOTOR DRIVEN AUX FEED PUMP SUPPLY BREAKER T21D11 BLACKOUT SEQUENTIAL TIME DELAY RELAY
2-62-BOS-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21D3 BLACKOUT TIME DELAY RELAY
2-62-CS-TA3	4KV CIRCUIT BREAKER T21A3 CONTAINMENT ISOLATION PHASE 'B' RESET TIME DELAY RELAY
2-62-CS-TD4	4KV CIRCUIT BREAKER T21D4 CONTAINMENT ISOLATION PHASE 'B' RESET TIME DELAY RELAY
2-62-S2E	EAST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34E OPERATION TIME DELAY RELAY
2-62-S2W	WEST ESSENTIAL SERVICE WATER PUMP DISCHARGE STRAINER OME-34W OPERATION TIME DELAY RELAY
2-62-SIS-B12	NORTH NON ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER 21B12 SI SEQUENTIAL TIMING RELAY
2-62-SIS-C17	SOUTH NON ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER 21C17 SI SEQUENTIAL TIMING RELAY
2-62-SIS-TA1	SOUTH SAFETY INJECTION PUMP SUPPLY BREAKER T21A1 SEQUENTIAL TIMING RELAY
2-62-SIS-TA2	WEST MTR DRIVEN AUX FEED PUMP SUPPLY BREAKER T21A2 SAFEGUARD SEQUENTIAL TIME DELAY RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-62-SIS-TA4	WEST RHR PUMP SUPPLY BREAKER T21A4 SEQUENTIAL TIMER AUXILIARY TIME DELAY RELAY
2-62-SIS-TA5	WEST ESW PUMP SUPPLY T21A5 BREAKER BLACKOUT SEQUENTIAL TIME DELAY RELAY
2-62-SIS-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21A7 SEQUENTIAL START TIME RELAY
2-62-SIS-TA8	WEST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T21A8 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
2-62-SIS-TD10	EAST ESW PUMP SUPPLY BREAKER T21D10 BLACKOUT SEQUENTIAL TIME DELAY RELAY
2-62-SIS-TD11	EAST MOTOR DRIVEN AUX FEED PUMP SUPPLY BREAKER T21D11 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
2-62-SIS-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21D3 SEQUENTIAL START TIME DELAY RELAY
2-62-SIS-TD5	NORTH SAFETY INJECTION PUMP SUPPLY BREAKER T21D5 SEQUENTIAL TIMING RELAY
2-62-SIS-TD6	EAST RHR PUMP SUPPLY BREAKER T21D6 SEQUENTIAL TIMER AUXILIARY TIME DELAY RELAY
2-62-SIS-TD7	EAST CENTRIFUGAL CHARGING PUMP SUPPLY BREAKER T21D7 SAFEGUARD SEQUENTIAL TIME DELAY RELAY
2-62-T21AU	4KV BUS T21A AUXILIARY UNDERVOLTAGE RELAY 27X-T21A TIME DELAY RELAY
2-62-T21BU	4KV BUS T21B AUXILIARY UNDERVOLTAGE RELAY 27X-T21B TIME DELAY RELAY
2-62-T21CU	4KV BUS T21C AUXILIARY UNDERVOLTAGE RELAY 27X-T21C TIME DELAY RELAY
2-62-T21DU	4KV BUS T21D AUXILIARY UNDERVOLTAGE RELAY 27X-T21D TIME DELAY RELAY
2-63-ACP-EH-DGAB	EMERGENCY DIESEL GENERATOR 2-AB FRONT BANK AIR CHEST EXTREME HIGH PRESSURE SWITCH
2-63-ACP-EH-DGCD	EMERGENCY DIESEL GENERATOR 2-CD FRONT BANK AIR CHEST EXTREME HIGH PRESSURE SWITCH
2-63X-S2E	EAST ESW PUMP DISCHARGE STRAINER HIGH DIFFERENTIAL PRESSURE SWITCH WDS-703 AUXILIARY RELAY
2-63X-S2W	WEST ESW PUMP DISCHARGE STRAINER HIGH DIFFERENTIAL PRESSURE SWITCH WDS-704 AUXILIARY RELAY
2-63X1-SG1M	WEST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP DISCHARGE FLOW SWITCH FFS-244 AUXILIARY RELAY #2
2-63X1-SG1T	TDAPP SUPPLY TO STEAM GENERATOR #1 CONTROL VALVE FMO-211 AUXILIARY RELAY
2-63X1-SG2M	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP DISCHARGE FLOW SWITCH FFS-254 AUXILIARY RELAY #2
2-63X1-SG2T	TDAPP SUPPLY TO STEAM GENERATOR #2 CONTROL VALVE FMO-221 AUXILIARY RELAY
2-63X1-SG3M	EAST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP DISCHARGE FLOW SWITCH FFS-255 AUXILIARY RELAY #2
2-63X1-SG3T	TDAPP SUPPLY TO STEAM GENERATOR #3 CONTROL VALVE FMO-231 AUXILIARY RELAY
2-63X1-SG4M	WEST MOTOR DRIVEN AUXILIARY FEEDWATER PUMP DISCHARGE FLOW SWITCH FFS-245 AUXILIARY RELAY #2
2-63X1-SG4T	TDAPP SUPPLY TO STEAM GENERATOR #4 CONTROL VALVE FMO-241 AUXILIARY RELAY
2-65X-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB GOVERNOR DROOP CIRCUIT RELAY
2-65X-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD GOVERNOR DROOP CIRCUIT RELAY
2-83-TILA	CD EMERGENCY DIESEL GENERATOR INVERTER DGCD-INV LOAD TRANSFER RELAY
2-83-TILB	CD EMERGENCY DIESEL GENERATOR INVERTER DGCD-INV LOAD TRANSFER RELAY
2-86-ICC1	REACTOR PROTECTION SET I INRUSH CONTROL CIRCUIT LOCKOUT RELAY
2-86-ICC2	REACTOR PROTECTION SET II INRUSH CONTROL CIRCUIT LOCKOUT RELAY
2-86-ICC3	REACTOR PROTECTION SET III INRUSH CONTROL CIRCUIT LOCKOUT RELAY
2-86-ICC4	REACTOR PROTECTION SET IV INRUSH CONTROL CIRCUIT LOCKOUT RELAY
2-87-DGAB-1	AB EMERGENCY DIESEL GENERATOR OME-150-AB PHASE #1 DIFFERENTIAL RELAY
2-87-DGAB-2	AB EMERGENCY DIESEL GENERATOR OME-150-AB PHASE #2 DIFFERENTIAL RELAY
2-87-DGAB-3	AB EMERGENCY DIESEL GENERATOR OME-150-AB PHASE #3 DIFFERENTIAL RELAY
2-87-DGCD-1	CD EMERGENCY DIESEL GENERATOR OME-150-CD PHASE #1 DIFFERENTIAL RELAY
2-87-DGCD-2	CD EMERGENCY DIESEL GENERATOR OME-150-CD PHASE #2 DIFFERENTIAL RELAY
2-87-DGCD-3	CD EMERGENCY DIESEL GENERATOR OME-150-CD PHASE #3 DIFFERENTIAL RELAY
2-87-T21A-1	600V BUS 21A SUPPLY TRANSFORMER TR21A PHASE #1 DIFFERENTIAL RELAY
2-87-T21A-2	600V BUS 21A SUPPLY TRANSFORMER TR21A PHASE #2 DIFFERENTIAL RELAY
2-87-T21A-3	600V BUS 21A SUPPLY TRANSFORMER TR21A PHASE #3 DIFFERENTIAL RELAY
2-87-T21B-1	600V BUS 21B SUPPLY TRANSFORMER TR21B PHASE #1 DIFFERENTIAL RELAY
2-87-T21B-2	600V BUS 21B SUPPLY TRANSFORMER TR21B PHASE #2 DIFFERENTIAL RELAY
2-87-T21B-3	600V BUS 21B SUPPLY TRANSFORMER TR21B PHASE #3 DIFFERENTIAL RELAY
2-87-T21C-1	600V BUS 21C SUPPLY TRANSFORMER TR21C PHASE #1 DIFFERENTIAL RELAY
2-87-T21C-2	600V BUS 21C SUPPLY TRANSFORMER TR21C PHASE #2 DIFFERENTIAL RELAY
2-87-T21C-3	600V BUS 21C SUPPLY TRANSFORMER TR21C PHASE #3 DIFFERENTIAL RELAY
2-87-T21D-1	600V BUS 21D SUPPLY TRANSFORMER TR21D PHASE #1 DIFFERENTIAL RELAY
2-87-T21D-2	600V BUS 21D SUPPLY TRANSFORMER TR21D PHASE #2 DIFFERENTIAL RELAY
2-87-T21D-3	600V BUS 21D SUPPLY TRANSFORMER TR21D PHASE #3 DIFFERENTIAL RELAY
2-87X-DGAB	AB EMERGENCY DIESEL GENERATOR OME-150-AB TRIP LOCKOUT HAND RESET RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-87X-DGCD	CD EMERGENCY DIESEL GENERATOR OME-150-CD TRIP LOCKOUT HAND RESET RELAY
2-87X-T21A	600V BUS 21A SUPPLY TRANSFORMER TR21A LOCKOUT HAND RESET RELAY
2-87X-T21B	600V BUS 21B SUPPLY TRANSFORMER TR21B LOCKOUT HAND RESET RELAY
2-87X-T21C	600 BUS 21C SUPPLY TRANSFORMER TR21C LOCKOUT HAND RESET RELAY
2-87X-T21D	600V BUS 21D SUPPLY TRANSFORMER TR21D LOCKOUT HAND RESET RELAY
2-88X-BC-A	TRAIN N BATTERY CHARGER BC-A STARTER CONTACTOR
2-88X-BC-B	TRAIN N BATTERY CHARGER BC-B STARTER CONTACTOR
2-88X1-BCA	TRAIN N BATTERY DISTRIBUTION TRAIN A BATTERY CHARGER BC-A AUXILIARY RELAY
2-88X1-BCB	TRAIN N BATTERY DISTRIBUTION TRAIN B BATTERY CHARGER BC-B AUXILIARY RELAY
2-88X2-BC-A	TRAIN N BATTERY DISTRIBUTION TRAIN A BATTERY CHARGER BC-A AUXILIARY RELAY
2-88X2-BC-B	TRAIN N BATTERY DISTRIBUTION TRAIN B BATTERY CHARGER BC-B AUXILIARY RELAY
2-AT6-23-WMSP	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-BC-A-F10	N TRAIN BATTERY CHARGER 2-BC-A RELAY
2-BC-A-F8	N TRAIN BATTERY CHARGER 2-BC-A RELAY
2-BC-A-F9	N TRAIN BATTERY CHARGER 2-BC-A RELAY
2-BC-A-K2	N TRAIN BATTERY CHARGER 2-BC-A RELAY
2-BC-A-TIMER	N TRAIN BATTERY CHARGER 2-BC-A RELAY
2-BC-B-F10	N TRAIN BATTERY CHARGER 2-BC-B RELAY
2-BC-B-F8	N TRAIN BATTERY CHARGER 2-BC-B RELAY
2-BC-B-F9	N TRAIN BATTERY CHARGER 2-BC-B RELAY
2-BC-B-K2	N TRAIN BATTERY CHARGER 2-BC-B RELAY
2-BC-B-TIMER	N TRAIN BATTERY CHARGER 2-BC-B RELAY
2-CIB-A-AUX	PHASE 'B' CONTAINMENT ISOLATION TRAIN 'A' AUXILIARY RELAY #1
2-CIB-A-AUX1	PHASE 'B' CONTAINMENT ISOLATION TRAIN 'A' AUXILIARY RELAY #2
2-CIB-B-AUX	PHASE 'B' CONTAINMENT ISOLATION TRAIN 'B' AUXILIARY RELAY #1
2-CIB-B-AUX1	PHASE 'B' CONTAINMENT ISOLATION TRAIN 'B' AUXILIARY RELAY #2
2-CSX-TA3	WEST CONTAINMENT SPRAY PUMP SUPPLY BREAKER T21A3 CS TRIP AUXILIARY RELAY
2-CSX-TD4	EAST CONTAINMENT SPRAY PUMP SUPPLY BREAKER T21D4 CS TRIP AUXILIARY RELAY
2-DGAB-INV-OB	EMERGENCY DIESEL GENERATOR 2-AB INVERTER
2-DGAB-INV-SB	EMERGENCY DIESEL GENERATOR 2-AB INVERTER
2-DGAB-INV-SY1	EMERGENCY DIESEL GENERATOR 2-AB INVERTER
2-DGAB-INV-SY2	EMERGENCY DIESEL GENERATOR 2-AB INVERTER
2-DGCD-INV-OB	EMERGENCY DIESEL GENERATOR 2-CD INVERTER
2-DGCD-INV-SB	EMERGENCY DIESEL GENERATOR 2-CD INVERTER
2-DGCD-INV-SY1	EMERGENCY DIESEL GENERATOR 2-CD INVERTER
2-DGCD-INV-SY2	EMERGENCY DIESEL GENERATOR 2-CD INVERTER
2-EOM-AUX	TURBINE DRIVEN AUXILIARY FEED PUMP PP-4 OVERSPEED TRIP AUXILIARY RELAY
2-FBCST-AB	EMERGENCY DIESEL GENERATOR 2-AB FRONT BANK CAMSHAFT SPEED TRANSMITTER
2-FBCST-CD	EMERGENCY DIESEL GENERATOR 2-CD FRONT BANK CAMSHAFT SPEED TRANSMITTER
2-K-301-AB1	PLANT BATTERY CHARGER BATT-AB BATTERY CHARGER #1 RELAY
2-K-301-AB2	PLANT BATTERY CHARGER BATT-AB BATTERY CHARGER #2 RELAY
2-K-301-CD1	PLANT BATTERY CHARGER BATT-CD BATTERY CHARGER #1 RELAY
2-K-301-CD2	PLANT BATTERY CHARGER BATT-CD BATTERY CHARGER #2 RELAY
2-K-303-AB1	PLANT BATTERY CHARGER BATT-AB BATTERY CHARGER #1 RELAY
2-K-303-AB2	PLANT BATTERY CHARGER BATT-AB BATTERY CHARGER #2 RELAY
2-K-303-CD1	PLANT BATTERY CHARGER BATT-CD BATTERY CHARGER #1 RELAY
2-K-303-CD2	PLANT BATTERY CHARGER BATT-CD BATTERY CHARGER #2 RELAY
2-K-304-AB1	PLANT BATTERY CHARGER BATT-AB BATTERY CHARGER #1 RELAY
2-K-304-AB2	PLANT BATTERY CHARGER BATT-AB BATTERY CHARGER #2 RELAY
2-K-304-CD1	PLANT BATTERY CHARGER BATT-CD BATTERY CHARGER #1 RELAY
2-K-304-CD2	PLANT BATTERY CHARGER BATT-CD BATTERY CHARGER #2 RELAY
2-K-644-A	CONTAINMENT SPRAY MOTOR OPERATED VALVES REACTOR PROTECTION OUTPUT RELAY
2-K-AUX-CMO-419	EAST RHR HX CCW OUTLET SHUTOFF VALVE CMO-419 AUTO OPERATION ON SI AUX RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-K-AUX-CMO-429	WEST RHR HX CCW OUTLET SHUTOFF VALVE CMO-429 AUTO OPERATION ON SI AUX RELAY
2-K-AUX-WMO-714	WEST CNTMT SPRAY HX ESW OUTLET SHUTOFF VALVE WMO-714 AUTOMATIC OPERATION AUXILIARY RELAY
2-K-AUX-WMO-718	EAST CNTMT SPRAY HX ESW OUTLET SHUTOFF VALVE WMO-718 AUTOMATIC OPERATION AUXILIARY RELAY
2-K-AUX-WMO-734	EAST CCW HX ESW OUTLET SHUTOFF VALVE WMO-734 AUTOMATIC OPERATION AUXILIARY RELAY
2-K-AUX-WMO-738	WEST CCW HX ESW OUTLET SHUTOFF VALVE WMO-738 AUTOMATIC OPERATION AUXILIARY RELAY
2-K1-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-K1-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-K1-21WMSP	NUCLEAR INSTRUMENTATION CHANNEL I WIDE RANGE RADIATION DETECTOR RELAY
2-K1-21WMSPBT	NUCLEAR INSTRUMENTATION CHANNEL I WIDE RANGE RADIATION DETECTOR RELAY
2-K1-21WRAMP	NUCLEAR INSTRUMENTATION CHANNEL I WIDE RANGE RADIATION DETECTOR RELAY
2-K1-23RMSP	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K1-23RMSP-DDA1	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K1-23RMSP-DDA2	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K1-23RMSP-DDA3	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K1-23RMSP-DDA4	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K1-23WMSP	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K1-23WRAMP	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K1-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-K1-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-K101-21WMSPBT	NUCLEAR INSTRUMENTATION CHANNEL I WIDE RANGE RADIATION DETECTOR RELAY
2-K118-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL I REACTOR PROT INPUT RELAY
2-K118-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL I REACTOR PROT INPUT RELAY
2-K119-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL I REACTOR PROT INPUT RELAY
2-K119-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL I REACTOR PROT INPUT RELAY
2-K131-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL I REACTOR PROTECTION INPUT RELAY
2-K131-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL I REACTOR PROTECTION INPUT RELAY
2-K133-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL I REACTOR PROT INPUT RELAY
2-K133-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL I REACTOR PROT INPUT RELAY
2-K134-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL I REACTOR PROT INPUT RELAY
2-K134-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL I REACTOR PROT INPUT RELAY
2-K137-A	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL I REACTOR PROTECTION INPUT RELAY
2-K137-B	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL I REACTOR PROTECTION OUTPUT RELAY
2-K150-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #1 CHANNEL I REACTOR PROTECTION INPUT RELAY
2-K150-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #1 CHANNEL I REACTOR PROTECTION INPUT RELAY
2-K2-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-K2-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-K2-21WMSP	NUCLEAR INSTRUMENTATION CHANNEL I WIDE RANGE RADIATION DETECTOR RELAY
2-K2-23RMSP	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K2-23RMSP-DDA1	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K2-23RMSP-DDA2	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K2-23RMSP-DDA3	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K2-23RMSP-DDA4	NUCLEAR INSTRUMENTATION CHANNEL III SOURCE RANGE RADIATION DETECTOR RELAY
2-K2-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-K2-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-K201-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL II REACTOR PROTECTION INPUT RELAY
2-K201-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL II REACTOR PROTECTION INPUT RELAY
2-K203-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL II REACTOR PROT INPUT RELAY
2-K203-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL II REACTOR PROT INPUT RELAY
2-K204-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL II REACTOR PROT INPUT RELAY
2-K204-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL II REACTOR PROT INPUT RELAY
2-K216-A	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION INPUT RELAY
2-K216-B	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION OUTPUT RELAY
2-K217-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION INPUT RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-K217-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION OUTPUT RELAY
2-K247-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL II REACTOR PROT INPUT RELAY
2-K247-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL II REACTOR PROT INPUT RELAY
2-K248-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL II REACTOR PROT INPUT RELAY
2-K248-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL II REACTOR PROT INPUT RELAY
2-K250-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #2 CHANNEL II REACTOR PROTECTION INPUT RELAY
2-K250-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #2 CHANNEL II REACTOR PROTECTION INPUT RELAY
2-K3-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-K3-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-K3-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-K3-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-K317-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL III REACTOR PROT INPUT RELAY
2-K317-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL III REACTOR PROT INPUT RELAY
2-K318-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL III REACTOR PROT INPUT RELAY
2-K318-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL III REACTOR PROT INPUT RELAY
2-K320-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #3 CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K320-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #3 CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K329-A	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K329-B	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION OUTPUT RELAY
2-K330-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K330-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION OUTPUT RELAY
2-K344-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K344-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL III REACTOR PROTECTION INPUT RELAY
2-K4-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-K4-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-K4-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-K4-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-K417-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL IV REACTOR PROT INPUT RELAY
2-K417-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL IV REACTOR PROT INPUT RELAY
2-K418-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL IV REACTOR PROT INPUT RELAY
2-K418-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL IV REACTOR PROT INPUT RELAY
2-K420-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #4 CHANNEL IV REACTOR PROTECTION INPUT RELAY
2-K420-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #4 CHANNEL IV REACTOR PROTECTION INPUT RELAY
2-K429-A	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL IV REACTOR PROTECTION INPUT RELAY
2-K429-B	SAFETY INJECTION HI-HI CONTAINMENT PRESSURE CHANNEL IV REACTOR PROTECTION OUTPUT RELAY
2-K430-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL IV PROTECTION INPUT RELAY
2-K430-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL IV PROTECTION OUTPUT RELAY
2-K5-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-K5-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-K5-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-K5-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-K501-A	SAFETY INJECTION CIRCUIT REACTOR PROTECTION TEST RELAY.
2-K501-B	SAFETY INJECTION CIRCUIT REACTOR PROTECTION TEST RELAY
2-K505-A	CONTAINMENT SPRAY ACTUATION REACTOR PROTECTION OUTPUT RELAY
2-K505-B	CONTAINMENT SPRAY ACTUATION REACTOR PROTECTION OUTPUT RELAY
2-K506-A	CONTAINMENT ISOLATION PHASE 'B' REACTOR PROTECTION OUTPUT RELAY
2-K506-B	CONTAINMENT ISOLATION PHASE 'B' REACTOR PROTECTION OUTPUT RELAY
2-K521-A	SAFETY INJECTION ACTUATION CIRCUIT REACTOR PROTECTION TEST RELAY
2-K521-B	SAFETY INJECTION ACTUATION CIRCUIT REACTOR PROTECTION TEST RELAY
2-K522-A	CONTAINMENT ISOLATION PHASE 'A' VALVES REACTOR PROTECTION OUTPUT RELAY
2-K522-B	CONTAINMENT ISOLATION PHASE 'A' VALVES REACTOR PROTECTION OUTPUT RELAY
2-K6-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-K6-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-K6-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-K6-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-K602-A	SAFETY INJECTION ACTUATION CIRCUIT TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
2-K602-B	SAFETY INJECTION ACUTATION CIRCUIT TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
2-K604-A	EAST CCW HX HE-15E ESW OUTLET SHUTOFF VALVE WMO-734 TEST BLOCK REACTOR PROT OUTPUT RELAY
2-K604-B	EAST CCW HX HE-15E ESW OUTLET SHUTOFF VALVE WMO-734 TEST BLOCK REACTOR PROT OUTPUT RELAY
2-K606-A	CONTAINMENT ISOLATION PHASE 'A' VALVES TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
2-K606-B	CONTAINMENT ISOLATION PHASE 'A' VALVES TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
2-K608-A	SAFETY INJECTION BLACKOUT INTAKE REACTOR PROTECTION OUTPUT RELAY
2-K608-B	SAFETY INJECTION BLACKOUT INTAKE REACTOR PROTECTION OUTPUT RELAY
2-K608-X1-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K608-X1-B	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K608-X2-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K608-X2-B	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K609-A	EMERGENCY DIESEL GENERATOR START REACTOR PROTECTION OUTPUT RELAY
2-K609-B	EMERGENCY DIESEL GENERATOR START REACTOR PROTECTION OUTPUT RELAY
2-K609-X1-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K609-X1-B	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K610-A	ENGINEERED SAFETY SYSTEM SAFETY INJECTION PUMPS START REACTOR PROTECTION OUTPUT RELAY
2-K610-B	ENGINEERED SAFETY SYSTEM INJECTION PUMPS START REACTOR PROTECTION OUTPUT RELAY
2-K610-X1-B	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K610-X1-X-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K611-A	ESW & AUXILIARY FEEDWATER PUMPS START REACTOR PROTECTION OUTPUT RELAY
2-K611-B	ESW & AUXILIARY FEEDWATER PUMPS START REACTOR PROTECTION OUTPUT RELAY
2-K611-X1-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K611-X1-B	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
2-K611X-B	UNIT 2 ESW & AUX FEEDWATER PUMPS START REACTOR PROTECTION OUTPUT RELAY UNIT 1 AUX RELAY
2-K618-A	CONTAINMENT ISOLATION PHASE 'B' CIRCUIT TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
2-K618-B	CONTAINMENT ISOLATION PHASE 'B' CIRCUIT TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
2-K619-A	CONTAINMENT ISOLATION PHASE 'B' CIRCUIT TEST BLOCK REACTOR PROTECTION OUTPUT RELAY
2-K619-B	CONTAINMENT ISOLATION PHASE 'B' CIRCUIT TEST BLOCK REACTOR PROTECTION OUPUT RELAY
2-K626-A	CONTAINMENT ISOLATION PHASE 'B' REACTOR PROTECTION OUTPUT RELAY
2-K626-B	CONTAINMENT ISOLATION PHASE 'B' REACTOR PROTECTION OUTPUT RELAY
2-K626-X3-A	REACTOR PROTECTION CONTAINMENT ISOLATION PHASE 'B' AUXILIARY RELAY
2-K626-X3-B	REACTOR PROTECTION CONTAINMENT ISOLATION PHASE 'B' AUXILIARY RELAY
2-K643-A	CONTAINMENT SPRAY SAFETY INJECTION ACTUATION REACTOR PROTECTION OUTPUT RELAY
2-K643-B	CONTAINMENT SPRAY SAFETY INJECTION ACTUATION REACTOR PROTECTION OUTPUT RELAY
2-K644-B	CONTAINMENT SPRAY MOTOR OPERATED VALVES REACTOR PROTECTION OUTPUT RELAY
2-LB-112-BX1	REACTOR COOLANT LETDOWN VCT EXTREME HIGH LEVEL CTRL TRANSMITTER AUX RELAY
2-LB-112-BX2	REACTOR COOLANT LETDOWN VCT EXTREME HIGH LEVEL CTRL TRANSMITTER AUX RELAY
2-LB-112-DX	REACTOR COOLANT LETDOWN VCT EXTREME HIGH LEVEL CTRL TRANSMITTER AUX RELAY
2-LB-185-BX1	REACTOR COOLANT LETDOWN VCT EXTREME HIGH LEVEL CTRL TRANSMITTER AUX RELAY
2-LB-185-BX2	REACTOR COOLANT LETDOWN VCT EXTREME HIGH LEVEL CTRL TRANSMITTER AUX RELAY
2-LCSI-A-AUX	CD EMERGENCY DIESEL GENERATOR OME-150-CD SAFETY INJECTION LOAD CONSERVATION TRIP RELAY
2-LCSI-B-AUX	AB EMERGENCY DIESEL GENERATOR OME-150-AB SAFETY INJECTION LOAD CONSERVATION TRIP RELAY
2-MUX-4-2	REACTOR COOLANT MAKEUP CONTROL AUTOMATIC OPERATION AUXILIARY RELAY #2
2-PB-455-X1	EAST CCP MINI FLOW TO RCP SEAL WATER HEAT EXCHANGER SHUTOFF VALVE CONTROL RELAY
2-PB-457-X1	WEST CCP MINI FLOW TO RCP SEAL WATER HEAT EXCHANGER SHUTOFF VALVE CONTROL RELAY
2-PBX-455D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-456D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-457D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-514A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-514B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-PBX-514C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-515A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-515B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-516C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-516D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-525A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-525B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-525C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-526C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-526D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-534A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-534B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-536A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-546A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-934A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-934B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-935A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-935B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-936A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-936B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-PBX-937A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
2-RBCST-AB	EMERGENCY DIESEL GENERATOR 2-AB REAR BANK CAMSHAFT SPEED TRANSMITTER
2-RBCST-CD	EMERGENCY DIESEL GENERATOR 2-CD REAR BANK CAMSHAFT SPEED TRANSMITTER
2-RL1-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-RL1-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-RL1-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-RL1-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-RL1-ACVS-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-RL1-ACVS-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-RL1-ACVS-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-RL1-ACVS-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-RL1-OSCBD-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-RL1-OSCBD-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-RL1-OSCBD-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-RL1-OSCBD-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-RL1-SYBD-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-RL1-SYBD-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-RL1-SYBD-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-RL1-SYBD-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-RL1SS-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-RL1SS-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-RL1SS-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-RL1SS-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-RL2-SYBD-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-RL2-SYBD-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-RL2-SYBD-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-RL2-SYBD-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-RL2SS-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-RL2SS-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-RL2SS-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-RL2SS-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-RL3-SYBD-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-RL3-SYBD-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
2-RL3-SYBD-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-RL3-SYBD-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-RR1-1	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL I INVERTER RELAY
2-RR1-2	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL II INVERTER RELAY
2-RR1-3	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL III INVERTER RELAY
2-RR1-4	120 VAC CONTROL ROOM INSTRUMENTATION DISTRIBUTION SYSTEM CHANNEL IV INVERTER RELAY
2-SI-X-TA2	WEST MOTOR DRIVEN AUXILIARY FEED PUMP SUPPLY BREAKER T21A2 SI TRIP AUX RELAY
2-SI-X-TD11	EAST MOTOR DRIVEN AUX FEEDWATER PUMP SUPPLY BREAKER T21D11 SI TRIP AUXILIARY RELAY
2-SIX-TA1	SOUTH SAFETY INJECTION PUMP SUPPLY BREAKER T21A1 SI TRIP AUXILIARY RELAY
2-SIX-TA4	WEST RESIDUAL HEAT REMOVAL PUMP SUPPLY BREAKER T21A4 SI TRIP AUXILIARY RELAY
2-SIX-TA5	WEST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T21A5 SI TRIP AUXILIARY RELAY
2-SIX-TA7	WEST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21A7 SI TRIP AUXILIARY RELAY
2-SIX-TD10	EAST ESSENTIAL SERVICE WATER PUMP SUPPLY BREAKER T21D10 SI TRIP AUXILIARY RELAY
2-SIX-TD3	EAST COMPONENT COOLING WATER PUMP SUPPLY BREAKER T21D3 SI TRIP AUXILIARY RELAY
2-SIX-TD5	NORTH SAFETY INJECTION PUMP SUPPLY BREAKER T21D5 SI TRIP AUXILIARY RELAY
2-SIX-TD6	EAST CENTIFUGAL CHARGING PUMP SUPPLY BREAKER T21D6 SI TRIP AUXILIARY RELAY
2-TDAPP-OSM	TURBINE DRIVEN AUXILIARY FEED PUMP PP-4 OVERSPEED MONITOR
1-FBX-512B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-513B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-522B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-523B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-532B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-533B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-542B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-FBX-543B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-K107-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #1 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K107-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #2 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K115-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #2 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K115-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #2 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K116-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #3 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K116-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #3 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K117-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #4 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K117-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #4 CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K118-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL I REACTOR PROT INPUT RELAY
1-K118-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL I REACTOR PROT INPUT RELAY
1-K119-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL I REACTOR PROT INPUT RELAY
1-K119-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL I REACTOR PROT INPUT RELAY
1-K131-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K131-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL I REACTOR PROTECTION INPUT RELAY
1-K133-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL I REACTOR PROT INPUT RELAY
1-K133-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL I REACTOR PROT INPUT RELAY
1-K134-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL I REACTOR PROT INPUT RELAY
1-K134-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL I REACTOR PROT INPUT RELAY
1-K148-A	REACTOR COOLANT LOOP #1 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K148-B	REACTOR COOLANT LOOP #1 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K201-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K201-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K203-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL II REACTOR PROT INPUT RELAY
1-K203-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL II REACTOR PROT INPUT RELAY
1-K204-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL II REACTOR PROT INPUT RELAY
1-K204-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL II REACTOR PROT INPUT RELAY
1-K217-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K217-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL II REACTOR PROTECTION OUTPUT RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-K229-A	REACTOR COOLANT LOOP #2 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K229-B	REACTOR COOLANT LOOP #2 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K243-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #1 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K243-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #1 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K244-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #3 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K244-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #3 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K245-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #4 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K245-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #4 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K246-A	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #2 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K246-B	STEAM GENERATOR HIGH STEAM LINE FLOW LOOP #2 CHANNEL II REACTOR PROTECTION INPUT RELAY
1-K247-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL II REACTOR PROT INPUT RELAY
1-K247-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL II REACTOR PROT INPUT RELAY
1-K248-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL II REACTOR PROT INPUT RELAY
1-K248-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL II REACTOR PROT INPUT RELAY
1-K306-A	REACTOR COOLANT LOOP #3 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K306-B	REACTOR COOLANT LOOP #3 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K317-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL III REACTOR PROT INPUT RELAY
1-K317-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #2 CHANNEL III REACTOR PROT INPUT RELAY
1-K318-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL III REACTOR PROT INPUT RELAY
1-K318-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #3 CHANNEL III REACTOR PROT INPUT RELAY
1-K319-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #2 CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K319-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #2 CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K320-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #3 CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K320-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #3 CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K330-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K330-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL III REACTOR PROTECTION OUTPUT RELAY
1-K344-A	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K344-B	PRESSURIZER LOW PRESSURE SFTY INJECTION INITIATION CHANNEL III REACTOR PROTECTION INPUT RELAY
1-K406-A	REACTOR COOLANT LOOP #4 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K406-B	REACTOR COOLANT LOOP #4 LOW LOW AVERAGE TEMPERATURE BISTABLE INPUT RELAY
1-K417-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL IV REACTOR PROT INPUT RELAY
1-K417-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #1 CHANNEL IV REACTOR PROT INPUT RELAY
1-K418-A	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL IV REACTOR PROT INPUT RELAY
1-K418-B	STEAM GENERATOR STEAM LINE DIFF PRESSURE LOOP #4 CHANNEL IV REACTOR PROT INPUT RELAY
1-K419-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #1 CHANNEL IV REACTOR PROTECTION INPUT RELAY
1-K419-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #1 CHANNEL IV REACTOR PROTECTION INPUT RELAY
1-K420-A	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #4 CHANNEL IV REACTOR PROTECTION INPUT RELAY
1-K420-B	STEAM GENERATOR LOW STEAM LINE PRESSURE LOOP #4 CHANNEL IV REACTOR PROTECTION INPUT RELAY
1-K430-A	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL IV PROTECTION INPUT RELAY
1-K430-B	SAFETY INJECTION HIGH CONTAINMENT PRESSURE CHANNEL IV PROTECTION OUTPUT RELAY
1-K501-A	SAFETY INJECTION CIRCUIT REACTOR PROTECTION TEST RELAY
1-K521-B	SAFETY INJECTION ACTUATION CIRCUIT REACTOR PROTECTION TEST RELAY
1-K610-A	ENGINEERED SAFETY SYSTEM SAFETY INJECTION PUMPS START REACTOR PROTECTION OUTPUT RELAY
1-K610-X1-A	REACTOR PROTECTION SAFETY INJECTION AUXILIARY RELAY
1-K611-B	ESW & AUXILIARY FEEDWATER PUMPS START REACTOR PROTECTION OUTPUT RELAY
1-PBX-455D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-456D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-457D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-514A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-514B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-515A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-515B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-516A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY

UNIT 2 ESSENTIAL RELAY LIST

<u>RELAY TAG NUMBER</u>	<u>DESCRIPTION</u>
1-PBX-516C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-516D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-525A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-525B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-526A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-526C	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-526D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-534A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-534B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-536A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-546A	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-934B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-935B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-PBX-936B	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-TBX-412D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-TBX-422D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-TBX-432D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY
1-TBX-442D	REACTOR PROTECTION SYSTEM OUTPUT ISOLATOR RELAY

APPENDIX D

AMPLIFICATION FACTORS FOR ESSENTIAL RELAY PANELS

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UNIT 2 ESSENTIAL RELAY PANELS	PAGES 3-4
AMPLIFICATION FOR 2-BC-B-PNL	PAGE 5

UNIT 1 AMPLIFICATION FACTORS FOR ESSENTIAL RELAY PANELS

<u>PANEL ID</u>	<u>PANEL DESCRIPTION</u>	<u>AMP FACTOR</u>
1-A11	AUX RELAY PANEL A11	MED
1-A13	AUX RELAY PANEL A13	MED
1-AB-N	250 VDC VALVE CONTROL CENTER AB-N	LOW
1-ABD-A	600 VAC MOTOR CONTROL CENTER ABD-A	LOW
1-ABD-B	600 VAC MOTOR CONTROL CENTER ABD-B	LOW
1-ABD-D	600 VAC MOTOR CONTROL CENTER ABD-D	LOW
1-ABV-A	600 VAC MOTOR CONTROL CENTER ABV-A	LOW
1-ABV-D	600 VAC MOTOR CONTROL CENTER ABV-D	LOW
1-ACRA-1	CONTROL ROOM AIR HANDLING SUBPANEL #1	MED
1-ACRA-2	CONTROL ROOM AIR HANDLING SUBPANEL #2	MED
1-AM-A	600 VAC MOTOR CONTROL CENTER AM-A	LOW
1-AM-D	600 VAC MOTOR CONTROL CENTER AM-D	LOW
1-ARA-2	REACTOR PROTECTION TRAIN A AUX RELAY CAB #2	MED
1-AZ-BC	600 VAC MOTOR CONTROL CENTER AZ-BC	LOW
1-AZV-A	600 VAC MOTOR CONTROL CENTER AZV-A	LOW
1-BC-A	BATTERY CHARGER A FOR N TRAIN BATTERY	MED
1-BC-A-PNL	BATTERY CHARGER A CONTROL BOX	RIG (Note 1)
1-BC-AB1	PLANT BATTERY BATT-AB BATTERY CHARGER #1	MED
1-BC-AB2	PLANT BATTERY BATT-AB BATTERY CHARGER #2	MED
1-BC-B	BATTERY CHARGER B FOR N TRAIN BATTERY	MED
1-BC-B-PNL	BATTERY CHARGER B CONTROL BOX	RIG (Note 1)
1-BC-CD1	PLANT BATTERY BATT-CD BATTERY CHARGER #1	MED
1-BC-CD2	PLANT BATTERY BATT-CD BATTERY CHARGER #2	MED
1-CRID-I-INV	120 VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER	MED
1-CRID-II-INV	120 VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER	MED
1-CRID-III-INV	120 VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER	MED
1-CRID-IV-INV	120 VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER	MED
1-DGAB	AB EMERGENCY DIESEL GENERATOR CONTROL SUBPANEL	MED/HI (Note 2)
1-DGAB-INV	AB EMERGENCY DIESEL GENERATOR INVERTER	HI
1-DGAB-X	AB EMERGENCY DIESEL GENERATOR AUXILIARY SUBPANEL	MED
1-DGCD	CD EMERGENCY DIESEL GENERATOR CONTROL SUBPANEL	MED/HI (Note 2)
1-DGCD-INV	CD EMERGENCY DIESEL GENERATOR INVERTER	HI
1-DGCD-X	CD EMERGENCY DIESEL GENERATOR AUXILIARY SUBPANEL	MED
1-EFR	EMERGENCY FIRE PANEL INSTRUMENT/RELAY RACK	MED
1-EZC-A	600 VAC MOTOR CONTROL CENTER EZC-A	LOW
1-EZC-B	600 VAC MOTOR CONTROL CENTER EZC-B	LOW
1-EZC-C	600 VAC MOTOR CONTROL CENTER EZC-C	LOW
1-EZC-D	600 VAC MOTOR CONTROL CENTER EZC-D	LOW
1-GR1	GENERATOR PANEL REAR INSTRUMENT/RELAY RACK #1	MED
1-GR2	GENERATOR PANEL REAR INSTRUMENT/RELAY RACK #2	MED
1-GRB	GENERATOR PANEL REAR INSTRUMENT/RELAY RACK B	MED
1-HSD1R	UNIT 1 HOT SHUTDOWN PANEL REAR RACK	MED
1-LSI-1	STEAM GENERATORS #1 AND #4 LOCAL SHUTDOWN STATION	RIG (Note 1)
1-LSI-2	STEAM GENERATORS #2 AND #3 LOCAL SHUTDOWN STATION	RIG (Note 1)
1-LSI-3	REACTOR COOLANT SYSTEM CHARGING AND LETDOWN LOCAL SHUTDOWN STATION	RIG (Note 1)
1-N21-RACK	NUCLEAR INSTRUMENTATION CHANNEL I LOCAL INSTRUMENT RACK	HI
1-N23-RACK	NUCLEAR INSTRUMENTATION CHANNEL III LOCAL INSTRUMENT RACK	MED
1-NIS-III	NUCLEAR INSTRUMENTATION SYSTEM PROTECTION CHANNEL III CONTROL PANEL	MED
1-NSR	NUCLEAR INSTRUMENTATION SYSTEM REAR INSTRUMENT/RELAY RACK	MED
1-PS-A	600 VAC MOTOR CONTROL CENTER PS-A	LOW
1-PS-D	600 VAC MOTOR CONTROL CENTER PS-D	LOW
1-RPC-1	REACTOR PROTECTION CHANNEL I CAB #1,2,3,4	MED
1-RPC-2	REACTOR PROTECTION CHANNEL II CAB #5,6,7	MED
1-RPC-3	REACTOR PROTECTION CHANNEL III CAB #9,10,11	MED

UNIT 1 AMPLIFICATION FACTORS FOR ESSENTIAL RELAY PANELS

<u>PANEL ID</u>	<u>PANEL DESCRIPTION</u>	<u>AMP FACTOR</u>
1-RPC-4	REACTOR PROTECTION CHANNEL IV CAB #12,13	MED
1-RPS-A	REACTOR PROTECTION AND SAFEGUARD ACTUATION TRAIN A CABINET	MED
1-RPS-B	REACTOR PROTECTION AND SAFEGUARD ACTUATION TRAIN B CABINET	MED
1-RPSX-A	REACTOR PROTECTION AND SAFEGUARD ACTUATION TRAIN A AUXILIARY CABINET	MED
1-RPSX-B	REACTOR PROTECTION AND SAFEGUARD ACTUATION TRAIN B AUXILIARY CABINET	MED
1-SA	STATION AUXILIARIES CONTROL PANEL	MED (Note 4)
1-SR1	STATION AUXILIARIES REAR INSTRUMENT/RELAY RACK #1	MED
1-SR2	STATION AUXILIARIES REAR INSTRUMENT/RELAY RACK #2	MED
1-SR3	STATION AUXILIARIES REAR INSTRUMENT/RELAY RACK #3	MED
1-SR4	STATION AUXILIARIES REAR INSTRUMENT/RELAY RACK #4	MED
1-SSR	ENGINEER SAFETY SYSTEM REAR INSTRUMENT/RELAY RACK	MED
1-SWR	NUCLEAR INSTRUMENTATION SOURCE RANGE N21 INSTRUMENT/RELAY RACK	MED
1-T11A	4KV T11A SWITCHGEAR	MED (Note 3)
1-T11B	4KV T11B SWITCHGEAR	MED (Note 3)
1-T11C	4KV T11C SWITCHGEAR	MED (Note 3)
1-T11D	4KV T11D SWITCHGEAR	MED (Note 3)
1-TFP	TURBINE DRIVEN AUX FEEDPUMP SUBPANEL	MED
1-TRB	TURBINE PANEL REAR INSTRUMENT/RELAY RACK B	MED
1-TRD	TURBINE PANEL REAR INSTRUMENT/RELAY RACK D	MED
1-TRE	TURBINE PANEL REAR INSTRUMENT/RELAY RACK E	MED
1-WRR	CONTROL ROOM WEST INSTRUMENT RELAY RACK	MED

Note 1 These panels are small wall mounted boxes for which the SCEs concluded no amplification is required

Note 2 The sides of these panels were classified as medium amplification, the rear was classified as high

Note 3 The SCEs judged the switchgear instrument compartments to be medium amplification because of the switchgears split compartment design

Note 4 The SA panel terminal block wall is high amplification

UNIT 2 AMPLIFICATION FACTORS FOR ESSENTIAL RELAY PANELS

<u>PANEL ID</u>	<u>PANEL DESCRIPTION</u>	<u>AMP FACTOR</u>
2-A11	AUX RELAY PANEL A11	MED
2-A13	AUX RELAY PANEL A13	MED
2-AB-N	250 VDC VALVE CONTROL CENTER AB-N	LOW
2-ABD-A	600 VAC MOTOR CONTROL CENTER ABD-A	LOW
2-ABD-B	600 VAC MOTOR CONTROL CENTER ABD-B	LOW
2-ABD-D	600 VAC MOTOR CONTROL CENTER ABD-D	LOW
2-ABV-A	600 VAC MOTOR CONTROL CENTER ABV-A	LOW
2-ABV-D	600 VAC MOTOR CONTROL CENTER ABV-D	LOW
2-ACRA-1	CONTROL ROOM AIR HANDLING SUBPANEL #1	MED
2-ACRA-2	CONTROL ROOM AIR HANDLING SUBPANEL #2	MED
2-AM-A	600 VAC MOTOR CONTROL CENTER AM-A	LOW
2-AM-D	600 VAC MOTOR CONTROL CENTER AM-D	LOW
2-ARA-2	REACTOR PROTECTION TRAIN A AUX RELAY CAB #2	MED
2-AB-A	600 VAC MOTOR CONTROL CENTER AB-A	LOW
2-AZV-A	600 VAC MOTOR CONTROL CENTER AZV-A	LOW
2-BC-A	BATTERY CHARGER A FOR N TRAIN BATTERY	MED
2-BC-A-PNL	BATTERY CHARGER A CONTROL BOX	RIG (Note 1)
2-BC-AB1	PLANT BATTERY BATT-AB BATTERY CHARGER #1	MED
2-BC-AB2	PLANT BATTERY BATT-AB BATTERY CHARGER #2	MED
2-BC-B	BATTERY CHARGER B FOR N TRAIN BATTERY	MED
2-BC-B-PNL	BATTERY CHARGER B CONTROL BOX	(Note 4)
2-BC-CD1	PLANT BATTERY BATT-CD BATTERY CHARGER #1	MED
2-BC-CD2	PLANT BATTERY BATT-CD BATTERY CHARGER #2	MED
2-CRID-I-INV	120 VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL I INVERTER	MED
2-CRID-II-INV	120 VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL II INVERTER	MED
2-CRID-III-INV	120 VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL III INVERTER	MED
2-CRID-IV-INV	120 VAC CONTROL ROOM INSTRUMENT DISTRIBUTION SYSTEM CHANNEL IV INVERTER	MED
2-DGAB	AB EMERGENCY DIESEL GENERATOR CONTROL SUBPANEL	MED/HI (Note 2)
2-DGAB-INV	AB EMERGENCY DIESEL GENERATOR INVERTER	HI
2-DGAB-X	AB EMERGENCY DIESEL GENERATOR AUXILIARY SUBPANEL	MED
2-DGCD	CD EMERGENCY DIESEL GENERATOR CONTROL SUBPANEL	MED/HI (Note 2)
2-DGCD-INV	CD EMERGENCY DIESEL GENERATOR INVERTER	HI
2-DGCD-X	CD EMERGENCY DIESEL GENERATOR AUXILIARY SUBPANEL	MED
2-EFR	EMERGENCY FIRE PANEL INSTRUMENT/RELAY RACK	MED
2-EZC-A	600 VAC MOTOR CONTROL CENTER EZC-A	LOW
2-EZC-B	600 VAC MOTOR CONTROL CENTER EZC-B	LOW
2-EZC-C	600 VAC MOTOR CONTROL CENTER EZC-C	LOW
2-EZC-D	600 VAC MOTOR CONTROL CENTER EZC-D	LOW
2-GR1	GENERATOR PANEL REAR INSTRUMENT/RELAY RACK #1	MED
2-GR2	GENERATOR PANEL REAR INSTRUMENT/RELAY RACK #2	MED
2-HSD2R	UNIT 2 HOT SHUTDOWN PANEL REAR RACK	MED
2-LSI-1	STEAM GENERATORS #1 AND #4 LOCAL SHUTDOWN STATION	RIG (Note 1)
2-LSI-2	STEAM GENERATORS #2 AND #3 LOCAL SHUTDOWN STATION	RIG (Note 1)
2-LSI-3	REACTOR COOLANT SYSTEM CHARGING AND LETDOWN LOCAL SHUTDOWN STATION	RIG (Note 1)
2-N21-RACK	NUCLEAR INSTRUMENTATION CHANNEL I LOCAL INSTRUMENT RACK	HI
2-N23-RACK	NUCLEAR INSTRUMENTATION CHANNEL III LOCAL INSTRUMENT RACK	MED
2-NIS-III	NUCLEAR INSTRUMENTATION SYSTEM PROTECTION CHANNEL III CONTROL PANEL	MED
2-NSR	NUCLEAR INSTRUMENTATION SYSTEM REAR INSTRUMENT/RELAY RACK	MED
2-PS-A	600 VAC MOTOR CONTROL CENTER PS-A	LOW
2-PS-D	600 VAC MOTOR CONTROL CENTER PS-D	LOW
2-RPC-1	REACTOR PROTECTION CHANNEL I CAB #1,2,3,4	MED
2-RPC-2	REACTOR PROTECTION CHANNEL II CAB #5,6,7	MED
2-RPC-3	REACTOR PROTECTION CHANNEL III CAB #9,10,11	MED
2-RPC-4	REACTOR PROTECTION CHANNEL IV CAB #12,13	MED

UNIT 2 AMPLIFICATION FACTORS FOR ESSENTIAL RELAY PANELS

<u>PANEL ID</u>	<u>PANEL DESCRIPTION</u>	<u>AMP FACTOR</u>
2-RPS-A	REACTOR PROTECTION AND SAFEGUARD ACTUATION TRAIN A CABINET	MED
2-RPS-B	REACTOR PROTECTION AND SAFEGUARD ACTUATION TRAIN B CABINET	MED
2-RPSX-A	REACTOR PROTECTION AND SAFEGUARD ACTUATION TRAIN A AUXILIARY CABINET	MED
2-RPSX-B	REACTOR PROTECTION AND SAFEGUARD ACTUATION TRAIN B AUXILIARY CABINET	MED
2-SA	STATION AUXILIARIES CONTROL PANEL	MED (Note 5)
2-SR1	STATION AUXILIARIES REAR INSTRUMENT/RELAY RACK #1	MED
2-SR2	STATION AUXILIARIES REAR INSTRUMENT/RELAY RACK #2	MED
2-SR3	STATION AUXILIARIES REAR INSTRUMENT/RELAY RACK #3	MED
2-SR4	STATION AUXILIARIES REAR INSTRUMENT/RELAY RACK #4	MED
2-SSR	ENGINEER SAFETY SYSTEM REAR INSTRUMENT/RELAY RACK	MED
2-SWR	NUCLEAR INSTRUMENTATION SOURCE RANGE N21 INSTRUMENT/RELAY RACK	MED
2-T21A	4KV T21A SWITCHGEAR	MED (Note 3)
2-T21B	4KV T21B SWITCHGEAR	MED (Note 3)
2-T21C	4KV T21C SWITCHGEAR	MED (Note 3)
2-T21D	4KV T21D SWITCHGEAR	MED (Note 3)
2-TFP	TURBINE DRIVEN AUX FEEDPUMP SUBPANEL	MED
2-TRB	TURBINE PANEL REAR INSTRUMENT/RELAY RACK B	MED
2-TRD	TURBINE PANEL REAR INSTRUMENT/RELAY RACK D	MED
2-TRE	TURBINE PANEL REAR INSTRUMENT/RELAY RACK E	MED
2-WRR	CONTROL ROOM WEST INSTRUMENT RELAY RACK	MED

Note 1 These panels are small wall mounted boxes for which the SCEs concluded no amplification is required

Note 2 The sides of these panels were classified as medium amplification, the rear was classified as high

Note 3 The SCEs judged the switchgear instrument compartments to be medium amplification because of the switchgears split compartment design

Note 4 See page 5 of 5 for 2-BC-B-PNL panel amplification justification

Note 5 The SA panel terminal block wall is high amplification

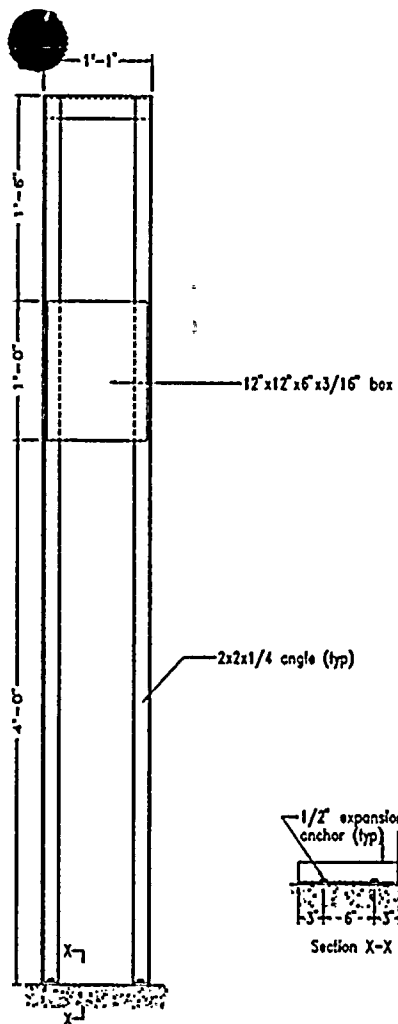


Figure 2a 2-BC-B-PNL outline drawing.

c:\temp\s dof
 ARS: c:\temp\ars 5
 TRS: c:\temp\aux633_5

Damping: 0.050
 Damping: 0.050

EDASP 1.1

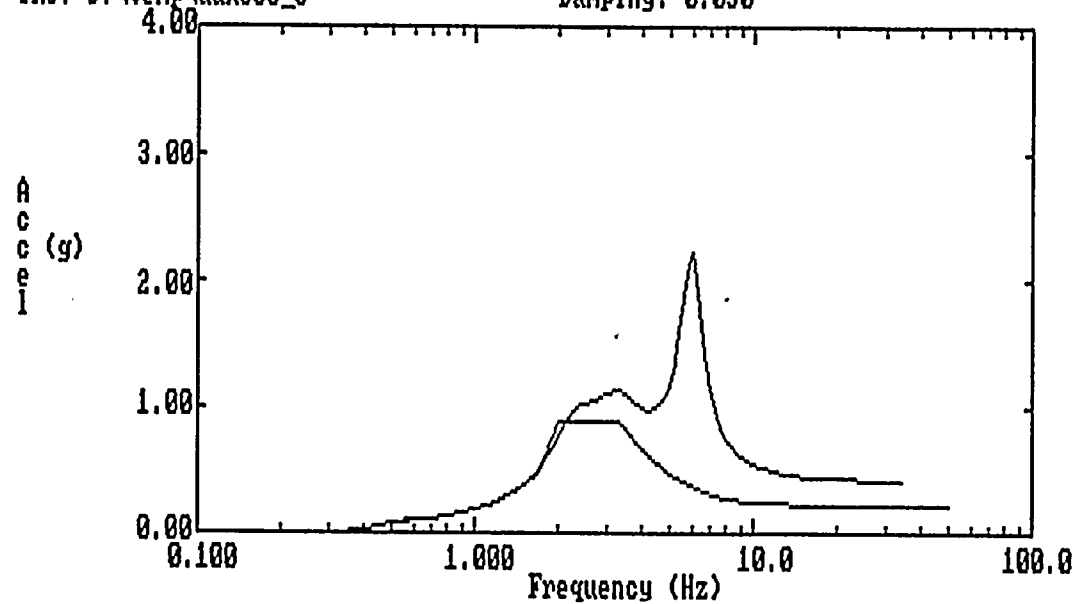


Figure 2b 2-BC-B-PNL floor response spectrum (FRS) and in-cabinet response spectrum (ICRS)

APPENDIX E

ESSENTIAL RELAY CAPACITY VERSUS DEMAND SUMMARIES

UNIT 1 ESSENTIAL RELAY LIST

PAGES 1-21

UNIT 2 ESSENTIAL RELAY LIST

PAGES 22-42

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/ ELEV</u>	<u>PANEL AMP</u>	<u>SCR LVL</u>	<u>DEMAND (PEAK) 4-16 HZ</u>	<u>CAP (PEAK) 4-16 HZ</u>	<u>DEMAND (ZPA) >33 HZ.</u>	<u>CAP (ZPA) >33 HZ</u>	<u>CAPACITY BASIS</u>	<u>NOTES</u>
1-100CR-AB	AIR PAX 206B4425-004	DGAB (REAR)	DG587	HI	1	8g	13g	N/A	N/A	F & H 60149	22
1-100CR-CD	AIR PAX 206B4425-004	DGCD (REAR)	DG587	HI	1	8g	13g	N/A	N/A	F & H 60149	22
1-12-OSTA	GE 12HFA151A9H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-12-OSTB	GE 12HFA151A9H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-12-SPSA1	GE 12HFA151A9H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-12-SPSA2	GE 12HFA151A9H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-12-SPSB1	GE 12HFA151A9H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-12-SPSB2	GE 12HFA151A9H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-12X-SPSA2	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-12X-SPSB2	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-12X-TDFP	GE 12HFA151A1H	TRB	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-19-1-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
1-19-1-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
1-19-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
1-19-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
1-1X-DGAB	GE 12HFA151A1H	SR2	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-1X-DGCD	GE 12HFA151A1H	SR4	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-20X-CCM-451-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CCM-452-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CCM-453-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CCM-454-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CCM-458-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CCM-459-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-410-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-410-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-411-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-412-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-413-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-414-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-415-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-416-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-419-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-420-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-420-OP	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-CMO-429-OP	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-FMO-211-CL	CUTLER HAMMER C80	AB-N	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-FMO-212-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5

UNIT 1 ESSENTIAL REL CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK)		CAP (PEAK)		DEMAND (ZPA)		CAP (ZPA)		CAPACITY BASIS	NOTES
						4-16 HZ	4-16 HZ	4-16 HZ	4-16 HZ	>33 HZ	>33 HZ	>33 HZ	>33 HZ		
1-20X-FMO-221-CL	CUTLER HAMMER C80	AB-N	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-FMO-222-CL	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20				
1-20X-FMO-231-CL	CUTLER HAMMER C80	AB-N	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-FMO-232-CL	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20				
1-20X-FMO-241-CL	CUTLER HAMMER C80	AB-N	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-FMO-242-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-ICM-111-OP	CUTLER HAMMER A50	EZC-C	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20				
1-20X-ICM-129-OP	CUTLER HAMMER A50	EZC-C	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20				
1-20X-ICM-250-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5				
1-20X-ICM-251-OP	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-ICM-260-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-ICM-265-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-ICM-305-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-ICM-306-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-ICM-311-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-ICM-321-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-314-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-128-OP	CUTLER HAMMER A50	EZC-B	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20				
1-20X-IMO-210-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-211-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-215-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-220-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-221-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-225-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-255-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5				
1-20X-IMO-256-OP	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-261-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-262-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-263-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-270-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-275-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-310-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-315-OP	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20				
1-20X-IMO-316-CL	CUTLER HAMMER A50	EZC-C	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20				
1-20X-IMO-320-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-324-OP	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5				
1-20X-IMO-325-OP	CUTLER HAMMER A50	EZC-A	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20				

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/</u>	<u>PANEL</u>	<u>SCR</u>	<u>DEMAND</u>	<u>CAP</u>	<u>DEMAND</u>	<u>CAP</u>	<u>CAPACITY</u>	
			<u>ELEV</u>	<u>AMP</u>	<u>LVL</u>	<u>(PEAK)</u>	<u>(PEAK)</u>	<u>(ZPA)</u>	<u>(ZPA)</u>	<u>BASIS</u>	<u>NOTES</u>
1-20X-IMO-326-CL	CUTLER HAMMER A50	EZC-B	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
1-20X-IMO-330-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-IMO-331-OP	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-IMO-340-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-IMO-350-OP	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-IMO-360-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-IMO-361-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-IMO-362-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-IMO-390-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-IMO-51-CL	CUTLER HAMMER A50	EZC-C	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
1-20X-IMO-52-CL	CUTLER HAMMER A50	EZC-B	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
1-20X-IMO-53-CL	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
1-20X-IMO-54-CL	CUTLER HAMMER A50	EZC-A	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
1-20X-MCM-221-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-MCM-231-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-NMO-151-CL	CUTLER HAMMER A50	EZC-A	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
1-20X-NMO-152-CL	CUTLER HAMMER A50	EZC-B	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
1-20X-NMO-153-CL	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
1-20X-QCM-250-CL	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
1-20X-QCM-350-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-QMO-225-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-QMO-226-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-QMO-410-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-QMO-451-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-QMO-452-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-SEL	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-20X-SER	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-20X-SIE-L	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-SIE-R	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-SIW-L	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-SIW-R	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-SOE-L	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-SOE-R	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-SOW-L	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-SOW-R	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-SWL	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-20X-SWR	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/	PANEL	SCR	DEMAND	CAP	DEMAND	CAP	CAPACITY	
			ELEV	AMP	LVL	(PEAK)	(PEAK)	(ZPA)	(ZPA)	BASIS	NOTES
						4-16 HZ	4-16 HZ	>33 HZ	>33 HZ		
1-20X-TDTV-CL	CUTLER HAMMER C80	AB-N	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-WMO-701-CL	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-WMO-701-OP	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-WMO-702-CL	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-WMO-702-OP	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
1-20X-WMO-705-CL	CUTLER HAMMER A50	ABD-A	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5,17
1-20X-WMO-707-CL	CUTLER HAMMER A50	ABD-D	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5,17
1-20X-WMO-711-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-WMO-713-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-WMO-715-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-WMO-717-OP	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-WMO-721-CL	CUTLER HAMMER A50	ABD-A	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5,17
1-20X-WMO-723-CL	CUTLER HAMMER A50	ABD-D	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5,17
1-20X-WMO-725-CL	CUTLER HAMMER A50	ABD-D	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5,17
1-20X-WMO-727-CL	CUTLER HAMMER A50	ABD-A	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5,17
1-20X-WMO-731-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-WMO-733-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-WMO-733-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-20X-WMO-735-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-WMO-737-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-WMO-737-OP	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-WMO-744-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-20X-WMO-753-OP	CUTLER HAMMER A50	AZ-BC	AUX609	LOW	2	2.70g	4.5g	.99g	2.7g	GERS-CON.3	5,17
1-20X-WMO-754-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
1-23X2-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-23X2-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-27X-T11A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-27X-T11B	GE 12HFA151A1H	SR2	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-27X-T11C	GE 12HFA151A1H	SR4	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-27X-T11D	GE 12HFA151A1H	GR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-33X-WMO-721	CH D26MR44B	DGAB (SIDE)	DG587	MED	2	3.74g	6.98g	1.35g	2.79g	F & H 61107	17,22
1-33X-WMO-723	CH D26MR44B	DGAB (SIDE)	DG587	MED	2	3.74g	6.98g	1.35g	2.79g	F & H 61107	17,22
1-33X-WMO-725	CH D26MR44B	DGCD (SIDE)	DG587	MED	2	3.74g	6.98g	1.35g	2.79g	F & H 61107	17,22
1-33X-WMO-727	CH D26MR44B	DGCD (SIDE)	DG587	MED	2	3.74g	6.98g	1.35g	2.79g	F & H 61107	17,22
1-4-TDTV	ASCO 2506	TFP	TUR591	MED	1	8g	9g	N/A	N/A	GERS TG 18	14
1-42-2-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-42-2-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK)	CAP (PEAK)	DEMAND (ZPA)	CAP (ZPA)	CAPACITY	
						4-16 HZ	4-16 HZ	>33 HZ	>33 HZ	BASIS	NOTES
1-42-3-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-42-3-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-42-4-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-42-4-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-42-5-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
1-42-5-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
1-42-6-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-42-6-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-42-7-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-42-7-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-42-8-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-42-8-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-43X-BLI-110	CH D4ORR34	LSI-1	AUX612	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
1-43X-BLI-120	CH D4ORR34	LSI-2	AUX591	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
1-43X-BLI-130	CH D4ORR34	LSI-2	AUX591	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
1-43X-BLI-140	CH D4ORR34	LSI-1	AUX612	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
1-43X-DGABCT	CH D4ORR43	DGAB-X	DG587	MED	1	8g	10g	N/A	N/A	GERS TG 17	
1-43X-DGCDCT	CH D4ORR43	DGCD-X	DG587	MED	1	8g	10g	N/A	N/A	GERS TG 17	
1-43X-NLI-151	CH D4ORR34	LSI-3	AUX587	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
1-43X-NPS-122	CH D4ORR34	LSI-3	AUX587	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
1-43X-QFI-200	CH D4ORR34	LSI-3	AUX587	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
1-43X1-DGABCT	CH D4ORR43	DGAB-X	DG587	MED	1	8g	10g	N/A	N/A	GERS TG 17	
1-43X1-DGCDCT	CH D4ORR43	DGCD-X	DG587	MED	1	8g	10g	N/A	N/A	GERS TG 17	
1-43X1-DGSAB	GE 12HFA151A1H	DGAB-X	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17
1-43X1-DGSCD	GE 12HFA151A1H	DGCD-X	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17
1-43X3-DGSAB	GE 12HFA151A1H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-43X3-DGSCD	GE 12HFA151A1H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-43X4-DGSAB	GE 12HFA151A1H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-43X4-DGSCD	GE 12HFA151A1H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-5-ACRA1	GE 12HFA151A8H	ACRA-1	AUX650	MED	2	4.41g	5g	1.53g	2g	G.E. RN150	14
1-5-ACRA2	GE 12HFA151A8H	ACRA-2	AUX650	MED	2	4.41g	5g	1.53g	2g	G.E. RN150	14
1-5-TA2	GE 12HFA151A1H	GRB	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5-TA4	GE 12HFA151A1H	WRR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5-TA5	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5-TA7	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5-TA8	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5-TD10	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/</u>	<u>PANEL</u>	<u>SCR</u>	<u>DEMAND</u>	<u>CAP</u>	<u>DEMAND</u>	<u>CAP</u>	<u>CAPACITY</u>	
			<u>ELEV</u>	<u>AMP</u>	<u>LVL</u>	<u>(PEAK)</u>	<u>(PEAK)</u>	<u>(ZPA)</u>	<u>(ZPA)</u>	<u>BASIS</u>	<u>NOTES</u>
						<u>4-16 HZ</u>	<u>4-16 HZ</u>	<u>>33 HZ.</u>	<u>>33 HZ</u>		
1-5-TD11	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5-TD3	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5-TD6	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5-TD7	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-50/50N-TA2	GE 12PJC11X1A	T11A2	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50/50N-TA5	GE 12PJC11X1A	T11A5	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50/50N-TA7	GE 12PJC11X1A	T11A7	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50/50N-TA8	GE 12PJC11X1A	T11A8	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50/50N-TD10	GE 12PJC11X1A	T11D10	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50/50N-TD11	GE 12PJC11X1A	T11D11	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50/50N-TD3	GE 12PJC11X1A	T11D3	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50/50N-TD7	GE 12PJC11X1A	T11D7	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50N-T11A	GE 12PJC11AV1A	T11A10	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50N-T11B	GE 12PJC11AV1A	T11B3	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50N-T11C	GE 12PJC11AV1A	T11C4	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-50N-T11D	GE 12PJC11AV1A	T11D2	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
1-51-DGAB-1	GE 12IAC51A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-DGAB-3	GE 12IAC51A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-DGCD-1	GE 12IAC51A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-DGCD-3	GE 12IAC51A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-T11A-1	GE 12IAC52A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-T11A-3	GE 12IAC52A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-T11B-1	GE 12IAC52A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-T11B-3	GE 12IAC52A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-T11C-1	GE 12IAC52A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-T11C-3	GE 12IAC52A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-T11D-1	GE 12IAC52A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-T11D-3	GE 12IAC52A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51-TA11-1	GE 12IAC51A2A	T11A11	DG609	MED	2	4.05g	7g	1.49g	4.2g	GERS B-75	13,16,17
1-51-TA11-3	GE 12IAC51A2A	T11A11	DG609	MED	2	4.05g	7g	1.49g	4.2g	GERS B-75	13,16,17
1-51-TA2	GE 12IAC66A1A	T11A2	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
1-51-TA5	GE 12IAC66A1A	T11A5	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
1-51-TA7	GE 12IAC66A1A	T11A7	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
1-51-TA8	GE 12IAC66A1A	T11A8	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
1-51-TD10	GE 12IAC66A1A	T11D10	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
1-51-TD11	GE 12IAC66A1A	T11D11	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
1-51-TD3	GE 12IAC66A1A	T11D3	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ.	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
1-51-TD7	GE 12IAC66A1A	T11D7	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
1-51-TD8-1	GE 12IAC51A2A	T11D8	DG609	MED	2	4.05g	7g	1.49g	4.2g	GERS B-75	13,16,17
1-51-TD8-3	GE 12IAC51A2A	T11D8	DG609	MED	2	4.05g	7g	1.49g	4.2g	GERS B-75	13,16,17
1-51-X-TD8	GE 12HEA61B	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
1-51N-DGAB	GE 12IAC51A2A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51N-DGCD	GE 12IAC51A2A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51N-T11B	GE 12IAC55A2A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51N-T11C	GE 12IAC55A2A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
1-51X-TA11	GE 12HEA61B	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
1-52Y-TA11	ITE 191921-T7	T11A11	DG609.	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
1-52Y-TA2	ITE 191921-T7	T11A2	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
1-52Y-TA5	ITE 191921-T7	T11A5	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
1-52Y-TA7	ITE 191921-T7	T11A7	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
1-52Y-TB4	ITE 191921-T7	T11B4	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
1-52Y-TC3	ITE 191921-T7	T11C3	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
1-52Y-TD10	ITE 191921-T7	T11D10	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
1-52Y-TD11	ITE 191921-T7	T11D11	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
1-52Y-TD3	ITE 191921-T7	T11D3	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
1-52Y-TD8	ITE 191921-T7	T11D8	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
1-53-DGAB	ASCO 2516C	DGAB (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERS TG 18	14,15,22
1-53-DGCD	ASCO 2516C	DGCD (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERS TG 18	14,15,22
1-59-TA2-1	GE 12HGA14BE98	T11A2	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TA2-2	GE 12HGA14BE98	T11A2	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TA2-3	GE 12HGA14BE98	T11A2	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TA5-1	GE 12HGA14BE98	T11A5	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TA5-2	GE 12HGA14BE98	T11A5	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TA5-3	GE 12HGA14BE98	T11A5	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TA7-1	GE 12HGA14BE98	T11A7	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TA7-2	GE 12HGA14BE98	T11A7	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TA7-3	GE 12HGA14BE98	T11A7	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TD10-1	GE 12HGA14BE98	T11D10	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TD10-2	GE 12HGA14BE98	T11D10	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TD10-3	GE 12HGA14BE98	T11D10	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TD11-1	GE 12HGA14BE98	T11D11	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TD11-2	GE 12HGA14BE98	T11D11	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TD11-3	GE 12HGA14BE98	T11D11	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TD3-1	GE 12HGA14BE98	T11D3	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/ ELEV</u>	<u>PANEL AMP</u>	<u>SCR LVL</u>	<u>DEMAND (PEAK) 4-16 HZ</u>	<u>CAP (PEAK) 4-16 HZ</u>	<u>DEMAND (ZPA) >33 HZ</u>	<u>CAP (ZPA) >33 HZ</u>	<u>CAPACITY BASIS</u>	<u>NOTES</u>
1-59-TD3-2	GE 12HGA14BE98	T11D3	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-59-TD3-3	GE 12HGA14BE98	T11D3	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 16	10,14,17
1-5A10	GE 12HFA151A1H	GR2	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5A13-LCTA	GE 12HFA151A1H	TRD	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5A6-LCTA	GE 12HFA151A1H	NSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5A6-LCTB	GE 12HFA151A1H	NSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5B10	GE 12HFA151A1H	GR2	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5B12	GE 12HFA151A1H	TRE	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5B6	GE 12HFA151A1H	GR2	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5C17	GE 12HFA151A1H	TRD	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5C4	GE 12HFA151A1H	EFR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X-AB	GE 12HFA151A1H	SR2	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X-CD	GE 12HFA151A1H	SR4	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X1-T11A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X1-T11B	GE 12HFA151A1H	SR2	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X2-T11A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X2-T11D	GE 12HFA151A1H	GR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X3-T11A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X3-T11C	GE 12HFA151A1H	SR4	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X3-T11D	GE 12HFA151A1H	GR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X5-T11A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X5-T11C	GE 12HFA151A1H	SR4	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X5-T11D	GE 12HFA151A1H	GR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X6-T11D	GE 12HFA151A1H	GR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5X7-T11A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-5Y-LCTA	ASCO 2506	NSR	AUX633	MED	1	8g	9g	N/A	N/A	GERS TG 18	14
1-5Y-LCTB	ASCO 2506	NSR	AUX633	MED	1	8g	9g	N/A	N/A	GERS TG 18	14
1-6-1-DGAB	GE 12HFA151A1H	SA	AUX633	HI	2	6.93g	5g	2.31g	2g	G.E. RN150	7,14
1-6-1-DGCD	GE 12HFA151A1H	SA	AUX633	HI	2	6.93g	5g	2.31g	2g	G.E. RN150	7,14
1-6-2-DGAB	CH D26MRD43B1	DGAB (SIDE)	DG587	MED	2	3.74g	6.98g	1.35g	2.79g	F & H 61107	17,22
1-6-2-DGCD	CH D26MRD43B1	DGCD (SIDE)	DG587	MED	2	3.74g	6.98g	1.35g	2.79g	F & H 61107	17,22
1-6-3-DGAB	GE 12HFA151A1H	DGAB-X	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17
1-6-3-DGCD	GE 12HFA151A1H	DGCD-X	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17
1-6-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-6-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-62-1-DGAB	AGASTAT E7012SD002	DGAB (SIDE)	DG587	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12,22
1-62-1-DGCD	AGASTAT E7012SD002	DGCD (SIDE)	DG587	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12,22

UNIT 1 ESSENTIAL REL CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/</u>	<u>PANEL</u>	<u>SCR</u>	<u>DEMAND</u>	<u>CAP</u>	<u>DEMAND</u>	<u>CAP</u>	<u>CAPACITY</u>	
			<u>ELEV</u>	<u>AMP</u>	<u>LVL</u>	<u>(PEAK)</u>	<u>(PEAK)</u>	<u>(ZPA)</u>	<u>(ZPA)</u>	<u>BASIS</u>	<u>NOTES</u>
1-62-1X-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-62-1X-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17,22
1-62-2-DGAB	AGASTAT E7022SD003	DGAB (SIDE)	DG587	MED	2	3.74g	4g	1.35g	1.6g	GERS B-8	12,17,22
1-62-2-DGCD	AGASTAT E7022SD003	DGCD (SIDE)	DG587	MED	2	3.74g	4g	1.35g	1.6g	GERS B-8	12,17,22
1-62-2-DGSAB	AGASTAT E7012SC002	DGAB-X	DG587	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12
1-62-2-DGSCD	AGASTAT E7012SC002	DGCD-X	DG587	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12
1-62-2X-DGAB	AGASTAT F9412SB	SR2	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
1-62-2X-DGCD	AGASTAT F9412SB	SR4	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
1-62-BOS-B12	AGASTAT F9412SC	TRE	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
1-62-BOS-C17	AGASTAT F9412SC	TRD	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
1-62-BOS-TA2	AGASTAT F9412SC	T11A2	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-BOS-TA5	AGASTAT F9412SC	T11A5	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-BOS-TA7	AGASTAT F9412SB	T11A7	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-BOS-TD10	AGASTAT F9412SC	T11D10	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-BOS-TD11	AGASTAT F9412SC	T11D11	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-BOS-TD3	AGASTAT F9412SB	T11D3	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-CS-TA3	AGASTAT F9412SD	T11A3	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-CS-TD4	AGASTAT F9412SD	T11D4	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-S1E	AGASTAT E7012BC003	SSR	AUX633	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12
1-62-S1W	AGASTAT E7012BC003	SSR	AUX633	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12
1-62-SIS-B12	AGASTAT F9412SD	TRE	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
1-62-SIS-C17	AGASTAT F9412SD	TRD	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
1-62-SIS-TA1	AGASTAT F9412SC	T11A1	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TA2	AGASTAT F9412SD	T11A2	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TA4	AGASTAT F9412SC	T11A4	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TA5	AGASTAT F9412SD	T11A5	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TA7	AGASTAT F9412SC	T11A7	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TA8	AGASTAT F9412SB	T11A8	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TD10	AGASTAT F9412SD	T11D10	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TD11	AGASTAT F9412SD	T11D11	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TD3	AGASTAT F9412SC	T11D3	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TD5	AGASTAT F9412SC	T11D5	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TD6	AGASTAT F9412SC	T11D6	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-SIS-TD7	AGASTAT F9412SB	T11D7	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
1-62-T11AU	AGASTAT F9412SB	SR2	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
1-62-T11BU	AGASTAT F9412SB	SR2	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
1-62-T11CU	AGASTAT F9412SB	SR3	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/ ELEV</u>	<u>PANEL AMP</u>	<u>SCR LVL</u>	<u>DEMAND (PEAK) 4-16 HZ</u>	<u>CAP (PEAK) 4-16 HZ</u>	<u>DEMAND (ZPA) >33 HZ</u>	<u>CAP (ZPA) >33 HZ</u>	<u>CAPACITY BASIS</u>	<u>NOTES</u>
1-62-T11DU	AGASTAT F9412SB	GR1	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
1-63-ACP-EH-DGAB	MERCOID DAW 7033-153	DGAB (REAR)	DG587	HI	2	5.81g	7.42g	2.1g	2.99g	ACTON 16013-2	11,17,22
1-63-ACP-EH-DGCD	MERCOID DAW 7033-153	DGCD (REAR)	DG587	HI	2	5.81g	7.42g	2.1g	2.99g	ACTON 16013-2	11,17,22
1-63X-S1E	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-63X-S1W	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-63X1-SG1M	GE 12HGA	HSD1R	AUX633	MED	2	4.46g	6.25g	1.49g	2.5g	G.E. RN150	10,14
1-63X1-SG1T	GE 12HGA	TRB	AUX633	MED	1	8g	8.75g	N/A	N/A	G.E. RN150	10,14
1-63X1-SG2M	GE 12HGA	HSD1R	AUX633	MED	2	4.46g	6.25g	1.49g	2.5g	G.E. RN150	10,14
1-63X1-SG2T	GE 12HGA	TRB	AUX633	MED	1	8g	8.75g	N/A	N/A	G.E. RN150	10,14
1-63X1-SG3M	GE 12HGA	HSD1R	AUX633	MED	2	4.46g	6.25g	1.49g	2.5g	G.E. RN150	10,14
1-63X1-SG3T	GE 12HGA	TRB	AUX633	MED	1	8g	8.75g	N/A	N/A	G.E. RN150	10,14
1-63X1-SG4M	GE 12HGA	HSD1R	AUX633	MED	2	4.46g	6.25g	1.49g	2.5g	G.E. RN150	10,14
1-63X1-SG4T	GE 12HGA	TRB	AUX633	MED	1	8g	8.75g	N/A	N/A	G.E. RN150	10,14
1-65X-DGAB	GE 12HFA151A1H	DGAB (REAR)	DG587	HI	2	5.81g	7.5g	2.1g	3g	G.E. RN150	6,14,17,22
1-65X-DGCD	GE 12HFA151A1H	DGCD (REAR)	DG587	HI	2	5.81g	7.5g	2.1g	3g	G.E. RN150	6,14,17,22
1-83-TILA	GE 12HFA151A9H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-83-TILB	GE 12HFA151A9H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	G.E. RN150	14,17
1-86-ICC1	GE 12HEA61M91	RPC 1 RACK 1	AUX633	MED	1	8g	12.5g	N/A	N/A	G.E. PCR 448-93	
1-86-ICC2	GE 12HEA61M91	RPC 2 RACK 5	AUX633	MED	1	8g	12.5g	N/A	N/A	G.E. PCR 448-93	
1-86-ICC3	GE 12HEA61M91	RPC 3 RACK 9	AUX633	MED	1	8g	12.5g	N/A	N/A	G.E. PCR 448-93	
1-86-ICC4	GE 12HEA61M91	RPC 4 RACK 12	AUX633	MED	1	8g	12.5g	N/A	N/A	G.E. PCR 448-93	
1-87-DGAB-1	ABB 419M6551	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
1-87-DGAB-2	ABB 419M6551	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
1-87-DGAB-3	ABB 419M6551	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
1-87-DGCD-1	ABB 419M6551	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
1-87-DGCD-2	ABB 419M6551	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
1-87-DGCD-3	ABB 419M6551	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
1-87-T11A-1	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87-T11A-2	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87-T11A-3	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87-T11B-1	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87-T11B-2	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87-T11B-3	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87-T11C-1	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87-T11C-2	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87-T11C-3	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87-T11D-1	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
1-87-T11D-2	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87-T11D-3	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
1-87X-DGAB	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
1-87X-DGCD	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
1-87X-T11A	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
1-87X-T11B	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
1-87X-T11C	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
1-87X-T11D	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
1-88X-BC-A	CUTLER HAMMER A10	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
1-88X-BC-B	CUTLER HAMMER A10	ABD-B	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5,17
1-88X1-BCA	CH D26MRD43B1	BC-A-PNL	AUX633	RIG	2	.99g	6.98g	.33g	2.79g	F & H 61107	2
1-88X1-BCB	CH D26MRD43B1	BC-B-PNL	AUX633	RIG	2	.99g	6.98g	.33g	2.79g	F & H 61107	2
1-88X2-BC-A	CH D26MR44B	AM-D	AUX633	LOW	2	2.97g	6.98g	.99g	2.79g	F & H 61107	
1-88X2-BC-B	CH D26MR44B	ABD-B	DG587	LOW	2	2.49g	6.98g	.90g	2.79g	F & H 61107	17
1-AT6-23-WMSP	GAMMA METRICS	N23 RACK	AUX596	MED	2	4.05g	6.5g	1.49g	5.9g	WYLE 58826	17,20
1-BC-A-F10	PWR CONVERSION PROD	BC-A	AUX633	N/A	4	.80g	.99g	.22g	.35g	WYLE 44761-1	18,23
1-BC-A-F8	PWR CONVERSION PROD	BC-A	AUX633	N/A	4	.80g	.99g	.22g	.35g	WYLE 44761-1	18,23
1-BC-A-F9	PWR CONVERSION PROD	BC-A	AUX633	N/A	4	.80g	.99g	.22g	.35g	WYLE 44761-1	18,23
1-BC-A-K2	PWR CONVERSION PROD	BC-A	AUX633	N/A	4	.80g	.99g	.22g	.35g	WYLE 44761-1	18,23
1-BC-A-TIMER	PWR CONVERSION PROD	BC-A	AUX633	N/A	4	.80g	.99g	.22g	.35g	WYLE 44761-1	18,23
1-BC-B-F10	PWR CONVERSION PROD	BC-B	AUX633	N/A	4	.80g	.99g	.22g	.35g	WYLE 44761-1	18,23
1-BC-B-F8	PWR CONVERSION PROD	BC-B	AUX633	N/A	4	.80g	.99g	.22g	.35g	WYLE 44761-1	18,23
1-BC-B-F9	PWR CONVERSION PROD	BC-B	AUX633	N/A	4	.80g	.99g	.22g	.35g	WYLE 44761-1	18,23
1-BC-B-K2	PWR CONVERSION PROD	BC-B	AUX633	N/A	4	.80g	.99g	.22g	.35g	WYLE 44761-1	18,23
1-BC-B-TIMER	PWR CONVERSION PROD	BC-B	AUX633	N/A	4	.80g	.99g	.22g	.35g	WYLE 44761-1	18,23
1-CIB-A-AUX	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-CIB-A-AUX1	CH D26MRD43B1	SSR	AUX633	MED	2	4.46g	6.98g	1.49g	2.79g	F & H 61107	
1-CIB-B-AUX	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-CIB-B-AUX1	CH D26MRD43B1	SSR	AUX633	MED	2	4.46g	6.98g	1.49g	2.79g	F & H 61107	
1-CSX-TA3	GE 12HFA151A1F	T11A3	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-CSX-TD4	GE 12HFA151A1F	T11D4	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-DGAB-INV-OB	SOLIDSTATE CNTRLs INC	DGAB-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
1-DGAB-INV-SB	SOLIDSTATE CNTRLs INC	DGAB-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
1-DGAB-INV-SY1	SOLIDSTATE CNTRLs INC	DGAB-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
1-DGAB-INV-SY2	SOLIDSTATE CNTRLs INC	DGAB-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
1-DGCD-INV-OB	SOLIDSTATE CNTRLs INC	DGCD-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
1-DGCD-INV-SB	SOLIDSTATE CNTRLs INC	DGCD-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
1-DGCD-INV-SY1	SOLIDSTATE CNTRL INC	DGCD-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
1-DGCD-INV-SY2	SOLIDSTATE CNTRL INC	DGCD-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
1-EOM-AUX	GE 12HFA151A5H	TFP	TUR591	MED	2	3.87g	5g	1.35g	2g	G.E. RN150	14
1-FBCST-AB	DYNALCO/P&B R10	DGAB (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERS TG 10	22
1-FBCST-CD	DYNALCO/P&B R10	DGCD (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERS TG 10	22
1-FBX-512B	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-FBX-513B	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-FBX-522B	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-FBX-523B	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-FBX-532B	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-FBX-533B	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-FBX-542B	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-FBX-543B	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-K-301-AB1	SOLIDSTATE CNTRL INC	BC-AB1	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-301-AB2	SOLIDSTATE CNTRL INC	BC-AB2	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-301-CD1	SOLIDSTATE CNTRL INC	BC-CD1	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-301-CD2	SOLIDSTATE CNTRL INC	BC-CD2	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-303-AB1	SOLIDSTATE CNTRL INC	BC-AB1	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-303-AB2	SOLIDSTATE CNTRL INC	BC-AB2	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-303-CD1	SOLIDSTATE CNTRL INC	BC-CD1	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-303-CD2	SOLIDSTATE CNTRL INC	BC-CD2	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-304-AB1	SOLIDSTATE CNTRL INC	BC-AB1	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-304-AB2	SOLIDSTATE CNTRL INC	BC-AB2	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-304-CD1	SOLIDSTATE CNTRL INC	BC-CD1	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-304-CD2	SOLIDSTATE CNTRL INC	BC-CD2	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
1-K-644-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K-644-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K-AUX-CMO-419	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-K-AUX-CMO-429	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-K-AUX-WMO-713	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-K-AUX-WMO-717	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-K-AUX-WMO-733	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-K-AUX-WMO-737	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-K1-1	SOLIDSTATE CNTRL INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K1-2	SOLIDSTATE CNTRL INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K1-21WMSP	GAMMA METRICS	SWR	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K1-21WMSPBT	GAMMA METRICS	SWR	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	

UNIT 1 ESSENTIAL REL CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
1-K1-21WRAMP	GAMMA METRICS	N21 RACK	AUX596	HI	2	6.3g	6.5g	2.31g	5.9g	WYLE 58826	17,20
1-K1-23RMSP	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K1-23RMSP-DDA1	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K1-23RMSP-DDA2	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K1-23RMSP-DDA3	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K1-23RMSP-DDA4	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K1-23WMSP	GAMMA METRICS	N23 RACK	AUX596	MED	2	4.05g	6.5g	1.49g	5.9g	WYLE 58826	17,20
1-K1-23WRAMP	GAMMA METRICS	N23 RACK	AUX596	MED	2	4.05g	6.5g	1.49g	5.9g	WYLE 58826	17,20
1-K1-3	SOLIDSTATE CNTRL INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K1-4	SOLIDSTATE CNTRL INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K101-21WMSPT	GAMMA METRICS	SWR	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K107-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K107-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K115-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K115-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K116-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K116-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K117-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K117-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K118-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K118-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K119-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K119-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K131-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K131-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K133-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K133-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K134-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K134-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K137-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K137-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K148-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K148-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K2-1	SOLIDSTATE CNTRL INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K2-2	SOLIDSTATE CNTRL INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K2-21WMSP	GAMMA METRICS	SWR	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K2-23RMSP	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	

UNIT 1 ESSENTIAL RELIABILITY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/ ELEV</u>	<u>PANEL AMP</u>	<u>SCR LVL</u>	<u>DEMAND (PEAK) 4-16 HZ</u>	<u>CAP (PEAK) 4-16 HZ</u>	<u>DEMAND (ZPA) >33 HZ</u>	<u>CAP (ZPA) >33 HZ</u>	<u>CAPACITY BASIS</u>	<u>NOTES</u>
1-K2-23RMSP-DDA1	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K2-23RMSP-DDA2	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K2-23RMSP-DDA3	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K2-23RMSP-DDA4	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
1-K2-3	SOLIDSTATE CNTRLs INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K2-4	SOLIDSTATE CNTRLs INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K201-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K201-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K203-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K203-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K204-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K204-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K216-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K216-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K217-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K217-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K229-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K229-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K243-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K243-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K244-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K244-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K245-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K245-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K246-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K246-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K247-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K247-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K248-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K248-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K3-1	SOLIDSTATE CNTRLs INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K3-2	SOLIDSTATE CNTRLs INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K3-3	SOLIDSTATE CNTRLs INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K3-4	SOLIDSTATE CNTRLs INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K306-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K306-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K317-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/</u>	<u>PANEL</u>	<u>SCR</u>	<u>DEMAND</u>	<u>CAP</u>	<u>DEMAND</u>	<u>CAP</u>	<u>CAPACITY</u>	
			<u>ELEV</u>	<u>AMP</u>	<u>LVL</u>	<u>(PEAK)</u>	<u>(PEAK)</u>	<u>(ZPA)</u>	<u>(ZPA)</u>	<u>BASIS</u>	<u>NOTES</u>
						<u>4-16 HZ</u>	<u>4-16 HZ</u>	<u>>33 HZ.</u>	<u>>33 HZ</u>		
1-K317-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K318-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K318-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K319-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K319-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K320-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K320-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K329-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K329-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K330-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K330-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K344-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K344-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K4-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K4-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K4-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K4-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K406-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K406-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K417-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K417-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K418-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K418-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K419-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K419-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K420-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K420-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K429-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K429-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K430-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K430-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K5-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K5-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K5-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K5-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K501-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K501-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/</u>	<u>PANEL</u>	<u>SCR</u>	<u>DEMAND</u>	<u>CAP</u>	<u>DEMAND</u>	<u>CAP</u>	<u>CAPACITY</u>	
			<u>ELEV</u>	<u>AMP</u>	<u>LVL</u>	<u>(PEAK)</u>	<u>(PEAK)</u>	<u>(ZPA)</u>	<u>(ZPA)</u>	<u>BASIS</u>	<u>NOTES</u>
						<u>4-16 HZ</u>	<u>4-16 HZ</u>	<u>>33 HZ.</u>	<u>>33 HZ</u>		
1-K505-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K505-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K506-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K506-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K521-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K521-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K522-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K522-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
1-K6-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K6-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K6-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K6-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-K602-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K602-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K604-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K604-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K606-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K606-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K608-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K608-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K608-X1-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K608-X1-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K608-X2-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K608-X2-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K609-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K609-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K609-X1-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K609-X1-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K610-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K610-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K610-X1-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K610-X1-X-A	GE 12HFA151A9H	TRE	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-K611-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K611-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K611-X-B	GE 12HFA151A1H	TRD	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-K611-X1-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K611-X1-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/</u>	<u>PANEL</u>	<u>SCR</u>	<u>DEMAND</u>	<u>CAP</u>	<u>DEMAND</u>	<u>CAP</u>	<u>CAPACITY</u>	
			<u>ELEV</u>	<u>AMP</u>	<u>LVL</u>	<u>(PEAK)</u>	<u>(PEAK)</u>	<u>(ZPA)</u>	<u>(ZPA)</u>	<u>BASIS</u>	<u>NOTES</u>
1-K618-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K618-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K619-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K619-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K626-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K626-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K626-X3-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K626-X3-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K643-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-K643-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-LB-112-BX1	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-LB-112-BX2	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-LB-112-DX	WESTINGHOUSE AR	ARA2	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-LB-185-BX1	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-LB-185-BX2	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-LCSI-A-AUX	GE 12HFA151A1H	NSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-LCSI-B-AUX	GE 12HFA151A1H	NSR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-MUX-4-2	WESTINGHOUSE AR	ARA2	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
1-PB-455-X1	GE 12HFA151A8H	SR3	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-PB-457-X1	GE 12HFA151A8H	WRR	AUX633	MED	2	4.46g	5g	1.49g	2g	G.E. RN150	14
1-PBX-455D	SIGMA 42JO-500G-SIL	RPC 1 RACK 1	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-456D	SIGMA 42JO-500G-SIL	RPC 2 RACK 5	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-457D	SIGMA 42JO-500G-SIL	RPC 3 RACK 9	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-514A	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-514B	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-515A	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-515B	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-516A	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-516C	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-516D	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-525A	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-525B	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-526A	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-526C	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-526D	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-534A	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-534B	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/ ELEV</u>	<u>PANEL AMP</u>	<u>SCR LVL</u>	<u>DEMAND (PEAK) 4-16 HZ</u>	<u>CAP (PEAK) 4-16 HZ</u>	<u>DEMAND (ZPA) >33 HZ</u>	<u>CAP (ZPA) >33 HZ</u>	<u>CAPACITY BASIS</u>	<u>NOTES</u>
1-PBX-536A	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-546A	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-934A	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-934B	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-935A	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-935B	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-936A	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-936B	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-PBX-937A	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-RBCST-AB	DYNALCO/P&B R10	DGAB (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERS TG 10	22
1-RBCST-CD	DYNALCO/P&B R10	DGCD (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERS TG 10	22
1-RL1-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-ACVS-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-ACVS-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-ACVS-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-ACVS-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-OSCBD-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-OSCBD-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-OSCBD-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-OSCBD-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-SYBD-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-SYBD-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-SYBD-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1-SYBD-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1SS-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1SS-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1SS-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL1SS-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL2-SYBD-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL2-SYBD-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL2-SYBD-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL2-SYBD-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL2SS-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL2SS-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23

UNIT 1 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND	CAP	DEMAND	CAP	CAPACITY	
						(PEAK) 4-16 HZ	(PEAK) 4-16 HZ	(ZPA) >33 HZ	(ZPA) >33 HZ	BASIS	NOTES
1-RL2SS-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL2SS-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL3-SYBD-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL3-SYBD-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL3-SYBD-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RL3-SYBD-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RR1-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RR1-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RR1-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-RR1-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
1-SI-X-TA2	GE 12HFA151A1F	T11A2	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-SI-X-TD11	GE 12HFA151A1F	T11D11	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-SIX-TA1	GE 12HFA151A1F	T11A1	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-SIX-TA4	GE 12HFA151A1F	T11A4	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-SIX-TA5	GE 12HFA151A1F	T11A5	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-SIX-TA7	GE 12HFA151A1F	T11A7	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-SIX-TD10	GE 12HFA151A1F	T11D10	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-SIX-TD3	GE 12HFA151A1F	T11D3	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-SIX-TD5	GE 12HFA151A1F	T11D5	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-SIX-TD6	GE 12HFA151A1F	T11D6	DG609	MED	2	4.05g	5g	1.49g	2g	G.E. RN150	14,17
1-TBX-412D	SIGMA 42JO-500G-SIL	RPC 1 RACK 2	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-TBX-422D	SIGMA 42JO-500G-SIL	RPC 2 RACK 6	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-TBX-432D	SIGMA 42JO-500G-SIL	RPC 3 RACK 10	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-TBX-442D	SIGMA 42JO-500G-SIL	RPC 4 RACK 13	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	23
1-TDAFP-OSM	DYNALCO SS-2200	TFP	TUR591	MED	2	3.87g	4.42g	1.35g	1.77g	F & H 20148	
2-K118-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K118-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K119-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K119-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K131-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K131-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K133-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K133-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K134-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K134-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K150-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K150-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8

UNIT 1 ESSENTIAL REL CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/	PANEL	SCR	DEMAND	CAP	DEMAND	CAP	CAPACITY	
			ELEV	AMP	LVL	(PEAK)	(PEAK)	(ZPA)	(ZPA)	BASIS	NOTES
						4-16 HZ	4-16 HZ	>33 HZ	>33 HZ		
2-K201-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K201-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K203-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K203-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K204-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K204-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K217-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K217-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K247-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K247-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K248-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K248-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K250-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K250-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K317-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K317-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K318-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K318-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K320-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K320-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K330-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K330-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K344-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K344-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K417-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K417-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K418-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K418-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K420-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K420-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K430-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K430-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K501-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K521-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
2-K610-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	8,21
2-K610X1-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	8,21
2-K611-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	8,21

UNIT 1 ESSENTIAL REL. CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/</u>	<u>PANEL</u>	<u>SCR</u>	<u>DEMAND</u>	<u>CAP</u>	<u>DEMAND</u>	<u>CAP</u>	<u>CAPACITY</u>	
			<u>ELEV</u>	<u>AMP</u>	<u>LVL</u>	<u>(PEAK)</u>	<u>(PEAK)</u>	<u>(ZPA)</u>	<u>(ZPA)</u>	<u>BASIS</u>	<u>NOTES</u>
2-PBX-455D	SIGMA 42JO-500G-SIL	RPC 1 RACK 1	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-456D	SIGMA 42JO-500G-SIL	RPC 2 RACK 5	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-457D	SIGMA 42JO-500G-SIL	RPC 3 RACK 9	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-514A	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-514B	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-514C	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-515A	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-515B	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-516C	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-516D	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-525A	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-525B	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-525C	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-526C	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-526D	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-534A	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-534B	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-536A	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-546A	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-934B	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-935B	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23
2-PBX-936B	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1g	NQS 1619	8,23

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/ ELEV</u>	<u>PANEL AMP</u>	<u>SCR LVL</u>	<u>DEMAND (PEAK) 4-16 HZ</u>	<u>CAP (PEAK) 4-16 HZ</u>	<u>DEMAND (ZPA) >33 HZ</u>	<u>CAP (ZPA) >33 HZ</u>	<u>CAPACITY BASIS</u>	<u>NOTES</u>
2-100CR-AB	AIR PAX 206B4425-004	DGAB (REAR)	DG587	HI	1	8g	13g	N/A	N/A	F & H 60149	22
2-100CR-CD	AIR PAX 206B4425-004	DGCD (REAR)	DG587	HI	1	8g	13g	N/A	N/A	F & H 60149	22
2-12-OSTA	GE 12HFA151A9H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-12-OSTB	GE 12HFA151A9H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-12-SPSA1	GE 12HFA151A9H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-12-SPSA2	GE 12HFA151A9H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-12-SPSB1	GE 12HFA151A9H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-12-SPSB2	GE 12HFA151A9H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-12X-SPSA2	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-12X-SPSB2	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-12X-TDFP	GE 12HFA151A1H	TRB	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-19-1-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
2-19-1-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
2-19-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
2-19-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
2-1X-DGAB	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-1X-DGCD	GE 12HFA151A1H	SR4	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-20X-CCM-451-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CCM-452-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CCM-453-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CCM-454-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CCM-458-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CCM-459-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-410-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-410-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-411-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-412-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-413-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-414-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-415-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-416-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-419-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-420-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-420-OP	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-CMO-429-OP	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-FMO-211-CL	CUTLER HAMMER C80	AB-N	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-FMO-212-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
2-20X-FMO-221-CL	CUTLER HAMMER C80	AB-N	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-FMO-222-CL	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-FMO-231-CL	CUTLER HAMMER C80	AB-N	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-FMO-232-CL	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-FMO-241-CL	CUTLER HAMMER C80	AB-N	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-FMO-242-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-ICM-111-OP	CUTLER HAMMER A50	EZC-C	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-ICM-129-OP	CUTLER HAMMER A50	EZC-C	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-ICM-250-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-ICM-251-OP	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-ICM-260-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-ICM-265-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-ICM-305-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-ICM-306-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-ICM-311-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-ICM-321-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-225-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-314-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-128-OP	CUTLER HAMMER A50	EZC-B	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-IMO-210-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-211-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-215-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-220-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-221-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-255-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-IMO-256-OP	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-261-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-262-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-263-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-270-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-275-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-310-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-315-OP	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-IMO-316-CL	CUTLER HAMMER A50	EZC-C	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-IMO-320-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-324-OP	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-325-OP	CUTLER HAMMER A50	EZC-A	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/ ELEV</u>	<u>PANEL AMP</u>	<u>SCR LVL</u>	<u>DEMAND (PEAK) 4-16 HZ</u>	<u>CAP (PEAK) 4-16 HZ</u>	<u>DEMAND (ZPA) >33 HZ</u>	<u>CAP (ZPA) >33 HZ</u>	<u>CAPACITY BASIS</u>	<u>NOTES</u>
2-20X-IMO-326-CL	CUTLER HAMMER A50	EZC-B	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-IMO-330-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-IMO-331-OP	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-IMO-340-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-IMO-350-OP	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-IMO-360-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-361-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-362-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-390-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-IMO-51-CL	CUTLER HAMMER A50	EZC-C	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-IMO-52-CL	CUTLER HAMMER A50	EZC-B	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-IMO-53-CL	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-IMO-54-CL	CUTLER HAMMER A50	EZC-A	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-MCM-221-CL	CUTLER HAMMER A50	AM-A	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-MCM-231-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-NMO-151-CL	CUTLER HAMMER A50	EZC-A	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-NMO-152-CL	CUTLER HAMMER A50	EZC-B	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-NMO-153-CL	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-QCM-250-CL	CUTLER HAMMER A50	EZC-D	DG613	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5,17,20
2-20X-QCM-350-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-QMO-225-CL	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-QMO-226-CL	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-QMO-420-OP	CUTLER HAMMER A50	ABV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-QMO-451-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-20X-QMO-452-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5
2-20X-SEL	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-20X-SER	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-20X-SIE-L	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
2-20X-SIE-R	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
2-20X-SIW-L	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
2-20X-SIW-R	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
2-20X-SOE-L	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
2-20X-SOE-R	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
2-20X-SOW-L	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
2-20X-SOW-R	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GERS-CON.3	5,21
2-20X-SWL	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-20X-SWR	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
2-20X-TDTV-CL	CUTLER HAMMER C80	AB-N	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5
2-20X-WMO-703-CL	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GRS-CON.3	5,21
2-20X-WMO-703-OP	CUTLER HAMMER A50	PS-D	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GRS-CON.3	5,21
2-20X-WMO-704-CL	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GRS-CON.3	5,21
2-20X-WMO-704-OP	CUTLER HAMMER A50	PS-A	SH 594	LOW	2	2.58g	4.5g	.90g	2.7g	GRS-CON.3	5,21
2-20X-WMO-706-CL	CUTLER HAMMER A50	ABD-A	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5,17
2-20X-WMO-708-CL	CUTLER HAMMER A50	ABD-D	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5,17
2-20X-WMO-712-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GRS-CON.3	5
2-20X-WMO-714-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GRS-CON.3	5
2-20X-WMO-716-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5
2-20X-WMO-718-OP	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5
2-20X-WMO-722-CL	CUTLER HAMMER A50	ABD-A	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5,17
2-20X-WMO-724-CL	CUTLER HAMMER A50	ABD-D	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5,17
2-20X-WMO-726-CL	CUTLER HAMMER A50	ABD-D	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5,17
2-20X-WMO-728-CL	CUTLER HAMMER A50	ABD-A	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5,17
2-20X-WMO-732-CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GRS-CON.3	5
2-20X-WMO-734-OP	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GRS-CON.3	5
2-20X-WMO-734CL	CUTLER HAMMER A50	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GRS-CON.3	5
2-20X-WMO-736-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5
2-20X-WMO-738-CL	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5
2-20X-WMO-738-OP	CUTLER HAMMER A50	AZV-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5
2-20X-WMO-744-OP	CUTLER HAMMER A50	AB-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5
2-20X-WMO-753-OP	CUTLER HAMMER A50	AB-A	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5
2-20X-WMO-754-OP	CUTLER HAMMER A50	ABV-D	AUX587	LOW	2	2.49g	4.5g	.90g	2.7g	GRS-CON.3	5
2-23X2-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-23X2-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-27X-T21A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-27X-T21B	GE 12HFA151A1H	SR2	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-27X-T21C	GE 12HFA151A1H	SR4	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-27X-T21D	GE 12HFA151A1H	GR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-33X-WMO-722	CH D26MR44B	DGAB (SIDE)	DG587	MED	2	3.74g	6.98g	1.35g	2.79g	F & H 61107	17,22
2-33X-WMO-724	CH D26MR44B	DGAB (SIDE)	DG587	MED	2	3.74g	6.98g	1.35g	2.79g	F & H 61107	17,22
2-33X-WMO-726	CH D26MR44B	DGCD (SIDE)	DG587	MED	2	3.74g	6.98g	1.35g	2.79g	F & H 61107	17,22
2-33X-WMO-728	CH D26MR44B	DGCD (SIDE)	DG587	MED	2	3.74g	6.98g	1.35g	2.79g	F & H 61107	17,22
2-4-TDTV	ASCO 2506	TFP	TUR591	MED	1	8g	9g	N/A	N/A	GRS TG 18	14
2-42-2-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-42-2-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
2-42-3-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-42-3-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-42-4-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-42-4-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-42-5-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
2-42-5-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17,22
2-42-6-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-42-6-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-42-7-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-42-7-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-42-8-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-42-8-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-43X-BLI-110	CH D40RR34	LSI-1	AUX612	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
2-43X-BLI-120	CH D40RR34	LSI-2	AUX591	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
2-43X-BLI-130	CH D40RR34	LSI-2	AUX591	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
2-43X-BLI-140	CH D40RR34	LSI-1	AUX612	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
2-43X-DGABCT	CH D40RR43	DGAB-X	DG587	MED	1	8g	10g	N/A	N/A	GERS TG 17	
2-43X-DGCDCT	CH D40RR43	DGCD-X	DG587	MED	1	8g	10g	N/A	N/A	GERS TG 17	
2-43X-NLI-151	CH D40RR34	LSI-3	AUX587	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
2-43X-NPS-122	CH D40RR34	LSI-3	AUX587	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
2-43X-QFI-200	CH D40RR34	LSI-3	AUX587	RIG	1	8g	10g	N/A	N/A	GERS TG 17	2
2-43X1-DGABCT	CH D40RR43	DGAB-X	DG587	MED	1	8g	10g	N/A	N/A	GERS TG 17	
2-43X1-DGCDCT	CH D40RR43	DGCD-X	DG587	MED	1	8g	10g	N/A	N/A	GERS TG 17	
2-43X1-DGSAB	GE 12HFA151A1H	DGAB-X	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17
2-43X1-DGSCD	GE 12HFA151A1H	DGCD-X	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17
2-43X3-DGSAB	GE 12HFA151A1H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-43X3-DGSCD	GE 12HFA151A1H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-43X4-DGSAB	GE 12HFA151A1H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-43X4-DGSCD	GE 12HFA151A1H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-5-ACRA1	GE 12HFA151A8H	ACRA-1	AUX650	MED	2	4.41g	5g	1.53g	2g	GE RN-150	14
2-5-ACRA2	GE 12HFA151A8H	ACRA-2	AUX650	MED	2	4.41g	5g	1.53g	2g	GE RN-150	14
2-5-TA4	GE 12HFA151A1H	WRR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5-TA5	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5-TA7	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5-TA8	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5-TD10	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5-TD11	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/</u>	<u>PANEL</u>	<u>SCR</u>	<u>DEMAND</u>	<u>CAP</u>	<u>DEMAND</u>	<u>CAP</u>	<u>CAPACITY</u>	<u>NOTES</u>
			<u>ELEV</u>	<u>AMP</u>	<u>LVL</u>	<u>(PEAK)</u>	<u>(PEAK)</u>	<u>(ZPA)</u>	<u>(ZPA)</u>		
						<u>4-16 HZ</u>	<u>4-16 HZ</u>	<u>>33 HZ</u>	<u>>33 HZ</u>	<u>BASIS</u>	
2-5-TD3	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5-TD6	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5-TD7	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-50/50N-TA2	GE 12PJC11X1A	T21A2	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50/50N-TA5	GE 12PJC11X1A	T21A5	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50/50N-TA7	GE 12PJC11X1A	T21A7	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50/50N-TA8	GE 12PJC11X1A	T21A8	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50/50N-TD10	GE 12PJC11X1A	T21D10	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50/50N-TD11	GE 12PJC11X1A	T21D11	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50/50N-TD3	GE 12PJC11X1A	T21D3	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50/50N-TD7	GE 12PJC11X1A	T21D7	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50N-T21A	GE 12PJC11AV1A	T21A10	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50N-T21B	GE 12PJC11AV1A	T21B3	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50N-T21C	GE 12PJC11AV1A	T21C4	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-50N-T21D	GE 12PJC11AV1A	T21D2	DG609	MED	2	4.05g	5g	1.49g	3g	GERS B-92	17
2-51-DGAB-1	GE 12IAC51A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-DGAB-3	GE 12IAC51A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-DGCD-1	GE 12IAC51A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-DGCD-3	GE 12IAC51A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-T21A-1	GE 12IAC52A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-T21A-3	GE 12IAC52A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-T21B-1	GE 12IAC52A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-T21B-3	GE 12IAC52A101A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-T21C-1	GE 12IAC52A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-T21C-3	GE 12IAC52A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-T21D-1	GE 12IAC52A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-T21D-3	GE 12IAC52A101A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51-TA11-1	GE 12IAC51A2A	T21A11	DG609	MED	2	4.05g	7g	1.49g	4.2g	GERS B-75	13,16,17
2-51-TA11-3	GE 12IAC51A2A	T21A11	DG609	MED	2	4.05g	7g	1.49g	4.2g	GERS B-75	13,16,17
2-51-TA2	GE 12IAC66A1A	T21A2	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
2-51-TA5	GE 12IAC66A1A	T21A5	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
2-51-TA7	GE 12IAC66A1A	T21A7	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
2-51-TA8	GE 12IAC66A1A	T21A8	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
2-51-TD10	GE 12IAC66A1A	T21D10	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
2-51-TD11	GE 12IAC66A1A	T21D11	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
2-51-TD3	GE 12IAC66A1A	T21D3	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17
2-51-TD7	GE 12IAC66A1A	T21D7	DG609	MED	2	4.05g	6g	1.49g	3.6g	GERS TG 11	13,17

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/	PANEL	SCR	DEMAND	CAP	DEMAND	CAP	CAPACITY	NOTES
			ELEV	AMP	LVL	(PEAK) 4-16 HZ	(PEAK) 4-16 HZ	(ZPA) >33 HZ	(ZPA) >33 HZ		
2-51-TD8-1	GE 12IAC51A2A	T21D8	DG609	MED	2	4.05g	7g	1.49g	4.2g	GERS B-75	13,16,17
2-51-TD8-3	GE 12IAC51A2A	T21D8	DG609	MED	2	4.05g	7g	1.49g	4.2g	GERS B-75	13,16,17
2-51-X-TD8	GE 12HEA61B	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
2-51N-DGAB	GE 12IAC51A2A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51N-DGCD	GE 12IAC51A2A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51N-T21B	GE 12IAC55A2A	A-11	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51N-T21C	GE 12IAC55A2A	A-13	AUX633	MED	2	4.46g	7g	1.49g	4.2g	GERS B-75	13,16
2-51X-TA11	GE 12HEA61B	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
2-52Y-TA11	ITE 191921-T7	T21A11	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
2-52Y-TA2	ITE 191921-T7	T21A2	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
2-52Y-TA5	ITE 191921-T7	T21A5	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
2-52Y-TA7	ITE 191921-T7	T21A7	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
2-52Y-TB4	ITE 191921-T7	T21B4	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
2-52Y-TC3	ITE 191921-T7	T21C3	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
2-52Y-TD10	ITE 191921-T7	T21D10	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
2-52Y-TD11	ITE 191921-T7	T21D11	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
2-52Y-TD3	ITE 191921-T7	T21D3	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
2-52Y-TD8	ITE 191921-T7	T21D8	DG609	N/A	S	.90g	1.8g	.33g	1g	GERS MVS/LVS.7	4,5,17
2-53-DGAB	ASCO 2516C	DGAB (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERS TG 18	14,15,22
2-53-DGCD	ASCO 2516C	DGCD (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERS TG 18	14,15,22
2-59-TA2-1	GE 12HGA14BE98	T21A2	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TA2-2	GE 12HGA14BE98	T21A2	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TA2-3	GE 12HGA14BE98	T21A2	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TA5-1	GE 12HGA14BE98	T21A5	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TA5-2	GE 12HGA14BE98	T21A5	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TA5-3	GE 12HGA14BE98	T21A5	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TA7-1	GE 12HGA14BE98	T21A7	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TA7-2	GE 12HGA14BE98	T21A7	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TA7-3	GE 12HGA14BE98	T21A7	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TD10-1	GE 12HGA14BE98	T21D10	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TD10-2	GE 12HGA14BE98	T21D10	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TD10-3	GE 12HGA14BE98	T21D10	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TD11-1	GE 12HGA14BE98	T21D11	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TD11-2	GE 12HGA14BE98	T21D11	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TD11-3	GE 12HGA14BE98	T21D11	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TD3-1	GE 12HGA14BE98	T21D3	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-59-TD3-2	GE 12HGA14BE98	T21D3	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
2-59-TD3-3	GE 12HGA14BE98	T21D3	DG609	MED	3	2.51g	4g	1.60g	2.4g	GERS TG 14	10,14,17
2-5A10	GE 12HFA151A1H	GR2	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5A6-LCTA	GE 12HFA151A1H	NSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5A6-LCTB	GE 12HFA151A1H	NSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5B10	GE 12HFA151A1H	GR2	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5B12	GE 12HFA151A1H	TRE	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5B6	GE 12HFA151A1H	GR2	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5C17	GE 12HFA151A1H	TRD	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5C4	GE 12HFA151A1H	EFR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5TA2	GE 12HFA151A1H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X-AB	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X-CD	GE 12HFA151A1H	SR4	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X1-T21A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X1-T21B	GE 12HFA151A1H	SR2	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X2-T21A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X2-T21D	GE 12HFA151A1H	GR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X3-T21A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X3-T21C	GE 12HFA151A1H	SR4	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X3-T21D	GE 12HFA151A1H	GR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X5-T21A	GE 12HFA151A1H	SR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X5-T21C	GE 12HFA151A1H	SR4	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X5-T21D	GE 12HFA151A1H	GR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5X6-T21D	GE 12HFA151A1H	GR1	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-5Y-LCTA	ASCO 2506	NSR	AUX633	MED	1	8g	9g	N/A	N/A	GERS TG 18	14
2-5Y-LCTB	ASCO 2506	NSR	AUX633	MED	1	8g	9g	N/A	N/A	GERS TG 18	14
2-6-1-DGAB	GE 12HFA151A1H	SA	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	7,14
2-6-1-DGCD	GE 12HFA151A1H	SA	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	7,14
2-6-2-DGAB	GE 12HGA	DGAB (SIDE)	DG587	MED	2	3.74g	1.25g	1.35g	.5g	GE RN-150	7,10,14,17,22
2-6-2-DGCD	GE 12HGA	DGCD (SIDE)	DG587	MED	2	3.74g	1.25g	1.35g	.5g	GE RN-150	7,10,14,17,22
2-6-3-DGAB	GE 12HFA151A1H	DGAB-X	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17
2-6-3-DGCD	GE 12HFA151A1H	DGCD-X	DG587	MED	3	1.95g	3g	1.33g	1.8g	GERS TG 19	1,14,17
2-6-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-6-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-62-1-DGAB	AGASTAT E7012SD002	DGAB (SIDE)	DG587	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12,22
2-62-1-DGCD	AGASTAT E7012SD002	DGCD (SIDE)	DG587	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12,22
2-62-1X-DGAB	GE 12HFA151A1H	DGAB (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22
2-62-1X-DGCD	GE 12HFA151A1H	DGCD (SIDE)	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17,22

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/	PANEL	SCR	DEMAND	CAP	DEMAND	CAP	CAPACITY	NOTES
			ELEV	AMP	LVL	(PEAK)	(PEAK)	(ZPA)	(ZPA)		
						4-16 HZ	4-16 HZ	>33 HZ	>33 HZ	BASIS	
2-62-2-DGAB	AGASTAT E7022SD003	DGAB (SIDE)	DG587	MED	2	3.74g	4g	1.35g	1.6g	GERS B-8	12,17,22
2-62-2-DGCD	AGASTAT E7022SD003	DGCD (SIDE)	DG587	MED	2	3.74g	4g	1.35g	1.6g	GERS B-8	12,17,22
2-62-2-DGSAB	AGASTAT E7012SC002	DGAB-X	DG587	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12
2-62-2-DGSCD	AGASTAT E7012SC002	DGCD-X	DG587	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12
2-62-2X-DGAB	AGASTAT F9412SB	SR1	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
2-62-2X-DGCD	AGASTAT F9412SB	SR4	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
2-62-BOS-B12	AGASTAT F9412SC	TRE	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
2-62-BOS-C17	AGASTAT F9412SC	TRD	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
2-62-BOS-TA2	AGASTAT F9412SC	T21A2	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-BOS-TA5	AGASTAT F9412SC	T21A5	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-BOS-TA7	AGASTAT F9412SB	T21A7	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-BOS-TD10	AGASTAT F9412SC	T21D10	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-BOS-TD11	AGASTAT F9412SC	T21D11	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-BOS-TD3	AGASTAT F9412SB	T21D3	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-CS-TA3	AGASTAT F9412SD	T21A3	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-CS-TD4	AGASTAT F9412SD	T21D4	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-S2E	AGASTAT E7012BC003	SSR	AUX633	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12
2-62-S2W	AGASTAT E7012BC003	SSR	AUX633	MED	1	8g	12.5g	N/A	N/A	GERS B-8	12
2-62-SIS-B12	AGASTAT F9412SD	TRE	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
2-62-SIS-C17	AGASTAT F9412SD	TRD	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
2-62-SIS-TA1	AGASTAT F9412SC	T21A1	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TA2	AGASTAT F9412SD	T21A2	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TA4	AGASTAT F9412SC	T21A4	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TA5	AGASTAT F9412SD	T21A5	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TA7	AGASTAT F9412SC	T21A7	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TA8	AGASTAT F9412SB	T21A8	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TD10	AGASTAT F9412SD	T21D10	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TD11	AGASTAT F9412SD	T21D11	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TD3	AGASTAT F9412SC	T21D3	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TD5	AGASTAT F9412SC	T21D5	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TD6	AGASTAT F9412SC	T21D6	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-SIS-TD7	AGASTAT F9412SB	T21D7	DG609	MED	3	2.51g	2.87g	1.6g	2.19g	F & H 20240	17
2-62-T21AU	AGASTAT F9412SB	SR2	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
2-62-T21BU	AGASTAT F9412SB	SR2	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
2-62-T21CU	AGASTAT F9412SB	SR3	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
2-62-T21DU	AGASTAT F9412SB	GR1	AUX633	MED	3	1.91g	2.87g	1.11g	2.19g	F & H 20240	
2-63-ACP-EH-DGAB	MERCOID DAW 7033-153	DGAB (REAR)	DG587	HI	2	5.81g	7.42g	2.1g	2.99g	ACTON 16013-2	11,17,22

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/	PANEL	SCR	DEMAND	CAP	DEMAND	CAP	CAPACITY	
			ELEV	AMP	LVL	(PEAK)	(PEAK)	(ZPA)	(ZPA)	BASIS	NOTES
2-63-ACP-EH-DGCD	MERCOID DAW 7033-153	DGCD (REAR)	DG587	HI	2	5.81g	7.42g	2.1g	2.99g	ACTON 16013-2	11,17,22
2-63X-S2E	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-63X-S2W	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-63X1-SG1M	GE 12HGA	HSD2R	AUX633	MED	2	4.46g	6.25g	1.49g	2.5g	GE RN-150	10,14
2-63X1-SG1T	GE 12HGA	TRB	AUX633	MED	1	8g	8.75g	N/A	N/A	GE RN-150	10,14
2-63X1-SG2M	GE 12HGA	HSD2R	AUX633	MED	2	4.46g	6.25g	1.49g	2.5g	GE RN-150	10,14
2-63X1-SG2T	GE 12HGA	TRB	AUX633	MED	1	8g	8.75g	N/A	N/A	GE RN-150	10,14
2-63X1-SG3M	GE 12HGA	HSD2R	AUX633	MED	2	4.46g	6.25g	1.49g	2.5g	GE RN-150	10,14
2-63X1-SG3T	GE 12HGA	TRB	AUX633	MED	1	8g	8.75g	N/A	N/A	GE RN-150	10,14
2-63X1-SG4M	GE 12HGA	HSD2R	AUX633	MED	2	4.46g	6.25g	1.49g	2.5g	GE RN-150	10,14
2-63X1-SG4T	GE 12HGA	TRB	AUX633	MED	1	8g	8.75g	N/A	N/A	GE RN-150	10,14
2-65X-DGAB	GE 12HFA151A1H	DGAB (REAR)	DG587	HI	2	5.81g	7.5g	2.1g	3g	GE RN-150	6,14,17,22
2-65X-DGCD	GE 12HFA151A1H	DGCD (REAR)	DG587	HI	2	5.81g	7.5g	2.1g	3g	GE RN-150	6,14,17,22
2-83-TILA	GE 12HFA151A9H	DGCD-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-83-TILB	GE 12HFA151A9H	DGAB-X	DG587	MED	2	3.74g	5g	1.35g	2g	GE RN-150	14,17
2-86-ICC1	GE 12HEA61M91	RPC 1 RACK 1	AUX633	MED	1	8g	12.5g	N/A	N/A	G.E. PCR 448-93	
2-86-ICC2	GE 12HEA61M91	RPC 2 RACK 5	AUX633	MED	1	8g	12.5g	N/A	N/A	G.E. PCR 448-93	
2-86-ICC3	GE 12HEA61M91	RPC 3 RACK 9	AUX633	MED	1	8g	12.5g	N/A	N/A	G.E. PCR 448-93	
2-86-ICC4	GE 12HEA61M91	RPC 4 RACK 12	AUX633	MED	1	8g	12.5g	N/A	N/A	G.E. PCR 448-93	
2-87-DGAB-1	ABB 419M6551	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
2-87-DGAB-2	ABB 419M6551	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
2-87-DGAB-3	ABB 419M6551	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
2-87-DGCD-1	ABB 419M6551	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
2-87-DGCD-2	ABB 419M6551	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
2-87-DGCD-3	ABB 419M6551	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5536	
2-87-T21A-1	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21A-2	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21A-3	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21B-1	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21B-2	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21B-3	ABB 419T2451	A-11	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21C-1	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21C-2	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21C-3	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21D-1	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21D-2	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	
2-87-T21D-3	ABB 419T2451	A-13	AUX633	MED	1	8g	15g	N/A	N/A	ABB RC-5535	

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
2-87X-DGAB	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
2-87X-DGCD	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
2-87X-T21A	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
2-87X-T21B	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
2-87X-T21C	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
2-87X-T21D	GE 12HEA61C	SA	AUX633	MED	1	8g	10g	N/A	N/A	GERS B-61	
2-88X-BC-A	CUTLER HAMMER A10	AM-D	AUX633	LOW	2	2.97g	4.5g	.99g	2.7g	GERS-CON.3	5
2-88X-BC-B	CUTLER HAMMER A10	ABD-B	DG587	LOW	2	2.49g	4.5g	.90g	2.7g	GERS-CON.3	5,17
2-88X1-BCA	CH D26MRD43B1	BC-A-PNL	AUX633	RIG	2	.99g	6.98g	.33g	2.79g	F & H 61107	2
2-88X1-BCB	CH D26MRD43B1	BC-B-PNL	AUX633	CAL	2	3.30g	6.98g	.63g	2.79g	F & H 61107	9
2-88X2-BC-A	CH D26MR44B	AM-D	AUX633	LOW	2	2.97g	6.98g	.99g	2.79g	F & H 61107	
2-88X2-BC-B	CH D26MR44B	ABD-B	DG587	LOW	2	2.49g	6.98g	.90g	2.79g	F & H 61107	17
2-AT6-23-WMSP	GAMMA METRICS	N23 RACK	AUX596	MED	2	4.05g	6.5g	1.49g	5.9g	WYLE 58826	17,20
2-BC-A-F10	PWR CONVERSION PROD	BC-A	AUX633	N/A	4	.8g	.99g	.22g	.35g	WYLE 44761-1	18,23
2-BC-A-F8	PWR CONVERSION PROD	BC-A	AUX633	N/A	4	.8g	.99g	.22g	.35g	WYLE 44761-1	18,23
2-BC-A-F9	PWR CONVERSION PROD	BC-A	AUX633	N/A	4	.8g	.99g	.22g	.35g	WYLE 44761-1	18,23
2-BC-A-K2	PWR CONVERSION PROD	BC-A	AUX633	N/A	4	.8g	.99g	.22g	.35g	WYLE 44761-1	18,23
2-BC-A-TIMER	PWR CONVERSION PROD	BC-A	AUX633	N/A	4	.8g	.99g	.22g	.35g	WYLE 44761-1	18,23
2-BC-B-F10	PWR CONVERSION PROD	BC-B	AUX633	N/A	4	.8g	.99g	.22g	.35g	WYLE 44761-1	18,23
2-BC-B-F8	PWR CONVERSION PROD	BC-B	AUX633	N/A	4	.8g	.99g	.22g	.35g	WYLE 44761-1	18,23
2-BC-B-F9	PWR CONVERSION PROD	BC-B	AUX633	N/A	4	.8g	.99g	.22g	.35g	WYLE 44761-1	18,23
2-BC-B-K2	PWR CONVERSION PROD	BC-B	AUX633	N/A	4	.8g	.99g	.22g	.35g	WYLE 44761-1	18,23
2-BC-B-TIMER	PWR CONVERSION PROD	BC-B	AUX633	N/A	4	.8g	.99g	.22g	.35g	WYLE 44761-1	18,23
2-CIB-A-AUX	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-CIB-A-AUX1	CH D26MRD43B1	SSR	AUX633	MED	2	4.46g	6.98g	1.49g	2.79g	F & H 61107	
2-CIB-B-AUX	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-CIB-B-AUX1	CH D26MRD43B1	SSR	AUX633	MED	2	4.46g	6.98g	1.49g	2.79g	F & H 61107	
2-CSX-TA3	GE 12HFA151A1F	T21A3	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-CSX-TD4	GE 12HFA151A1F	T21D4	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-DGAB-INV-OB	SOLIDSTATE CNTRLs INC	DGAB-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
2-DGAB-INV-SB	SOLIDSTATE CNTRLs INC	DGAB-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
2-DGAB-INV-SY1	SOLIDSTATE CNTRLs INC	DGAB-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
2-DGAB-INV-SY2	SOLIDSTATE CNTRLs INC	DGAB-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
2-DGCD-INV-OB	SOLIDSTATE CNTRLs INC	DGCD-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
2-DGCD-INV-SB	SOLIDSTATE CNTRLs INC	DGCD-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
2-DGCD-INV-SY1	SOLIDSTATE CNTRLs INC	DGCD-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23
2-DGCD-INV-SY2	SOLIDSTATE CNTRLs INC	DGCD-INV	DG587	N/A	4	.55g	.65g	.2g	.39g	F & H 10260	17,19,23

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/	PANEL	SCR	DEMAND	CAP	DEMAND	CAP	CAPACITY	NOTES
			ELEV	AMP	LVL	(PEAK)	(PEAK)	(ZPA)	(ZPA)		
						4-16 HZ	4-16 HZ	>33 HZ	>33 HZ	BASIS	
2-EOM-AUX	GE 12HFA151A5H	TFP	TUR591	MED	2	3.87g	5g	1.35g	2g	GE RN-150	14
2-FBCST-AB	DYNALCO/P&B R10	DGAB (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERS TG 10	22
2-FBCST-CD	DYNALCO/P&B R10	DGCD (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERS TG 10	22
2-K-301-AB1	SOLIDSTATE CNTRLS INC	BC-AB1	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-301-AB2	SOLIDSTATE CNTRLS INC	BC-AB2	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-301-CD1	SOLIDSTATE CNTRLS INC	BC-CD1	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-301-CD2	SOLIDSTATE CNTRLS INC	BC-CD2	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-303-AB1	SOLIDSTATE CNTRLS INC	BC-AB1	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-303-AB2	SOLIDSTATE CNTRLS INC	BC-AB2	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-303-CD1	SOLIDSTATE CNTRLS INC	BC-CD1	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-303-CD2	SOLIDSTATE CNTRLS INC	BC-CD2	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-304-AB1	SOLIDSTATE CNTRLS INC	BC-AB1	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-304-AB2	SOLIDSTATE CNTRLS INC	BC-AB2	DG613	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-304-CD1	SOLIDSTATE CNTRLS INC	BC-CD1	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-304-CD2	SOLIDSTATE CNTRLS INC	BC-CD2	DG626	N/A	4	.80g	1.3g	.22g	.64g	WYLE 49275-1	17,18,20,23
2-K-644-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K-AUX-CMO-419	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-K-AUX-CMO-429	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-K-AUX-WMO-714	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-K-AUX-WMO-718	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-K-AUX-WMO-734	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-K-AUX-WMO-738	GE 12HFA151A8H	SSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-K1-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K1-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K1-21WMSP	GAMMA METRICS	SWR	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K1-21WMSPBT	GAMMA METRICS	SWR	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K1-21WRAMP	GAMMA METRICS	N21 RACK	AUX596	HI	2	6.3g	6.5g	2.31g	5.9g	WYLE 58826	17,20
2-K1-23RMSP	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K1-23RMSP-DDA1	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K1-23RMSP-DDA2	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K1-23RMSP-DDA3	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K1-23RMSP-DDA4	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K1-23WMSP	GAMMA METRICS	N23 RACK	AUX596	MED	2	4.05g	6.5g	1.49g	5.9g	WYLE 58826	17,20
2-K1-23WRAMP	GAMMA METRICS	N23 RACK	AUX596	MED	2	4.05g	6.5g	1.49g	5.9g	WYLE 58826	17,20
2-K1-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K1-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K101-21WMSPBT	GAMMA METRICS	SWR	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/	PANEL	SCR	DEMAND	CAP	DEMAND	CAP	CAPACITY	
			ELEV	AMP	LVL	(PEAK)	(PEAK)	(ZPA)	(ZPA)	BASIS	NOTES
						4-16 HZ	4-16 HZ	>33 HZ	>33 HZ		
2-K118-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K118-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K119-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K119-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K131-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K131-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K133-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K133-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K134-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K134-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K137-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K137-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K150-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K150-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K2-1	SOLIDSTATE CNTRL INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K2-2	SOLIDSTATE CNTRL INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K2-21WMSP	GAMMA METRICS	SWR	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K2-23RMSP	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K2-23RMSP-DDA1	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K2-23RMSP-DDA2	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K2-23RMSP-DDA3	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K2-23RMSP-DDA4	GAMMA METRICS	NIS III	AUX633	MED	2	4.46g	6.5g	1.49g	5.9g	WYLE 58826	
2-K2-3	SOLIDSTATE CNTRL INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K2-4	SOLIDSTATE CNTRL INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K201-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K201-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K203-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K203-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K204-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K204-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K216-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K216-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K217-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K217-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K247-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K247-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K248-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
2-K248-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K250-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K250-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K3-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K3-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K3-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K3-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K317-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K317-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K318-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K318-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K320-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K320-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K329-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K329-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K330-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K330-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K344-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K344-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K4-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K4-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K4-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K4-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K417-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K417-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K418-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K418-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K420-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K420-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K429-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K429-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K430-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K430-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K5-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K5-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K5-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K5-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/	PANEL	SCR	DEMAND	CAP	DEMAND	CAP	CAPACITY	
			ELEV	AMP	LVL	(PEAK)	(PEAK)	(ZPA)	(ZPA)	BASIS	NOTES
						4-16 HZ	4-16 HZ	>33 HZ	>33 HZ		
2-K501-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K501-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K505-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K505-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K506-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K506-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K521-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K521-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K522-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K522-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3
2-K6-1	SOLIDSTATE CNTRL INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K6-2	SOLIDSTATE CNTRL INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K6-3	SOLIDSTATE CNTRL INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K6-4	SOLIDSTATE CNTRL INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-K602-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K602-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K604-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K604-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K606-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K606-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K608-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K608-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K608-X1-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K608-X1-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K608-X2-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K608-X2-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K609-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K609-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K609-X1-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K609-X1-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K610-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K610-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K610-X1-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K610-X1-X-A	GE 12HFA151A9H	TRE	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-K611-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K611-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K611-X1-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
2-K611-X1-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K611X-B	GE 12HFA151A9H	TRE	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-K618-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K618-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K619-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K619-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K626-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K626-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K626-X3-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K626-X3-B	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K643-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K643-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-K644-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-LB-112-BX1	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-LB-112-BX2	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-LB-112-DX	WESTINGHOUSE AR	ARA2	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-LB-185-BX1	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-LB-185-BX2	WESTINGHOUSE AR	RPSX-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-LCSI-A-AUX	GE 12HFA151A1H	NSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-LCSI-B-AUX	GE 12HFA151A1H	NSR	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-MUX-4-2	WESTINGHOUSE AR	ARA2	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	21
2-PB-455-X1	GE 12HFA151A8H	SR3	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-PB-457-X1	GE 12HFA151A8H	SR2	AUX633	MED	2	4.46g	5g	1.49g	2g	GE RN-150	14
2-PBX-455D	SIGMA 42JO-500G-SIL	RPC 1 RACK 1	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-456D	SIGMA 42JO-500G-SIL	RPC 2 RACK 5	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-457D	SIGMA 42JO-500G-SIL	RPC 3 RACK 9	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-514A	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-514B	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-514C	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-515A	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-515B	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-516C	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-516D	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-525A	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-525B	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-525C	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-526C	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
2-PBX-526D	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-534A	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-534B	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-536A	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-546A	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-934A	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-934B	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-935A	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-935B	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-936A	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-936B	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-PBX-937A	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	23
2-RBCST-AB	DYNALCO/P&B R10	DGAB (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERs TG 10	22
2-RBCST-CD	DYNALCO/P&B R10	DGCD (REAR)	DG587	HI	1	8g	9g	N/A	N/A	GERs TG 10	22
2-RL1-1	SOLIDSTATE CNTRLs INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-2	SOLIDSTATE CNTRLs INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-3	SOLIDSTATE CNTRLs INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-4	SOLIDSTATE CNTRLs INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-ACVS-1	SOLIDSTATE CNTRLs INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-ACVS-2	SOLIDSTATE CNTRLs INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-ACVS-3	SOLIDSTATE CNTRLs INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-ACVS-4	SOLIDSTATE CNTRLs INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-OSCB-1	SOLIDSTATE CNTRLs INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-OSCB-2	SOLIDSTATE CNTRLs INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-OSCB-3	SOLIDSTATE CNTRLs INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-OSCB-4	SOLIDSTATE CNTRLs INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-SYBD-1	SOLIDSTATE CNTRLs INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-SYBD-2	SOLIDSTATE CNTRLs INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-SYBD-3	SOLIDSTATE CNTRLs INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1-SYBD-4	SOLIDSTATE CNTRLs INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1SS-1	SOLIDSTATE CNTRLs INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1SS-2	SOLIDSTATE CNTRLs INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1SS-3	SOLIDSTATE CNTRLs INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL1SS-4	SOLIDSTATE CNTRLs INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL2-SYBD-1	SOLIDSTATE CNTRLs INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL2-SYBD-2	SOLIDSTATE CNTRLs INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL2-SYBD-3	SOLIDSTATE CNTRLs INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
2-RL2-SYBD-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL2SS-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL2SS-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL2SS-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL2SS-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL3-SYBD-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL3-SYBD-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL3-SYBD-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RL3-SYBD-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RR1-1	SOLIDSTATE CNTRLS INC	CRID-I	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RR1-2	SOLIDSTATE CNTRLS INC	CRID-II	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RR1-3	SOLIDSTATE CNTRLS INC	CRID-III	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-RR1-4	SOLIDSTATE CNTRLS INC	CRID-IV	DG609	N/A	4	.70g	1.75g	.23g	.7g	WYLE 47612-1	17,18,23
2-SI-X-TA2	GE 12HFA151A1F	T21A2	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-SI-X-TD11	GE 12HFA151A1F	T21D11	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-SIX-TA1	GE 12HFA151A1F	T21A1	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-SIX-TA4	GE 12HFA151A1F	T21A4	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-SIX-TA5	GE 12HFA151A1F	T21A5	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-SIX-TA7	GE 12HFA151A1F	T21A7	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-SIX-TD10	GE 12HFA151A1F	T21D10	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-SIX-TD3	GE 12HFA151A1F	T21D3	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-SIX-TD5	GE 12HFA151A1F	T21D5	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-SIX-TD6	GE 12HFA151A1F	T21D6	DG609	MED	2	4.05g	5g	1.49g	2g	GE RN-150	14,17
2-TDAFP-OSM	DYNALCO SS-2200	TFP	TUR591	MED	2	3.87g	4.42g	1.35g	1.77g	F & H 20148	
1-FBX-512B	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-FBX-513B	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-FBX-522B	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-FBX-523B	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-FBX-532B	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-FBX-533B	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-FBX-542B	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-FBX-543B	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-K107-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K107-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K115-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K115-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K116-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND (PEAK) 4-16 HZ	CAP (PEAK) 4-16 HZ	DEMAND (ZPA) >33 HZ	CAP (ZPA) >33 HZ	CAPACITY BASIS	NOTES
1-K116-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K117-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K117-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K118-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K118-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K119-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K119-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K131-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K131-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K133-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K133-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K134-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K134-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K148-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K148-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K201-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K201-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K203-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K203-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K204-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K204-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K217-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K217-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K229-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K229-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K243-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K243-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K244-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K244-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K245-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K245-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K246-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K246-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K247-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K247-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K248-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K248-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

<u>RELAY TAG NUMBER</u>	<u>MODEL NUMBER</u>	<u>PANEL</u>	<u>BLDG/</u>	<u>PANEL</u>	<u>SCR</u>	<u>DEMAND</u>	<u>CAP</u>	<u>DEMAND</u>	<u>CAP</u>	<u>CAPACITY</u>	
			<u>ELEV</u>	<u>AMP</u>	<u>LVL</u>	<u>(PEAK)</u>	<u>(PEAK)</u>	<u>(ZPA)</u>	<u>(ZPA)</u>	<u>BASIS</u>	<u>NOTES</u>
1-K306-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K306-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K317-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K317-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K318-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K318-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K319-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K319-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K320-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K320-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K330-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K330-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K344-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K344-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K406-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K406-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K417-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K417-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K418-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K418-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K419-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K419-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K420-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K420-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K430-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K430-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K501-A	CLARE,MIDTEX,P&B	RPS-A	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K521-B	CLARE,MIDTEX,P&B	RPS-B	AUX633	MED	1	8g	9g	N/A	N/A	GERS 13,14,17	3,8
1-K610-A	WESTINGHOUSE AR	RPS-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	8,21
1-K610-X1-A	WESTINGHOUSE AR	RPSX-A	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	8,21
1-K611-B	WESTINGHOUSE AR	RPS-B	AUX633	MED	2	4.46g	7.5g	1.49g	3g	GERS B-37	8,21
1-PBX-455D	SIGMA 42JO-500G-SIL	RPC 1 RACK 1	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-456D	SIGMA 42JO-500G-SIL	RPC 2 RACK 5	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-457D	SIGMA 42JO-500G-SIL	RPC 3 RACK 9	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-514A	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-514B	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-515A	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23

UNIT 2 ESSENTIAL RELAY CAPACITY VS. DEMAND SUMMARY

RELAY TAG NUMBER	MODEL NUMBER	PANEL	BLDG/ ELEV	PANEL AMP	SCR LVL	DEMAND	CAP	DEMAND	CAP	CAPACITY	
						(PEAK) 4-16 HZ	(PEAK) 4-16 HZ	(ZPA) >33 HZ	(ZPA) >33 HZ	BASIS	NOTES
1-PBX-515B	SIGMA 42JO-500G-SIL	RPC 2 RACK 7	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-516A	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-516C	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-516D	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-525A	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-525B	SIGMA 42JO-500G-SIL	RPC 2 RACK 8	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-526A	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-526C	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-526D	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-534A	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-534B	SIGMA 42JO-500G-SIL	RPC 1 RACK 4	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-536A	SIGMA 42JO-500G-SIL	RPC 3 RACK 11	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-546A	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-934B	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-935B	SIGMA 42JO-500G-SIL	RPC 4 RACK 12	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-PBX-936B	SIGMA 42JO-500G-SIL	RPC 1 RACK 3	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-TBX-412D	SIGMA 42JO-500G-SIL	RPC 1 RACK 2	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-TBX-422D	SIGMA 42JO-500G-SIL	RPC 2 RACK 6	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-TBX-432D	SIGMA 42JO-500G-SIL	RPC 3 RACK 10	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23
1-TBX-442D	SIGMA 42JO-500G-SIL	RPC 4 RACK 13	AUX633	N/A	4	.66g	4.2g	.22g	1.0g	NQS 1619	8,23

- (1) These General Electric type HFA relays are configured with greater than three normally closed contacts, and therefore, their seismic capacity is reduced
- (2) These small wall mounted panels were judged by the SCEs to be rigid (i.e. no amplification required)
- (3) These relays are either Clare GP1, Midtex 156, or Potter & Brumfield KHUs. The lowest capacity of the three (Clare) is listed, 9g
- (4) These relays directly control switchgear breakers. Per step 7 on page 5-9 of EPRI 7148, they were screened based on the switchgear GERS
- (5) See EPRI NP-5223-SL-R1 (Reference 6) for these GERS
- (6) These General Electric type HFA relays use only normally open contacts for essential functions, therefore, the seismic capacity is increased
- (7) These relays are outliers. See section 7.0 for further details.

Because the opposite Units Essential Service Water Pumps start on Safety Injection Signal, the opposite Units ESFAS relays appear on the essential relay list

- (9) The amplification of this panel was calculated using case specific analysis (see Appendix D)
- (10) These General Electric type HGA relays use only the normally open contacts, therefore, the Low Ruggedness restriction does not apply
- (11) These Mercoild pressure switches are the snap-action type (i.e. mercury switches are not used)
- (12) The time delay setting of all 7000 series Agastats is greater than .3 seconds
- (13) The time dial setting of all General Electric type IAC relays is greater than unity
- (14) The adjustable spring settings were not modified from the original manufacturers setting
- (15) The ASCO 2516C is equivalent to the ASCO 2506, except that it is mounted in an enclosure
- (16) See Reference 8 for the justification for using the IAC 53 GERS for IACs 51, 53, and 55
- (17) The Diesel Generator Building 609 elevation floor response spectra is used for relays located on the Auxiliary Building 609 elevation
The Auxiliary Building 587 floor response spectra was used for relays located on the Diesel Generator 587 elevation
The Auxiliary Building 633 floor response spectra was used for relays located on the Diesel Generator 613 and 626 elevations
The Turbine Building 591 floor response spectra was used for relays located on the Screenhouse 594 elevation
- (18) 2% damping used
- (19) Farwell and Hendricks qualification report 10260 is for a similar Solidstate Controls static inverter which uses the same type of relays
- (20) For relays located between elevations for which floor response spectra were developed, the next highest elevation was used
- (21) All of the Westinghouse AR relays on the essential relay list are AC
- (22) The SCEs determined that the rear of this panel is high amplification and the side is medium amplification (see reference 7)
- (23) The relays were included in IEEE 344-75 tests in which the entire enclosure was shaker table tested. The accelerations listed are the appropriate floor response spectra and the test response spectra at the base of the enclosure

APPENDIX F
OUTLIER SEISMIC VERIFICATION SHEETS

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)		GIP Rev 2, Corrected 2/14/92 Sheet 1 of 1
ID: See comments below	Class: Relay	
Description: Emergency Diesel Generator Differential Relays		
Bldg: Auxiliary	Floor El: 633'	Room, Row/Col: Control Room

1. OUTLIER ISSUE DEFINITION - Essential Relays

- a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)

Capacity vs. Demand	
Mounting, Type, Location	X
Other	

- b. Describe all the reasons for the outlier (i.e. if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy).

General Electric Type CFD relays are on the low ruggedness relay list in Appendix E of EPRI 7148

2. PROPOSED METHOD OF OUTLIER RESOLUTION (Optional)

- a. Defined proposed method(s) for resolving outlier.

The relays were replaced with during the 1994 refueling outages with Asea Brown Boveri type 87M solidstate differential relays. Reference Request for Change 12-RFC-3067.

- b. Provide information needed to implement proposed methods(s) for resolving outlier (e.g. estimate of fundamental frequency).

3. COMMENTS

The following relays were replaced:

1-87-DGAB-1	2-87-DGAB-1
1-87-DGAB-2	2-87-DGAB-2
1-87-DGAB-3	2-87-DGAB-3
1-87-DGCD-1	2-87-DGCD-1
1-87-DGCD-2	2-87-DGCD-2
1-87-DGCD-3	2-87-DGCD-3

4. CERTIFICATION

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by:

RC Steele
A. Harris

Date:

10-25-95

11-6-95

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)		GIP Rev 2, Corrected 2/14/92 Sheet 1 of 1
ID: See comments below	Class: Relay	
Description: 4kV/600V Transformer Differential Relays		
Bldg: Auxiliary	Floor El: 633'	Room, Row/Col: Control Room

1. OUTLIER ISSUE DEFINITION - Essential Relays

- a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)

Capacity vs. Demand	
Mounting, Type, Location	X
Other	

- b. Describe all the reasons for the outlier (i.e. if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy).

General Electric Type IJD relays are on the low ruggedness relay list in Appendix E of EPRI 7148

2. PROPOSED METHOD OF OUTLIER RESOLUTION (Optional)

- a. Defined proposed method(s) for resolving outlier.

The relays were replaced with during the 1994 refueling outages with Asea Brown Boveri type 87T solidstate differential relays. Reference Request for Change 12-RFC-3067.

- b. Provide information needed to implement proposed methods(s) for resolving outlier (e.g. estimate of fundamental frequency).

3. COMMENTS

The following relays were replaced:

1-87-T11A-1	1-87-T11C-1	2-87-T21A-1	2-87-T21C-1
1-87-T11A-2	1-87-T11C-2	2-87-T21A-2	2-87-T21C-2
1-87-T11A-3	1-87-T11C-3	2-87-T21A-3	2-87-T21C-3
1-87-T11B-1	1-87-T11D-1	2-87-T21B-1	2-87-T21D-1
1-87-T11B-2	1-87-T11D-2	2-87-T21B-2	2-87-T21D-2
1-87-T11B-3	1-87-T11D-3	2-87-T21B-3	2-87-T21D-3

4. CERTIFICATION

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by:

RC Hark
AA Hark

Date:

10-25-95
11-6-95

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)		GIP Rev 2, Corrected 2/14/92 Sheet 1 of 1
ID: See comments below	Class: Relay	
Description: Emergency Diesel Generator Starting Relays		
Bldg: Diesel Generator	Floor El: 587	Room, Row/Col: Diesel Rooms

1. OUTLIER ISSUE DEFINITION - Essential Relays

- a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)

Capacity vs. Demand	
Mounting, Type, Location	X
Other	

- b. Describe all the reasons for the outlier (i.e. if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy).

General Electric Type EGA relays which use normally closed contacts are on the low ruggedness list in Appendix E of EPRI 7148

2. PROPOSED METHOD OF OUTLIER RESOLUTION (Optional)

- a. Defined proposed method(s) for resolving outlier.

For Unit 1, the relays were replaced with Cutler Hammer type M600 relays in 1995. For Unit 2, the relays will be replaced with Cutler Hammer type M600 relays prior to the 1996 refueling outage. Reference Minor Modification 12-MX-549.

- b. Provide information needed to implement proposed methods(s) for resolving outlier (e.g. estimate of fundamental frequency).

--

3. COMMENTS

The following relays have been or will be replaced:

1-6-2-DGAB
1-6-2-DGCD
2-6-2-DGAB
2-6-2-DGCD

4. CERTIFICATION

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by:

RC Steel
MA Adams

Date:

10-25-95
11-6-95

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)		GIP Rev 2, Corrected 2/14/92 Sheet 1 of 1
ID: See comments below	Class: Relay	
Description: Emergency Diesel Generator Starting Relays		
Bldg: Auxiliary	Floor El: 633	Room, Row/Col: Control Rooms

1. OUTLIER ISSUE DEFINITION - Essential Relays

- a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)

Capacity vs. Demand	X
Mounting, Type, Location	
Other	

- b. Describe all the reasons for the outlier (i.e. if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy).

The relays are located on a high amplification portion of the panel for which the seismic demand is 6.93 g. The capacity of the relays is 5 g (G.E. HFAs).

2. PROPOSED METHOD OF OUTLIER RESOLUTION (Optional)

- a. Defined proposed method(s) for resolving outlier.

The relays will be relocated to the main portion of the panel where the amplification is medium. This design change (12-DCP-18) will be installed during the 1997 refueling outages.

- b. Provide information needed to implement proposed methods(s) for resolving outlier (e.g. estimate of fundamental frequency).

--

3. COMMENTS

The following relays will be relocated:

1-6-1-DGAB
1-6-1-DGCD
2-6-1-DGAB
2-6-1-DGCD

4. CERTIFICATION

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: RC Steel Date: 10-25-95
MA Janner 11-6-95

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)		GIP Rev 2, Corrected 2/14/92 Sheet 1 of 1
ID: See comments below	Class: Relay	
Description: Transformer Fire Detection Circuitry		
Bldg: Diesel Generator	Floor El: 609	Room, Row/Col: Switchgear

1. OUTLIER ISSUE DEFINITION - Essential Relays

- a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)

Capacity vs. Demand	
Mounting, Type, Location	
Other	X

- b. Describe all the reasons for the outlier (i.e. if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy).

The seismic capacity of the relays in the fire detection circuitry is unknown.

2. PROPOSED METHOD OF OUTLIER RESOLUTION (Optional)

- a. Defined proposed method(s) for resolving outlier.

An operator action will be included in the Seismic Safe Shutdown Procedure to verify that the fans have not been locked out, or to reset the fans, if necessary. The procedure will be completed by July 31, 1997.

- b. Provide information needed to implement proposed methods(s) for resolving outlier (e.g. estimate of fundamental frequency).

3. COMMENTS

The following switchgear roof fans could be locked out during a seismic event:

1-HV-SGRS2
1-HV-SGRS3
2-HV-SGRS2
2-HV-SGRS3

4. CERTIFICATION

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by:

RC Steele
HA Adams

Date:

10-25-95

10-6-95

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)		GIP Rev 2, Corrected 2/14/92 Sheet 1 of 1
ID: See comments below	Class: Relay	
Description: Plant Process Computer Room Halon Actuation System		
Bldg: Auxiliary	Floor El: 650	Room, Row/Col: PPC Rooms

1. OUTLIER ISSUE DEFINITION - Essential Relays

- a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)

Capacity vs. Demand	
Mounting, Type, Location	
Other	X

- b. Describe all the reasons for the outlier (i.e. if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy).

The seismic capacity of the relays in the Halon Actuation System is unknown.

2. PROPOSED METHOD OF OUTLIER RESOLUTION (Optional)

- a. Defined proposed method(s) for resolving outlier.

An operator action will be included in the Seismic Safe Shutdown Procedure to verify that the dampers have not closed, or to open the dampers, if necessary. The procedure will be completed by July 31, 1997.

- b. Provide information needed to implement proposed methods(s) for resolving outlier (e.g. estimate of fundamental frequency).

3. COMMENTS

The following dampers could close during a seismic event:

1-HV-AC-FD-1
1-HV-AC-FD-2
1-HV-AC-FD-3
2-HV-AC-FD-1
2-HV-AC-FD-2
2-HV-AC-FD-3

4. CERTIFICATION

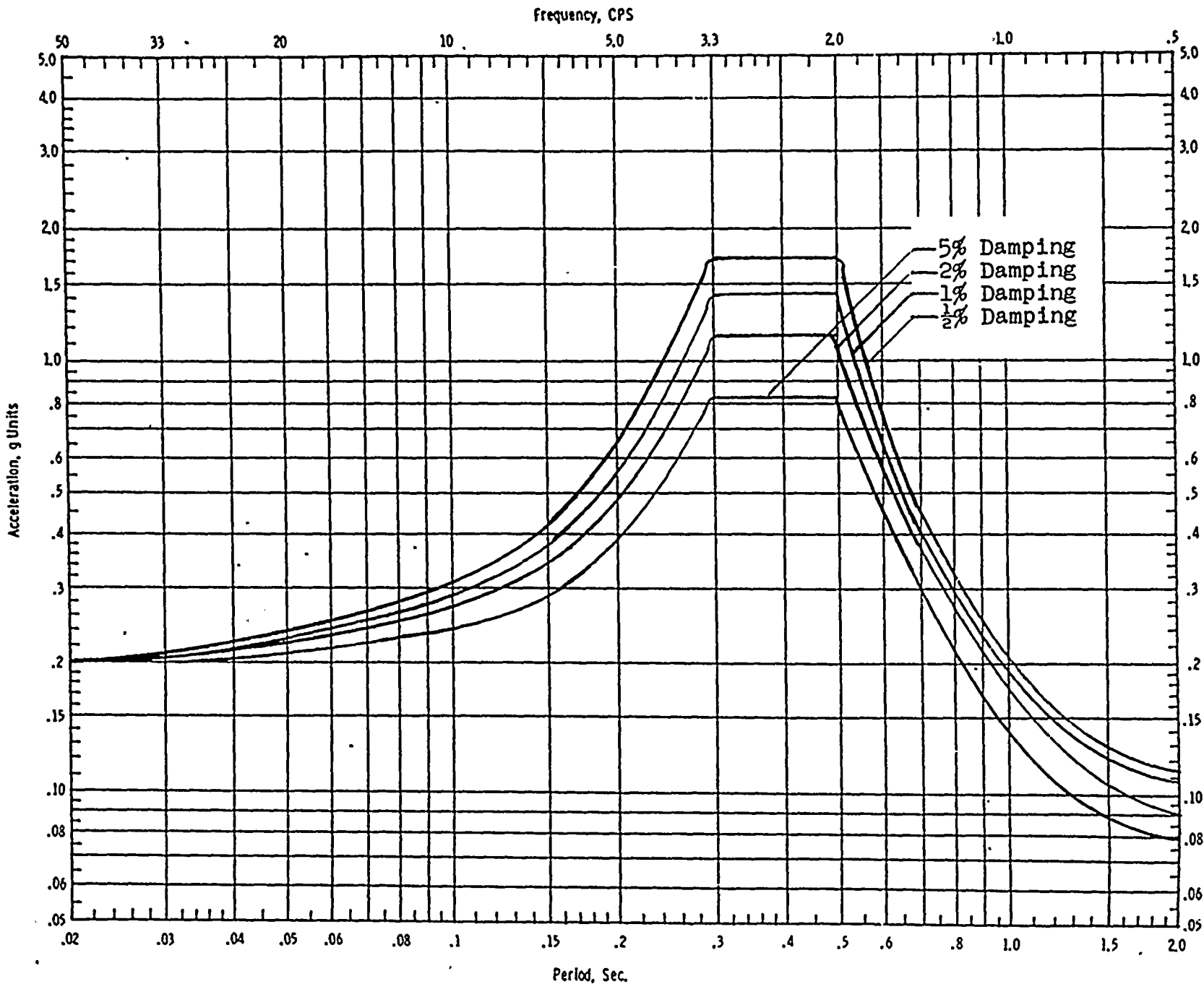
The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: RG Steele Date: 10-25-95
AAHamm 11-6-95

APPENDIX G

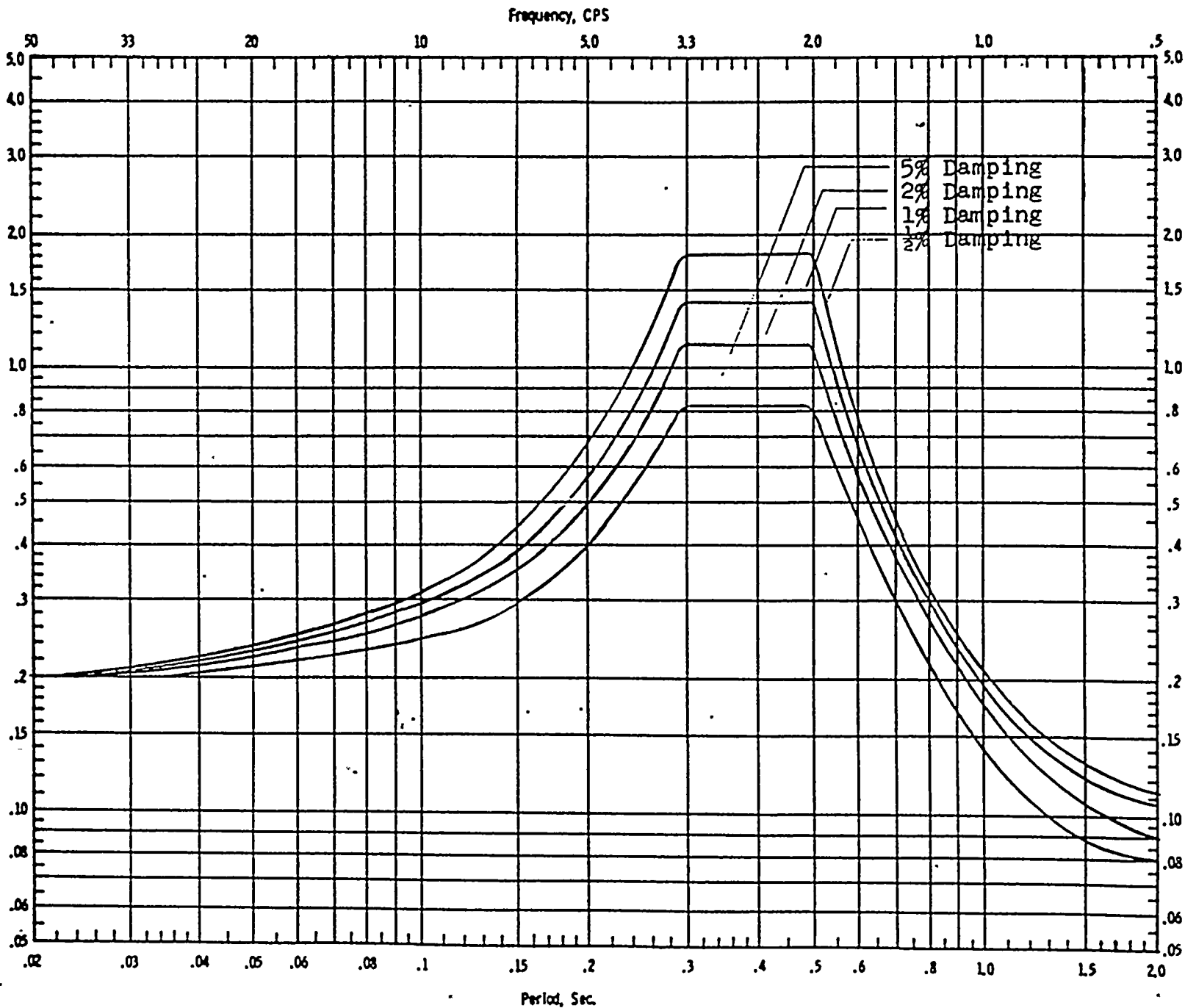
COOK NUCLEAR PLANT FLOOR RESPONSE SPECTRA

PROJECT D. C. COOK JOB NO. 4210
 DESIGN BY RAW DATE DECEMBER 19, 1970
 CHECKED BY GSB DATE 12-19-70 SHEET 7 OF 8



RESPONSE SPECTRA
 COOK AUXILIARY BUILDING
 FLOOR EL. 587'-0"
 DESIGN BASIS EARTHQUAKE

CLIENT AEP PROJECT D. C. COOK JOB NO. 4210
 DESIGN BY HHS DATE 3-12-71
 CHECKED BY GSB DATE 3-12-71 SHEET 1 OF 1

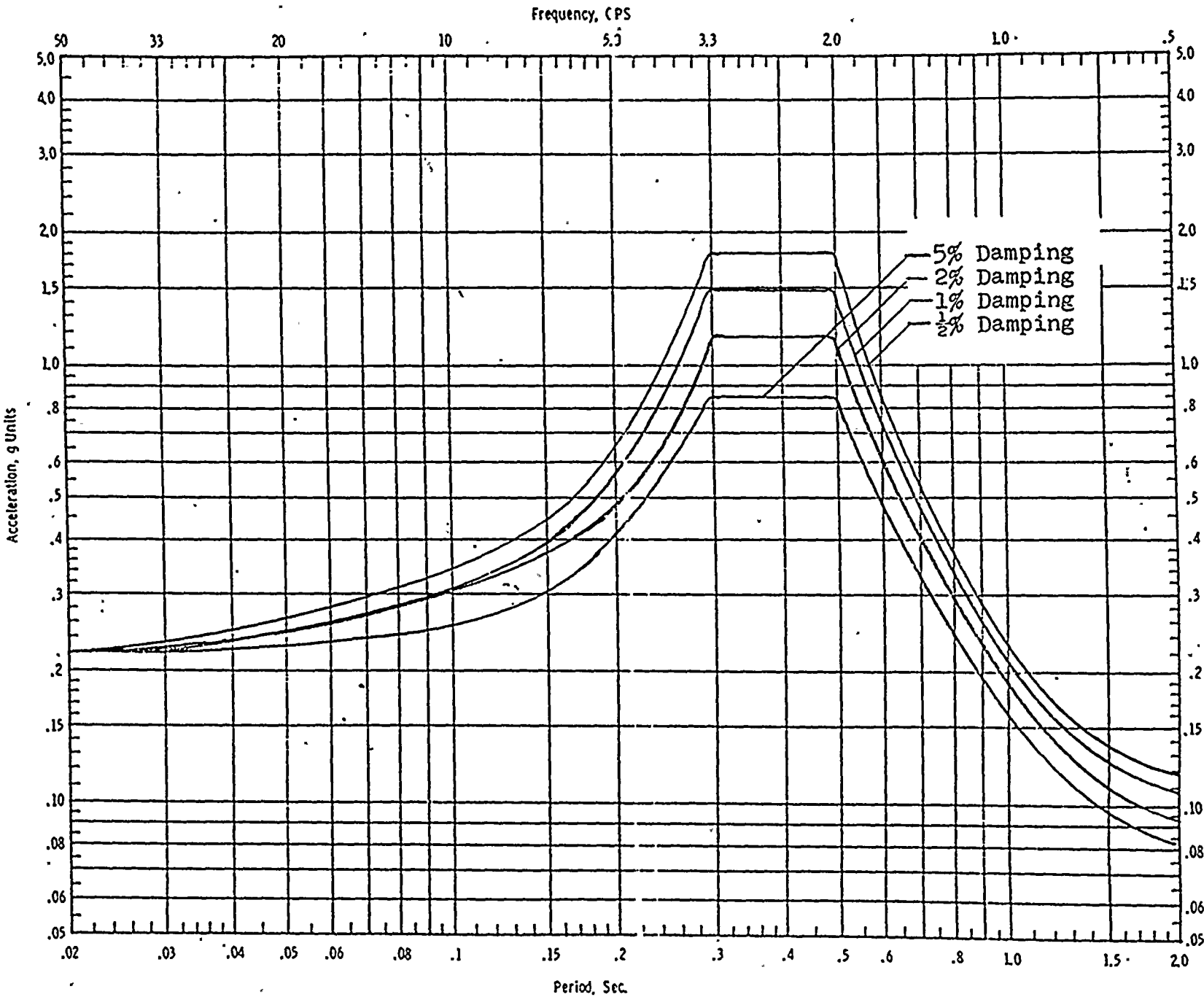


RESPONSE SPECTRA
 COOK TURBINE BUILDING
 FLOOR EL. 591'-0"
 DESIGN BASIS EARTHQUAKE

SARGENT & LUNDY

ENGINEERS

CLIENT AEP JOB NO. 4210
 PROJECT D. C. COOK
 DESIGN BY RAW DATE DECEMBER 19, 1970
 CHECKED BY GSB DATE 12-19-70 SHEET 8 OF 8

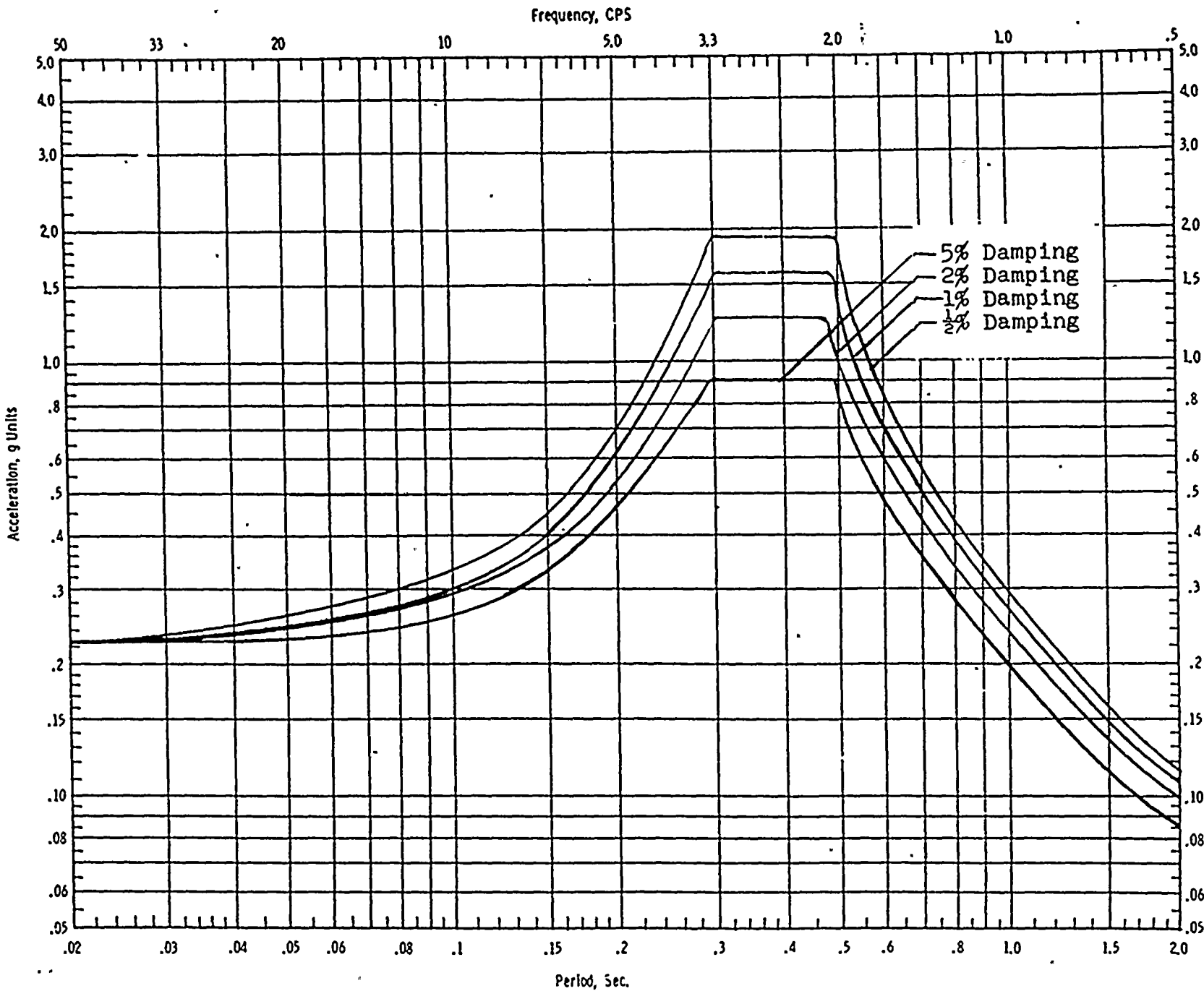


RESPONSE SPECTRA
 COOK DIESEL GENERATOR BUILDING
 FLOOR EL. 609
 DESIGN BASIS EARTHQUAKE

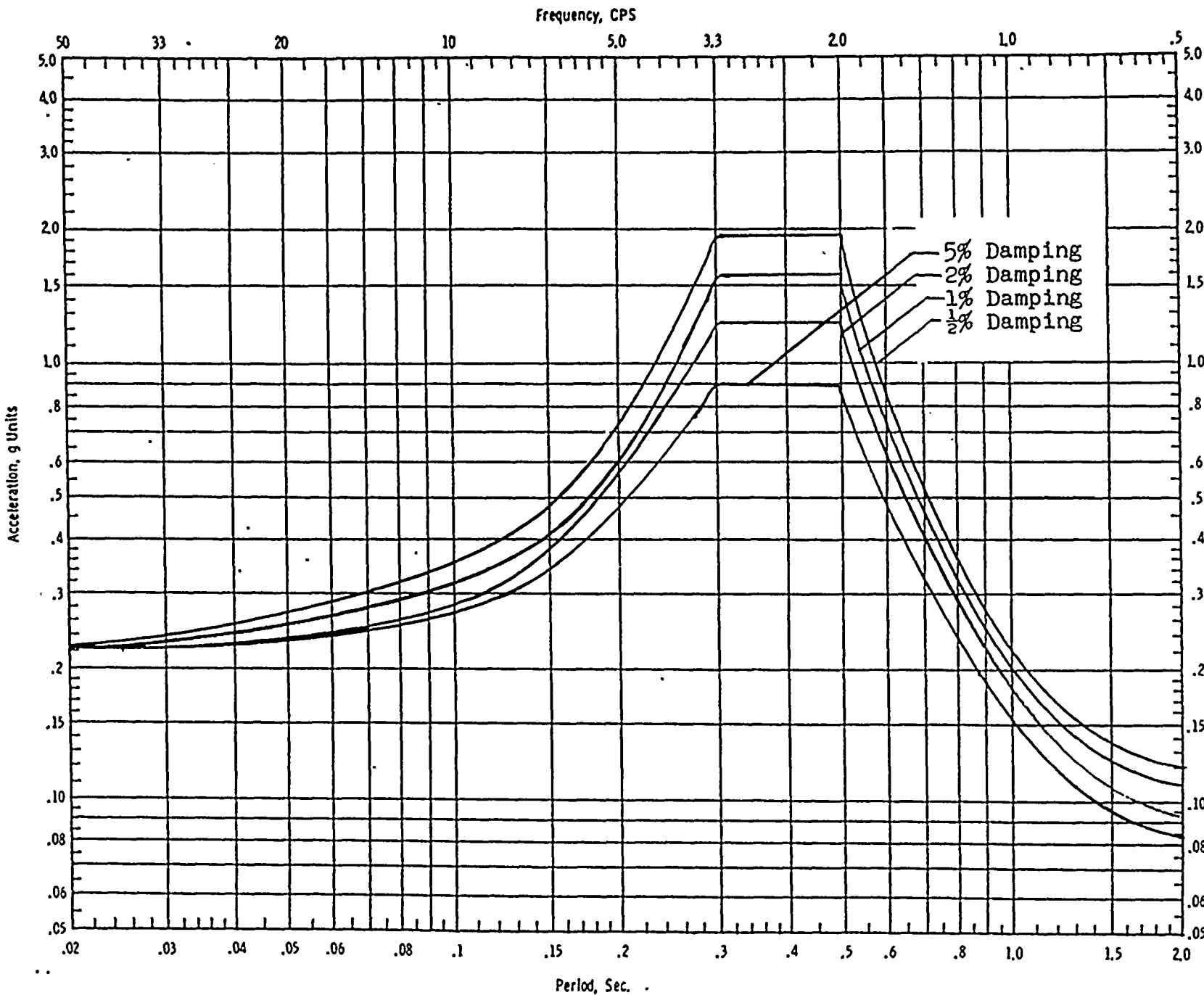
SARGENT LUNDY

ENGINEERS

PROJECT D. C. COOK JOB NO. 4210
 DESIGN BY RAW DATE DECEMBER 19, 1970
 CHECKED BY GSB DATE 12-19-70 SHEET 5 OF 8



RESPONSE SPECTRA
 COOK AUXILIARY BUILDING
 FLOOR EL. 633
 DESIGN BASIS EARTHQUAKE



RESPONSE SPECTRA
 COOK AUXILIARY BUILDING
 FLOOR, EL. 650'-0"
 DESIGN BASIS EARTHQUAKE

APPENDIX H
LEAD RELAY REVIEWER RESUME'

1. *Chlorophyll a* (Chl *a*)
 2. *Chlorophyll b* (Chl *b*)
 3. *Chlorophyll c* (Chl *c*)
 4. *Chlorophyll d* (Chl *d*)
 5. *Chlorophyll e* (Chl *e*)
 6. *Chlorophyll f* (Chl *f*)
 7. *Chlorophyll g* (Chl *g*)
 8. *Chlorophyll h* (Chl *h*)
 9. *Chlorophyll i* (Chl *i*)
 10. *Chlorophyll j* (Chl *j*)
 11. *Chlorophyll k* (Chl *k*)
 12. *Chlorophyll l* (Chl *l*)
 13. *Chlorophyll m* (Chl *m*)
 14. *Chlorophyll n* (Chl *n*)
 15. *Chlorophyll o* (Chl *o*)
 16. *Chlorophyll p* (Chl *p*)
 17. *Chlorophyll q* (Chl *q*)
 18. *Chlorophyll r* (Chl *r*)
 19. *Chlorophyll s* (Chl *s*)
 20. *Chlorophyll t* (Chl *t*)
 21. *Chlorophyll u* (Chl *u*)
 22. *Chlorophyll v* (Chl *v*)
 23. *Chlorophyll w* (Chl *w*)
 24. *Chlorophyll x* (Chl *x*)
 25. *Chlorophyll y* (Chl *y*)
 26. *Chlorophyll z* (Chl *z*)
 27. *Chlorophyll aa* (Chl *aa*)
 28. *Chlorophyll ab* (Chl *ab*)
 29. *Chlorophyll ac* (Chl *ac*)
 30. *Chlorophyll ad* (Chl *ad*)
 31. *Chlorophyll ae* (Chl *ae*)
 32. *Chlorophyll af* (Chl *af*)
 33. *Chlorophyll ag* (Chl *ag*)
 34. *Chlorophyll ah* (Chl *ah*)
 35. *Chlorophyll ai* (Chl *ai*)
 36. *Chlorophyll aj* (Chl *aj*)
 37. *Chlorophyll ak* (Chl *ak*)
 38. *Chlorophyll al* (Chl *al*)
 39. *Chlorophyll am* (Chl *am*)
 40. *Chlorophyll an* (Chl *an*)
 41. *Chlorophyll ao* (Chl *ao*)
 42. *Chlorophyll ap* (Chl *ap*)
 43. *Chlorophyll aq* (Chl *aq*)
 44. *Chlorophyll ar* (Chl *ar*)
 45. *Chlorophyll as* (Chl *as*)
 46. *Chlorophyll at* (Chl *at*)
 47. *Chlorophyll au* (Chl *au*)
 48. *Chlorophyll av* (Chl *av*)
 49. *Chlorophyll aw* (Chl *aw*)
 50. *Chlorophyll ax* (Chl *ax*)
 51. *Chlorophyll ay* (Chl *ay*)
 52. *Chlorophyll az* (Chl *az*)
 53. *Chlorophyll aza* (Chl *aza*)
 54. *Chlorophyll abz* (Chl *abz*)
 55. *Chlorophyll acz* (Chl *acz*)
 56. *Chlorophyll adz* (Chl *adz*)
 57. *Chlorophyll aez* (Chl *aez*)
 58. *Chlorophyll afz* (Chl *afz*)
 59. *Chlorophyll agz* (Chl *agz*)
 60. *Chlorophyll ahz* (Chl *ahz*)
 61. *Chlorophyll aiz* (Chl *aiz*)
 62. *Chlorophyll ajz* (Chl *ajz*)
 63. *Chlorophyll akz* (Chl *akz*)
 64. *Chlorophyll alz* (Chl *alz*)
 65. *Chlorophyll amz* (Chl *amz*)
 66. *Chlorophyll anz* (Chl *anz*)
 67. *Chlorophyll aoz* (Chl *aoz*)
 68. *Chlorophyll apz* (Chl *apz*)
 69. *Chlorophyll aqz* (Chl *aqz*)
 70. *Chlorophyll arz* (Chl *arz*)
 71. *Chlorophyll asz* (Chl *asz*)
 72. *Chlorophyll atz* (Chl *atz*)
 73. *Chlorophyll auz* (Chl *auz*)
 74. *Chlorophyll avz* (Chl *avz*)
 75. *Chlorophyll awz* (Chl *awz*)
 76. *Chlorophyll axz* (Chl *axz*)
 77. *Chlorophyll ayz* (Chl *ayz*)
 78. *Chlorophyll azz* (Chl *azz*)
 79. *Chlorophyll azaa* (Chl *aza*)
 80. *Chlorophyll abz* (Chl *abz*)
 81. *Chlorophyll acz* (Chl *acz*)
 82. *Chlorophyll adz* (Chl *adz*)
 83. *Chlorophyll aez* (Chl *aez*)
 84. *Chlorophyll afz* (Chl *afz*)
 85. *Chlorophyll agz* (Chl *agz*)
 86. *Chlorophyll ahz* (Chl *ahz*)
 87. *Chlorophyll aiz* (Chl *aiz*)
 88. *Chlorophyll ajz* (Chl *ajz*)
 89. *Chlorophyll akz* (Chl *akz*)
 90. *Chlorophyll alz* (Chl *alz*)
 91. *Chlorophyll amz* (Chl *amz*)
 92. *Chlorophyll anz* (Chl *anz*)
 93. *Chlorophyll aoz* (Chl *aoz*)
 94. *Chlorophyll apz* (Chl *apz*)
 95. *Chlorophyll aqz* (Chl *aqz*)
 96. *Chlorophyll arz* (Chl *arz*)
 97. *Chlorophyll asz* (Chl *asz*)
 98. *Chlorophyll atz* (Chl *atz*)
 99. *Chlorophyll auz* (Chl *auz*)
 100. *Chlorophyll avz* (Chl *avz*)
 101. *Chlorophyll awz* (Chl *awz*)
 102. *Chlorophyll axz* (Chl *axz*)
 103. *Chlorophyll ayz* (Chl *ayz*)
 104. *Chlorophyll azz* (Chl *azz*)
 105. *Chlorophyll azaa* (Chl *aza*)
 106. *Chlorophyll abz* (Chl *abz*)
 107. *Chlorophyll acz* (Chl *acz*)
 108. *Chlorophyll adz* (Chl *adz*)
 109. *Chlorophyll aez* (Chl *aez*)
 110. *Chlorophyll afz* (Chl *afz*)
 111. *Chlorophyll agz* (Chl *agz*)
 112. *Chlorophyll ahz* (Chl *ahz*)
 113. *Chlorophyll aiz* (Chl *aiz*)
 114. *Chlorophyll ajz* (Chl *ajz*)
 115. *Chlorophyll akz* (Chl *akz*)
 116. *Chlorophyll alz* (Chl *alz*)
 117. *Chlorophyll amz* (Chl *amz*)
 118. *Chlorophyll anz* (Chl *anz*)
 119. *Chlorophyll aoz* (Chl *aoz*)
 120. *Chlorophyll apz* (Chl *apz*)
 121. *Chlorophyll aqz* (Chl *aqz*)
 122. *Chlorophyll arz* (Chl *arz*)
 123. *Chlorophyll asz* (Chl *asz*)
 124. *Chlorophyll atz* (Chl *atz*)
 125. *Chlorophyll auz* (Chl *auz*)
 126. *Chlorophyll avz* (Chl *avz*)
 127. *Chlorophyll awz* (Chl *awz*)
 128. *Chlorophyll axz* (Chl *axz*)
 129. *Chlorophyll ayz* (Chl *ayz*)
 130. *Chlorophyll azz* (Chl *azz*)
 131. *Chlorophyll azaa* (Chl *aza*)
 132. *Chlorophyll abz* (Chl *abz*)
 133.

[illegible][illegible]

(This shows the 2nd am.
 plan with a power of 100
 which is the left of the
 engineering department.
 Section 1000)

"The trip was our first experience...
and we had a great time."

... ..

... ..

$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{x}} \right) = \frac{\partial L}{\partial x}$

DATE: 11/11/2006

SECRET

Randall C. Steele

Professional Experience

6/87 to Present	American Electric Power Columbus, Ohio
3/94 to Present	USI A-46 Lead Relay Reviewer, Instrumentation and Controls Design Section, Nuclear Engineering Department. Responsible for USI A-46 Relay Evaluation for Donald C. Cook Nuclear Plant.
5/91 to 3/94	Low Voltage A.C. Distribution System Engineer, Nuclear Engineering Department. Responsible for 120 Volt A.C. Vital Bus System. Prepared for and participated in the Nuclear Regulatory Commission's Electrical Distribution System Functional Inspection at the Donald C. Cook Nuclear Plant.
6/90 to 5/91	Electrical Verification Engineer, Wm. H. Zimmer Generating Station, Moscow, Ohio. Responsible for onsite electrical control circuit design review, field design modifications, and equipment check-out and start-up during the construction of the plant.
11/89 to 6/90	Electrical Engineer, Fossil Plant Engineering Department. Responsible for various design modifications on fossil plant auxiliary power and control systems throughout the AEP system.
6/87 to 11/89	Electrical Engineer, Nuclear Engineering Department. Responsible for Environmental Qualification of Electrical Equipment and various design modifications involving the auxiliary power and control systems at Cook Nuclear Plant.

Education

B.S.E.E., University of Illinois at Urbana/Champaign, May 1987.

E.I.T.- Engineer in Training, State of Illinois.

SQUG Training

SQUG Equipment Selection Training Course, November 17-19, 1992

SQUG Relay Evaluation Training Course, November 17-19, 1992

SQUG Walkdown Screening and Seismic Evaluation Training Course,
February 1-5, 1993



ADMINISTRATIVE TOPICS

.....9619280156

QUESTION: A.1.2.a

Briefly describe the steps required, and the equipment used, to transfer a used or irradiated fuel assembly from the Spent Fuel Pit to its installed position in the reactor vessel.

ANSWER: A.1.2.a

The fuel assembly is picked up by the Spent Fuel Pit Bridge Crane and moved to the RCCA Change Fixture.

Following replacement of the Rod Control Cluster (if required) the assembly is moved to the Spent Fuel Side Upender.

The SF Upender is lowered in the fuel transfer canal and transferred through the Fuel Transfer Tube into the Containment.

The assembly is raised by the Reactor Pit Side Upender.

The assembly is raised into the mast of the Manipulator Crane which is then moved to the assembly coordinates over the core.

The assembly is lowered onto the lower core plate.

COMMENTS: (References Acceptable) _____

REFERENCES: SR-C-CA03, Refueling Procedures, Rev. 1.
SR-C-CA01, Refueling Systems, Rev. 2.

K/A: 034000 K6.01

IMPORTANCE: SRO 3.0

RO 2.1



ADMINISTRATIVE TOPICS

QUESTION: A.1.2.b

Refueling is in progress on Unit 1. You are the Unit Supervisor. The SRO-CA notifies you that an irradiated fuel assembly has been crushed in the pit side upender and the fuel handling crew noticed bubbles rising to the surface from the assembly. The SRO-CA reports that he has evacuated the spent fuel storage area and suspended fuel handling inside containment. Based on this information, what actions are responsible to immediately implement?

ANSWER: A.1.2.b

1. Announce on the page system that a fuel handling accident has occurred in the spent fuel storage area, all personnel evacuate Unit 1 and 2 Auxiliary Buildings.
- 2.a. Verify the GDT to AB ventilation isolation valve (RRV-306) closes. (If release is assumed.)
 - b. Verify SF area exhaust unit (12-HV-AFX) bypass dampers close. Ensure one AFX unit is running.
 - c. Verify SF area supply fans (HV-AFS-1,2,3,4) trip.
3. Notify Radiation Protection of the accident.

COMMENTS: (No References) _____

REFERENCES: PMP 4050.029.004, Fuel Handling Accident in the SF Storage Area, Rev. 4. Page 2

K/A: 000036 SG.01
000036 SG.10

IMPORTANCE: SRO 4.1 RO 2.8
SRO 3.8 RO 3.7

SR-O-AD01

TITLE	Administrative Actions, RCS RTD Failure	REVISION	0
PROGRAM	Initial NRC Exam	TIME	25 minutes

SCOPE OF REVISION:

Revision 0:

Admin Task JPM
Developed for January 1996 NRC SRO exam

DATE

DEVELOPING INSTRUCTOR(S)

12/27/95

Russ Scott

REVIEWED BY:

APPROVED BY

Page 1 of 9
Revision 0



TITLE: Administrative Actions, RCS RTD Failure

SR-O-AD01

REFERENCES

PMI 2110 Section 3.11, Attachment 5
NPM-02CM Section 5.1.2
02-OHP 4022.013.007 Revision 0

TRAINING AIDS/TOOLS/EQUIPMENT

Caution Tag Log Book
Computer with access to the NPM System

SPECIAL SAFETY INSTRUCTIONS

None

ATTACHMENTS

1. Sample of Caution Tag Sheet
2. Sample Caution Tag

STUDENT HANDOUTS

1. Signed of copy of 02-OHP 4022.013.007 Attachment C

TASK STANDARD

This is an administrative JPM. The standards applied to this JPM involve procedural compliance and successful use of the NPM system

SIMULATOR SETUP

1. Reset to any at power IC.
2. Fail loop 3 T_{HOT} high [RX02C (650)
3. Trip bistables associated with Loop 3 T_{HOT}
RPR 129
RPR 130
RPR 131
RPR 132
RPR 133
RPR 134
4. Override the Test Injection Cover open light for channel 3 "on"

TITLE: Administrative Actions, RCS RTD Failure

SR-O-AD01

DIRECTIONS

The RCS Loop 3 Hot Leg RTD has failed high. The crew responded to the failure in accordance with 2-OHP 4022.013.007. I&C has completed tripping bistables in accordance with Attachment C. You are directed to complete the remaining administrative actions of caution tagging the appropriate control switches and generating an Action Request for repair of the failed channel. You should state each step of the task before performing it.

INITIAL CONDITIONS

RCS Loop 3 Hot Leg RTD has failed high. The crew responded to the failure in accordance with 2-OHP 4022.013.007. Bistable tripping in accordance with Attachment C has been completed.

INITIATING CUE

Complete the remaining administrative actions for this failure including:

- ▶ Caution tag the appropriate control switches (including appropriate log entries)
- ▶ Generate an Action Request for repair of the failed channel.

TERMINATING CUE

Caution tag log entry is completed and tags are hanging on the following control switches:

- ▶ T_{avg} defeat switch
- ▶ ΔT defeat switch
- ▶ ΔT/OPΔT/OTΔT recorder input selector

NPM accessed for generation of the Action Request.



CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*1.	Generate Caution Tag(s) for Switches: <ul style="list-style-type: none"> ▶ T_{avg} defeat ▶ ΔT defeat ▶ ΔT/OPΔT/OTΔT recorder input selector Note: a single tag may be accepted	Tag(s) Contain the following information: <ul style="list-style-type: none"> ▶ Tag Number ▶ Name of initiator ▶ Date ▶ Unit (2) ▶ Instructions/information
COMMENTS: In accordance with PMI 2110, section 3.11.3 (pg 13)		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
2. This step may be simulated, it is NOT necessary to actually attach the tags if the JPM is conducted in the control room.	Hang Caution Tags	Tags affixed to the following switches: <ul style="list-style-type: none"> ▶ T_{avg} defeat ▶ ΔT defeat ▶ ΔT/OPΔT/OTΔT recorder input selector (Note it <u>is</u> acceptable to use a single tag attached to all three switches)
COMMENTS:		

TITLE: Administrative Actions, RCS RTD Failure

SR-O-AD01

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
3.	Complete Caution Tag Log	Complete PMI 2110, attachment 5 (or Facsimile) with the following as a MINIMUM: ▶ Tag Number(s) ▶ Name of initiator ▶ Date ▶ Unit (2) ▶ Instructions/ information
<u>COMMENTS:</u> In accordance with PMI 2110, Section 3.11.4 and .5		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4. Screen: DOS Prompt	Log into the Local Area Network (LAN)	Locate computer Enter Proper ID and Password
<u>COMMENTS:</u>		

TITLE: Administrative Actions, RCS RTD Failure

SR-O-AD01

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
S5. Screen: AEP Computer Network	Access the AEP network (Main Frame)	At the DOS prompt, enter "3270" or "3271"
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
S6. Screen: Log In	Access NPM System	Enter "H" (Note if candidate has access to the test region, enter IT)
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
S7. Screen: Sign on Complete	Access NPM (continues)	Enter Proper ID and Password
<u>COMMENTS:</u>		

TITLE: Administrative Actions, RCS RTD Failure

SR-O-AD01

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
S8. Screen: Primary Options Menu	Access NPM (continues)	Enter "IMS"
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
S9. Screen: Secondary Options Menu	Access NPM (continues)	Enter Option "1"
<u>COMMENTS:</u> STOP THE CANDIDATE AT THIS POINT, <u>DO NOT</u> GENERATE AN ACTUAL ACTION REQUEST! The remainder of this exercise will be completed using oral questions. Note to examiner: Due to the nature of the NPM system, it is <u>NOT</u> desirable to have the candidate actually generate a request. There once the proper system is accessed, follow up questions are used rather than complete an actual action request.		

TERMINATING CUE
NPM Secondary Options menu has been accessed.

ADMINISTRATIVE TOPICS

SECTION: A.3

Unit 1 is at 100% power. When a problem is noted with the Safety Injection Accumulator vent valve, GRV-341. The operators in the Control Room are unable to open it. The Unit Supervisor asks you to go look at the valve locally to see if you can determine anything wrong with the valve and report back to him.

QUESTION A.3.a

What are the reactor power level restrictions, if any, to perform this task?

ANSWER: A.3.a

There is no power limit for this entry.

Note: The component location will require access to containment (instrument room).

COMMENTS: (References Acceptable) _____

REFERENCES: PMP-6010 RPP 003, Section 4.5.5, Page 6
PMI-4010, Section 3.1.3, Page 2

K/A: 103000 A2.02

IMPORTANCE: SRO 3.2

This question is a continues with the "scenario" posed on the previous page. If the candidate failed to properly identify the component location in the previous question, the key answer should reflect the requirements for entry into the location assumed for the previous question.

QUESTION: A.3.b

Briefly describe the administrative requirements necessary to perform this task.

ANSWER: A.3.b

A Radiation Work Permit (RWP) is required.

The incore movable detectors (incore NIs) must be tagged out under an SS clearance permit. (To ensure all detectors are either in their storage location or are positioned below the seal table.)

COMMENTS: (References Acceptable)

REFERENCES: 12-PMP 6010.RPP.003, Section 4.3 and 4.5.4,
Pages 4 and 6

K/A: 194000 K1.03

IMPORTANCE: SRO 3.4

ADMINISTRATIVE TOPICS

QUESTION: A.4.a

If you had been the Shift Supervisor during this scenario, you would have classified the event. Please classify the event that just concluded. Be sure to explain how you arrive at this classification.

ANSWER: A.4.a

The final classification may not be predictable due to the dynamic qualities of an evaluated simulator scenario. Additional or different categories or classifications may be identified by the candidate which should be considered valid with sufficient justification.

Loss of Heat Sink: Site Area Emergency per ECC-14 (1)

ATWS/Steamline Break: Site Area Emergency per ECC-12 (1)

SGTR/TS 3.0.3 Problem: Alert per ECC-17 (1 or 3)

Small LOCA/Loss Offsite Power: Alert (4) or Site Area Emergency (1) per ECC-14

COMMENTS: (References Acceptable) _____

REFERENCES: PMP-2080.EPP.101, Emergency Classification, Rev. 1.

K/A: 000029 SG.02	IMPORTANCE: SRO <u>4.3</u>	RO <u>3.1</u>
000038 SG.02	<u>4.3</u>	<u>3.0</u>
000040 SG.02	<u>4.0</u>	<u>3.0</u>
000054 SG.02	<u>3.1</u>	<u>2.4</u>
000009 SG.02	<u>4.3</u>	<u>3.4</u>

WALK THROUGH
JPM
(PART B OF
OPERATING TEST)
FINAL AS-RUN

AE-O-E217

TITLE	RCP Seal Injection via CVCS Cross-Tie to Maintain Pressurizer Level
PROGRAM	Regualification

REVISION	7
TIME	25 minutes

SCOPE OF REVISION:

Revision 7: Minor Revision

- ▶ Updated references to procedure numbers.
- ▶ In Step 16 and the termination cue changed "actual" to "indicated" pressurizer level.
- ▶ Added questions 3 and 4.

DATE

DEVELOPING INSTRUCTOR(S)

Roger Anderson

REVIEWED BY:

APPROVED BY

Page 1 of 17
Revision 7

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

REFERENCES

- ▶ 1-OHP-4025.LS-6 (Rev. 0) Emergency Remote Shutdown Procedure, Subprocedures LS-6-1 and LS-6-2.
- ▶ 2-OHP-4025.LS-6 (Rev. 1) Emergency Remote Shutdown Procedure, Subprocedures LS-6-1 and LS-6-2.
- ▶ Unit 1 Technical Specifications

TRAINING AIDS/TOOLS/EQUIPMENT

- ▶ General Safety Equipment

SPECIAL SAFETY INSTRUCTIONS

- ▶ All in plant JPMs are to be simulated only.

ATTACHMENTS

Attachment 1: JPM Student Evaluation Worksheet
Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

AE-O-E217-HO-1: Initial Conditions and Initiating and Terminating Cues.
AE-O-E217-HO-2: Questions

TASK STANDARD

- ▶ Seal Injection Established via CVCS Cross-Tie and increased to maintain pressurizer level within procedural range.

SIMULATOR SETUP

- ▶ None. This JPM must be simulated in plant.

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

DIRECTIONS

When I tell you to begin you are to SIMULATE ALIGNING SEAL INJECTION TO UNIT 1 RCPs VIA CVCS CROSS-TIE TO MAINTAIN PRESSURIZER LEVEL. I will provide you with a copy of 4025.LS-6, and any required information as to plant conditions and/or parameters needed to simulate the task.) You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

INITIAL CONDITIONS

Unit 1 has sustained a complete loss of charging pumps all LSI panels are in service and operable.

INITIATING CUE

Shift Supervisor directs you to re-establish Unit 1 RCP seal injection from Unit 2 in accordance with 1-OHP-4025.LS-6.

TERMINATING CUE

Unit seal injection has been established and pressurizer level is being controlled.

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1. Provide the student with a copy of 1-OHP-4025.LS-6.	Begins with LS-6-1, step 1.	Procedure opened to LS-6-1 step 1.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
2. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction.	Verify 1-CS-536 (CVCS Unit 1 cross tie valve) CLOSED.	Locates valve operator for 1-CS-536, verifies valve closed.

COMMENTS:



TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
3. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction.	Verify 1-CS-535 (Unit 1 seal injection bypass valve) CLOSED.	Locates valve operator for 1-CS-535, verifies valve closed.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction.	Verify 1-CS-534 (Unit 1 BIT inlet bypass valve) CLOSED.	Locates valve operator for 1-CS-534, verifies valve closed.

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
5. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction.	Verify 2-CS-534 (Unit 2 BIT inlet bypass valve) CLOSED.	Locates valve operator for 2-CS-534, verifies valve closed.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction.	Verify 2-CS-535 (Unit 2 seal injection bypass valve) CLOSED.	Locates valve operator for 2-CS-535, verifies valve closed.

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
7. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction. <u>OR</u> When the placard is checked, state that the valve is closed.	Close/verify closed 1-CS-548 (CVCS charging pump discharge cross-tie to Unit 2 drain valve).	Closes or verifies closed valve. Either of the following: <ul style="list-style-type: none">• Enters 2W CCP room to locate and close valve.• Verifies valve position closed by observation of placard below flow meter.

COMMENTS:

If ALARA concerns pre-empt entry to the Unit 1 W CCP room, the evaluator may state the valve has been closed.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
8. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction. <u>OR</u> When the placard is checked, state the valve is closed.	Close/verify closed 2-CS-548 (CVCS charging pump discharge cross-tie to Unit 1 drain valve).	Closes or verifies closed valve. Either of the following: <ul style="list-style-type: none">• Enters 2WCCP room to locate and close valve.• Verifies valve position closed by observation of placard below flow meter.

COMMENTS:

If ALARA concerns pre-empt entry to the Unit 2 W CCP room, the evaluator may state the valve has been closed.



TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*9. Response: When valve operator is located, state that after approx. 15 turns in CCW direction (if valve is in the open direction), he is no longer able to move the operator.	Slowly open 2-CS-536 (CVCS Unit 2 cross-tie valve).	Locates valve operator for 2-CS-536, and fully opens valve.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
10.Cue: Perform procedure section LS-6-2, "Pressurizer Level Control via CVCS Cross-Tie" through step 2 to establish seal injection flow and control pressurizer level.		Candidate reports completion of LS-6-1

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*11. Response: When valve is located state that after approx. 6 turns in CW direction (assuming valve is turned in the close direction), he is no longer able to turn the valve.	Isolate air to the EPT for 1-QRV-200.	Locates air isolation valve for EPT for 1-QRV-200 and closes the valve.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
12. Response: State that flow indicates 0.	Verify 0 flow on 12-QFI-201 (CVCS cross-tie flow indicator).	Locates 12-QFI-201.

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*13. Response: When valve is simulated open several turns, state that flow is 25 gpm. (CW Direction)	Slowly open 1-CS-535 (Unit 1 seal injection bypass valve) to obtain 25 gpm indication on 12-QFI-201.	Locates and simulates operating 1-CS-535 and observes flow on 12-QFI-201.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*14. Response: When level indication located, state that level is 22% and decreasing slowly (if asked .05%/min.)	Observe pressurizer level indication on local shutdown panel 1-LSI-3.	Locates pressurizer level indicator on panel 1-LSI-3.

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
15.	Report CVCS cross-tie operations are in progress.	Makes overt announcement <u>or</u> report.

COMMENTS:

CUE: The BIT injection alignment (LS-6-3) has not been completed.

CUE: (Adequate) CCW flow exists through RCP thermal barrier coolers.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
16. Response: When pressure indication located, state that RCS pressure is 1100 6psig.	Observe RCS pressure indication (NPS-122) on LSI-3.	Locates RCS pressure indicator on panel 1-LSI-3.

COMMENTS:

Cue: Pressurizer Level 20% and DECREASING

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level .

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
17. Response: State that flow has increased to 30 gpm.	Throttle 1-CS-535 (Unit 1 seal injection bypass valve) OPEN to maintain indicated pressurizer level between 20% and 39%.	Simulates throttling 1-CS-535 open and observes flow indication on 12-QFI-201.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
S 18. Following candidate response, state that level is 21% and stable.	Monitor pressurizer level (1-NLI-151) or 1-LSI-3.	Candidate observes pressurizer level (1-NLI-151) indication on 1-LSI-3.

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
19.	Report pressurizer level control in progress.	Candidate makes overt announcement or report.

COMMENTS:

TERMINATION CUE:

Seal injection established and pressurizer level is controlled between 20% and 39% indicated level.

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

QUESTION: #3

When it becomes necessary to establish CVCS Cross-tie in accordance with 1-OHP 4025.LS-6, it is reported that the boron concentration in U-2 RWST is greater than the Tech. Spec. required minimum, but less than the concentration in U-1 RCS.

How do the operators justify diluting the U-1 RCS?

ANSWER: #3

The Tech Spec LCO states that for the purpose of satisfying "Appendix R" requirements the addition of water from the RWST, which is at a greater than the minimum required boron concentration does not constitute a dilution.

* *References (Tech Spec) should be allowed for this question since the correct answer is found in a note at the bottom of the Tech Spec page.*

REFERENCES: Technical Specification 3.1.2.3.b, 3.1.2.7.b

K/A NUMBER: 000022 SG.03

K/A IMPORTANCE: SRO 3.4 RO 2.8

TIME: 3 MINUTES

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

QUESTION: #4

With RCP Seal Injection established via the CVCS Cross-tie, a Safety Injection occurs.

What effect will receipt of the Safety Injection have on RCP Seal Injection flow?

ANSWER: #4

A Safety Injection will not effect the flow rate through the cross-tie since it is manually throttled. However, open BIT valves in response to a SI actuation would reduce the amount of water going to the RCP seals.

* *Use of a flow diagram should be allowed to simplify the detail needed in the candidate's response to this question.*

REFERENCES: OP 1-5129-26

K/A NUMBER: 000022 SG.03

K/A IMPORTANCE: SRO 3.5 RO 2.5

TIME: 3 MINUTES

COMMENTS:



AE-O-E236

TITLE	Locally Control West RHR Heat Exchanger Flow using Flow Control Valve IRV-320	REVISION	4
PROGRAM	Regualification	TIME	10 minutes

SCOPE OF REVISION:

Revision 4: Minor revision. No marginal markings.

- References updated to current revision.

DATE

DEVELOPING INSTRUCTOR(S)

10/30/93

Jack Carney

REVIEWED BY:

APPROVED BY

1/ilafjpm/lf

Page 1 of 11
Revision 4



TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

REFERENCES

- 1-OHP 4025.001.001, Rev. 0
- 2-OHP 4025.001.001, Rev. 0

TRAINING AIDS/TOOLS/EQUIPMENT

Flashlight

SPECIAL SAFETY INSTRUCTIONS

All in plant JPMs are to be simulated only.

ATTACHMENTS

- Attachment 1: JPM Student Evaluation Worksheet
- Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

AE-O-E236-HO-1: Initial Conditions and Initiating and Terminating Cues.
AE-O-E236-HO-2: Questions

OHP 4025.R-12, Section R-12-16

TASK STANDARD

IRV-320 has been locally throttled in closed direction.

SIMULATOR SETUP

N/A

2/ilafjpm/lf

Page 2 of 11
Revision 4

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

DIRECTIONS

When I tell you to begin you are to Simulate Establishing Local Control of IRV-320. I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task. You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

INITIAL CONDITIONS

The Shift Supervisor has implemented Emergency Remote Shutdown Procedure OHP 4025.001.001 due to inability to control the plant from the control room or Hot Standby Panel. Control air is available.

INITIATING CUE

The SS has directed you to establish local control of the Unit 2 West RHR Heat exchanger flow control valve (IRV-320) and provides you with Section 12-16. You are the Auxiliary Building Tour Operator.

NOTE: The evaluator may elect to conduct this JPM for 1-IRV-320. The control station location description is the same as that for 2-IRV-320.

TERMINATING CUE

IRV-320 has been locally throttled in closed direction.

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
NOTE: THIS JPM IS WRITTEN FOR UNIT TWO. TAG DESIGNATIONS ARE SLIGHTLY DIFFERENT FOR UNIT 1.		
1.	Verify that valve number on flex hose matches number on emergency connection.	The tag "IRV-320" on the EPT end of the flex hose is compared to the emergency connection tag "EMERGENCY CONTROL AIR TO 2-IRV-320 HOSE CONNECTION."
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*2. Response: Resistance is felt when further attempt to turn air supply valve to EPT in CW direction.	Close normal air supply valve to EPT.	Valve "NORMAL CONTROL AIR SUPPLY TO 2-EPT-320 FOR 2-IRV-320" is fully closed.
<u>COMMENTS:</u>		

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*3. Response: Flex hose is disconnected and brief hiss of air sound is heard. CUE: If step 2 not performed, prompt that a continued hiss of air is heard from the piping at the hose quick disconnect.	Disconnect flex hose at normal air connection.	Flex hose end labeled "IRV-320" is disconnected from "NORMAL CONTROL AIR SUPPLY FROM 2-EPT-320 TO 2-IRV-320 HOSE CONNECTION."

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+4. Response: Flex hose is connected to Emergency Control Air Supply.	Reconnect flex hose at emergency control air connection.	Flex hose end labeled "IRV-320" is connected to connection "EMERGENCY CONTROL AIR TO 2-IRV-320 HOSE CONNECTION."

COMMENTS:

S+ - Step 3 must be performed first.



TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*5. Response: Resistance is felt when further attempt to turn emergency air supply valve IRV-320 in CCW direction.	Open emergency control air supply to emergency connection.	Valve "EMERGENCY CONTROL AIR SUPPLY TO 2-IRV-320" is opened fully.
<u>COMMENTS:</u>		

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*6. CUE: CONTROL ROOM DIRECTS YOU TO DECREASE FLOW THROUGH RHR HX 2-AV-35, air regulator pressure indicates 0 psig.</p> <p>Response: Air regulator 2-AV-35 pressure indication is increasing (as the regulator control handle is turned Clockwise.) Give values for pressure - e.g. 4 psig, 5 psig, etc. - Up to maximum of 15 psig.</p>	<p>Adjust pressure regulator to control valve.</p>	<p>Air regulator "2-AV-35, WEST RHR HEAT EXCH HE-17W OUTLET FLOW CTRL VALVE IRV-320 CURRENT TO PNEU XDCC PRESSURE REG is turned right to increase air pressure.</p>
<p><u>COMMENTS:</u></p>		

TERMINATING CUE

Valve IRV-320 has been locally throttled in closed direction.

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

QUESTION: #2

Unit 2 is in Mode 5 cooling down. The West RHR train is in service with heat exchanger outlet and heat exchanger bypass flow established. The West RHR Heat Exchanger is provided with 5000 gpm of CCW flow. The control air line to IRV-320 breaks off while the valve is in a mid position. Explain how this failure affects RCS temperature.

ANSWER: #2

RCS temperature will decrease since more RHR flow will now pass through the Hx (which is supplied with cooling.)

REFERENCES: OP-5143

K/A NUMBER: 005000 A1.02
K/A NUMBER: 005000 K6.11

K/A IMPORTANCE: SRO 3.4 RO 3.3
K/A IMPORTANCE: SRO 2.7 RO 2.3

TIME: 4 MINUTES

COMMENTS:

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

QUESTION: #3

Without references, if IRV-320 is closed during the injection phase of an SI, how is the West RHR pump protected against operating at shutoff head?

ANSWER: #3

The West RHR pump recirculation valve automatically opens.

REFERENCES: RO-C-NS08

K/A NUMBER: 005000 K4.06

K/A IMPORTANCE: SRO 3.0 RO 2.7

TIME: 2 MINUTES

COMMENTS:

AE-O-E250

TITLE	Shift TDAFP Suction to ESW
PROGRAM	Regualification

REVISION	8
TIME	10 minutes

SCOPE OF REVISION:

Revision 8: Major Revision.

- No marginal markings.
- Modified critical standard for tell-tale closure sequence.
- Added two new questions.

DATE

DEVELOPING INSTRUCTOR(S)

Lisa Tatrault

REVIEWED BY:

APPROVED BY

1/ilafjpm/gh

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Revision 8

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

REFERENCES

► 1-OHP 4022.055.003

TRAINING AIDS/TOOLS/EQUIPMENT

Flashlight (optional)

SPECIAL SAFETY INSTRUCTIONS

Any JPM conducted in plant is to be simulated only.

ATTACHMENTS

Attachment 1: JPM Student Evaluation Worksheet

Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

Current copy of 1-OHP 4022.055.003

AE-O-E250-HO-1 Initial Conditions and Initiating and Terminating Cues.

AE-O-E250-HO-2 Questions.

TASK STANDARD

1-ESW-115 and 1-WMO-753 are open. 1-ESW-110 (tell-tale drain) is closed.

SIMULATOR SETUP

None. This task must be simulated in plant.

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

DIRECTIONS

When I tell you to begin you are to SIMULATE ALIGNING ESW TO THE SUCTION OF THE TURBINE-DRIVEN AUXILIARY FEEDWATER PUMP. I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task. You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

INITIAL CONDITIONS

Unit 1 has NO AC power. U-1 CST is at the low-low alarm level and U-2 CST is at its technical specification low limit.

INITIATING CUE

The "Contingency Team Leader" (ASS) directs you to align ESW to provide a suction to the turbine-driven auxiliary feedwater pump by performing 1-OHP 022.055.003 step 13. Notify the control room upon completion.

TERMINATING CUE

ESW has been manually aligned to provide a suction for the TDAFP. The tell-tale ESW drain has been closed.

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1.	Locates 1-ESW-110.	Correct valve found.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
2. RESPONSE: When appropriate say "seal is off."	Removes seal.	Seal is removed.
<u>COMMENTS:</u>		

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*3. When appropriate say "resistance is felt while turning valve clockwise."	Closes 1-ESW-110.	1-ESW-110 is operated in the clockwise direction.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4.	Locates 1-ESW-115.	Correct valve found.
<u>COMMENTS:</u>		

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
5. RESPONSE: When appropriate say "seal is removed."	Removes seal.	Seal is removed.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+6 When appropriate say "handle is pointing down or handle has reached the stop." If tell-tale drain is still open, State: Water is pouring from that valve (point to tell-tale).	Opens 1-ESW-115.	1-ESW-115 is operated in the <u>clockwise</u> direction until handle is pointing down.
<u>COMMENTS:</u>		
S+ Tell-tale drain (1-ESW-110) must be closed before 1-ESW-115 is opened or when cued.		

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*7. CUE: (As control room) say "open 1-WMO-753 locally, we have NO control power." If asked, state that the breaker has been opened.	Locates 1-WMO-753.	Correct valve found.
<u>COMMENTS:</u>		

TITLE: Shift TDAFP Suction to ESW .

AE-O-E250

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*8. RESPONSE: When appropriate say "resistance is felt while turning valve counterclockwise."	Opens 1-WMO-753 locally.	Operator does the following: a. Moves declutch lever in direction of arrow. b. Rotates handwheel in counterclockwise direction.
<u>COMMENTS:</u>		

TERMINATION CUE:

Valve 1-ESW-115 and 1-WMO-753 are open.

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

QUESTION: #1

Given that the assigned task (shifting TDAFP suction to ESW) has been completed, (including the start of the TDAFP) what is currently cooling the governor oil system?

ANSWER: #1

ESW (self-supplied by discharge flow).

REFERENCES: System Piping Layout; AFW System Flowprint

K/A NUMBER: 061000 A2.04

K/A IMPORTANCE: SRO 3.8 RO 3.4

TIME: 2 MINUTES

COMMENTS:

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

QUESTION: #2

A total loss of AC to both Units has occurred. What is the next available water source to the Unit 1 TDAFP? (Neither Unit's CSTs are available.)

ANSWER: #2

Fire Water (Diesel Driven Fire Pump)

REFERENCES: ESW System Flowprint

K/A NUMBER: 076000 A2.01

K/A IMPORTANCE: SRO 3.7 RO 3.5

TIME: 1 MINUTE

COMMENTS:

RO-O-A001

TITLE	Determine the Source of CCW In-Leakage
PROGRAM	Regualification Training

REVISION	0
TIME	20 minutes

SCOPE OF REVISION:

Revision 0: Initial Issue.

DATE

DEVELOPING INSTRUCTOR(S)

Roger Anderson

REVIEWED BY:

APPROVED BY

1/ilafjpm/gh

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TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

REFERENCES

2-OHP 4022.016.003, Rev. 3, CCW In-Leakage

TRAINING AIDS/TOOLS/EQUIPMENT

02-OHP 4022.016.003, Rev. 3, CCW In-Leakage

SPECIAL SAFETY INSTRUCTIONS

All in plant JPMs are to be simulated only.

ATTACHMENTS

Attachment 1: JPM Student Evaluation Worksheet

Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

RO-O-A001-HO-1: Initial Conditions and Initiating and Terminating Cues

RO-O-A001-HO-2: Questions

TASK STANDARD

Determine the source of CCW in-leakage.

SIMULATOR SETUP

- Initialize to any at power steady state IC; run the simulator.
- Insert malfunction CV05 at 100% severity. When R17A or R17B rad alarms are received freeze the simulator until INITIATING CUE has been read to candidate.

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

DIRECTIONS

When I tell you to begin you are to respond to the radiation alarm. You may use any approved reference materials normally available in the control room. You must follow all required data sheets as they pertain to the task. *(I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task.) You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

* Read only if simulating the task.

INITIAL CONDITIONS

- o (Any) power; equilibrium xenon; T_{avg} and T_{ref} are matched.
- o RCS boron concentration is 671 ppm.
- o A high rad alarm has been received on R-17A(or B).

INITIATING CUE

- o You are the RO.
- o The US directs you to respond to the radiation alarm.
- o You are to perform actions necessary to confirm that diagnosis.

TERMINATING CUE

- o The source of CCW in-leakage has been determined.

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1.	Candidate obtains a copy of 02-OHP 4022.016.003	Copy of procedure located.

COMMENTS:

Candidate may utilize annunciator response procedures initially. The Annunciator responses will direct the candidate to this procedure. It is acceptable to go directly to the abnormal procedure.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
* 2. Response: CCW Surge Tank level recorder pen has moved from 110" to 120" in 15 minutes.	Check CCW Surge Tank level.	CCW Surge Tank level is determined to be increasing.

COMMENTS:

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
3. Response: CCW high radiation alarms red lamps are lit.	Check high radiation alarms clear.	CCW high radiation alarms are determined to be standing.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4. Response: CRV-412 control switch red target is showing and green lamp is lit.	Verify CCW vent, CRV-412, closed.	CRV-412 verified closed.

COMMENTS:

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*5. Response: R17A is presently indicating 180 CPM; at turnover is indicated 40 CPM.	Check CCW radiation monitor(s) increasing.	Notify chem lab and RP of high activity.

COMMENTS:

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6. Response: Alarm panel 207 Drops 7, 27, 67, 87, 8, 28, 68, 88, 9, 29, 69, 89, and 45 are not lit.	Check RCP thermal barrier heat exchangers for leakage.	Go to Step 11 (CCW from RCP thermal barrier is not isolated)

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
7. Response: 70 gpm flow is indicated on QFI- 301.	Check normal letdown heat exchanger in service.	Normal letdown is verified in service.

COMMENTS:

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

**CUES
NOTES TO EXAMINER**

ELEMENT

STANDARD

*8. Response: 0 gpm flow
is indicated on QFI-301

Remove normal
letdown from
service.

Normal letdown is removed
from service.
▶ Close 2-QRV-111
▶ Close 2-QRV-112

COMMENTS:

**CUES
NOTES TO EXAMINER**

ELEMENT

STANDARD

*9. Response: CCW surge
tank level recorder
pen has moved from
125" to 120" in 5
minutes.

Check CCW
surge tank
level stable
or decreasing

CCW surge tank level is
determined to be stable or
decreasing.

COMMENTS:



TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
10.Response: 185°F is indicated on QTA-170 Charging Flowmeter indicates 40gpm	Place Excess Letdown in service	Excess letdown is placed in service as follows: <ul style="list-style-type: none">▶ Open 2-QRV-113 and 114▶ Check 2-QRV-171 selected to "VCT"▶ Open 2-QRV-170 slowly▶ Monitor 2-QTA-170 (Maintain temp <195°F)▶ Reduce Charging flow using 2-QRV-251▶ Close 2-QMO-200 and 201▶ Reduce Charging flow to <52gpm using 2-QRV-251

COMMENTS:

TERMINATING CUE:

Normal letdown has been determined to be the source of CCW in-leakage and excess letdown is in service.

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

QUESTION: #1

Without references, describe (5) five CCW system valves which reposition in direct response to a safety injection.

ANSWER: #1

CMO-410 (420), CCW Heat Exchanger Outlets (open).
CMO-419 (429), RHR Heat Exchanger CCW Outlets (open).
CRV-470, CVCS Letdown Heat Exchanger CCW Outlet (close).
CRV-485, Boric Acid (waste) Evaporator CCW Supply (close).
CRV-445, Spent Fuel Pit Heat Exchanger CCW Supply (close).
CCR-445 (456 & 457), CCW from Reactor Support Cooler (close).
CCR-460 (462), CCW to Excess Letdown Heat Exchanger (close).

ANY FIVE

REFERENCES: 02-OHP 4022.016.003, Recovery from Inadvertent Containment Isolation Phase A, Rev. 3
02-OHP 4023.E-0, Reactor Trip or Safety Injection, Rev. 7

K/A NUMBER: 008030 K4.02

K/A IMPORTANCE: SRO 2.6 RO 2.3

TIME: 5 MINUTES

COMMENTS:

No References allowed

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

QUESTION: #2

Following a LOCA RCS pressure stabilizes at 300 psig and CCW Surge Tank level is steadily increasing. Without references, name (3) THREE potential sources of CCW in-leakage.

ANSWER: #2

(Any (3) THREE)

RHR Heat Exchangers

RCP Thermal Barrier Heat Exchangers

Sample Heat Exchangers

The Opposite Unit CCW System Cross-tie

CTS Pump Seal Water Heat Exchangers

SI Pump Seal Water Heat Exchangers

REFERENCES: 02-OHP 4022.016.003, CCW In-Leakage, Rev. 4.

K/A NUMBER: 008000 K1.04

K/A IMPORTANCE: SRO 3.3 RO 3.3

TIME: 5 MINUTES

COMMENTS:

No References allowed

RO-O-E007A

TITLE	Initiate Cold Leg Recirculation
PROGRAM	Requalification

REVISION	0
TIME	25 minutes

SCOPE OF REVISION:

Revision 0: Initial issue.

DATE

DEVELOPING INSTRUCTOR(S)

Scott Hehl

REVIEWED BY:

APPROVED BY

1/ilafjpm/gh

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REFERENCES

- ▶ 2-OHP-4023.ES-1.3, Transfer to Cold Leg Recirculation, Rev. 2 CS-2

TRAINING AIDS/TOOLS/EQUIPMENT

- ▶ Booth operator may serve as US (procedure reader) if required.

SPECIAL SAFETY INSTRUCTIONS

- ▶ All in plant JPMs are to be simulated only.

ATTACHMENTS

Attachment 1: JPM Student Evaluation Worksheet

Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

- RO-O-E007A-HO-1: Initial Conditions and Initiating and Terminating Cues.
- RO-O-E007A-HO-2: Questions

TASK STANDARD

- ▶ ECCS equipment is operating in cold leg recirculation mode.

SIMULATOR SETUP

Intent: DBA LOCA occurs while at 100%. Run until transition to ES-1.3 is required by RWST level.

- Setup:
- o Initialize the simulator at 100% power, steady state.
 - o Insert MALF RC01A (B,C,D) at 50%.
 - o Override 2-ICM-306 to neutral
 - o Perform actions of E-0, transition to E-1.
 - o When RWST level decreases to 40% - 32%, FREEZE the simulator. Note: RCS pressure should be less than 1630 psig.
 - o SNAP to a designated IC if this JPM is to be used more than once.

Run: Bring the candidate into the simulator. Provide the candidate with directions and Initial Conditions. Place the simulator in RUN and have candidate begin.

DIRECTIONS

When I tell you to begin you are to TRANSFER ECCS TO COLD LEG RECIRCULATION. You may use any approved reference materials normally available in the control room. You must follow all required data sheets as they pertain to the task. *(I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task.) You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

* Read only if simulating the task.

INITIAL CONDITIONS

- Reactor trip with SI occurred. US has implemented E-1 due to loss of primary coolant. RWST level is decreasing rapidly towards 32%. The US is ready to transition to cold leg recirculation.

INITIATING CUE

D You are the RO. US directs you to transfer the ECCS pumps to cold leg recirculation per ES-1.3. (The CCW trains will be left cross-tied.) You are to transfer to cold leg recirculation by performing ES-1.3 as the reader and performer.

TERMINATING CUE

- Both trains of ECCS are aligned to cold leg recirculation as available.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1. Response: Indicate that SI reset alarm sounded after the SI reset pushbutton for each train was depressed.	Verify SI reset.	Verifies SI reset. ----- INFORMATION ONLY: ▶ AUTO SAFETY INJECTION BLOCKED status light will illuminate (status panel SML-18, drip 11) OR ▶ SAFETY INJECTION RESET ALARM will come in. Annunciator panel 4024.104 (U-1) 204 (U-2) drop 21. ▶ SAFETY INJECTION ACTUATED status light <u>OFF</u> SML-18 drop 16.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
2. If simulated indicate both RHR pumps are operating.	Checks both RHR pumps operable.	Checks any of the following: <ul style="list-style-type: none">▶ RHR pump amps.▶ RHR pump indicating lights.▶ RHR Loop Low Flow Alarms clear.▶ RHR pump discharge pressures.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
3. If simulated indicate both CCW pumps are operating.	Check both CCW pumps operable.	Checks any of the following: <ul style="list-style-type: none">▶ CCW pumps amps.▶ CCW pump indicating lights.▶ CCW pump discharge pressure.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+4a. Response: Indicate that the W RHR and W CTS pump breakers shows green indicating lights and C/S's are in PULL-TO-LOCK.	Align West RHR and CTS for recirculation : o STOP the following pumps and place in PULL-TO-LOCKOUT position: - W RHR pump - W CTS pump	► Selects STOP and PULL-TO-LOCK on the control switch for the W RHR and W CTS pumps.

COMMENTS:

S+: Pump must be stopped and locked out before its suction valve is closed.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*4b. Response: That valve green lights are lit.	CLOSE the following valves concurrently: W RHR pump suction valve: IMO-320 W CTS pump suction from RWST: IMO-225 W RHR pump discharge crosstie valve: IMO-324	CLOSES: ▶ Valves IMO-320 and IMO-225. ----- INFORMATION ONLY ▶ IMO-324 verified closed.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*4c. Response: Indicate that ICM-306 white light is lit for control power.</p> <p>*4.c.1 Response: Indicate that ICM-306 green light on red light off.</p>	<p>Restore control power to ICM-306</p> <p>► Attempts to open ICM-306.</p>	<p>Opens ICM-306.</p> <p>-----</p> <p>INFORMATION ONLY</p> <p>► Establishes control power to ICM-306 by turning INTERLOCK switches to ON.</p> <p>AND</p> <p>► Verifies control power ON cube light - LIT and INTERLOCK WHITE LIGHTS - LIT.</p> <p>AND</p> <p>► Unlocks ICM-306 control switch</p> <p>AND</p> <p>► Selects OPEN position on control switch.</p> <p>► Reports ICM-306 will not open</p>
<p><u>COMMENTS:</u></p>		

D

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*4d. Response: Indicate that IMO-225 red light on green light off.	Open IMO-225 W' CTS suction from RWST	OPEN IMO-255 ----- INFORMATION ONLY ▶ Selects open on IMO-225. ▶ Verifies IMO-225 red light on green light off OR ▶ Verifies by status light IMO-225 open.

COMMENTS:

D

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+4e. Response: Indicate that pump breaker red light is lit.	Restart the W CTS pump if previously running.	W CTS pump switch placed in CLOSE and pump is running. ----- INFORMATION ONLY ▶ W CTS PUMP red light ON. ▶ W CTS pump amps increase. ▶ W CTS pump discharge pressure increases. ▶ W CTS pump startup monitor light (SML-9B drop 3) ON.

COMMENTS:

QUESTIONS NOTES TO EXAMINER	ELEMENT	STANDARD
4f.	Go to Attachment B	► Transitions to Attachment B of ES-1.3
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*S+5a. Response: Indicate that the pump breaker indicating lights are green and pump switches are pull-to-lock</p>	<p>Align East RHR and CTS for recirculation ■ Stop the following pumps and place in pull-to-lock</p> <p>▶ W RHR pump ▶ E RHR pump ▶ E CTS pump</p>	<p>▶ Selects pull to lock on control switch for the W RHR, E RHR and E CTS pumps.</p> <p>▶ Pumps must be pull-to- lock prior to its suction valve being closed.</p>
<p><u>COMMENTS:</u></p>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
S+5b. Response: Valve green lights on red lights off.	Close the following valve concurrently: RHR pump suctions ▶IMO-310 ▶IMO-320 CTS pump suction ▶IMO-215 RHR cross-ties ▶IMO-314 ▶IMO-324	Closes: ▶ IMO-310. ▶ IMO-320. ▶ IMO-215. Verifies closed ▶ IMO-314 ▶ IMO-324 ▶ Valve position verified by green light on red lights off.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*5c. Response: Indicate that ICM-305 white light is lit when control power switch is turned on and red light on when valve is opened.	Restore control power and OPEN recirc sump to E RHR/CTS pump valve: ▶ ICM-305	Restores power to ICM-305 Opens ICM-305 ----- INFORMATION ONLY ▶ Establishes control power to ICM-305 by selecting ON or INTERLOCK control switch - white lights - LIT. AND ▶ Unlocks valve control switches. AND ▶ Selects OPEN position on control switch. ▶ Verifies ICM-305 breaker control position green light - OFF and red light - ON OR ▶ Verifies ICM-305 OP position status light (SML-12C drop 2) ON. OR ▶ Verifies ICM-305 CL position status light (SML-12A, drop 6) OFF.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+5d. Response: Indicate that pump breaker red light is lit.	Start the E RHR pump.	<ul style="list-style-type: none">▶ E RHR PUMP switch is placed in CLOSE and pump is running. <p>-----</p> <p>INFORMATION ONLY</p> <ul style="list-style-type: none">▶ E RHR PUMP red breaker position is energized. OR▶ E RHR HX FLOW indication increases to expected gpm. OR▶ E RHR PUMP DISCH PRESS indication (IPI-310) increases to expected psig. OR▶ East RHR PUMP STARTUP monitor light (SML-12B drop 2) ON. OR▶ E RHR pump amps increase to expected amps.

COMMENTS:

S+: RHR pump is not started until its recirculation sump suction valve is open.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+5e. Response: Indicate that pump breaker red light is lit.	Start the E CTS pump.	E CTS pump switch placed in CLOSE and pump is running. ----- INFORMATION ONLY <ul style="list-style-type: none">▶ E CTS pump red breaker position light ON. OR▶ E CTS pump amps increase to expected amps. OR▶ E CTS pump discharge pressure (IPI-210) increases to expected psig. OR▶ E CTS pump startup monitor light (SML-9B drop 2) ON.

COMMENTS:

S+: CTS pump is not started until its recirculation sump suction valve is open.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
5e2. Response: Indicate that WMO-712 and 714 have red lights lit.	Verifies ESW flow to/from E CTS Hx: (Unit 1 - in parentheses) <ul style="list-style-type: none">▶ WMO-712 (711) - OPEN▶ WMO-714 (713) - OPEN	Responds with either of the following: <ul style="list-style-type: none">▶ WMO-712 to east Hx OPEN and WMO-714 from east Hx throttled or full open.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6a. If simulated indicate safety injection white lights are out.	Reset CCP miniflow valves: ▶ 2-QMO-225 ▶ 2-QMO-226	Safety injection white lights out.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6b,c. Both CCP pump breakers have red lights lit and TOTAL BIT flow is 300 gpm.	Check total BIT flow greater than minimum.	CCP miniflow valves are closed.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
S6d,e. Response: Indicate that N(S) SI pump breakers have red lights lit and ICM-260 and 265 have red lights lit and IMO-316 and IMO-326 have red lights LIT.	Check Safety Injection flow path: <ul style="list-style-type: none">▶ ICM-265 - OPEN▶ ICM-260 - OPEN▶ IMO-316 OPEN▶ IMO-326 OPEN	Responds with either of the following for BOTH ICM-265 and ICM-260 and IMO-316 and IMO-326. <ul style="list-style-type: none">▶ Red breaker position light ON.▶ ICM-265 (260) OP SI DISCH TO COLD LEGS monitor light (SML-11B drops 20 (17) ON.▶ SML12B Drops 17 and 20 for IMO-326 and 316.▶ Red breaker position light ON for IMO-326 and IMO-316.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S6f. Response: Indicate that IMO-270 and 275 have green lights lit.	Closes SI discharge crosstie valves. ▶ IMO-270 ▶ IMO-275	IMO-270 and/or 275 closed.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
S+6g. If simulated following operator response indicate SI flow is approximately 250 gpm for each pump.	Check each SI pump flow greater than 70 gpm. ▶ 2-IFI-260 ▶ 2-IFI-266	Stop affected SI pump if flow < 70 gpm.

COMMENTS:

S+: SI pumps must be stopped before closing recirculation valves if SI pump flow is less than 70 gpm.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
CUE: (IF CONTROL POWER IS NOT TURNED ON): INDICATE THAT VALVE GREEN LIGHT DOES NOT COME ON.		
*S+6h. Response: Indicate that IMO-262, 263 have green lights lit.	CLOSE SI pumps recirculation to RWST valves: <ul style="list-style-type: none">▶ IMO-262▶ IMO-263	IMO-262 and/or 263 closed. ----- INFORMATION ONLY: <ul style="list-style-type: none">▶ Establishes power to IMO-262, 263 by selecting ON for the INTERLOCK SWITCH for the valves. AND▶ Verifies control power white lights - LIT. AND▶ Unlocks valve control switches AND▶ Selects CLOSED on control switches for IMO-262, 263 AND▶ Verifies valves breaker control position green lights - LIT. OR▶ IMO-262 (263) status light position lights (SML-11A, drops 6,7) ON. OR▶ IMO-262 (263) status light position lights (SML-11C drop 2,3) ON.
<u>COMMENTS:</u> S+: SI pump recirc valves IMO-262 or IMO-263 are closed prior to opening IMO-340.		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*S6i,j. Response: Indicate that IMO-340, 361 and 362 have red lights lit.</p>	<p>OPEN the following valves.</p> <p>Pump suction from E RHR Hx valve:</p> <ul style="list-style-type: none">▶ IMO-340 <p>SI pump suction crosstie to CCP valves:</p> <ul style="list-style-type: none">▶ IMO-361▶ IMO-362	<p>IMO-340 opened.</p> <p>IMO-361 and/or 362 opened.</p>

COMMENTS:

S+: SI pump recirculation flowpath must first be isolated and RHR suction from recirculation sump open.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
CUE: (IF CONTROL POWER IS NOT TURNED ON): INDICATE THAT VALVE GREEN LIGHT DOES NOT COME ON.		
S+6k. Response: Indicate that IMO-261 has green light lit.	CLOSE SI pump suction from RWST. ▶ IMO-261	IMO-261 closed. ----- INFORMATION ONLY: To close IMO-261: ▶ Selects ON for INTERLOCK switch white lights - LIT. AND ▶ Unlocks valve control switch. AND ▶ Selects CLOSE on control switch for IMO-261. AND ▶ IMO-261 breaker control position green light - LIT. OR ▶ IMO-261 OP SI pumps suction from RWST status light (SML-11A, drops 5, 8) OFF. OR ▶ IMO-261 CL SI pumps SUCTION FROM RWST status light (SML-11C, drops 1,4) ON.
<u>COMMENTS:</u> S+: SI pumps suction from RHR must first be established. (Sequential standard is applied only if valve is improperly closed; not if it is left open.)		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
61. Response to Step: Indicate that IMO-910, 911 green lights are lit.	CLOSE the following valves: CCP suction from RWST ▶ IMO-910 ▶ IMO-911	IMO-910 and/or -911 are closed. ----- INFORMATION ONLY: To close IMO-910, 911: ▶ Selects CLOSED on control switches for IMO-910,911. AND ▶ CCP SUCTION FROM RWST valve closed position indication (green) ON. OR ▶ IMO-910 (911) OP CCP SUCTION FROM RWST monitor light (SML- 11A, drops 2, 3) OFF. OR ▶ IMO-910 (911) CL CCP SUCTION from RWST monitor light (SML- 11C, drops 6, 7) ON.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6m.	Check CCP's - BOTH RUNNING.	<p><u>IF</u> CCPs were stopped because of RWST low-low level, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none">1) Start one CCP.2) Check total BIT flow - greater than 150 gpm (160 gpm for adverse containment). <u>IF NOT</u>, <u>THEN</u> open the associated miniflow valve and go to Step 2o.3) Check RCS pressure - less than 1700 psig. <u>IF NOT</u>, <u>THEN</u> go to Step 2o. <u>WHEN</u> RCS pressure is less than 1700 psig, <u>THEN</u> restart all CCP's.4) Start second CCP.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6n.	Check SI pumps - BOTH RUNNING.	<p><u>IF</u> SI pumps were stopped because of RWST low-low level, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none">1) Check RCS pressure - less than 1425 psig (1150 psig for adverse containment). <u>IF NOT</u>, <u>THEN</u> go to Step 6. <u>WHEN</u> RCS pressure is less than 1425 psig (1150 psig for adverse containment), <u>THEN</u> do step 2o.2) Check SI pump discharge crosstie valves - closed: ▶ 2-IMO-270 -OR- ▶ 2-IMO-2753) <u>IF</u> SI pump discharge crosstie is isolated, <u>THEN</u> start both SI pumps. <u>IF NOT</u>, <u>THEN</u> start only one SI pump.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>60 Response to Step: IMO-390 green light is lit.</p>	<p>CLOSE RHR suction from RWST:</p> <p>► IMO-390</p>	<p>IMO-390 is closed.</p> <p>SML 12A drop 1 clear.</p> <p>To close IMO-390:</p> <p>► For IMO-390 establishes control power for the valve by selecting ON for the INTERLOCK switch verify white lights - LIT.</p> <p>AND</p> <p>► Unlocks valve control switch.</p> <p>AND</p> <p>► Selects CLOSED on control switch for IMO-390.</p> <p>AND</p> <p>► RHR PUMP SUCTION FROM RWST closed position indication light (green) ON.</p> <p>OR</p> <p>► IMO-390 OP RHR PP SUCT FROM RWST monitor light OFF. (SML-12A, drop 1)</p> <p>OR</p> <p>► IMO-390 CL RHR PP SUCT FROM RWST monitor light ON. (SML-12C, drop 5)</p>

COMMENTS:

S+: CCP suction from RHR must first be established.

S+: RHR pump suction from RWST must first be established.
(Sequential standard is applied only if IMO-390 is improperly closed, not if it is left open.)

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+7a. Response: Indicate that the W CTS pump breaker show a green indicating light and their C/S is in PULL-TO-LOCK.	Algin West CTS for recirculation ▶ STOP the following pump and place in PULL-TO-LOCKOUT position: - W CTS pump	RESPONDS WITH THE FOLLOWING: ▶ Selects STOP and PULL-TO-LOCK with the control switch for the W CTS pump.

COMMENTS:

S+: Pump must be stopped and locked out before its suction valve is closed.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+7b. Response: RWST is 9.5%. When W CTS control switch is placed in Pull-to-Lock indicate that breaker green light is on and red light is off.	Check RWST level <10% when <10% stops and locks out W CTS pump	Checks RWST level <10% <ul style="list-style-type: none">► Stops W CTS pump and places control switch in Pull-to-Lock.► Pump is stopped prior to closing its suction from RWST.

COMMENTS:

S+: Pump must be stopped and locked out before its suction valve is closed.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+7d. Response: IMO-225 green light on red light off.	Closes IMO-225 W CTS suction from RWST	Takes IMO-225 to close verifies green light on and red light off.

COMMENTS:

S+: Pump must be stopped and locked out before its suction valve is closed.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+7e. Response: ICM-306 green light on red light off.	Attempts to open ICM-306 Go to Step 4 Att. B ES-1.3	Reports ICM-306 will not open. Proceeds with Step 4

COMMENTS:

S+: Pump must be stopped and locked out before its suction valve is closed.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
8. Response: No increase noted.	Check VCT level NO UNEXPECTED INCREASE.	Reports no unexpected increase.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
9. Candidate may continue and split CCW trains prior to reporting. This may be done without penalty.	Reports to US.	Reports that ECCS aligned for cold leg recirculation.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
10. Response: Both white lights for charcoal filters are lit. AEO reports: ▶ Damper #1 - Closed. ▶ Damper #2 - Closed ▶ Face damper - Open	Check Aux Building ESF ventilation ▶ Check AES fans charcoal filter operating lights lit. ▶ Checks damper alignment	▶ Verifies white light lit for AES fans. ▶ Dispatches AEO to check damper positions.

COMMENTS:

TERMINATION CUE: BOTH TRAINS OF ECCS HAVE BEEN RE-ALIGNED FOR COLD LEG RECIRCULATION AND OPERATING NORMALLY.

TITLE: INITIATE COLD LEG RECIRCULATION

RO-O-E007A

QUESTION: #1

Without using references, answer the following question:

Explain why the procedure ES-1.3 requires completion of Steps 1 through 6 before any Functional Restoration Procedure (FRP) can be implemented.

ANSWER: #1

Candidate responds with wither of the following:

- o Maintenance of core cooling.
- o Prevent ECCS pump operation without water supply.

REFERENCES: ERG-HP Background, ES-1.3, Step 1 Note.

K/A NUMBER: 000011 EK3.12

K/A IMPORTANCE: SRO 4.6 RO 4.4

TIME: 3 MINUTES

COMMENTS:



TITLE: INITIATE COLD LEG RECIRCULATION

RO-O-E007A

QUESTION: #4

Without using references, answer the following question:

Why does this procedure not allow restarting SI pumps until RCS pressure is less than 1425 psig?

ANSWER: #4

This pressure is above the SI pump shutoff head and the procedure isolates the SI pump recirculation.

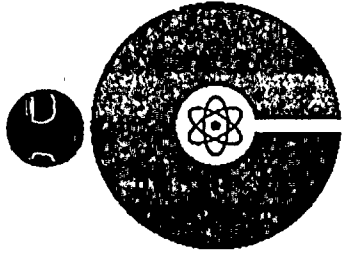
REFERENCES: ERG-HP Background; ES-1.3, Step 5.g RNO

K/A NUMBER: 006000 A2.02

K/A IMPORTANCE: SRO 4.3 RO 3.9

TIME: MINUTES

COMMENTS:



COOK NUCLEAR PLANT TRAINING CENTER

Bridgman, Michigan

RO-O-E102A

TITLE	Restore Power to AC Emergency Bus Train B
PROGRAM	Licensed Operator Replacement Training

REVISION	0
TIME	15 Minutes

SCOPE OF REVISION:

Revision 0: Original issue.

- ▶ Modified JPM RO-O-E102 to delete re-energization of Train A portion of the task.
- Deleted questions #3 and #4.

DATE

DEVELOPING INSTRUCTOR(S)

Bob Sailor

REVIEWED BY

APPROVED BY

TITLE: Restore Power to AC Emergency Bus Train B

RO-O-E102A

REFERENCES

2-OHP 4023.E-0	Rev. 6, CS-2	Reactor Trip or Safety Injection
2-OHP 4023.ECA-0.0	Rev. 7, CS-3	Loss of All AC Power
2-OHP 4030.STP.027AB	Rev. 6, CS-10	AB Diesel Generator Operability Test (Train B)
2-OHP 4030.STP.027CD	Rev. 7, CS-10	CD Diesel Generator Operability Test (Train A)
2-OHP 4024.219	Rev. 5	Annunciator #219 Response, Station Auxiliary AB
2-OHP 4024.220	Rev. 5	Annunciator #220 Response, Station Auxiliary CD
2-OHP 4023.SUP.002	Rev. 0, CS-1	Supplement #2, Restoration of Reserve Feed to 4KV Buses

ERG Background, E-0, ECA-0.0

TRAINING AIDS/TOOLS/EQUIPMENT

None (for simulator)

SPECIAL SAFETY CONSIDERATIONS

All JPMs conducted in-plant are to be simulated only.

ATTACHMENTS

Attachment 1	JPM Student Evaluation Worksheet
Attachment 2	Question/Answer Summary Sheet

STUDENT HANDOUTS

RO-O-E102-HO-1	Initial Conditions and Initiating and Terminating Cues
RO-O-E102-HO-2	Student Questions

TASK STANDARD

Electrical Power is restored to Train B safeguards bus per the directions given in ECA-0.0, Step 5 and the appropriate attachment.

SIMULATOR SETUP

1. Reset to any steady state IC.
 2. Run CAEI 2ABTAGOUT
 3. Place DG2AB Output Breaker control switches in lockout.
 4. Hang Red Tags for diesel clearance
 - ◆ Stop/Run Switch
 - ◆ HEA (Tripped)
 - ◆ DG Output Breakers (Lockout)
 - ◆ Fuel Oil Transfer Pumps (Stop)
 5. Insert Malfunctions
 - ◆ EG10B DG2CD Fail to Start
 - ◆ ED26 Loss of 765KV DUMONT LINE
 - ◆ ED01 Loss of 345KV Bus 1
6. Trip the Main Turbine
7. Perform/Verify Actions of ECA-0.0 up to Step 5, including OSO.093 actions.
8. Reset DG2AB and DG2CD Trip Targets
 9. Acknowledge alarms and Freeze the Simulator until ready to begin.

NOTE: CAEI RO-O-E102 will perform setup items 2, 5.

This path starts with DG2AB tagged out for maintenance with its output breaker control switches in "pull-to-lock" and its breaker racked out. The unit trips due to a loss of 765 and 345KV transmission network. The 2CD diesel fails to start on the loss of power. The success path for this JPM will require the operator to manually strip 4KV (Train B) loads and restore power to T21A and B from Emergency Power.

TITLE: Restore Power to AC Emergency Bus Train B

RO-O-E102A

DIRECTIONS

When I tell you to begin you are to RESTORE POWER TO TRAIN B SAFEGUARDS BUSES T21A and T21B. You may use any approved reference materials normally available in the control room. You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

*(I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task.)

*Read only if task is simulated.

INITIAL CONDITIONS

A reactor/turbine/generator trip has occurred due to electrical system degradation. The US has transitioned to ECA-0.0 from Step 4 of E-0. The first 4 steps of ECA-0.0 are completed. Additionally, no attempt(s) to restore power were made while in E-0.

INITIATING CUE

You are an Extra RO from Unit 1. The US directs you to restore power to and Train 'B' safeguards buses T21A and T21B in accordance with Step 5 of ECA-0.0.

TERMINATING CUE

Electrical power has been restored to the appropriate safeguards bus.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1.	Obtain copy of procedure ECA-0.0.	Copy of procedure located and opened to step 5.
<u>COMMENTS:</u> 		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>2. RESPONSE:</p> <p>As each component is checked,</p> <p>STATE:</p> <p>The white light is NOT LIT.</p> <p>NOTE: PRZ heaters may be checked at 4KV feeder breaker or individual heater bank breakers.</p>	<p>Verifies Train B load shed relays have actuated. (Step 5.a)</p>	<p>Checks white "Load Shed" lights NOT LIT for Train B:</p> <ul style="list-style-type: none"> ◆ PRZ Heaters ◆ West MDAFW Pump ◆ West CCP ◆ West RHR Pump ◆ South SI Pump ◆ West CTS Pump ◆ West CCW Pump
<u>COMMENTS:</u> 		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*S+3. RESPONSE:</p> <p>As each control switch is taken to the trip/lockout position,</p> <p>STATE:</p> <p>Green light is LIT, Red light is out and switch is in pull to lock position (as applicable.)</p> <p>NOTE: PRZ heaters may be tripped at 4KV feeder breaker or individual heater bank breakers.</p>	<p>Trips/locks out 4KV Loads. (Step 5.a RNO)</p>	<p>◆ PRZ Heater Breaker(s) opened.</p> <p>◆ 4KV Pump Breakers placed in pull to lock:</p> <ul style="list-style-type: none"> ▶ West MDAFW Pump ▶ West CCP ▶ West RHR Pump ▶ South SI Pump ▶ West CTS Pump ▶ West CCW Pump <hr/> <p><u>INFORMATION ONLY</u></p> <p>Verifies breakers open by observing green position light LIT at control switch.</p>

COMMENTS:

The critical aspect of this step is that the listed breakers are tripped/placed in lockout. The sequential aspect is that this action is completed before reenergizing T21A.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4. RESPONSE: As breakers are checked, STATE: The Green light is LIT.	Verifies RCP Bus Tie Breakers are open. (Step 5.b)	Checks green breaker open lights LIT for: ♦ T21A9 ♦ T21B1
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
5. RESPONSE: The green light is LIT OR Field Volts/Amps indicate zero.	Checks if DG2AB is NOT running. (Step 5.c)	Checks if DG2AB is NOT running by observing: Green STOP light LIT at STOP/RUN switch. Red RUN light off at STOP/RUN switch. OR Field Volts/Amps meters.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6. RESPONSE: HEA has orange target OR Drop 51 is LIT.	Checks DG2AB HEA reset. (Step 5.d)	Checks differential relay (HEA) and determines orange target indicates HEA is tripped OR Checks annunciator Panel 219, Drop 51 is LIT.
COMMENTS: 		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
7. RESPONSE: EP: ♦ Red lights are LIT. ♦ Panel 221, Drop 71 NOT LIT. ♦ Voltmeter(s) indicate 118 volts.	Determine if EP is available for powering the T-Buses. (Step 5.d RNO)	Checks availability of EP by: ♦ Emer. Power to Bus T21A(C) & T21B(D) Energized Red lights LIT on mimic bus. ♦ Ann. Panel 221, Drop 71 NOT LIT. ♦ Monitoring Voltage on Diesel Start Voltmeter after selecting an EP position.
COMMENTS: 		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
8.	Refers to Attachment D of ECA-0.0. (Step 5.d RNO)	Attachment D is referred to.
COMMENTS:		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*9. RESPONSE: ◆ ∅ volts indicated. ◆ Control switch is in lockout. ◆ Green light LIT (T21A9). ◆ T21A12 has a red target. ◆ Red light LIT (T21A12). ◆ Bus T21A voltage is 118 volts (if T21A position selected.)	Bus T21A energized from 69/4KV (EP) supply. (Att. D, Step 1)	◆ Monitors T21A voltage on RUN voltmeter. ◆ Verifies T21A11 control switch in lockout. ◆ Verifies ACB T21A9 open by green position light LIT. *◆ Closes T21A12 <hr/> INFORMATION ONLY ◆ Verifies T21A12 closed by red position light LIT and/or monitoring Bus T21A voltage.
COMMENTS: NOTE: The only critical standard associated with this step is that T21A12 is closed.		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*10. RESPONSE:</p> <ul style="list-style-type: none"> ◆ ∅ volts indicated. ◆ Control switch is in lockout. ◆ Green light LIT (T21B1). ◆ T21B2 has a red target. ◆ Red light LIT (T21B2). ◆ Bus T21B voltage is 118 volts (if T21B position selected.) 	<p>Bus T21B energized from 69/4KV (EP) supply. (Att. D, Step 2)</p>	<ul style="list-style-type: none"> ◆ Monitors T21B voltage on RUN voltmeter. ◆ Verifies T21B4 control switch in lockout. ◆ Verifies ACB T21B1 open by green position light LIT. * ◆ Closes T21B2. <hr/> <p><u>INFORMATION ONLY</u></p> <ul style="list-style-type: none"> ◆ Verifies T21B2 closed by red position light LIT and/or monitoring Bus T21B voltage.

COMMENTS:

NOTE: The only critical standard associated with this step is that T21B2 is closed.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>11. RESPONSE:</p> <p>Unit Supervisor understands that Bus T21A (and T21B) is energized and Step 7 can be implemented.</p> <p>CUE:</p> <p>If required US directs continuance with Train 'A' restoration.</p>	<p>Procedure ECA-0.0 continued at Step 7.</p>	<p>Unit Supervisor informed that power is restored to Bus T21A and that Step 7 of ECA-0.0 can be implemented.</p>
<p>COMMENTS:</p> <p>This step is not required to be performed by procedure flowpath, but may be performed.</p>		

TERMINATING CUE

Electrical Power has been restored to safeguards buses T21A and T21B.

TITLE: Restore Power to AC Emergency Bus Train B

RO-O-E102A

QUESTION: #1

Without the aid of references, answer the following question:

ECA-0.0, Step 5.a has you verify load shed white lights LIT for various components, and if not lit, to open the affected breakers. What is the purpose of tripping the 4KV loads?

ANSWER: #1

To prevent overloading the incoming power supply when the bus is reenergized (due to starting currents of loads not tripped) OR to ensure that loads are sequenced on to the bus when power is restored.

REFERENCES: ERG Background ECA-0.0

K/A NUMBER: 056EK3.02

K/A IMPORTANCE: SRO 4.7

RO 4.4

TIME: 5 MINUTES

COMMENTS:

TITLE: Restore Power to AC Emergency Bus Train B

RO-O-E102A

QUESTION: #2

The RNO for 5.h) has you trip DGAB if neither DG output breaker can be closed. Why is this necessary?

ANSWER: #2

The diesel is running without any forced cooling (Jacket Water) which could lead to (mechanical) failure of the engine.

REFERENCES: ERG Background ECA-0.0; RO-C-AS10, Emergency Diesel Generator

K/A NUMBER: 056EK3.02

K/A IMPORTANCE: SRO 4.7

RO 4.4

TIME: 5 MINUTES

COMMENTS:

RO-O-N073

TITLE	Calculate Shutdown Margin Boron Concentration
PROGRAM	Requalification

REVISION	4
TIME	25 minutes

SCOPE OF REVISION:

Revision 4: Minor revision.

- Updated to reflect current procedure and cycle 10 Technical Data Book curves.

DATE

DEVELOPING INSTRUCTOR(S)

Scott Hehl

REVIEWED BY:

APPROVED BY

1/ilafjpm/gh

Page 1 of 15
Revision 4

TITLE: Calculate Shutdown Margin Boron Concentration

RO-O-N073

REFERENCES

- ▶ 2-OHP-4021.001.012, Rev. 7, Determination of Reactor Shutdown Margin
- ▶ Unit 2 Technical Specifications 3.1.1.1 and 3.1.1.2, Surveillance Requirement; 4.1.1.1.e Mode 3 and 4.1.1.2.b for Modes 4 and 5.
- ▶ Unit 2 Technical Data Book Current Cycle (10).

TRAINING AIDS/TOOLS/EQUIPMENT

- ▶ Calculator

SPECIAL SAFETY INSTRUCTIONS

All JPMs performed in plant are to be simulated only.

ATTACHMENTS

- Attachment 1: JPM Student Evaluation Worksheet
- Attachment 2: Question/Answer Summary Sheet
- Attachment 3: Unit 2 SDM Calculation for Evaluator: Current Cycle (10).

*Always review calculations for a Unit 2 cycle change and review acceptable range by using the Simulator TDB figures as references and generally either allowing a half increment or the next legible line on either side as the limits.

STUDENT HANDOUTS

- RO-O-N073-HO-1: Initial Conditions and Initiating and Terminating Cues.
- RO-O-N073-HO-2: Questions

TASK STANDARD

The required shutdown boron concentration has been determined and the ppm boration (if any) has been calculated.

SIMULATOR SETUP

None

TITLE: Calculate Shutdown Margin Boron Concentration

RO-O-N073

DIRECTIONS

When I tell you to begin you are to CALCULATE SHUTDOWN MARGIN BORON CONCENTRATION. You may use any approved reference materials normally available in the control room.

INITIAL CONDITIONS

- Unit 2 is in Hot Standby 1 hour after a reactor trip from full power.
- Core age is MOC. [From Technical Data Book Figure 1.3 (uses EFPH to determine core age)]
- Xenon is increasing.
- All shutdown and control rods are inserted. [Control Board Indications]
- All RCPs are running. [Control Board Indications]
- A unit startup is scheduled within the next 24 hours. Therefore, it is desirable to minimize any boron addition.
- EFPH (from Control Room Log) = 3083.08. [From PPC point U0031]
- Tavg = 547 degrees F. [Control Board Indications]
- RCS boron concentration 1000 ppm. No RCS dilutions are planned. (Lab sample taken one-half hour earlier.) [Contact Chem lab, Phone 1374]
- Xenon reactivity at 30 hours after shutdown (from Reactor Engineering) - 2100 pcm. [From Reactor Engineering (ext 1536) or Duty Engineer list during off hours]

INITIATING CUE

US directs that a SDM be performed based on the above conditions.

TERMINATING CUE

The ppm boration (if any) has been calculated.

TITLE: Calculate Shutdown Margin Boron Concentration

RO-O-N073

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1.	Candidate obtains a copy of Unit 2 OHP.4021.001.012, Determination of SDM.	Copy of procedure is located.
COMMENTS:		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*2.	Determines correct attachment to use.	Copy of Data Sheet 1 is obtained.
COMMENTS:		

TITLE: Calculate Shutdown Margin Boron
Concentration

RO-O-N073

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
3.	Initial conditions and precautions are reviewed.	Any precautions which are applicable for completion of the SDM are met.
COMMENTS:		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4.	Records Unit cycle, date, and shutdown time.	Based on initial conditions correct time is entered on line 1.
COMMENTS:		

TITLE: Calculate Shutdown Margin Boron Concentration

RO-O-N073

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
5.	The expiration date and time are entered.	An expiration time not greater than 30 hours from shutdown is entered on line 2.
COMMENTS:		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6.	The burnup/cycle exposure is determined (GWD/MTU).	From the given EFPH and the Technical Data Book Figure 4.5 conversion, GWD/MTU is calculated and entered on line 3.3. (See applicable Attachment for value.)
COMMENTS:		

TITLE: Calculate Shutdown Margin Boron Concentration

RO-O-N073

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*7.	Selects Tech Data Book 4.5 curve based on plant conditions and determines minimum required boron concentration.	Enters boron concentration on line 5. (See applicable Attachment for value.)
COMMENTS:		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*8.	Reactivity value given in Initial Conditions is entered.	Enters xenon reactivity value given on line 6.1. (See applicable Attachment for value.)
COMMENTS:		

TITLE: Calculate Shutdown Margin Boron Concentration

RO-O-N073

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
9.	Current RCS boron concentration is used for minimum expected boron concentration.	Enters current RCS boron concentration on line 6.2. (See applicable attachment for value.)
COMMENTS:		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*10.	Tech Data Book Figure 4.1.b (MOC) is used to determine DBW.	Enter value of DBW on line 6.3. (See applicable Attachment for value.)
COMMENTS:		

TITLE: Calculate Shutdown Margin Boron Concentration

RO-O-N073

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*11.	Xenon reactivity is divided by differential boron worth.	Calculate Xenon correction and enter value on line 6.4. (See applicable Attachment for value.)
COMMENTS:		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*12.	Corrected minimum boron concentration is calculated by subtracting Xenon correction from required boron concentration.	Enter remainder on line 6.5. (See applicable Attachment for value.)
COMMENTS:		

TITLE: Calculate Shutdown Margin Boron
Concentration

RO-O-N073

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
13.	Current RCS boron concentration is entered.	Enter current RCS boron concentration, date and sample time on line 7.0. (See applicable Attachment for value.)
COMMENTS:		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*14.	Record the minimum required boron concentration.	Record value entered in line 6.5 on line 8. (See applicable Attachment for value.)
COMMENTS:		



TITLE: Calculate Shutdown Margin Boron Concentration

RO-O-N073

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*15.	Determine whether boration is required by subtracting the actual boron concentration from the minimum boron required.	zero is entered on line 9. (See applicable Attachment for value.)
COMMENTS:		

TERMINATING CUE:

The candidate has completed the SDM. Instructor should gather all calculations and work sheet used in calculation.

TITLE: Calculate Shutdown Margin Boron
Concentration

RO-O-N073

QUESTION: #1

Without using references, answer the following question.

The procedure you have just performed (Calculate Shutdown Margin Boron Concentration) is not normally performed during power operation. How is adequate shutdown margin verified when the reactor is critical?

ANSWER: #1

Control rod position is above rod insertion limit.

REFERENCES: Technical Specification 3.1.3.6, Surveillance Requirement
4.1.3.6.

K/A NUMBER: 001010 A4.04

K/A IMPORTANCE: SRO 4.1 RO 3.5

TIME: 1 MINUTE?

COMMENTS:



TITLE: Calculate Shutdown Margin Boron
Concentration

RO-O-N073

QUESTION: #3

Without using references, answer the following question.

State one reactivity factor considered by the Technical Specification for shutdown margin that is not used in the shutdown margin calculation.

ANSWER: #3

(EITHER)

- Xenon (if xenon correction not used)
- Samarium

REFERENCES: 2-OHP 4021.001.012, Revision 4, CS-4, Determination of Shutdown Margin; Technical Specification 3.1.1.1, Surveillance Requirement 4.1.1.1e.

K/A NUMBER: 001010 K5.37

K/A IMPORTANCE: SRO 3.4 RO 3.2

TIME: 3 MINUTES?

COMMENTS:

RO-O-N074

TITLE	Restore Normal Letdown
PROGRAM	Regualification

REVISION	2
TIME	10 minutes

SCOPE OF REVISION:

Revision 2: Major revision. Marginal markings not used.

- Updated references to current procedure revision.
- Modified responses to address Taylor controller changeout.
- Revised steps to align with OHP 4021.003.001

DATE

DEVELOPING INSTRUCTOR(S)

1/10/96

Russ Scott

REVIEWED BY:

APPROVED BY

REFERENCES

2-OHP 4021.003.001, Rev. 10, Letdown, Charging and Seal Water Operation

TRAINING AIDS/TOOLS/EQUIPMENT

None

SPECIAL SAFETY INSTRUCTIONS

None

ATTACHMENTS

Attachment 1: JPM Student Evaluation Worksheet

Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

RO-O-N074-HO-1: Initial Conditions and Initiating and Terminating Cues.

RO-O-N074-HO-2: Questions

TASK STANDARD

120 gpm normal letdown is in service with charging flow adjusted to stabilize PZR level.

SIMULATOR SETUP

- Initialize the simulator to any at power IC.
- Place excess letdown in service per OHP 4021.003.001, Att. No. 7, and remove normal letdown from service per OHP 4021.003.001, Att. 3.

DIRECTIONS

When I tell you to begin you are to Remove Excess Letdown and Restore Normal Letdown. You may use any approved reference materials normally available in the control room. You are to follow all approved plant radiation and safety procedures as they apply to completing the task. You must follow all required data sheets as they pertain to the task. *(I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task.) You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

* Read only if simulating the task.

INITIAL CONDITIONS

- ▶ Excess letdown is in service and aligned to the VCT.
- ▶ Normal letdown was removed from service for maintenance. Letdown isolation and orifice isolation valves are closed.
- ▶ Normal charging is isolated.

INITIATING CUE

Maintenance has been completed repairs following a CCW leak in the letdown heat exchanger.

You are to remove excess letdown from service and restore normal letdown at 120 gpm using the directions found in Attachment 6 of OHP 4021.003.001.

TERMINATING CUE

Normal letdown is in service at 120 gpm with charging flow adjusted to stabilize PZR level.

TITLE: Restore Normal Letdown

RO-O-N074

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1.	Obtains OHP 4021.003.001 Attachment No. 6.	Locates procedure 2-OHP 4021.003.001.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
2.	OHP 4021.003.001 precautions reviewed.	Letdown temperature precautions 4.6 and 4.7 noted as applicable.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*3. If simulated state QFI-200 indicates 35 gpm. Response: Valve red lights are lit, green lights are out.	Verify adequate charging flow.	QMO-200 and QMO-201 are open.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4. Response: QFI-200 indicates 85 gpm. Modify response based on whether QRV-200 is opened; e.g. if QRV-251 opened and QRV-200 remains closed respond with individual seal flows increasing and QFI-200 indication equal to total seal flow.	QRV-200 and QRV-251 throttled in open direction.	QFI-200 indicates greater than 75 gpm (80 - 90 gpm).
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
5. CUE: Seal injection flows are 6 gpm each. RESPONSE: (If QRV-200 throttled more closed): Seal injection flows range from 7-8 gpm each.	Adjust QRV-200 to obtain desired seal flows.	Each RCP seal injection flow is 7-10 gpm.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6. RESPONSE: Orifice isolation valves have green lights lit. [Per Attachment 2]	Verify orifice valves CLOSED. <ul style="list-style-type: none">• QRV-160• QRV-161• QRV-162	QVR-160, -161, and -162 are CLOSED.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
7. (If placed in manual and opened): controller output demand indicates 50%. (If left in AUTO): controller output demand indicates 0%.	Verify letdown Hx temperature control valve OPEN. • CRV-470	CRV-470 controller is placed in MANUAL and an open demand signal (>0% demand) is given.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*8. RESPONSE: Valve red lights are lit.	OPENS CVCS letdown containment isolation valves: • QCR-300 • QCR-301	QCR-300 and QCR-301 are OPEN.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*9. RESPONSE: valve red lights are lit.	OPEN letdown isolation valves: <ul style="list-style-type: none">• QRV-111• QRV-112	QRV-111 and QRV-112 are OPEN.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*10. RESPONSE: Indicate that QRV-301 demand is at 50%.	Adjust letdown back pressure valve to 50% output demand signal. <ul style="list-style-type: none">• QRV-301	QRV-301 controller placed in manual and demand adjusted to $\geq 50\%$.
<u>COMMENTS:</u>		

TUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*11. RESPONSE:</p> <ul style="list-style-type: none"> • Orifice isolation valve selected has red light lit. • (If Regen Hx portion of charging flow at least 25 gpm and QRV-301 approx. 50% demand): <ul style="list-style-type: none"> • QPC-301 indicates stable 300 psig Regen Hx Letdown Outlet Temperature has stabilized at 280 degrees F. • (If Regen Hx portion of charging flow <25 gpm): <ul style="list-style-type: none"> • Regen Hx Letdown Outlet Temperature is 330 degrees and increasing rapidly. • QPC-301 indicating pressure oscillations of 200 psi. • Letdown relief temperature high alarm in. <p><u>CONTINUED NEXT PAGE</u></p>	<p>OPEN 75 gpm orifice valve.</p> <ul style="list-style-type: none"> • QRV-161 <p><u>OR</u></p> <ul style="list-style-type: none"> • QRV-162 	<ul style="list-style-type: none"> • QRV-161 OR QRV-162 is OPEN <p><u>AND</u></p> <ul style="list-style-type: none"> • Letdown fluid is NOT flashing [any flashing that occurred has been stopped by either: <ul style="list-style-type: none"> • Increasing charging flow through the regenerative Hx (If that portion of the flow was less than 25 gpm) <p><u>AND/OR</u></p> <ul style="list-style-type: none"> • Throttling back QRV-301 (if output demand >75%)]. <p><u>AND</u></p> <ul style="list-style-type: none"> • Letdown relief is not lifting (or has reseated) <p><u>AND</u></p> <ul style="list-style-type: none"> • Letdown temperature demineralizers has remained less than 143 degrees F.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*11. CONTINUED</p> <ul style="list-style-type: none">• (If QRV-301 demand >75%):<ul style="list-style-type: none">• QPC-301 indicates pressure of ≤ 200 psig).• (If QRV-301 @ 100% demand):<ul style="list-style-type: none">• QPC-301 indicates pressure oscillations.• (If QRV-301 demand <50%):<ul style="list-style-type: none">• QPC-301 indicates pressure (>400 psig - increase pressure given with lesser demands).• (If CRV-470 in MANUAL and 40 - 60% demand):<ul style="list-style-type: none">• QTA-302 indicates 95 degrees F (stable).• (If CRV-470 in MANUAL and demand <40%):<ul style="list-style-type: none">• QTA-302 indicates 110 degrees (and increasing). <p><u>CONTINUED ON NEXT PAGE</u></p>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*11. CONTINUED</p> <ul style="list-style-type: none">• (If CRV-470 in MANUAL and demand >60%):<ul style="list-style-type: none">• QTA-302 indicates 90 degrees and decreasing.• (If CRV-470 left in AUTO and closed):<ul style="list-style-type: none">• QTA-302 indicates 120 degrees and increasing.		
<u>COMMENTS:</u>		

Note: At this point the candidate May elect to increase letdown flow to 120, if so steps 17 to 21 will be performed at this time.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
12. CUE: QPC-301 pressure is 342 psig.	Adjust letdown backpressure valve QRV-301 to obtain 340 to 350 psig on 2-QPC-301	QRV-301 is closed to increase pressure on QPC-301 to 340 - 350 psig.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
13. CUE: When the Auto pad is depressed the "AUTO" light appears on the controller face.	Place QRV-301 in Auto.	QVR-301 controller is nulled and the AUTO pad is pressed.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*14. RESPONSE: Green lights lit on QRV-114 and 114. 0 demand indication on QRV-170. [Per Attachment 2]	Close Excess letdown valves. <ul style="list-style-type: none">• QRV-170• QRV-113• QRV-114	QVR-170, -113, and -114 are CLOSED.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
15. Response: Pressurizer level is 20% and slowly increasing.	QVR-200 and QRV-251 throttled as needed to control pressurizer level.	QVR-200 opened to increase charging flow. QRV-251 opened to increase charging and seal injection flow.
<u>COMMENTS:</u>		

TITLE: Restore Normal Letdown

RO-O-N074

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
16. Response: When contacted respond that 2-CS-370 has been opened and 2-CS-369 has been closed.	Align RCP seal return to CCP suction.	Contacts an NLO to Open 2-CS-370 and Close 2-CS-369.
<u>COMMENTS:</u>		

Candidate returns to Attachment 2 (Step 2.3) to increase letdown flow to 120gpm

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*17. CUE: QPC-301 pressure is decreasing as valve is OPENED.	Adjust letdown backpressure valve QRV-301 to decrease letdown pressure.	QVR-301 is placed in manual and OPENED to drop pressure on QPC-301. ----- <u>INFORMATION ONLY</u> QPC-301 should read approx. 200 psig.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*18. Valve red light is lit.	OPEN 45 gpm orifice valve QRV-160.	QVR-160 is OPENED.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*19. CUE: Based on Regen Hx cooling and QRV-301 position from previous step. RESPONSE: Based on simulated valve movement.	Adjust QRV-301 to obtain desired pressure.	QPC-301 indicates 300 - 400 psig. ----- <u>INFORMATION ONLY:</u> QPC-301 indicates 340-350 psig.
<u>COMMENTS:</u>		

TITLE: Restore Normal Letdown

RO-O-N074

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*20. RESPONSE: QPC-301 indicates constant pressure (nominal pressure 340-350 psig.	Place QRV-301 controller in AUTO.	Setpoint for QRV-301 set to current reading on QPC-301 and AUTO is selected. ----- <u>INFORMATION ONLY</u> Nominal pressure is 340-350 psig.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*21. CUE: QFI-200 indicates 135 gpm charging flow.</p> <p>QFI-301 indicates 120 gpm letdown flow.</p> <p>RCP #1 seal return flows each indicate 3 gpm.</p> <p>PRZ level indicates 1% above program.</p>	<p>Adjust charging flow (as necessary to restore PRZ level to program).</p>	<p>Close QMO-225 then reposition QRV-200 and/or QRV-251 as needed to restore PRZ level to program.</p> <ul style="list-style-type: none">• QFI-200 flow should be slightly less than letdown plus seal return flows if PRZ level > program.• QFI-200 flow should be slightly greater than letdown plus seal return flows if PRZ level < program.
<u>COMMENTS:</u>		

TERMINATING CUE

120 gpm letdown has been established and PZR level has been stabilized.

TITLE: Restore Normal Letdown

RO-O-N074

QUESTION: #1

Without references, what are the four conditions which will result in an automatic isolation of the letdown orifice isolation valves (QRV-160, 161, 162)?

ANSWER: #1

- 1) Containment isolation signal phase A.
- 2) Loss of all charging pumps (breakers).
- 3) Closing of either letdown isolation valve QRV-111, 112.
- 4) Low PRZ water level (17%).

REFERENCES: OP-2-98274, Rev. 11; OP-1-98274, Rev. 9

K/A NUMBER: 004020 K4.03

K/A IMPORTANCE: SRO 3.4 RO 3.0

TIME: 5 MINUTES

COMMENTS:

TITLE: Restore Normal Letdown

RO-O-N074

QUESTION: #2

Why must charging flow through the normal charging line be established before normal letdown flow is established?

ANSWER: #2

To provide cooling for letdown.

REFERENCES: RO-C-NS06, Rev. 3; OP-5129

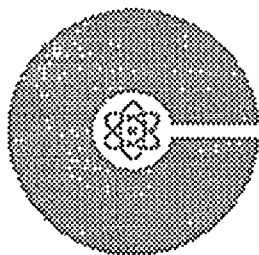
K/A NUMBER: 004010 K4.03

K/A IMPORTANCE: SRO 3.6 RO 3.1

TIME: 1 MINUTE

COMMENTS:

COOK NUCLEAR PLANT TRAINING CENTER
Bridgman, Michigan



RO-O-N70A

TITLE	Setup the Counter Scaler for a 1/M Plot	REVISION	0
PROGRAM	Requalification	TIME	10 minutes

SCOPE OF REVISION:

Revision 0: Original Issue.

DATE

DEVELOPING INSTRUCTOR(S)

Bob Sailor

REVIEWED BY:

APPROVED BY

1/ilafjpm/lf

Page 1 of 11
Revision 0

REFERENCES

2-OHP 4021.013.005, Rev. 4, Visual Audio Count Rate Channel

TRAINING AIDS/TOOLS/EQUIPMENT

Calculator

SPECIAL SAFETY INSTRUCTIONS

None

ATTACHMENTS

Attachment 1: JPM Student Evaluation Worksheet

Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

RO-O-E004-HO-1: Initial Conditions and Initiating and Terminating Cues.
RO-O-E004-HO-2: Questions

TASK STANDARD

Counter Scaler setup for 1/M plot.

SIMULATOR SETUP

- ▶ Initialize to a Mode 3 (awaiting startup) IC.
- ▶ Align Counter Scaler switches:
 - Channel Selector to "N31"
 - VOLUME to "comfortable" range.
 - AUDIO MULTIPLIER to "comfortable" range.
 - SAMPLING MODE Switch to "COUNT-SEC".
 - THUMBWHEELS to "02500".
 - SAMPLING MODE Toggle to "AUTO".
- ▶ Depress the GATE pushbutton prior to starting the JPM.

DIRECTIONS

When I tell you to begin you are to SETUP THE COUNTER SCALER FOR A 1/M PLOT. You may use any approved reference materials normally available in the control room. You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

*(I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task.)

*Read only if the task is simulated.

INITIAL CONDITIONS

A reactor startup will begin shortly. The control and shutdown banks are fully inserted.

INITIATING CUE

You are the Extra SRO. The US directs you to setup the counter scaler in preparation for a 1/M plot in accordance with 02-OHP 4021.013.005, Step 4.2.

TERMINATING CUE

The counter scaler is ready to perform a 1/M plot.

TITLE: Setup the Counter Scaler for a 1/M Plot

RO-O-N70A

D

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1.	Obtain procedure 4021.013.005.	Procedure located and opened to Step 4.2.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
2. NOTE: This may be done at any appropriate time.	Obtain Data Sheet 2.	Locates Data Sheet in procedure data sheet/attachment drawer.
<u>COMMENTS:</u>		

D

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+3.If simulated, following response to Step, provide indications that Counter Scaler drawer lights have been energized.	Energize the Counter Scaler.	Places or Verifies that the POWER Switch is in the "UP" position.
<u>COMMENTS:</u> *: Critical only if the Drawer is NOT powered initially. S+: Must be performed prior to subsequent steps if the drawer is initially deenergized.		

D

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4. If simulated, state that a beeping sound comes from the speaker about every 10 seconds. CUE: The US desires the counts to be audible during the startup	Disable the audible count rate, if desired.	No action is required.

COMMENTS:

D

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
5. If simulated, state that either N31 or N32 may be used.	Select source range channel.	Rotates switch to right or left as appropriate if channel is changed.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*6. If simulated, state that the Sample Mode Switch is in the COUNT-SEC position.	Set Sample Mode for determining base count rate.	Sample Mode Switch Rotated so that "COUNT" is on the left and "SEC" is on the right.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*7.	Set count time to 100 seconds.	Thumbwheels are rotated and left as "01000".

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
8. If simulated, state that the small gate light is LIT and the toggle is positioned to Auto.	Sampling Mode switch in Auto.	-Positions or verifies the SAMPLING MODE Toggle Switch to the "AUTO" position. -Verifies the GATE light LIT.

COMMENTS:

TITLE: Setup the Counter Scaler for a 1/M Plot

RO-O-N70A

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
9. If simulated, state that the lighted digital display reads 08000, 100 seconds after the toggle switch is placed in auto.	Determine base count rate.	Records the lighted digital display value divided by 100 in the appropriate space on Data Sheet 1. (This value should be approximately 80.)

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*10.	Set Sample Mode for timing the base counts.	Sample Mode Switch Rotated so that "SEC" is on the left and "COUNT" is on the right.

COMMENTS:



TITLE: Setup the Counter Scaler for a 1/M Plot

RO-O-N70A

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*11.	Set base count preset to obtain a 10 second count.	-Thumbwheels are rotated and left as 10X the base count rate. (Approximately "00800".) -Verify the lighted display changes displays approximately every 10 seconds and reads approximately "10.0".

COMMENTS:

TERMINATING CUE:

The Counter Scaler is set up to perform a 1/M plot.

TITLE: Setup the Counter Scaler for a 1/M Plot

RO-O-N70A

QUESTION: #1

This question poses a problem situation NOT encountered during the performance of this JPM.

With the control banks halfway withdrawn from the core, the Counter Scaler loses power. How may the 1/M plot be completed?

ANSWER: #1

The original or base count level may be divided by the present count rate to obtain the value to plot on Data Sheet 1.

(Or equivalent answer relating to $Co/Cf = 1/M$.)

REFERENCES: 02-OHP 4021.013.005, Step 4.4, p 5.

K/A NUMBER: 192008 K1.03

K/A IMPORTANCE: SRO 4.0 RO 3.9

TIME: 2 MINUTES

COMMENTS:

TITLE: Setup the Counter Scaler for a 1/M Plot

RO-O-N70A

QUESTION: #2

This question poses a problem situation NOT encountered during the performance of this JPM.

What action is required if the source range channel selected to the Counter Scaler Fails LOW during the Reactor Startup, just prior to criticality?

ANSWER: #2

Power level may NOT be increased past the P-6 setpoint (approximately 1×10^{-6} amps.)

OR

Any other conservative operating related answer that does not allow reactivity conditions to exceed those above. For example:

"Stop the control rod withdrawal"

"Stop the control rod withdrawal and make repairs to the SR prior to proceeding"

"Fully insert control rods and make repairs to the SR prior to re-attempting the startup"

REFERENCES: Unit 2 Technical Specifications, Table 3.3-1, Action 4.

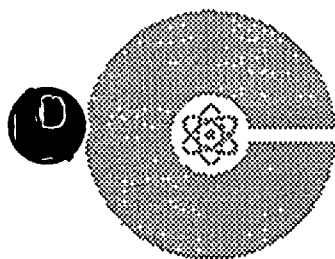
K/A NUMBER: 000032 EK3.01

K/A IMPORTANCE: SRO 3.6 RO 3.2

TIME: 5 MINUTES

COMMENTS:

COOK NUCLEAR PLANT TRAINING CENTER
Bridgman, Michigan



RG-O-S001

TITLE	Perform SG Stop Valve Operability Test
PROGRAM	Requalification

REVISION	0
TIME	20 minutes

SCOPE OF REVISION:

Revision 0: Original Issue.

DATE

DEVELOPING INSTRUCTOR(S)

Bob Sailor

REVIEWED BY:

APPROVED BY

1/ilafjpm/lf

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Revision 0

TITLE: Perform SG Stop Valve Operability Test

RO-O-S001

REFERENCES

**2-OHP 4030.STP.019F, Steam Generator Stop Valve Operability Test
RO-C-PG2A, Unit 2 Main and Reheat Steam.
U2 LER 90-002, MSIV Inoperability - Due to Condensate on Vent Side of
Operating Piston.

TRAINING AIDS/TOOLS/EQUIPMENT

Calibrated Stopwatch
Verified copy of STP.019F with TDB Figure 19.1 stroke time filled in.

SPECIAL SAFETY INSTRUCTIONS

None

ATTACHMENTS

Attachment 1: JPM Student Evaluation Worksheet
Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

RO-O-S001-HO-1: Initial Conditions and Initiating and Terminating Cues.
RO-O-S001-HO-2: Questions

TASK STANDARD

STP.019 completed for MRV-210.

SIMULATOR SETUP

► Initialize to a Mode 3 (awaiting startup) IC.

DIRECTIONS

When I tell you to begin you are to PERFORM STP.019F, STEAM GENERATOR STOP VALVE OPERABILITY TEST. You may use any approved reference materials normally available in the control room. You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

*(I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task.)

*Read only if the task is simulated.

INITIAL CONDITIONS

Unit 2 is in Mode 3. All reactor coolant pumps are in service with the steam dump controlling RCS tavg at 547 degrees. A reactor startup is expected shortly, pending successful retest of MRV-210 full closure STP.

INITIATING CUE

You are the extra RO. The US directs you to perform STP.019F, Steam Generator Stop Valve Full Closure Test Train A. You are to perform the applicable steps of the STP to accomplish a retest of MRV-210. A NLO is stationed in the East MSIV enclosure and may be contacted on the radio. The BOP operator will operate the stopwatch during the test.

TERMINATING CUE

MRV-210 has been full closure tested and returned to the open position.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1. Provide a working copy of STP.019F to the student when located and inform the student that the US has filled in the MSIV stroke time from Tech Data Book Figure 19.1.	Obtain STP.019F	Procedure located.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
2. NOTE: Provide the following as asked. -3.1 The SS is aware of the test. -3.3 The NLO will check the hydraulic fluid when asked. -***12-THP 4030.STP.205A or B will not be performed.	INITIAL CONDITIONS, PRECAUTIONS, AND LIMITATIONS sections are reviewed.	Pages 2, 3, and 4 are reviewed:
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
3. NOTE: provide the following as requested. -Calibrated stopwatch. -A secondary stopwatch will not be used.	Data recorded.	o Stopwatch data recorded in appropriate spaces.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4. NOTE: Provide the following as asked via the radio. -MRV-210 hydraulic reservoir is in the middle of the normal range of the gauge glass.	Verify hydraulic reservoir level.	o The space provided at step 3.4 is initialed.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*5. If simulated, state the controller indication has changed from "AUT" to "MAN" on the display area.	Place MRV-213 controller in Manual.	<ul style="list-style-type: none">o DEPRESSES the manual section of the MRV-213 controller touchpad area.o Verifies the controller display indicates "MAN".

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6. If simulated, state that the annunciator window is NOT LIT.	Verify Annunciator 213, Drop 16 is clear.	Verifies Annunciator window 213, Drop 16 is NOT LIT.

COMMENTS:

D

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
7. If simulated, state that the annunciator window is NOT LIT.	Verify Annunciator window 213, Drop 6 is clear.	Verifies Annunciator window 213, Drop 6 is NOT LIT.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+8. If simulated, state the following: -MRV-211 RED light lights; GREEN light extinguishes. -Annunciator 213, Drop 6 alarms and flashes during MRV-210 travel, then clears when MRV-210 closes. -MRV-210 GREEN light lights; RED light extinguishes.	MRV-210 tripped closed.	o MRV-210 control switch rotated to the TRIP/RESET position. ----- INFORMATION o Stopwatch started when switch is rotated. o Stopwatch stopped when MRV-210 RED light extinguishes.

COMMENTS:

Either the evaluator or an instructor should operate the stopwatch.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*9. If simulated, state the closing time as 3.5 seconds.	Closing time for MRV-210 recorded.	Closing time recorded in appropriate space. The TDB accepted closure time should be recorded.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
10. If asked via the radio, state that the NLO at MRV-210 reports smooth valve closing.	Verify local closure.	Verifies that MRV-210 has stroked smoothly by requesting the NLO report.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+11. If simulated, state that the MRV-211 RED light extinguishes and the MRV-211 GREEN light lights.	Close MRV-211.	o MRV-211 control switch rotated to the NEUTRAL position.
<u>COMMENTS:</u>		
S+MRV-211 must be closed prior to step 15..		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*12. If simulated, state that MRV-212 open RED light lights: closed GREEN light extinguishes.	Open MRV-212.	o MRV-212 control switch rotated to the TRIP/RESET position.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+13. NOTE: If simulated, state that MRV-212 closed GREEN light lights; open RED light extinguishes.	Close MRV-212.	o MRV-212 control switch rotated to the NEUTRAL position.

COMMENTS:

S+: MRV-212 must be closed prior to step 15.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
14. If asked via the radio, state that the NLO near MRV-212 reports the valve has opened and is now closed.	Verify local cycling of MRV-212.	Verifies that MRV-212 has cycled by requesting the NLO report.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*S+15. If simulated, provide the following:</p> <p>When the switch is rotated, both the RED open and the GREEN closed lights are LIT.</p> <p>Annunciator 213, Drop 6 alarms at this time.</p> <p>When MRV-210 is nearly open, the WHITE status light above the control switch lights,</p> <p>(After about 5 minutes), when the valve is fully open;</p> <p>-The WHITE status light extinguishes.</p> <p>-The annunciator clears.</p> <p>-The GREEN close light extinguishes.</p>	Open MRV-210.	<ul style="list-style-type: none">o MRV-210 control switch rotated to the OPEN position.o When MRV-210 is fully open, the control switch is rotated to the NEUTRAL position.

COMMENTS:

S+: Must not be performed until steps 11 and 13 are Complete.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
16. If asked via the radio, state that the NLO near MRV-210 reports that the valve slowly and smoothly traveled to the full open position.	Verify local open position of MRV-210.	Verifies that MRV-210 has traveled to the full open position.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
17. If simulated, state that the annunciator window is NOT LIT.	Verify Annnciator 213, Drop 6 is clear.	Verifies Annunciator window 213, Drop 6 is NOT LIT.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
18. If simulated, state that the annunciator window is NOT LIT.	Verify Annunciator 213, Drop 16 is clear.	Verifies Annunciator 213, Drop 16 is NOT LIT.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*19. If simulated, state that the controller indication has changed from "MAN" to "AUT" on the display area.	Place MRV-213 controller in AUTO.	<ul style="list-style-type: none">o DEPRESSES the AUTO section of the MRV-213 controller touchpad area.o Verifies the controller display indicates "MAN".

COMMENTS:TERMINATING CUE:

MRV-210 has been full closure tested and returned to the open position.

TITLE: Perform SG Stop Valve Operability Test

RO-O-S001

QUESTION: #1

This question poses a problem situation NOT encountered during the performance of this JPM.

How would fast closure operation of MRV-210 be affected if one of the two dump valves (MRV-211 or 212) had a small seat leak that caused condensate buildup on the top of the operating cylinder disc?

ANSWER: #1

Fast closure (trip closure) would take longer.

REFERENCES: Cook Unit 2 LER 90-002, pp 3 and 4; OP-1-5105D

K/A NUMBER: 035010 K6.01

K/A IMPORTANCE: SRO 3.6 RO 3.2

TIME: 2 MINUTES

COMMENTS:

TITLE: Perform SG Stop Valve Operability Test

RO-O-S001

QUESTION: #2

This question poses a problem not encountered during the performance of this JPM.

Without references, what effect would a complete loss of control air have on a Main Steam Isolation Valve in Mode 2?

ANSWER: #2

The valve would (fast) close.

REFERENCES: 01-OHP 4022.064.002, Att.B3; OP-1-5105D.

K/A NUMBER: 035010 K6.01

K/A IMPORTANCE: SRO 3.6 RO 3.2

TIME: 2 MINUTES

COMMENTS:

17 18

Simulation Facility: Cook Unit 2

Scenario #.: ATWS/Uncontrolled
① Depressurization of All SGs.

Examiners: Clyde Osterholtz

Applicants: Robert Gillespie [BOP]

RO Surrogate

SRO Surrogate

Initial Conditions: 80% Power, MOC, (IC # 18)

Shift Turnover: 2 CD Diesel Generator Is tagged out to replace an injector. No other problems noted. Boron concentration: 1067

[illegible]

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIOS
(PART C OF
OPERATING TEST)
FINAL AS-RUN

CC Doherty
CHIEF EXAMINER

ES-301

Operator Actions

Form ES-301-4

Scenario No: ATWSEvent No: 1Page 2 of 12Event Description: SG pressure (MPP-210) FAILURE LOWA failure of the compensating pressure channel for the SF channelinputting the FRV-210 control circuit. (RX17A @ 0% severity; ramp 2 minutes).

Time	Position	Applicant's Actions or Behavior
	BOP	Note annunciator alarms related to steam flow, steam pressure, and SG level. Take manual control of FRV-210 to restore to restore SG level. Report action taken and indications to US. Place stm flow selector to channel 2 position. Return FRV-210 to automatic control.
	US	Direct actions of BOP to control #21 SG level. Direct recovery actions in accordance with 02-OHP 4022.013.012. Stm flow selector to Channel 2 Declare MPP-210 inoperable Implement Att. A-1 associated actions

Examiner Standards



ES-301

Operator Actions

Form ES-301-4

Scenario No: ATWSEvent No: 2Page 3 of 12Event Description: LUBE OIL LEAK FROM THE WEST MAIN FEEDWATER PUMPA leak of approximately 100 gpm from the strainer resulting in a feedpump trip in about 20 minutes. (FW12B @ 20% severity)

Time	Position	Applicant's Actions or Behavior
	BOP	Note annunciator alarm 02-OHP 4024.215, Drop 88 and inform US
	SRO	Take action in accordance with annunciator response procedure and dispatch NLO to investigate. Based upon the report from NLO; Determine W MFW pump should be removed from service. Direct RO/BOP to prepare a power reduction to approximately 60% power in accordance with 02-OHP 4021.001.003 Brief crew on significant precautions and limitations
	RO	Decreases generator load Uses rods/boration to maintain $T_{AVG} \pm 3^\circ$ from T_{ref} Maintains AFD in target band
	BOP	Secures W MFW pump in accordance with 02-OHP 4021.055.004 Starts Aux LO and Control Oil Pumps Reduces W MFP speed in manual Trips W MFW pump when E MFW pump will meet feed flow requirements

Examiner Standards



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Operator Actions

Form ES-301-4

Scenario No: ATWSEvent No: 4Page 5 of 12

Event Description: UNCONTROLLED DEPRESSURIZATION OF ALL SGs
WITH FAILURE OF RTBs (ATWS) MS06A, MS06B, MS06C, MS06D @ 100%

Severity (RP03A & B inserted)

Time	Position	Applicant's Actions or Behavior
	NOTE	(This event starts when the reactor trip signal is generated from High High #22 SG level)
	RO	Attempt to trip reactor when annunciators calling for reactor trip are observed (02-OHP 4024.211, Drops 22 & 27) Inform US of ATWS
	NOTE	The reactor will be locally tripped when the following criteria are met: <ul style="list-style-type: none">▶ When the NLO is directed by the crew <u>AND</u>▶ When the immediate actions are complete <u>AND</u>▶ When reactor power is less than 5%

	SRO/RO/BOP	<p>SRO directs crew to perform FR-S.1 immediate actions (RO should have already attempted to open each reactor trip breaker)</p> <ul style="list-style-type: none"> ▶ RO either monitors AUTO rod insertion to ensure speed is greater than that achievable with MANUAL insertion (48 Steps/min) or MANUALLY inserts rods. [If AUTO insertion is used, RO must switch to MANUAL insertion when AUTO rod speed drops below 48 steps/min]. ▶ BOP actuates AMSAC and verifies turbine trip ▶ RO and BOP announce completion of immediate actions. <p>SRO begins directing FR-S.1 including review of immediate action steps already completed or in progress.</p> <ul style="list-style-type: none"> ▶ BOP checks AFW pumps running ▶ RO initiates emergency boration of RCS <ul style="list-style-type: none"> ■ Verify CCPs running ○ Place BA transfer pumps in Fast ■ Open QMO-420 ▶ RO aligns charging header for maximum boration flow. <ul style="list-style-type: none"> ■ If SI has occurred, this step is N/A. Otherwise, fully opens QRV-200 and opens QRV-251. <p>(RO tasks to begin emergency boration and maximize charging flow may already be accomplished before the US reads these steps if BOP has relieved RO for rod insertion.)</p> <ul style="list-style-type: none"> ■ Check pressurizer pressure ■ If SI has not actuated, verify boration flow ■ Dispatch NLO to locally trip reactor.
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	SRO/RO/BOP (Cont)	<ul style="list-style-type: none"> ■ (If SI has occurred, may direct RO/BOP to perform E-0 actions as time permits.) ▶ Verify containment ventilation isolation ▶ Check SG levels (direct AFW flowrate) <ul style="list-style-type: none"> ■ BOP to ensure AFW flow > 450 K lbm/hr until a NR SG level > 6% (as long as power generation exceeds capacity of AFW and RCS cooldown below 541° has not occurred.) ▶ Isolate dilution paths <ul style="list-style-type: none"> ■ RO turns off PW pumps ■ RO closes QRV-422 ■ RO verifies QRV-500 to filter position ▶ Stop RCS cooldown (T < 541°F) <ul style="list-style-type: none"> ■ BOP checks steam dumps closed ■ BOP ensures steam line drains are closed ■ SRO directs Unit 1 to supply aux. steam (These steps N/A if a main steam line isolation has already taken place) ■ BOP throttles AFW to as low as 240K lbm/hr. ▶ Isolate SGs (T < 541°F and decreasing) <ul style="list-style-type: none"> ■ BOP trips closed MSIVs ▶ Identify faulted SGs <ul style="list-style-type: none"> ■ BOP identifies all SGs as faulted ▶ Directs further throttling of AFW to minimize cooldown <ul style="list-style-type: none"> ■ BOP throttles AFW to as low as 25K lbm/hr each SG. ▶ Isolates faulted SGs
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		<ul style="list-style-type: none"> ■ BOP checks closed <ul style="list-style-type: none"> ◆ MFW pump discharge valves ◆ Feedwater regulating valves ◆ Feedwater isolation valves ▶ Verify reactor subcritical <ul style="list-style-type: none"> ■ Power range less than 5% ■ Intermediate range negative SUR ▶ Place PACHMS in service <ul style="list-style-type: none"> ■ Bypass containment isolation <p>Transition to E-0 if:</p> <ul style="list-style-type: none"> ▶ Power range is less than 5% ▶ Intermediate range negative SUR
	SRO/RO/BOP	<p>SRO begins directing E-0 actions</p> <ul style="list-style-type: none"> ▶ Verify reactor trip ▶ Check DC bus available (either RO or BOP) ▶ Verify turbine and generator tripped <ul style="list-style-type: none"> ■ BOP checks turbine stop valve status lights lit ■ BOP checks generator output breakers A1 and A 2 and exciter field breaker open. ▶ Verify power to AC emergency buses <ul style="list-style-type: none"> ■ T21A or T21D at minimum ▶ Check if SI is actuated <ul style="list-style-type: none"> ■ RO checks: <ul style="list-style-type: none"> ◆ SI status light on ◆ Both CCP white leak-off lights on ◆ Both SI trains actuated ▶ Verify steamline isolation ▶ Verify AFW pumps running ▶ Verify ECCS pumps running

		<ul style="list-style-type: none"> ▶ RO checks: <ul style="list-style-type: none"> ■ CCPs ■ RHR ■ SIPs ▶ Check CCW pumps running ▶ Check ESW status <ul style="list-style-type: none"> ■ RO checks: <ul style="list-style-type: none"> ◆ ESW pumps running ◆ DG cooling flow ▶ Verify ESW, CCW and ECCS alignment <ul style="list-style-type: none"> ■ RO checks status light panels properly lit for each system ▶ Verify feedwater isolation ▶ Verify containment isolation Phase A actuated <ul style="list-style-type: none"> ■ BOP aligns control room pressurization and AES fans so that only one of each type is running ■ SRO/BOP views Phase A status on PPC/containment isolation panel ▶ Place PACHMS in service (already directed) ▶ Check NESW <ul style="list-style-type: none"> ■ RO checks <ul style="list-style-type: none"> ◆ NESW pumps running ◆ Discharge valves open ◆ Circulating water pump running ▶ Verify CTS not required <ul style="list-style-type: none"> ■ RO checks containment pressure < 2.9 psig ▶ Verify ECCS flow <ul style="list-style-type: none"> ■ RO checks: ▶ One or more SGs are completely depressurized
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		<ul style="list-style-type: none"> ◆ BIT flow ◆ SI flow (if RCS P < 1630) ◆ RHR flow (if RCS P < 300) <ul style="list-style-type: none"> ▶ Verify AFW flow <ul style="list-style-type: none"> ■ BOP should control to minimize cooldown with flow as low as 25K lbm/hr per SG (Per FR-S.1 guidance for 4 faulted SGs) ▶ Check RCS temperature <ul style="list-style-type: none"> ■ SRO should direct BOP to increase AFW flowrate and/or steaming rate to stabilize RCS temperature when uncontrolled cooldown stops (SG blowdown completed) ▶ Check if DGs should be stopped <ul style="list-style-type: none"> ■ BOP verifies ■ AB DG is unloaded ■ RO resets SI ■ BOP stops AB DG ▶ Check if RCPs should be stopped <ul style="list-style-type: none"> ■ If RCS P < 1250 psig, RO should inform US and RCPs should be stopped ▶ Check if PRZ PORVs and spray valves are closed <ul style="list-style-type: none"> ■ RO confirms one block valve open <p>Transition to E-2 when:</p> <ul style="list-style-type: none"> ▶ One or more SG pressure is uncontrollably decreasing <u>OR</u> ▶ One or more Sgs is completely depressurized <p>SRO announces transition to E-2 and directs crew to perform E-2 actions (if not already performed).</p> <ul style="list-style-type: none"> ▶ Check MSIVs closed ▶ Check for ECA-2.1 transition
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		<p>Transition to ECA-2.1 when:</p> <ul style="list-style-type: none"> ▶ All SG pressures are decreasing (No SG pressure boundary is intact) ▶ SRO directs crew to perform ECA-2.1 actions (not previously performed) ▶ Verify isolation status of each SG <ul style="list-style-type: none"> ■ BOP closes steam supply valves to TDAFP ■ BOP verifies SG PORVs closed ■ Dispatch NLO to close 2-MS-141 (drain trap isolation) <p>(Other valves listed duplicate earlier checks)</p> <ul style="list-style-type: none"> ▶ Control AFW flow <ul style="list-style-type: none"> ■ SRO should repeat previous directions to throttle AFW to as low as 25K lbm/hr per SG if RCS cooldown is ongoing. (If RCS temperature is increasing, directions to increase AFW flow to stabilize RCS hot leg temperature should be given. ▶ Check if RCPs should be stopped <ul style="list-style-type: none"> ■ RO continues to monitor RCS P relative to 1250 psig to determine whether RCPs should be stopped. ▶ Check condensate storage tank level ▶ Check PRZ PORV status and availability to relieve RCS overpressure ▶ Check for SGTR <ul style="list-style-type: none"> ■ RO/BOP resets Phase A isolation for sampling
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		<ul style="list-style-type: none"> ▶ Check if RHR pumps should be stopped <ul style="list-style-type: none"> ■ RO checks RCS P > 300 psig and stable or increasing (expected) ■ RO stops RHR pumps ▶ Check CTS pumps not running ▶ Check RWST level <ul style="list-style-type: none"> ■ RO verifies RWST level above ES-1.3 cold leg recirculation alignment level (SI, Phase A resets already done. No phase B) ▶ Establish control air to containment <ul style="list-style-type: none"> ■ RO/BOP confirms hot leg temperature status ■ SRO directs accumulator isolation if ≥ 2 hot leg temperatures < 354°F. ▶ Check if ECCS flow should be reduced <ul style="list-style-type: none"> ■ SRO/RO determine subcooling above 30°F ■ SRO/RO determine RCS pressure trend stable or increasing ■ SRO/RO determine PRZ level > 4% ▶ Stop one CCP
		<p>NOTE: Terminate scenario when one CCP has been stopped.</p> <p>SRO Classify Event</p> <p><u>Site Area Emergency per ECC-12 (1)</u></p>

ES-301

Scenario Events

Form ES-301-3

Simulation Facility: Cook Unit 2Scenario #: Loss of Heat SinkExaminers: Clyde OsterholtzApplicants: Robert Gillespie [US]RO SurrogateSRO SurrogateInitial Conditions: 100% power; MSR's OOSShift Turnover: CD DG OOS to repair lube oil leak; 2 hours into Action Statement, TS surveillances scheduledEast MDAFP OOS for bearing replacement; 2 hours into Action StatementLoop 3 T_{rot} failed high; bistables tripped

Event No.	Malfunction No.	Event Type*	Event Description
PreInsert PreInsert PreInsert PreInsert PreInsert PreInsert	RX02C(650) APP H3 FWR63(local) FWR64(100%)		CD DG OOS E MDAFP OOS Loop 3 T _H failed high RCS Loop 3 RTD Bistables tripped TDAFP Speed Control in Local TDAFP Speed Setting at 100% (overspeeds on start)
1	MS06B	C	Small steam leak reported by NLO downstream of isolation valve from #2 steam lead to TDAFP. Crew isolates MCM-221 and declares TDAFP Inoperable. Report E MDAFP repair duration of 10 hours. Crew begins T.S. shutdown (3.7.1.2)
2		R,N	Power decrease
3	RX04A	I	Controlling PZR pressure channel fails high. RO closes spray valves. Crew actions directed by OHP 4022.013.009.
4	FW05A FW05B RP01A RP01B TC03 ED05E (Rx trip + 35) ED24	M	Loss of feedwater; (momentary - auto only) "ATWS" with failure of auto main turbine trip and AFW. Emergency bus T21A faulted. Crew directs manual reactor trip and turbine trip. Crew directs trip of AB DG. Crew directs restoration of feedwater to SGs.

* (N)ormal,

(R)eactivity,

(I)Instrument,

(C)omponent,

(M)ajor

C. Osterholtz
 CHIEF EXAMINER

ES-301

Operator Actions

Form ES-301-4

Scenario No: LOHSEvent No: 1Page 2 of 9

Event Description: Small steam leak on steam supply from #2 lead to TDAFP downstream of isolation valve. Reported by NLO. Leak (MS06B @ 5% ~ 44K PPH)

Time	Position	Applicant's Actions or Behavior
	SRO	Receives information from NLO re: steam leak Directs RO to close MCM-221. Consult T.S. (*3.7.1.2); determines shutdown required (inoperable TDAFP) Consults with management to determine shutdown rate. (MGMT to direct shutdown rate of 30%/hour)
	RO	Closes MCM-221.

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ES-301	Operator Actions	Form ES-301-4
Scenario No: <u>LOHS</u>	Event No: <u>2</u>	Page <u>3</u> of <u>9</u>
Event Description: <u>Reduce Power</u>		
Time	Position	Applicant's Actions or Behavior
	SRO	02-OHP 4021.001.003 Review precautions and limitations. Direct panel operators to commence power reduction. State parameter control and rate expectations. Direct RO to place PRZ backup heaters on to force spray flow to equalize PRZ to RCS boron concentration. Assess panel operator performance during power reduction. Follow up where necessary to clarify/reinforce control ranges.
	RO	Determine required boration (TDB sections 6.4.7) Combine boration and rod insertion as directed. Position rods to maintain AFD as directed. Ensure boration and/or rod insertion rates support requested power reduction rate and maintain $T_{AVG} - T_{REF}$ relationship as directed.
	RO/BOP	Reduces turbine load using load limiter at a rate which supports requested power reduction rate and maintains $T_{AVG} - T_{REF}$ relationship as directed.
	BOP	Monitor MFW/MS parameters during power reduction to assess automatic control.

Examiner Standards

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Operator Actions

Form ES-301-4

Scenario No: LOHSEvent No: 3Page 4 of 9

Event Description: Controlling PRZ pressure channel fails high resulting in auto open spray valves (RX04A Severity: 2500 Ramp: 10 seconds)

Time	Position	Applicant's Actions or Behavior
	RO	Acknowledges alarms indicating high RCS pressure. Reports alarms.
		Determines that actual RCS pressure is decreasing from spray down.
		Closes spray valves
	SRO	<ul style="list-style-type: none"> ▶ Directs that actual RCS pressure is decreasing from spray down. ▶ Directs RO to close spray valves. <p>OHP 4022.013.009 Directs selection of alternate channel for pressure control and recorders. Declares E CCP inoperable and directs ELO to be opened and deenergized. Consults T.S. Directs return of PRZ pressure control to AUTO. Reviews bistable tripping with "other" SRO to determine whether it can be performed Decides <u>NOT</u> to trip Bistables due to OTΔT trip Consults T.S. (per procedure list.) Continues with shutdown (Hot SB in 6 Hours)</p>

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Operator Actions

Form ES-301-4

Scenario No: LOHSEvent No: 4Page 5 of 9

Event Description: Loss of feedwater "ATWS" with failure of auto turbine trip.
Bus T21A faults 5 seconds after fast transfer. TDAFP trips on overspeed, then N
train battery lost. Setup: RP01A,B; TC03; ED05E (ET: Reactor trip plus 35
seconds); ED24 (ET: Reactor trip plus 10 seconds); Initiate: FW05A,B

Time	Position	Applicant's Actions or Behavior
	SRO/RO/BOP	<p>Announce existence of auto trip signal Direct/perform manual reactor trip perform E-0 immediate actions</p> <ul style="list-style-type: none">▶ Verify reactor tripped▶ Verify turbine tripped/perform manual turbine trip▶ (Close main steam lead drains, bypass header drains, stop valve drain)▶ Verify emergency (T) busses powered<ul style="list-style-type: none">■ Reports T21A faulted■ Directs/performs trip AB DG.▶ Verify DC buses powered

		<p>Criteria for E-0 exit:</p> <ul style="list-style-type: none"> ▶ Verify SI not occurred nor required <ul style="list-style-type: none"> ■ SI status light out ■ CCP ELO lights out ■ PRZ P > 1908 ■ Containment P < 1.1 ■ No steamline DP > 100 ■ No low steamline P < 600 <p>FR-H.1 - Loss of Heat Sink - Transition</p> <ul style="list-style-type: none"> ▶ E-0 exit ▶ No AFW / red path - heat sink OR (not expected, but may occur if manual turbine trip is delayed) ▶ If SI has occurred, continue in E-0 until step 18 AFW flow check requires transition to FR-H.1 when no AFW flow exists. (E-0 steps verifying auto SI actions will first be performed.)
	NOTE	Delay AFW restoration until bleed and feed criteria are met.

	SRO/RO/BOP	FR-H.1 <ul style="list-style-type: none"> ▶ Informs RO/BOP of bleed and feed initiation criteria ▶ Checks SG blowdown isolation ▶ Directs NLO assistance to locally start TDAFP ▶ Requests assistance clearing fault on T21A to restore power to W MSAFP ▶ Directs NLO to establish AFW crosstie from Unit 1 (2-OHP 4025.LS-2) ▶ Stops all RCPs ▶ Transfers steam dump to steam pressure mode <ul style="list-style-type: none"> Place steam pressure controller in manual Match controller output to valve demand Place mode selector in STM PRESSURE Adjust setpoint Place controller in AUTO ▶ Determines whether restoration of feed source from condensate system should be attempted ▶ Follows up on TDAFP status ▶ Requests information relative to MFP availability
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	NOTE	<p>If the crew elects to pursue use of condensate system [parallel to restoration of TDAFP and (MDAFP) crosstie from Unit 1], the following sequence applies:</p> <ul style="list-style-type: none"> ▶ Inform RO/BOP of SI reinitiation criteria ▶ Actuate SI ▶ Reset Phase A ▶ Open control air to containment valves ▶ Reset SI ▶ Stop one SI pump ▶ Select one SG to depressurize ▶ Isolate selected SG <ul style="list-style-type: none"> ■ Close the other 3 MSIVs (and steam to condenser) OR ■ Close the selected MSIV (and steam to atmosphere) ▶ Align condensate system flowpath <ul style="list-style-type: none"> ■ Open feedpump discharge valves (if MFP trips reset) OR ■ Direct NLO to locally open one of the following: <ul style="list-style-type: none"> ◆ MFP discharge bypass valves ◆ SG fill line ◆ MFP discharge valves ▶ Close MFP ELO valves (if MFP tripped) ▶ Direct NLO to de-energize and locally open feedwater isolation valve to selected SG ▶ Direct NLO to locally throttle feedwater regulating valve for selected SG ▶ Depressurizer selected SG until condensate flow is established
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	NOTE (Do not perform until SG WR levels are < 29%)	BOOTH OPERATIONS NECESSARY: To defeat FWI: RPR143; RPR144 to open SG fill line: FWR26
	SRO/RO/BOP	<ul style="list-style-type: none"> ▶ Recognize required conditions to initiate bleed and feed <ul style="list-style-type: none"> ■ 3 SG WR levels < 29% ▶ Establish bleed and feed <ul style="list-style-type: none"> ■ Actuate SI ■ Verify feed path ■ Establish bleed path <ul style="list-style-type: none"> ◆ Open all 3 PRZ PORVs ■ Reset SI ■ Establish control air to containment <ul style="list-style-type: none"> ◆ Reset Phase A ◆ Open isolation valves ▶ Concurrently perform E-0 steps 5-14 (verify SI auto actions)
	NOTE	After bleed and feed initiated, restore TDAFP. (Local Operation Required) <u>OR</u> Align Crosstie from Unit 1 (if directed)
		Booth operations necessary to open TTV: FWR78, FWR79
	SRO/RO/BOP	Directs BOP to establish contact with Unit 1 or TDAFP Monitors FR-H.1 foldout page to determine that no flowrate restrictions exist. Ensures AFW flow is delivered.
	NOTE	Terminate scenario when AFW flow established.
	SRO	Classify event: <u>General Emergency per ECC-21 (1)</u>

Simulation Facility: Cook Nuclear PlantScenario #: Leak Affecting Four-Loop Injection
with SGTRExaminers: Clyde OsterholtzApplicants: Robert Gillespie [RO]RO SurrogateSRO Surrogate

Initial Conditions: The unit is operating at 100% power. Xenon equilibrium. RCS boron concentration is 1155 ppm. Core age is MOL. CD Diesel Generator tagged out. E MAFFP tagged out.

Shift Turnover: Conditions as noted. No evolutions are planned and there is no work in progress which jeopardizes continued operations. C/D tagged out due to lube oil leak; 2 hours into action statement, surveillance requirements have been met.

E MDAFP tagged due to outboard motor bearing repair; 24 hours into action statement

Event No.	Malfunction No.	Event Type*	Event Description
1	RX19A@0%; 60sec ramp	I	The first event is a failure of turbine impulse pressure channel MPC-253. The crew should diagnose the failure by the response of feedwater, T-ref, and rod motion (if in auto). The crew will respond in accordance with 2-OHP 4022.013.016 to trip bistables.
2	RH08@30% Override: ON ann 206 Drops 8 then 7 then 6 Delete malf & ORs when isolated	C	The second event is a pipe failure of the safety injection pumps discharge crosstie header. RWST level will decrease at a rate of 1000 gpm until header isolation valves, IMO-270 and IMO-275, are closed. SI pump compartment sump level alarms alert operators to the area of the break. Upon inspection a verbal report on break location prompts crew to isolate the crosstie header and lockout E RHR pump.
3		R	Operators initiate a power reduction to reduce power to less than 95% within one hour in accordance with the Action requirements of Tech. Spec. 3.5.2.
4	RC23A@50% 5min ramp	M	Following the 5% power reductions a tube leak develops in #21 SG which increases to a 500 gpm tube rupture over the following five minutes. The crew responds in accordance with 2-OHP 4022.002.020 and/or 2-OHP 4022.002.021 to address the excessive RCS/SG tube leakage. Upon determination that leakage exceeds CVCS makeup capacity the crew will perform a manual safety injection if directed. The crew will mitigate the event in accordance with E-0 and E-3.

* (N)ormal,

(R)eactivity,

(I)instrument,

(C)omponent,

(M)ajor


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ES-301

Operator Actions

Form ES-301-4

Scenario No: SGTREvent No: 1Page 2 of 12Event Description: ECCS Leak affecting Four-Loop Injection

Time	Position	Applicant's Actions or Behavior
	RO	<ul style="list-style-type: none"> ▶ Inform SRO of SI pump room sump high level alarm. ▶ Review annunciator response procedure (Panel 24: Drop 6) ▶ Align RHR discharge cross-tie as directed <ul style="list-style-type: none"> ■ Open IMO-314 ■ Open IMO-324 ▶ Close SI pump discharge cross-tie to isolate leak <ul style="list-style-type: none"> ■ Close IMO-270 and IMO-275 ▶ Place E RHR pump C/S in lockout
	SRO NOTE: Report leak location between the SI discharge cross-tie valves.	<ul style="list-style-type: none"> ▶ Acknowledge report of SI pump room sump alarm. ▶ Direct NLO to investigate room for leakage location. ▶ Direct leak isolation in a manner which maintains 4 loop injection capability (from RHR) by ensuring RHR cross-ties opened before SI cross-ties closed. ▶ Direct E RHR pump C/S to be placed in lockout.
	NOTE: Delete leak malfunction when IMO-270 and IMO-275 are both closed	Review 3.5.2.f of Tech Specs. <ul style="list-style-type: none"> ▶ Identify power reduction to less than 3250 MW_{th} within one hour.

Examiner Standards

ES-301		Operator Actions	Form ES-301-4
Scenario No: <u>SGTR</u>		Event No: <u>2</u>	Page <u>3</u> of <u>12</u>
Event Description: <u>Reduce Power</u>			
Time	Position	Applicant's Actions or Behavior	
	SRO	02-OHP 4021.001.003 Review precautions and limitations. Direct BOP to reduce turbine load. Direct RO to borate.	
	BOP	Reduce turbine load using load limiter or operating device.	
	RO	12-OHP 4021.005.001 Review precautions and limitations. Determine required boration by referring to Section 7.0 of the Technical Data Book. Select STOP on makeup C/S and BORATE on mode selector. Set desired batch on the boric acid batch counter. Adjust the boric acid flow controller to desired flow. Select START on the make up control switch When batch counter completes selected batch, return switches to initial lineup.	

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Operator Actions

Form ES-301-4

Scenario No: SGTREvent No: 3Page 4 of 12Event Description: Failure of MPC-253 - Turbine impulse pressure fails low.

Time	Position	Applicant's Actions or Behavior
	RO	02-OHP 4024.211 Review annunciator response procedures. Auctioneered Tavg greater than T-ref. Diagnose MPC-253 instrument malfunction. Control rods in manual.
	SRO	02-OHP 4022.013.016 Verify MPC-253 failed. Verify control rods in manual. Direct AMSAC bypass test switch placed in BYPASS/TEST. Direct steam dump control selector switches placed in OFF. Direct performance of Attachment A. Place reviewed attachment in tripped bistable section of blocked alarm log. Hang caution tags on AMSAC, steam dump; rod control bank selector, and main turbine solenoid trip switches. Review 3.3.2.1 of Technical Specifications.
	BOP	AMSAC bypass test switch in BYPASS/TEST. Steam dump control selector switches in OFF.

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Operator Actions

Form ES-301-4

Scenario No: SGTREvent No: 4Page 5 of 12Event Description: Steam generator tube leak develops into 500 gpm tube rupture.

Time	Position	Applicant's Actions or Behavior
	RO	<p>Identify increased leak rate. Assess whether PRZ leak rate maintained with normal charging system.</p> <ul style="list-style-type: none"> ▶ Increase charging flow by opening QRV-200 and QRV-251 ▶ Assess leak rate by comparing charging/letdown difference and PRZ level drop ▶ Isolate letdown ▶ Start a 2nd charging pump * ▶ Report when 2 charging pumps required to maintain (or cannot maintain) PRZ level <p>Turn steam dump system back on. Perform manual rx trip. Perform manual SI.</p>
	SRO	<p>02-OHP 4022.002.020/02-OHP 4022.002.021 Increase charging flow Reduce letdown flow Start a second charging pump* Check pressurizer level maintained. Direct return of steam dump control selector switches to ON. Direct manual reactor trip and SI initiation.</p>
	BOP	<p>02-OHP 4024.211. Verify SGBD sample isolation 02-OHP 4024.238. Verify SGBD isolation on R-19 high alarm.</p>
		<p>* A second charging pump may not be started if SG tube leak implemented prior to direction in Excessive Reactor Coolant Leakage.</p>

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Operator Actions

Form ES-301-4

Scenario No: SGTREvent No: 4Page 6 of 12Event Description: Steam generator tube leak develops into SGTR rupture.

Time	Position	Applicant's Actions or Behavior
	SRO/RO/BOP	Return steam dump to 02-OHP 4023.E-0 Perform E-0 immediate actions Verify rx trip. Check 250 VDC Busses Energized. Verify Turbine Trip. Verify Power to AC Emergency Buses (T buses). Verify SI is Actuated.
		Direct Actions of E-0
		Verify immediate actions have been performed. Verify Main Steamline Isolation Not Required. Verify AFW Pumps Running. Verify ECCS Pumps Running.
		Recognize one RHR pump in pull-to-lockout for pump protection. (Do not start unless it will inject).
		Check CCW pumps. Check ESW pumps. Verify System Alignments - Recognize reason for abnormal ECCS alignment. Verify FW Isolation. Verify Containment Phase A. Direct PACHMS in Service. Check NESW in Service. Verify Containment Spray not required.

Examiner Standards

ES-301

Operator Actions

Form ES-301-4

Scenario No: SGTREvent No: 4Page 7 of 12Event Description: Response to steam generator tube rupture.

Time	Position	Applicant's Actions or Behavior
		<p>E-0 continued. Verify ECCS flow. Verify AFW flow. Check RCS temperature stable at or trending to 547°F Place steam dump system in steam pressure mode. Verify AC emergency busses energized by offsite power. Reset SI Stop unloaded DGs. (AB and CD) Check if RCPs should be stopped - no Check PZR PORVs and spray valves - closed Check secondary pressure boundaries intact. E-3 Transition criteria:</p> <ul style="list-style-type: none"> ▶ SG blowdown abnormal (R19/R24) ▶ SG relief valve radiation abnormal ▶ Gland steam vent radiation abnormal (2805) ▶ Steam jet air ejector radiation abnormal (2905) ▶ (FF decrease with constant level at power in a SG) ▶ (Level increase at power in a SG) ▶ (Abnormal level increase post trip)
		<p>NOTE: The SG relief valves RMS will probably not indicate upward trend. Other RMS indications will be trending up and in either alert or high alarm.</p>

Examiner Standards

ES-301

Operator Actions

Form ES-301-4

Scenario No: SGTREvent No: 4Page 8 of 12Event Description: SGTR Continued.

Time	Position	Applicant's Actions or Behavior
	SRO/RO/BOP	<p>E-3</p> <p>Check if RCPs should be stopped</p> <ul style="list-style-type: none">▶ RCS P < 1250 psig/CCP or SIP running <p>Should determine that RCPs remain running</p> <p>Identify ruptured SG (21)</p> <p>Isolate steam flow from SG 21</p> <ul style="list-style-type: none">▶ Adjust 21 SG PORV to 1040 psig (any have been done earlier)▶ Monitor 21 SG PORV operations: closed if SG 21 P < 1040; open if pressure has reached 1040.▶ Trip closed 21 SG MSIV▶ Close SG stop valve drain valve▶ Close SGSV dump valves▶ Direct NLO to close local blowdown isolation valve (BD-103-1) <p>When 21 SG NR level >6%, isolate AFW to 21 SG</p> <p>Check PRZ PORVs for proper operation available</p> <p>Maintain AFW flow (to intact SGs) to meet heat sink requirements and control level</p>

Establish control air to containment

Reset Phase A

Open C.A. containment isolation valve,
Transfer condenser steam dump to steam
pressure mode.

Stop RHR pumps

Check ready to begin RCS cooldown

- ▶ Ruptured SG isolated from intact
SGs

- ▶ SG 21 pressure > 315 psig

Determine cooldown target temperature (496°)

Initiate RCS cooldown

- ▶ Increase demand on steam
pressure controller

- ▶ Monitor steam flow to ensure it
remains below 1.47 E6 PPH on
each loop to avoid possible
steamline isolation

- ▶ Block low steamline pressure SI
(keeps MSIV dump valves closed
on SG 21) when RCS
Temperature < 541°F (P-12)

- ▶ Bypass P-12 interlock when RCS
temperature below 541°F to
reopen 3 steam dump valves

- ▶ Fully open 3 steam dump valves

- ▶ Stop cooldown when core exit
temperature reaches 496°

- Adjust steam pressure
controller to maintain
current steam pressure in
AUTO.

Check SG 21 pressure stable (may have slight decrease attributable to cooldown)

Check RCS subcooling $> 50^{\circ}$

Depressurize RCS

- ▶ Open both spray valves fully.
- ▶ Close spray valves when any of the following reached.
 - $\text{RCS } P \leq \text{SG 21 } P$ and
 $\text{PRZ} < 74\%$
OR
 - $\text{PRZ} > 76\%$
OR
 - $\text{Subcooling} < 30^{\circ}$

Check for ECCS flow termination (all criteria must be met)

- ▶ Subcooling > 30°
- ▶ Heat sink (flow or level)
- ▶ RCS pressure - stable or increasing
- ▶ PRZ level > 4%

Stop both SI pumps

Stop one CCP

Reset and open CCP ELO valves

Isolate BIT

Establish minimum charging

- ▶ Close QRV-200
- ▶ Open charging isolation valves
- ▶ Adjust seal injection flow

Control charging flow to maintain PRZ level

Verify ECCS flow - not required

- ▶ PRZ level > 4%
- ▶ Subcooling > 30°

Establish letdown

- ▶ Increase charging flow to cool regenerative hx
- ▶ Reset CCW cooling to letdown hx (0 demand on CRV-470) and place controller in AUTO
- ▶ Open letdown containment isolation valves (QCR-300/301)
- ▶ Open letdown isolation valves (QVR-111/112)
- ▶ Full open on QRV-301 (letdown backpressure)
- ▶ Open desired orifice valves (2 - 75 gpm and 1 - 45 gpm available) NOTE: flowrate for full system pressure.
- ▶ Adjust QRV-301 to obtain pressure above saturation and place in AUTO.

		<p>Set blender in AUTO at 2400 ppm Align CCP suction to VCT</p> <ul style="list-style-type: none"> ▶ VCT level > 17% ▶ Open CCP suction valves from VCT ▶ Close CCP suction valves from RWST ▶ Open seal water return valves <p>Control RCS pressure equal to ruptured SG pressure</p> <ul style="list-style-type: none"> ▶ If SG 21 level is increasing, reduce RCS pressure (increase spray +/or decrease charging flow per step 33 table instructions) ▶ If SG 21 level is decreasing, increase RCS pressure (turn on PRZ heaters per Step 33) <p>Stop scenario after students demonstrate ability to control RCS pressure at ruptured SG pressure.</p>
	SRO	Event Classification <u>Alert per ECC-17 (1 or 3)</u>

Examiner Standards

ES-301

Scenario Events

Form ES-301-3

Simulation Facility: Cook Unit 2Scenario #.: SBLOCA/Loss Offsite PowerExaminers: Clyde Osterholtz

SPARE

Applicants: Robert GillespieInitial Conditions: 100% power; MSRs OOSShift Turnover: CD DG OOS to repair lube oil leak; 2 hours into Action Statement, TS
surveillances scheduledEast MDAFP OOS for bearing replacement; 2 hours into Action StatementLoop 3 T_h failed high; bistables trippedMSRs to be returned to service

Event No.	Malfunction No.	Event Type*	Event Description
Preinsert Preinsert Preinsert Preinsert	RX02C(650) APP H3		CD DG OOS E MDAFP OOS Loop 3 T _h failed high Loop 3 RTD Bistables tripping
1		R,N	Power reduction to 95% to return MSRs to service
2	RX17C	I	SG 1 pressure channel MPP-212 fails high, SG PORV MRV-213 opens. Crew takes action to close PORV as directed by 2-OHP 4022.013.012.
3	RC10A	M	SBLOCA begins. Leak size ramps from 10 gpm to 300 gpm over 10 minutes. Crew takes actions to assess leak size and stabilize inventory per 2-OHP 4022.002.020. Crew may direct manual SI. Crew will mitigate using E-0, E-1 and ES-1.2.
4	ED01	C	Reserve power bus loss. AB DG starts and loads emergency bus B. W MDAFP must be started.

* (N)ormal,

(R)eactivity,

(I)nstrument,

(C)omponent,

(M)ajor

C. Osterholtz
CHIEF EXAMINER

ES-301

Operator Actions

Form ES-301-4

Scenario No: SBLOCA/LOPEvent No: 1Page 2 of 12Event Description: Reduce Power

Time	Position	Applicant's Actions or Behavior
	SRO	02-OHP 4021.001.003 Review precautions and limitations which apply for a power reduction to 95% Direct panel operators to commence power reduction. State parameter control and rate expectations Direct RO to place PRZ backup heaters on to force spray flow to equalize PRZ boron concentration with RCS boron concentration.
	RO	Determine required boration (TDB Sections 6.4.7) Combine boration and rod insertion as directed to insert negative reactivity Position rods to maintain AFD within directed variance from target value Ensure boration and/or rod insertion rate supports requested power reduction rate and maintains T_{AVG} T_{REF} relationship specified by US.
	RO/BOP	Reduces turbine load using limiter at a rate which supports requested power reduction rate and maintains T_{AVG} - T_{REF} relationship specified by US.

Examiner Standards



ES-301	Operator Actions	Form ES-301-4
Scenario No: <u>SBLOCA/LOP</u>	Event No: <u>2</u>	Page <u>4</u> of <u>12</u>
Event Description: <u>MPP-212 fails high; SG 1 PORV opens in AUTO. (RX17C at 1200 psig)</u>		
Time	Position	Applicant's Actions or Behavior
	BOP	Acknowledges and reports annunciators for SG 4 steam line pressure low and SG 1 PORV open. Determines that SG 1 PORV is open. Places controller for SG 1 PORV in manual and inserts full closed demand signal Verifies PORV closure
	US	Determines that SG 1 PORV is open. Directs closure of SG 1 PORV 2-OHP 4022.013.012 Consults with another SRO to determine whether bistable tripping can proceed. Directs bistable tripping per Att. A-3. Directs caution tagging PORV controller Review TS 3.3.2.1.

Examiner Standards



ES-301

Operator Actions

Form ES-301-4

Scenario No: SBLOCA/LOPEvent No: 3Page 5 of 12

Event Description: SBLOCA. Begins at 10 gpm and ramps to 300 gpm over 10 minutes. Will require reactor trip and SI.

RC10A : Initial Severity .5% Final Severity 15% Ramp: 10 minutes

Time	Position	Applicant's Actions or Behavior
	RO	Identify RCS leak. Increases charging flow. Ensures CVCS makeup in AUTO. Isolates letdown. Starts second CCP. Maintains CCP suction source. Reports leak size in excess of charging system.
	US	Direct estimate of leak size Implement OHP 4022.002.020 Direct PRZ level maintenance actions Provide conditions which would warrant reactor trip/SI. Directs manual trip and SI

Examiner Standards

ES-301

Operator Actions

Form ES-301-4

Scenario No: SBLOCA/LOPEvent No: 4Page 6 of 12

Event Description: Reserve power lost. Loss of bus power when generator transfers. AB DG starts and loads. W MDAFP must be started

ED01 on ET: Rx trip

Time	Position	Applicant's Actions or Behavior
	SRO/RO/BOP	<p>Performs E-0 immediate actions</p> <ul style="list-style-type: none"> ▶ Verify reactor trip ▶ Verify DC buses powered ▶ Verify turbine/generator trip ▶ Verify AC emergency power (T bus) <ul style="list-style-type: none"> ■ T21A (T21B) energized ■ T21D (T21C) deenergized [Able to reenergize from EP] ▶ Verify SI actuated <p>Monitor AB DG - proper operation Verify main steam line isolation not required Verify AFW pumps running Start W MDAFP Verify ECCS pumps running (B train) Verify CCW pump running (B train) Verify ESW pump running (B train) Verify ESW ICCW/ECCS valve alignment</p> <ul style="list-style-type: none"> ▶ RO checks monitor light panels for B train equipment <p>Verify feedwater isolation Verify containment isolation Phase A Place PACHMS in service</p> <ul style="list-style-type: none"> ▶ Direct chemist ▶ Actuate containment hydrogen sample bypass

Check NESW pump running (B train)

- ▶ Maintain pump stopped if load conservation (BO/W/CTS) has stripped it [ensure DG loading limit of 3500 kw met.)
- ▶ If NESW pump running (no CTS yet), open supply from discharge tunnel close supply from intake tunnel (or ensure Unit 1 supply open)

NOTE: Att. A for
CTS actions

Verify CTS not required (see Att. A for actions)

Verify ECCS flow

- ▶ BIT
- ▶ SI pumps ($P < 1630/1920$)

Verify AFW flow

- ▶ BOP should throttle to maintain heat sink requirements and prevent overcooling

Check RCS temperature stable at no-load

- ▶ Verify steaming controlled isolated
- ▶ Direct Unit 1 to supply aux. steam
- ▶ Control steaming rate to stabilize RCS temperatures

Check DG status

- ▶ Maintain AB DG running
- ▶ Reset plant lighting(11A4)
- ▶ Prioritize power restoration to T21D

Note: Att. B for
Em. Power

Check proper operation/availability of PRZ
PORVs

Diagnose accident

- ▶ Determine that it is not a secondary side break or a SGTR
- ▶ Determine that it is a LOCA inside containment

	<p>NOTE: Transition criteria E-1</p>	<p>E-1 (LOCA) transition criteria</p> <ul style="list-style-type: none"> ▶ Containment radiation - abnormal ▶ Containment pressure - abnormal ▶ Containment sump level - abnormal ▶ Containment lower dewpoint - abnormal <p>Implement E-1 (LOCA) procedure</p> <ul style="list-style-type: none"> ▶ Control AFW flow to: <ul style="list-style-type: none"> ■ Maintain heat sink requirements ■ Maintain SG level service ■ Prevent overcooling
	<p>NOTE: This transition may depend on timing E-1 → ES-1.2 or E-1 → ES-1.1 → ES-1.2 (See Att. C for ES-1.1)</p>	<ul style="list-style-type: none"> ▶ Determine ECCS flow requirements (ES-1.1 SI termination transition criteria) If all criteria met, transition to ES-1.1 If containment pressure ≥ 1.1 psig (ADVERSE values) must be used <ul style="list-style-type: none"> ■ Subcooling - $> 30^{\circ}$ (SUPP) ■ Heat Sink - level [6(22)%] or flow ■ RCS P - not decreasing ■ PRZ level - $> 4\%$ (30%) ▶ Continue in E-1 if any criterion not met ▶ Reset SI ▶ Establish control air to containment <ul style="list-style-type: none"> ■ Reset Phase A ■ Open C.A. containment isolation valves

	NOTE: Continuous action	<p>Check if CTS can be stopped</p> <ul style="list-style-type: none"> ▶ If both, containment pressure is < 1.5 psig and hydrogen is < 4%. ▶ Reset Phase B and CTS signals ▶ Turn off hydrogen igniters (DIS) (done before stop 2nd CTS pump) ▶ Stop CTS pump ▶ Close discharge valves ▶ (Evaluate to determine whether 2nd CTS pump can be stopped based on containment pressure response.) ▶ Return lower containment ventilation to service ▶ Stop RHR pumps [if RCS pressure not decreasing and above 300 (590) psig] ▶ Determine that no faulted SG (blowdown) is in progress ▶ Verify cold leg recirculation capability ▶ Transition to ES-1.2 "Post LOCA cooldown and depressurization" if: <ul style="list-style-type: none"> ■ RCS P > 300 (590) psig <p>ES-1.2</p> <ul style="list-style-type: none"> ▶ Initiate RCS cooldown at a specified rate less than 100°F/hr <ul style="list-style-type: none"> ■ Open SG PORVs ▶ Trip PRZ heaters ▶ Depressurize RCS to refill PRZ to 17% (44%) <ul style="list-style-type: none"> ■ Opens one PRZ PORV to refill PRZ (as required) ▶ If second train of ECCS started, determines if one CCP can be stopped ▶ If only one train of ECCS running, determines if the SI pump can be stopped.
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	NOTE	Terminate the scenario after the cooldown has been established AND after the CCP stop evaluation has been completed (for two ECCS trains running) or after the SI pump stop evaluation has been completed (for one ECCS train.)
	NOTE	<p>Att. A Containment spray verification</p> <ul style="list-style-type: none"> ▶ Use E-0 Att. D if still in E-0 ▶ Use FR-Z.1 if E-0 exited
	SRO/RO/BOP	<ul style="list-style-type: none"> ▶ Verify MSIVs closed ▶ Verify CTS pump running (B train) ▶ Verify CTS valve alignment ▶ Verify containment isolation <ul style="list-style-type: none"> Phase B actuated <ul style="list-style-type: none"> ■ Verify valve closure using PPC ■ Verify containment recirc fan operation (after 10 minute time delayed start) ▶ Direct NLO to stop ice condenser AHUs ▶ Energize hydrogen igniters (DIS) after AHUs reported stopped ▶ Check containment hydrogen concentration after PACHMS in service
		<p>Att. B Emergency Power Supply to T21C/T21D</p> <ul style="list-style-type: none"> ▶ Use E-0 Att. C
	BOP	<p>Lockout D/G output breaker to bus Verify RCP bus cross-tie breaker open Close emergency power breaker</p>

	SRO	<p>Direct start of Train A ECCS equipment if SI reinitiation criteria are not met</p> <ul style="list-style-type: none"> ▶ Subcooling > 30° (SUPP) ▶ PRZ level > 4% (30%) <p>Direct reset of plant lighting transformers in (11D10) and standby (11C8) to repower various chart recorders</p>
		<p>Att. C Transition to ES-1.1</p>
	SRO/RO/BOP	<p>Establish control air to containment</p> <ul style="list-style-type: none"> ▶ Reset Phase A ▶ Open containment C.A. isolation valves ▶ Stop second CCP (if running) ▶ Check RCS pressure - stable or increasing
	Transition	<p>E-1 return if P decreasing</p> <ul style="list-style-type: none"> ▶ Open CCP ELO valves ▶ Isolate BIT ▶ Establish minimum charging flow <ul style="list-style-type: none"> ■ Close QRV-200 ■ Open isolation valves ■ Adjust seal injection ▶ Control charging flow to maintain PRZ level

Examiner Standards



ES-301

Operator Actions

Form ES-301-4

Scenario No: SBLOCA/LOPEvent No: 4Page 12 of 12Event Description: (Continued)

Time	Position	Applicant's Actions or Behavior
		E-1 Continued
	BOP	Restore power to CD bus from EP if directed
	SRO	Direct start of Train A ECCS equipment (when power restored if SI reinitiation criteria not satisfied) 02-OHP 4023-ES-1.2
	SRO	Direct initiation of RCS cooldown at a specified rate less than 100°/HR
	BOP	Begins cooldown using steam dump in steam pressure mode (or SG PORVs if steam line isolation has occurred from Hi-Hi containment pressure)
	SRO	Direct RCS depressurization to refill PRZ [if PRZ level less than 17% (44%)]
	RO	Operates one PRZ PORV to refill PRZ
	SRO	[If second train of ECCS equipment running, determines whether one CCP may be stopped : Step 13] [If only one train of ECCS equipment running, determines that neither the running CCP nor the running SIP may be stopped: Step 14]
	SRO	Classify the event Category <u>Alert (4) or Site Area Emergency (1) per ECC-14</u>

Examiner Standards

ES-301		Administrative Topics Outline	Form ES-301-1
Examinations Level (Circle One):		RO / <u>SRO</u>	
Facility: <u>Cook Plant</u>		Week of Examination: <u>1/8/96</u>	
Examiner's Name (print): _____			
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions	
A.1	Shift Staffing Requirements	Describe the control room staffing requirements (of OPP.5) while performing a plant startup (2-15% power range)	
		Offgoing SS receives phone call that his relief has been in an accident; when must a relief be provided in order to prevent exceeding working hour limitations?	
	Fuel handling and subsequent damage while in transit	Briefly describe the steps required, and equipment used to transfer a used fuel assembly from the SFP to its installed position in the reactor vessel.	
		State the immediate actions required if a used assembly is damaged with accompanying gas release on the SFP side of containment.	
A.2	Failure of a loop Thot instrument	Complete the administrative documents for this failure (blocked alarm log and tag log)	
		Complete an action request ("work request") for this failure.	
A.3	Containment entry after criticality.	What is the power level requirement imposed prior to entering the instrument room when the reactor is critical.	
		What radiological requirements must be met for the above described entry?	
A.4	E-Plan classification responsibility	(Evaluate a post scenario, classification of the event)	
		Describe the responsibilities that you are required to perform (or direct) as SS/SEC.	

Examiner: _____

Chief Examiner: _____

Examiner Standards

INITIAL
SUBMITTALS
OUTLINES AND
EXAMINATIONS

A070

ES-301

Individual Walk-through Test Outline

Form ES-301-2

Examination Level (Circle One):

RO / SRO(I) / SRO(U)

Facility: _____

Week of Examination: _____

Examiner's Name (print): _____

#	System/JPM	Safety Function	K/A	(importance)	Description
1	NIS	IX	a. 015000	K4.05(4.5)	With 1 channel failed, why would slow adjustment be important?
	RO-O-N084		b. 015000	A3.01(3.8)	For each meter on drawers A & B describe any changes when gain is adjusted.
2	CVCS	II	a. 011000	A2.07(3.3)	What effect if CS-369/370 not repositioned?
	RO-O-N072		b. 011000	A3.03(3.3)	What effect if charging header has 5 gpm leak by.
3	Steam Gen.	IV	a. 035010	K6.01(3.6)	Effect of water accumulation on top of MSIV piston.
	STP.019F SG stop valve oper. test		b. 035010	K6.01(3.6)	Effect of loss of control air on MSIV.
4	SGTR	III (F)	a. 000038	EK3.06(4.5)	Why aux spray prioritized last by depressurization sequence.
	Depr to refill p2r		b. 000038	EK1.01(3.4)	Calc. subcooling, given steam tables & data.
5	CVCS	I (F)	a. 004000	K1.16(3.5)	Show flowpath from BAST to CCP suction on flow prints.
	Perf. boration of RCS		b. 004000	A4.04(3.6)	Calc. boron change for boration evolution.
6	CCW	X	a. 008030	K4.02(2.6)	Provide 5 valves that reposition directly from and SI.
	Determine CCW inleak source		b. 008030	K1.04(3.3)	Provide 3 sources of inleakage during LOCA.
7	Loss on and offsite power	VII (F)	a. 000055	EK3.02(4.6)	Why check while LS lts before energizing 4KV bus?
	RO-O-E103		b. 000055	EK3.02(4.6)	Why trip EDG if it can't be paralleled to vital bus?

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11

11

ES-301

Individual Walk-through Test Outline

Form ES-301-2

Examination Level (Circle One):

RO / SRO(I) / SRO(U)

Facility: _____

Week of Examination: _____

Examiner's Name (print): _____

#	System/JPM	Safety Function	K/A	(Importance)	Description
8	Inst. Air	VIII	a. 000065	EA2.08(3.3)	What effect on all 3 NRVs with loss containment air.
	AE-O-E244		b. 000065	EK2.02(2.1)	Why valve inoperable with hose connected?
9	ESW	V	a. 000054	EK3.04(4.6)	Describe how feed established to S/Gs to regain heat sinks.
	AE-O-E250		b. 000054	EA1.03(3.7)	What provides bearing cooling post TDAFWP start?
10	CVCS	II	a. 000022	SG.03(3.4)	How effect operability of opposite unit?
	AE-O-E217		b. 000022	SG.04(3.5)	How would this flow arrangement be affected by SI.

Examiner: _____

Chief Examiner: _____

Examiner Standards

Scenario Outline

ES-301	Scenario Events	Form ES-301-3	
Simulation Facility: <u>Cook Unit 2</u>			
Scenario #: <u>SBLOCA/Loss Offsite Power</u>			
Examiners: _____		Applicants: _____	
_____		_____	
_____		_____	
Initial Conditions: <u>100% power MSRs OOS</u>			

Turnover: <u>CD DG OOS to repair lube oil leak; 2 hours into action statement, TS surv.</u>			
<u>scheduled E MDAFP OOS for bearing replacement; 2 hours into action statement MSRs to be</u>			
<u>returned to service</u>			
Event No.	Malfunction No.	Event Type*	Event Description
1		R,N	Power reduction to 95% to return MSRs to service
2	RX17C	I	SG 1 press channel MPP-212 fails high. SG PORV MRV-213 opens. Crew takes actions to close PORV as directed by 2-OHP 4022.013.012.
3	RC10A	M	SBLOCA begins. Leak size ramps from 10 gpm to 300 gpm over 10 minutes. Crew takes actions to assess leak size and stabilize inventory per 2-OHP 4022.002.020. Crew may direct manual SI. Crew will mitigate using E-0, E-1 and ES-1.2.
4	ED01	C	Reserve power bus loss. AB DG starts and loads emergency bus B. W ESW, W CCW, W MDAFP and W NESW pumps must be restarted.

* (N)ormal, (R)eactivity, (I)instrument, (C)omponent, (M)ajor

Examiner: _____

Chief Examiner: _____

Examiner Standards

ES-301

Scenario Events

Form ES-301-3

Simulation Facility: Cook Unit 2Scenario #.: ATWS/Faulted SG

Examiners: _____

Applicants: _____

Initial Conditions: 80% power, MOCTurnover: 2CD Diesel Generator on clearance

Event No.	Malfunction No.	Event Type*	Event Description
1	FW12B	C	Lube oil in the West MFW pump.
2	NA	R	Power reduction to approximately 60% to remove W MW pump from service.
3	CV13A	C	Trip of the east charging pump.
4	NA	N	Reestablish charging and letdown.
5	RX04C	I	Failure of NPP-153, Pzr pressure channel (TS 3.03 implications)
6	FW15B	C	FRV-220 (#22 SG FRV) fails open.
7	MS02D	M	Steamline break inside containment #22 S/G.
8	RP03A RP03B	M	ATWS (the crew will address the ATWS with a steamline break in progress.

* (N)ormal,

(R)eactivity,

(I)instrument,

(C)omponent,

(M)ajor

Examiner: _____

Chief Examiner: _____

Examiner Standards

ES-301

Scenario Events

Form ES-301-3

Simulation Facility: Cook Unit 2Scenario #: SGTR

Examiners: _____

Applicants: _____

Initial Conditions: The unit is operating at 100% power. Xenon equilibrium.
RCS boron concentration is 1155 ppm. Core age is MOL.

Turnover: Conditions as note. No evolutions are planned and there is no work in
progress which jeopardizes continued operations

Event No.	Malfunction No.	Event Type*	Event Description
1	RH08	C	The first event is a pipe failure of the safety injection pumps discharge crosstie header. RWST level will decrease at a rate of 1000 gpm until header isolation valves, IMO-270 and IMO-275, are closed. SI pump compartment sump level alarms alert operators to the area of the break. Upon inspection a verbal report on break location prompts crew to isolate the crosstie header.
2		R	Operators initiate a power reduction to reduce power to less than 95% within one hour in accordance with the action requirements of Tech Spec 3.5.2.
3	RX19A	I	The third event is a failure of turbine impulse pressure channel MPC-253. The crew should diagnose the failure by the response of feedwater, T-ref, and rod motion (if in auto). The crew will respond in accordance with 2-OHP 4022.013.016 to trip bistables.
4	RC23A	M	A tube leak develops in #21 SG which increases to a 500 gpm tube rupture over the following five minutes. The crew responds in accordance with 2-OHP 4022.002.020 and/or 2-OHP 4022.002.021 to address the excessive RCS/SG tube leakage. Upon determination that leakage exceeds CVCS makeup capacity the crew will perform a manual reactor trip and may perform a manual safety injection if directed. The crew will mitigate the event in accordance with E-0, E-3, and ES-3.1.

* (N)ormal,
Examiner: _____

(R)eachivity,

(I)instrument,

(C)omponent,

(M)ajor

ES-301

Scenario Events

Form ES-301-3

Simulation Facility: Cook Unit 2Scenario #.: Loss of Heat SinkExaminers: _____

_____Applicants: _____

_____Initial Conditions: 100% power MSRs OOSTDAFP speed governor set incorrectly - overspeed trip resultsTurnover: CD DG OOS to repair lube oil leak; 2 hours into action statement, TS surv.
scheduled E MDAFP OOS for bearing replacement Loop 3 T_H failed - bistables tripped

Event No.	Malfunction No.	Event Type*	Event Description
	MS03B	C	Small steam leak on #2 steam lead. Simulate to be on supply pipe to TDAFP. Report leak location downstream of MCM-221. Crew should isolate MCM-221 and declare TDAFP Inoperable. Report E MDAFP repair duration of 10 hour. Crew should begin T.S shutdown. (3.7.1.2 and 3.0.5)
		R;N	Crew performs power decrease.
	RX04A	I	Controlling PRZ P. channel fails high. RO closes spray valves. Crew actions directed by OHP 4022.013.009.
	RP01A RP01B TC03 (Auto reactor and turbine trip failure)	M	Loss of feedwater "ATWS" with failure of auto main turbine trip and AFW. Emergency bus B (T21A) faulted.
	FW05A FW05B (MFPs trip)		Crew directs manual reactor trip and turbine trip. Crew directs trip of AB DG.
	ED24 (Loss of TDAFP power supply)		Crew directs restoration of feedwater to SGs.

ES-301

Scenario Events

Form ES-301-3

Simulation Facility: Cook Unit 2Scenario #.: Loss of Heat SinkExaminers: _____

_____Applicants: _____

_____Initial Conditions: 100% power MSRs OOSTDAFP speed governor set incorrectly - overspeed trip resultsTurnover: CD DG OOS to repair lube oil leak; 2 hours into action statement, TS surv.
scheduled E MDAFP OOS for bearing replacement Loop 3 T₁₁ failed - bistables tripped

Event No.	Malfunction No.	Event Type*	Event Description
	ED05E (T21A fault)		Crew will mitigate using E-0 and FR-H.1.

* (N)ormal,

(R)eactivity,

(I)instrument,

(C)omponent,

(M)ajor

Examiner: _____

Chief Examiner: _____

Examiner Standards

SRO Written Outline

Knowledgeable and Abilities Record Form
PLANT - WIDE GENERIC RESPONSIBILITIES
PWR - Senior Reactor Operator

Plant Wide Generic - 17%

Q#	System #	K/A #	Rating	K/A Topic
01	294001	K1.01	3.7	Knowledge of how to conduct and verify valve lineups
02	294001	K1.02	4.1	Knowledge of tagging and clearance procedures
03	294001	K1.02	4.1	Knowledge of tagging and clearance procedures
04	294001	K1.07	3.7	Knowledge of safety procedures related to electrical equipment
05	294001	K1.07	3.7	Knowledge of safety procedures related to electrical equipment
06	294001	K1.14	3.6	Knowledge of safety procedures related to confined space
07	294001	A1.15	3.8	Knowledge of safety procedures related to hydrogen
08	294001	A1.03	3.4	Ability to locate/use procedures related to shift staffing
09	294001	A1.04	3.2	Ability to operate plant phone, paging system, and 2-way radio
10	294001	A1.06	3.4	Ability to maintain accurate, clear, concise logs, etc.
11	294001	A1.09	3.9	Ability to coordinate inside control room
12	294001	A1.10	3.9	Ability to coordinate personnel outside control room
13	294001	A1.13	4.1	Ability to locate switches etc. and determine lineups
14	294001	A1.14	2.9	Ability to maintain pri/sec chemistry

Knowledgeable and Abilities Record Form
PLANT - WIDE GENERIC RESPONSIBILITIES
PWR - Senior Reactor Operator

Q#	System #	K/A #	Rating	K/A Topic
15	294001	A1.15	3.4	Ability to use plant computer and evaluate
16	294001	A1.16	4.4	Ability to take actions as SEC
17	294001	A1.17	4.4	Ability to take actions as SEC

Knowledgeable and Abilities Record Form
PLANT SYSTEMS
PWR - Senior Reactor Operator

Group I Plant Systems - 19%

001	Control Rod Drive System	025	Ice Condenser System
003	Reactor Coolant Pump System	056	Condensate System
004	Chemical and Volume Control System	059	Main Feedwater System
013	Engineered Safety Features Actuation System	061	Auxiliary/Emergency Feedwater System
014	Rod Position Indication System	063	DC Electrical Distribution System
015	Nuclear Instrumentation System	068	Liquid Radwaste System
017	In-Core Temperature Monitor System	071	Waste Gas Disposal System
022	Containment Cooling System	072	Area Radiation Monitoring System

Q#	System #	K/A #	Rating	K/A Topic
18	001000	A2.03	4.2	Effect of stuck or misaligned rod
19	003000	K3.02	3.8	Knowledge of loss of RCPs on SGs
20	003000	K1.08	3.0	Knowledge of cause effect: containment isolation
21	004000	SG.05	3.8	Knowledge of LCOs and safety limits
22	004010	A1.05	3.2	Ability to predict/monitor changes: VCT level
23	013000	K4.01	4.3	Knowledge of SIS reset
24	013000	A4.01	4.8	Ability ESFAS - equipment fails to actuate
25	014000	A1.02	3.6	Ability to predict impact/monitor control rod position indication on control room panels
26	015000	K4.07	3.8	Knowledge of dsn. or interlocks: permissives
27	015000	A3.02	3.9	Ability to predict impacts: NIS annunciator and alarm signals

Knowledgeable and Abilities Record Form
 PLANT SYSTEMS
 PWR - Senior Reactor Operator

Q#	System #	K/A #	Rating	K/A Topic
28	017000	K4.02	3.6	Knowledge of dsn. or interlocks: sensing and determining hot spots
29	025000	A4.02	2.5	Containment ventilation fans
30	026000	A4.04	3.5	Containment Spray Reset switches
31	059000	K4.19	3.4	Automatic isolation of the MFW
32	061000	K4.04	3.4	Prevention of AFW runout by limiting AFW flow
33	061000	K2.01	3.1	AFW system bus power supplies to MOVs
34	063000	K2.01	3.1	Knowledge of power supplies: major DC loads
35	068000	A4.03	3.8	Stoppage of release if limits exceeded
36	071000	K5.04	3.1	Relationship of H ₂ /O ₂ to flammability

Knowledgeable and Abilities Record Form
PLANT SYSTEMS
PWR - Senior Reactor Operator

Group II Plant Systems - 17%

002	Reactor Coolant System	033	Spent Fuel Pool Cooling System
006	Emergency Core Cooling System	034	Fuel Handling Equipment System
010	Pressurizer Pressure Control System	035	Steam Generator System
011	Pressurizer Level Control System	039	Main and Reheat Steam System
012	Reactor Protection System	055	Condenser Air Removal System
016	Non-Nuclear Instrumentation System	062	AC Electrical Distribution System
027	Containment Iodine Removal System	064	Emergency Diesel Generator System
028	Hydrogen Recombiner and Purge Control System	073	Process Radiation Monitoring System
029	Containment Purge System	075	Circulating Water System
		079	Station Air System
		086	Fire Protection System
		103	Containment System

Q#	System #	K/A #	Rating	K/A Topic
37	002000	K1.07	3.7	Reactor vessel level indicating System
38	006000	K4.06	4.2	Cross connection of HPI/LPI/SIP
39	006000	A3.03	4.2	Ability to monitor: ESFAS valves
40	010000	A2.03	3.3	A. spray nozzle ΔT
41	011000	K1.02	3.8	Cause-effect between pzs level control and RCS
42	012000	K6.02	3.1	Performance and design attributes of RPS: Redundant channels
43	012000	A3.05	3.7	Ability to monitor: single and multiple channel indicators
44	033000	SG.07	2.6	Knowledge of purpose and function of major system component and controls
45	035000	A4.06	4.6	S/G isolation on steam leak or tube rupture/leak
46	039000	K4.08	3.4	Interlocks on MSIVs and bypass valves

Knowledgeable and Abilities Record Form
PLANT SYSTEMS
PWR - Senior Reactor Operator

Q#	System #	K/A #	Rating	K/A Topic
47	062000	A2.16	2.9	Ability to predict: degraded system voltage
48	062000	K4.03	3.1	Interlocks between automatic bus trans/and breakers
49	064000	K4.10	4.0	Automatic load sequencer: blackout
50	073000	SG.07	3.0	Knowledge and purpose of major system controls
51	079000	A3.03	3.2	Ability to monitor: Cross connection with IAS
52	086000	A4.02	3.5	Ability to operate or monitor: fire detection panels
53	103000	K6.02	3.1	Performance/design attributes of RPS: redundant channels

Knowledgeable and Abilities Record Form
 PLANT SYSTEMS
 PWR - Senior Reactor Operator

Group III Plant Systems - 4%

005	Residual Heat Removal System	041	Steam Dump System
007	Pressurizer Relief Tank/Quench Tank System	045	Main Turbine Generator
008	Component Cooling Water System	076	Service Water System

Q#	System #	K/A #	Rating	K/A Topic
54	005000	K2.03	2.8	RCS pressure boundary motor operated valves
55	008000	K3.01	3.5	Knowledge of loss of CCW effect on loads cooled by CCW
56	041020	K3.02	3.9	Loss of SDS affect on RCS
57	078000	K3.02	3.6	Knowledge of loss of air: system having pneu. valves and control

Knowledgeable and Abilities Record Form
EMERGENCY AND ABNORMAL EVOLUTIONS
PWR - Senior Reactor Operator

Group I Emergency and Abnormal Plant Evolutions - 24%

000001 Continuous Rod Withdrawal
000003 Dropped Control Rod
000005 Inoperable/Stuck Control Rod
000011 Large Break LOCA
000015 RCP Motor Malfunction
000024 Emergency Boration
000026 Loss of Component Cooling Water
000029 Anticipated Transient Without Scram
000040 Steam Line Rupture
000051 Loss of Condenser Vacuum

000055 Loss of Offsite and Onsite Power
000057 Loss of Vital AC Electrical Instrument Bus
000059 Accidental Liquid Radioactive Waste Release
000067 Plant Fire On Site
000068 Control Room Evacuation
000069 Loss of Containment Integrity
000074 Inadequate Core Cooling
000076 High Reactor Coolant Activity

Q#	System #	K/A #	Rating	K/A Topic
58	000001	SG.10	4.0	Ability to perform without procedures actions required immediately
59	000003	EK1.11	3.5	Long range affects of core QPT
60	000011	EK3.13	4.2	Basis for hot leg injection/recirculation
61	000011	EK3.12	4.6	Actions contained in EOPs for LOCA
62	000015	EA2.08	3.5	When to secure RCPs on high bearing temperature
63	000024	EA1.02	3.5	Ability to operate and monitor: BA pump
64	000026	EA2.06	3.1	The length of time after CCW loss prior to damage
65	000026	EA2.03	2.9	The valve lineups required to restart CCW after bypass
66	000029	EK3.12	4.7	Actions contained in EOPs for ATWS
67	000029	EK3.12	4.7	Actions contained in EOPs for ATWS

Knowledgeable and Abilities Record Form
EMERGENCY AND ABNORMAL EVOLUTIONS
PWR - Senior Reactor Operator

Q#	System #	K/A #	Rating	K/A Topic
68	000040	EA2.03	4.7	Ability to determine/interpret: difference between overcool and LOCA
69	000040	EK3.04	4.7	Actions contained in EOPs for steamline rupture
70	000040	EK3.02	4.4	ESFAS initiation signals
71	000051	SG.10	2.9	Ability to perform without procedures immediate actions
72	000055	EK3.02	4.6	Actions contained in EOPs for loss of power
73	000055	EA1.07	4.5	Restoration of power from offsite
74	000055	EA2.04	4.1	Instruments and control available with only DC power
75	000057	EA1.05	3.4	Ability to operate and monitor: backup instrument indications
76	000067	EA2.17	4.3	System that may be affected by the fire
77	000068	EK2.01	4.0	Auxiliary SD panel layout
78	000068	EK3.18	4.5	Actions contained in EOP for control room evacuation
79	000068	EA1.01	4.5	Ability to operate: SG atmospheric relief
80	000074	EK3.11	4.4	Basis for guidance in EOPs for ICC
81	000074	SG.11	4.6	Ability to recognize abnormal conditions and entry into EOPs

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

QUESTION: #1

Describe (5) five CCW system valves which reposition in direct response to a safety injection.

ANSWER: #1

CMO-410 (420), CCW Heat Exchanger Outlets (open).
CMO-419 (429), RHR Heat Exchanger CCW Outlets (open).
CRV-470, CVCS Letdown Heat Exchanger CCW Outlet (close).
CRV-485, Boric Acid (waste) Evaporator CCW Supply (close).
CRV-445, Spent Fuel Pit Heat Exchanger CCW Supply (close).
CCR-445 (456 & 457), CCW from Reactor Support Cooler (close).
CCR-460 (462), CCW to Excess Letdown Heat Exchanger (close).

ANY FIVE

REFERENCES: 02-OHP 4022.016.003, Recovery from Inadvertent
Containment Isolation Phase A, Rev. 3
02-OHP 4023.E-0, Reactor Trip or Safety Injection, Rev. 7

K/A NUMBER: 008030 K4.02

K/A IMPORTANCE: SRO 2.6 RO 2.3

TIME: 5 MINUTES

COMMENTS:

9/ilafjpm/gh

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TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

QUESTION: #2

Following a LOCA RCS pressure stabilizes at 300 psig and CCW Surge Tank level is steadily increasing. Name (3) THREE potential sources of CCW in-leakage.

ANSWER: #2

(Any (3) THREE)

RHR Heat Exchangers

RCP Thermal Barrier Heat Exchangers

Sample Heat Exchangers

The Opposite Unit CCW System Cross-tie

CTS Pump Seal Water Heat Exchangers

SI Pump Seal Water Heat Exchangers

REFERENCES: 02-OHP 4022.016.003, CCW In-Leakage, Rev. 4.

K/A NUMBER: 008000 K1.04

K/A IMPORTANCE: SRO 3.3 RO 3.3

TIME: 5 MINUTES

COMMENTS:

RO-O-A001

JPM STUDENT EVALUATION WORKSHEET

TASK TITLE: Determine the Source of CCW In-Leakage

TASK NUMBER: _____ PLANT IMPORTANCE: _____ SRO _____ RO _____

K/A CROSS REFERENCE: 000800 K1.04 K/A IMPORTANCE: SRO 3.3 RO 3.3

EVALUATION SETTING: PLANT _____ SIMULATOR _____ CONTROL ROOM (UNIT _____)

EVALUATION METHOD: PERFORM _____ SIMULATE _____

COMPLETION TIME: _____ (Not to be used as an evaluation standard)

OPERATOR'S NAME: _____ DATE _____

OPERATOR'S STATUS: SRO _____ RO _____ NLO _____ (CIRCLE ONE)

SSN: _____

THE OPERATOR'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JOB PERFORMANCE MEASURE AND DETERMINED TO BE:

(CIRCLE ONE) SATISFACTORY UNSATISFACTORY

COMMENTS:

(If unsatisfactory, reason must be stated.)

EVALUATOR'S SIGNATURE: _____ DATE _____

1/ilafjpm/gh

INITIAL CONDITIONS

- (Any) power; equilibrium xenon; T_{avg} and T_{ref} are matched.
- RCS boron concentration is 671 ppm.
- A high radiation alarm has been received on R-17A (or B).

INITIATING CUE

- You are the RO.
- The US directs you to DETERMINE THE SOURCE OF CCW IN-LEAKAGE.
- You are to perform actions necessary to confirm that diagnosis.

TERMINATING CUE

- The source of CCW in-leakage has been determined.



TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

QUESTIONS

Q.1

Describe (5) five CCW system valves which reposition in direct response to a safety injection.

A.1

CMO-410 (420), CCW Heat Exchanger Outlets (open).
CMO-419 (429), RHR Heat Exchanger CCW Outlets (open).
CRV-470, CVCS Letdown Heat Exchanger CCW Outlet (close).
CRV-485, Boric Acid (waste) Evaporator CCW Supply (close).
CRV-445, Spent Fuel Pit Heat Exchanger CCW Supply (close).
CCR-445 (456 & 457), CCW from Reactor Support Cooler (close).
CCR-460 (462), CCW to Excess Letdown Heat Exchanger (close).

ANY FIVE

*Student Answer: S/U

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001

QUESTIONS

Q.2

Following a LOCA RCS pressure stabilizes at 300 psig and CCW Surge Tank level is steadily increasing. Name (3) THREE potential sources of CCW in-leakage.

A.2

(Any (3) THREE)

RHR Heat Exchangers
RCP Thermal Barrier Heat Exchangers
Sample Heat Exchangers
The Opposite Unit CCW System Cross-tie
CTS Pump Seal Water Heat Exchangers
SI Pump Seal Water Heat Exchangers

*Student Answer: S/U

Circle Satisfactory (S) or Unsatisfactory (U)

*Only incomplete or unsatisfactory answers need to be recorded.

TITLE: Determine the Source of CCW In-Leakage

RO-O-A001-HO-2

QUESTION: #1

Describe (5) five CCW system valves which reposition in direct response to a safety injection.

1/ilafjpm/gh

Page 1 of 2
Revision 0

TITLE: Determine the Source of CCW In-Leakage

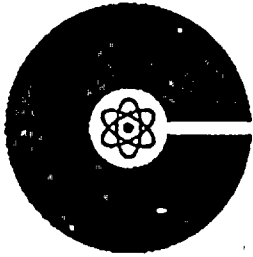
RO-O-A001-HO-2

QUESTION: #2

Following a LOCA RCS pressure stabilizes at 300 psig and CCW Surge Tank level is steadily increasing. Name (3) THREE potential sources of CCW in-leakage.

2/ilafjpm/gh

Page 2 of 2
Revision 0



COOK NUCLEAR PLANT TRAINING CENTER

Bridgman, Michigan

RO-O-E102

TITLE	Restore Power to AC Emergency Buses
PROGRAM	Licensed Operator Replacement Training

REVISION	1
TIME	25 Minutes

SCOPE OF REVISION:

Revision 1: Minor revision.

- ▶ Updated References.
- ▶ Changed sequential step designators (S to S+).
- ▶ Step six is no longer a critical step.
- ▶ Changed steps 22 and 23 to include the Diesel Generator output breakers being placed in lockout as a critical task. Without the output breakers being placed in lockout, the EP feeder breakers will close but will automatically trip open from the load shed signal that hasn't had time to clear.
- ▶ Marginal markings used.

DATE

T-94-00890

DEVELOPING INSTRUCTOR(S)

Randy Dubs
Randy Dubs

12/1/94

REVIEWED BY

M. Davidson

12/2/94

APPROVED BY

M. Davidson

12-5-94

REFERENCES

2-OHP 4023.E-0	Rev. 6, CS-2	Reactor Trip or Safety Injection
2-OHP 4023.ECA-0.0	Rev. 7, CS-3	Loss of All AC Power
2-OHP 4030.STP.027AB	Rev. 6, CS-10	AB Diesel Generator Operability Test (Train B)
2-OHP 4030.STP.027CD	Rev. 7, CS-10	CD Diesel Generator Operability Test (Train A)
2-OHP 4024.219	Rev. 5	Annunciator #219 Response, Station Auxiliary AB
2-OHP 4024.220	Rev. 5	Annunciator #220 Response, Station Auxiliary CD
2-OHP 4023.SUP.002	Rev. 0, CS-1	Supplement #2, Restoration of Reserve Feed to 4KV Buses

ERG Background, E-0, ECA-0.0

TRAINING AIDS/TOOLS/EQUIPMENT

None (for simulator)

SPECIAL SAFETY CONSIDERATIONS

All JPMs conducted in-plant are to be simulated only.

ATTACHMENTS

Attachment 1	JPM Student Evaluation Worksheet
Attachment 2	Question/Answer Summary Sheet

STUDENT HANDOUTS

RO-O-E102-HO-1	Initial Conditions and Initiating and Terminating Cues
RO-O-E102-HO-2	Student Questions

TASK STANDARD

Electrical Power is restored to the safeguards buses per the directions given in ECA-0.0, Steps 5 and 6.

SIMULATOR SETUP

1. Reset to any steady state IC.
2. Run CAE! 2ABTAGOUT
3. Place DG2AB Output Breaker control switches in lockout.
4. Hang Red Tags for diesel clearance
 - ◆ Stop/Run Switch
 - ◆ HEA (Tripped)
 - ◆ DG Output Breakers (Lockout)
 - ◆ Fuel Oil Transfer Pumps (Stop)
5. Insert Malfunctions
 - ◆ EG10B DG2CD Fail to Start
 - ◆ ED26 Loss of 765KV DUMONT LINE
 - ◆ ED01 Loss of 345KV Bus 1
6. Trip the Main Turbine
7. Perform/Verify Actions of ECA-0.0 up to Step 5, including OSO.093 actions.
8. Reset DG2AB and DG2CD Trip Targets
9. Acknowledge alarms and Freeze the Simulator until ready to begin.

NOTE: CAE! RO-O-E102 will perform setup items 2, 5.

This path starts with DG2AB tagged out for maintenance with its output breaker control switches in "pull-to-lock" and its breaker racked out. The unit trips due to a loss of 765 and 345KV transmission network. The 2CD diesel fails to start on the loss of power. The success path for this JPM will require the operator to manually strip 4KV (Train B) loads and restore power to the T-Buses from Emergency Power.

DIRECTIONS

When I tell you to begin you are to RESTORE POWER TO SAFEGUARDS BUSES. You may use any approved reference materials normally available in the control room. You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

*(I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task.)

*Read only if task is simulated.

INITIAL CONDITIONS

A reactor/turbine/generator trip has occurred due to electrical system degradation. The US has transitioned to ECA-0.0 from Step 4 of E-0. The first 4 steps of ECA-0.0 are completed. Additionally, no attempt(s) to restore power were made while in E-0.

INITIATING CUE

You are an Extra RO from Unit 1. The US directs you to restore power to both the Train 'A' and Train 'B' safeguards buses in accordance with Steps 5 and 6 of ECA-0.0.

TERMINATING CUE

Electrical power has been restored to the appropriate safeguards buses.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD						
1.	Obtain copy of procedure ECA-0.0.	Copy of procedure located and opened to step 5.						
<u>COMMENTS:</u> This procedure (ECA-0.0) allows the candidate to start with either Train (A & B buses or C&D buses). This JPM is written assuming that assessment and restoration will start with 'B' Train (A&B buses) and then proceed to 'A' Train (C&D buses). Possible additional path options are: Step 1 is always first <table><tbody><tr><td>a)</td><td>Steps 2 - 6 Steps 13 - 20 Steps 7 - 11 Steps 22, 23 Step 12</td><td>b)</td><td>Steps 13 - 20 Step 7 Step 8 (21) Steps 22, 23 Steps 2 - 6 Steps 9, 10 Steps 11, 12</td><td>c)</td><td>Steps 5, 6 Steps 2 - 4 Steps 13 - 14 Step 7 Steps 15 - 21 Steps 9, 10 Step 11 Steps 22, 23 Step 12</td></tr></tbody></table>			a)	Steps 2 - 6 Steps 13 - 20 Steps 7 - 11 Steps 22, 23 Step 12	b)	Steps 13 - 20 Step 7 Step 8 (21) Steps 22, 23 Steps 2 - 6 Steps 9, 10 Steps 11, 12	c)	Steps 5, 6 Steps 2 - 4 Steps 13 - 14 Step 7 Steps 15 - 21 Steps 9, 10 Step 11 Steps 22, 23 Step 12
a)	Steps 2 - 6 Steps 13 - 20 Steps 7 - 11 Steps 22, 23 Step 12	b)	Steps 13 - 20 Step 7 Step 8 (21) Steps 22, 23 Steps 2 - 6 Steps 9, 10 Steps 11, 12	c)	Steps 5, 6 Steps 2 - 4 Steps 13 - 14 Step 7 Steps 15 - 21 Steps 9, 10 Step 11 Steps 22, 23 Step 12			

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>2. RESPONSE:</p> <p>As each component is checked,</p> <p>STATE:</p> <p>The white light is NOT LIT.</p> <p>NOTE: PRZ heaters may be checked at 4KV feeder breaker or individual heater bank breakers.</p>	<p>Verifies Train B load shed relays have actuated. (Step 5.a)</p>	<p>Checks white "Load Shed" lights NOT LIT for Train B:</p> <ul style="list-style-type: none">◆ PRZ Heaters◆ West MDAFW Pump◆ West CCP◆ West RHR Pump◆ South SI Pump◆ West CTS Pump◆ West CCW Pump
<p><u>COMMENTS:</u></p>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*S+3. RESPONSE:</p> <p>As each control switch is taken to the trip/lockout position,</p> <p>STATE:</p> <p>Green light is LIT, Red light is out and switch is in pull to lock position (as applicable.)</p> <p>NOTE: PRZ heaters may be tripped at 4KV feeder breaker or individual heater bank breakers.</p>	<p>Trips/locks out 4KV Loads. (Step 5.a RNO)</p>	<p>◆ PRZ Heater Breaker(s) opened.</p> <p>◆ 4KV Pump Breakers placed in pull to lock:</p> <ul style="list-style-type: none"> ▶ West MDAFW Pump ▶ West CCP ▶ West RHR Pump ▶ South SI Pump ▶ West CTS Pump ▶ West CCW Pump <hr/> <p><u>INFORMATION ONLY</u></p> <p>Verifies breakers open by observing green position light LIT at control switch.</p>
<p><u>COMMENTS:</u></p> <p>The critical aspect of this step is that the listed breakers are tripped/placed in lockout. The sequential aspect is that this action is completed before reenergizing T21A.</p>		



CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4. RESPONSE: As breakers are checked, STATE: The Green light is LIT.	Verifies RCP Bus Tie Breakers are open. (Step 5.b)	Checks green breaker open lights LIT for: ♦ T21A9 ♦ T21B1
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
5. RESPONSE: The green light is LIT OR Field Volts/Amps indicate zero.	Checks if DG2AB is NOT running. (Step 5.c)	Checks if DG2AB is NOT running by observing: Green STOP light LIT at STOP/RUN switch. Red RUN light off at STOP/RUN switch. OR Field Volts/Amps meters.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6: RESPONSE: HEA has orange target OR Drop 51 is LIT.	Checks DG2AB HEA reset. (Step 5.d)	Checks differential relay (HEA) and determines orange target indicates HEA is tripped OR Checks annunciator Panel 219, Drop 51 is LIT.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
7. RESPONSE: EP: ♦ Red lights are LIT. ♦ Panel 221, Drop 71 NOT LIT. ♦ Voltmeter(s) indicate 118 volts.	Determine if EP is available for powering the T-Buses. (Step 5.d RNO)	Checks availability of EP by: ♦ Emer. Power to Bus T21A(C) & T21B(D) Energized Red lights LIT on mimic bus. ♦ Ann. Panel 221, Drop 71 NOT LIT. ♦ Monitoring Voltage on Diesel Start Voltmeter after selecting an EP position.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
8.	Refers to Attachment D of ECA-0.0. (Step 5.d RNO)	Attachment D is referred to.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*9. RESPONSE:</p> <ul style="list-style-type: none"> ◆ Ø volts indicated. ◆ Control switch is in lockout. ◆ Green light LIT (T21A9). ◆ T21A12 has a red target. ◆ Red light LIT (T21A12). ◆ Bus T21A voltage is 118 volts (if T21A position selected.) 	<p>Bus T21A energized from 69/4KV (EP) supply. (Att. D, Step 1)</p>	<ul style="list-style-type: none"> ◆ Monitors T21A voltage on RUN voltmeter. ◆ Verifies T21A11 control switch in lockout. ◆ Verifies ACB T21A9 open by green position light LIT. * ◆ Closes T21A12 <div data-bbox="1020 730 1609 936"> <p><u>INFORMATION ONLY</u></p> <ul style="list-style-type: none"> ◆ Verifies T21A12 closed by red position light LIT and/or monitoring Bus T21A voltage. </div>
<p><u>COMMENTS:</u></p> <p>NOTE: The only critical standard associated with this step is that T21A12 is closed.</p>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*10. RESPONSE:</p> <ul style="list-style-type: none"> ◆ Ø volts indicated. ◆ Control switch is in lockout. ◆ Green light LIT (T21B1). ◆ T21B2 has a red target. ◆ Red light LIT (T21B2). ◆ Bus T21B voltage is 118 volts (if T21B position selected.) 	<p>Bus T21B energized from 69/4KV (EP) supply. (Att. D, Step 2)</p>	<ul style="list-style-type: none"> ◆ Monitors T21B voltage on RUN voltmeter. ◆ Verifies T21B4 control switch in lockout. ◆ Verifies ACB T21B1 open by green position light LIT. * ◆ Closes T21B2. <hr/> <p><u>INFORMATION ONLY</u></p> <ul style="list-style-type: none"> ◆ Verifies T21B2 closed by red position light LIT and/or monitoring Bus T21B voltage.
<p>COMMENTS:</p> <p>NOTE: The only critical standard associated with this step is that T21B2 is closed.</p>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>11. RESPONSE:</p> <p>Unit Supervisor understands that Bus T21A (and T21B) is energized and Step 7 can be implemented.</p> <p>CUE:</p> <p>If required US directs continuance with Train 'A' restoration.</p>	<p>Procedure ECA-0.0 continued at Step 7.</p>	<p>Unit Supervisor informed that power is restored to Bus T21A and that Step 7 of ECA-0.0 can be implemented.</p>
<p>COMMENTS:</p> <p>This step is not required to be performed by procedure flowpath, but may be performed.</p>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>12.</p>	<p>Assistance is requested to return diesel to service. (Step 5.d RNO)</p>	<p>US, PET, or Maintenance notified of desire to return diesel to service.</p>
<p>COMMENTS:</p> <p>NOTE: This step can be performed anytime after Step 6 but should be performed prior to terminating cue.</p>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>13. RESPONSE:</p> <p>As each component is checked,</p> <p>STATE:</p> <p>The white light is LIT.</p> <p>NOTE: PRZ heaters may be checked at 4KV feeder breaker or individual heater bank breakers.</p>	<p>Verifies Train A load shed relays have actuated. (Step 6.a)</p>	<p>Checks white "Load Shed" lights LIT for Train A:</p> <ul style="list-style-type: none">◆ PRZ Heaters◆ East MDAFW Pump◆ East CCP◆ East RHR Pump◆ North SI Pump◆ East CTS Pump◆ East CCW Pump
<p><u>COMMENTS:</u></p>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
14. RESPONSE: As breakers are checked, STATE: The green light is LIT.	Verifies RCP bus tie breakers are open. (Step 6.b)	Checks green breaker open lights LIT for: ♦ T21D12 ♦ T21C1
<u>COMMENTS:</u> 		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
15. RESPONSE: The green light is LIT OR Field volts/amps indicate zero.	Checks if DG2CD is NOT running. (Step 6.c)	Checks if DG2CD is NOT running by observing: ♦ Green STOP light LIT at STOP/RUN switch and Red RUN light NOT LIT. OR ♦ Field volts/amps meters.
<u>COMMENTS:</u> 		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
16. RESPONSE: The HEA is in the Reset position. RESPONSE: Alarm is NOT LIT.	Checks DG2CD HEA reset. (Step 6.d)	Checks DG2CD differential relay (HEA) is in the reset position OR Checks alarm panel 220, Drop 51, DG2CD Differential Operated NOT LIT.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
17. RESPONSE: Incomplete Start annunciator is LIT.	Checks DG2CD incomplete start annunciator NOT LIT. (Step 6.e)	Checks panel 220, drop 41, DG2CD Incomplete Start annunciator LIT.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
18. RESPONSE: Incomplete Start annunciator has cleared.	Resets DG2CD Incomplete Start. (Step 6.e RNO)	Depresses Incomplete Start pushbutton. <u>INFORMATION ONLY:</u> Observes diesel starting by monitoring: ◆ Incomplete Start Annunciator clearing.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
19. RESPONSE: Trips Disabled annunciator is LIT.	Checks DG2CD Trips Disabled annunciator LIT. (Step 6.f)	Checks DG2CD Trips Disabled annunciator, Panel 220, Drop 53, LIT.
<u>COMMENTS:</u>		
NOTE: This must be checked while the diesel is starting per the second NOTE preceding step 5 of ECA-0.0.		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
20. RESPONSE: Green light is LIT. STATE: Incomplete Start annunciator is LIT.	Verifies DG2CD running. (Step 6.g)	Verifies DG2CD not running by observing green light LIT at STOP/RUN switch and Incomplete Start annunciator (Panel 220, Drop 41) LIT.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
21	Refers to Attachment D of ECA-0.0. (Step 6.g RNO)	Attachment D is referred to.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*22. RESPONSE:</p> <ul style="list-style-type: none"> ◆ Ø volts indicated. ◆ Control switch is in lockout. ◆ Green light LIT (T21D12). ◆ T21D1 has a red target. ◆ Red light LIT (T21D1). ◆ Bus T21D voltage is 118 volts (if T21D position selected.) 	<p>Bus T21D energized from 69/4KV (EP) supply. (Att. D, Step 3)</p>	<ul style="list-style-type: none"> ◆ Monitors T21D voltage on RUN voltmeter. * ◆ Places T21D8 control switch in lockout. ◆ Verifies ACB T21D12 open by green position light LIT. * ◆ Closes T21D1. <hr/> <p>INFORMATION ONLY</p> <ul style="list-style-type: none"> ◆ Verifies T21D1 closed by red position light LIT and/or monitoring Bus T21D voltage.

COMMENTS:

NOTE: The only critical standards associated with this step is that T21D8 control switch is placed in lockout and T21D1 is closed.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*23. RESPONSE:</p> <ul style="list-style-type: none"> ◆ ∅ volts indicated. ◆ Control switch is in-lockout. ◆ Green light LIT (T21C1). ◆ T21C2 has a red target. ◆ Red light LIT (T21C2). ◆ Bus T21C voltage is 118 volts (if T21C position selected.) <p>CUE:</p> <p>If required US directs continuance with Train 'B' restoration.</p>	<p>Bus T21C energized from 69/4KV (EP) supply. (Att. D, Step 4)</p>	<ul style="list-style-type: none"> ◆ Monitors T21C voltage on RUN voltmeter. * ◆ Places T21C3 control switch in lockout. ◆ Verifies ACB T21C1 open by green position light LIT. * ◆ Closes T21C2. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">INFORMATION ONLY</p> <ul style="list-style-type: none"> ◆ Verifies T21C2 closed by red position light LIT and/or monitoring Bus T21C voltage. </div>
<p>COMMENTS:</p> <p>NOTE: The only critical standards associated with this step is that T21C3 control switch is placed in lockout and T21C2 is closed.</p>		

TERMINATING CUE

Electrical Power has been restored to the appropriate safeguards buses.

TITLE: Restore Power to AC Emergency Buses

RO-O-E102

QUESTION: #1

ECA-0.0, Step 5.a has you verify load shed white lights LIT for various components, and if not lit, to open the affected breakers. What is the purpose of tripping the 4KV loads?

ANSWER: #1

To prevent overloading the incoming power supply when the bus is reenergized (due to starting currents of loads not tripped) OR to ensure that loads are sequenced on to the bus when power is restored.

REFERENCES: ERG Background ECA-0.0

K/A NUMBER: 056EK3.02

K/A IMPORTANCE: SRO 4.7

RO 4.4

TIME: 5 MINUTES

COMMENTS:

TITLE: Restore Power to AC Emergency Buses

RO-O-E102

QUESTION: #2

The RNO for 5.h) has you trip DGAB if neither DG output breaker can be closed. Why is this necessary?

ANSWER: #2

The diesel is running without any forced cooling (Jacket Water) which could lead to (mechanical) failure of the engine.

REFERENCES: ERG Background ECA-0.0; RO-C-AS10, Emergency Diesel Generator

K/A NUMBER: 056EK3.02

K/A IMPORTANCE: SRO 4.7

RO 4.4

TIME: 5 MINUTES

COMMENTS:



TITLE: Restore Power to AC Emergency Buses

RO-O-E102

QUESTION: #3

ECA-0.0, Step 5.f) has you check DGAB Trip Disabled annunciator lit. Specifically, what conditions are necessary for the Trips Disabled Annunciator to be lit? Assume all instrument and control power is available.

ANSWER: #3

Trips Disabled will be lit when the following conditions exist:

Load Shed exists (or has occurred) on either safeguards bus (for Train B)

OR

A safety injection signal exists

AND

The diesel is starting and running.

REFERENCES: 1/2 OP-98043, RO-C-AS10, Emergency Diesel Generator

K/A NUMBER: 064K4.02

K/A IMPORTANCE: SRO 4.2

RO 3.9

TIME: 5 MINUTES

COMMENTS:

TITLE: Restore Power to AC Emergency Buses

RO-O-E102

QUESTION: #4

Supplement #2, Step 1.c has you open two knife switches. What is the purpose of opening these switches?

ANSWER: #4

Opening these switches deenergizes the sealed-in anti-pump circuit (for breaker 2A5).

OR

Opening these switches clears the anti-pump circuit (for breaker 2A5).

REFERENCES: 2-OP-98045, RO-C-PG14, 4KV Electrical Distribution

K/A NUMBER: 055EA2.03

K/A IMPORTANCE: SRO 4.7

RO 3.9

TIME: 10 MINUTES

COMMENTS:

RO-O-E102

JPM STUDENT EVALUATION WORKSHEET

TASK TITLE: RESTORE AN ENGINEERING SAFEGUARDS BUS TO SERVICETASK NUMBER: 0620080101PLANT IMPORTANCE: SRO 3.6 RO 3.6K/A CROSS REFERENCE: 062A2.11K/A IMPORTANCE: SRO 4.1 RO 3.7

EVALUATION SETTING: PLANT _____ SIMULATOR _____ CONTROL ROOM (UNIT _____)

EVALUATION METHOD: PERFORM _____ SIMULATE _____

COMPLETION TIME: _____ (Not to be used as an evaluation standard)

OPERATOR'S NAME: _____ DATE _____

OPERATOR'S STATUS: SRO RO NLO (CIRCLE ONE)

SSN: _____

THE OPERATOR'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JOB PERFORMANCE MEASURE AND DETERMINED TO BE:

(CIRCLE ONE) SATISFACTORY UNSATISFACTORY

COMMENTS:

(If unsatisfactory, reason must be stated.)

EVALUATOR'S SIGNATURE: _____ DATE _____

QUESTIONS

QUESTION: #1

ECA-0.0, Step 5.a has you verify load shed white lights LIT for various components, and if not lit, to open the affected breakers. What is the purpose of tripping the 4KV loads?

TITLE: Restore Power to AC Emergency Buses

RO-O-E102-HO-2

QUESTIONS

QUESTION: #2

The RNO for 5.h) has you trip DGAB if neither DG output breaker can be closed. Why is this necessary?

TITLE: Restore Power to AC Emergency Buses

RO-O-E102-HO-2

QUESTIONS

QUESTION: #3

ECA-0.0, Step 5.f) has you check DGAB Trip Disabled annunciator lit. Specifically, what conditions are necessary for the Trips Disabled Annunciator to be lit? Assume all instrument and control power is available.

QUESTIONS

QUESTION: #4

Supplement #2, Step 1.c has you open two knife switches. What is the purpose of opening these switches?

TITLE: RESTORE POWER TO SAFEGUARDS BUS

RO-O-E102

QUESTION/ANSWER SUMMARY

Q.1

ECA-0.0, Step 5.a has you verify load shed white lights LIT for various components, and if not lit, to open the affected breakers. What is the purpose of tripping the 4KV loads?

A.1

To prevent overloading the incoming power supply when the bus is reenergized (due to starting currents of loads not tripped) OR to ensure that loads are sequenced on to the bus when power is restored.

*Student Answer: S/U

Q.2

The RNO for 5.h) has you trip DGAB if neither DG output breaker can be closed. Why is this necessary?

A.2

The diesel is running without any forced cooling (Jacket Water) which could lead to (mechanical) failure of the engine.

*Student Answer: S/U

Circle Satisfactory (S) or Unsatisfactory (U)

*Only incomplete or unsatisfactory answers need to be recorded.

TITLE: RESTORE POWER TO SAFEGUARDS BUS

RO-O-E102

QUESTION/ANSWER SUMMARY

Q.3

ECA-0.0, Step 5.f) has you check DGAB Trip Disabled annunciator lit. Specifically, what conditions are necessary for the Trips Disabled Annunciator to be lit? Assume all instrument and control power is available.

A.3

Trips Disabled will be lit when the following conditions exist:

Load Shed exists (or has occurred) on either safeguards bus (for Train B)

OR

A safety injection signal exists

AND

The diesel is starting and running.

*Student Answer: S/U

Q.4

Supplement #2, Step 1.c has you open two knife switches. What is the purpose of opening these switches?

A.4

Opening these switches deenergizes the sealed-in anti-pump circuit (for breaker 2A5).

OR

Opening these switches clears the anti-pump circuit (for breaker 2A5).

*Student Answer: S/U

Circle Satisfactory (S) or Unsatisfactory (U)

*Only incomplete or unsatisfactory answers need to be recorded.

INITIAL CONDITIONS

A reactor/turbine/generator trip has occurred due to electrical system degradation. The US has transitioned to ECA-0.0 from Step 4 of E-0. The first 4 steps of ECA-0.0 are completed. Additionally, no attempt(s) to restore power were made while in E-0.

INITIATING CUE

You are an Extra RO from Unit 1. The US directs you to restore power to both the Train 'A' and Train 'B' safeguards buses in accordance with Steps 5 and 6 of ECA-0.0.

TERMINATING CUE

Electrical power has been restored to the appropriate safeguards buses.

AE-O-E236

TITLE	Locally Control West RHR Heat Exchanger Flow using Flow Control Valve IRV-320
PROGRAM	Requalification

REVISION	4
TIME	10 minutes

SCOPE OF REVISION:

Revision 4: Minor revision. No marginal markings.

► References updated to current revision.

		DATE
DEVELOPING INSTRUCTOR(S)	<i>Jack Carney</i> Jack Carney	10/30/93
REVIEWED BY:	^{11/1/93} <i>MD</i> <i>M. Raudin</i>	11/3/93
APPROVED BY	<i>MD</i>	11-15-93

1/ilafjpm/lf

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

REFERENCES

- 1-OHP 4025.001.001, Rev. 0
- 2-OHP 4025.001.001, Rev. 0

TRAINING AIDS/TOOLS/EQUIPMENT

Flashlight

SPECIAL SAFETY INSTRUCTIONS

All in plant JPMS are to be simulated only.

ATTACHMENTS

- Attachment 1: JPM Student Evaluation Worksheet
Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

AE-O-E236-HO-1: Initial Conditions and Initiating and Terminating Cues.
AE-O-E236-HO-2: Questions

OHP 4025.R-12, Section R-12-16

TASK STANDARD

IRV-320 has been locally throttled in closed direction.

SIMULATOR SETUP

N/A

2/ilafjpm/lf

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

DIRECTIONS

When I tell you to begin you are to Simulate Establishing Local Control of IRV-320. I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task. You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

INITIAL CONDITIONS

The Shift Supervisor has implemented Emergency Remote Shutdown Procedure OHP 4025.001.001 due to inability to control the plant from the control room or Hot Standby Panel. Control air is available.

INITIATING CUE

The SS has directed you to establish local control of the Unit 2 West RHR heat exchanger flow control valve (IRV-320) from its station outside the RHR Heat Exchanger rooms and provides you with Section R-12-16. You are the Auxiliary Building Tour Operator.

NOTE: The evaluator may elect to conduct this JPM for 1-IRV-320. The control station location description is the same as that for 2-IRV-320.

TERMINATING CUE

IRV-320 has been locally throttled in closed direction.

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
NOTE: THIS JPM IS WRITTEN FOR UNIT TWO. TAG DESIGNATIONS ARE SLIGHTLY DIFFERENT FOR UNIT 1.		
1.	Verify that valve number on flex hose matches number on emergency connection.	The tag "IRV-320" on the EPT end of the flex hose is compared to the emergency connection tag "EMERGENCY CONTROL AIR TO 2-IRV-320 HOSE CONNECTION."
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*2. Response: Resistance is felt when further attempt to turn air supply valve to EPT in CW direction.	Close normal air supply valve to EPT.	Valve "NORMAL CONTROL AIR SUPPLY TO 2-EPT-320 FOR 2-IRV-320" is fully closed.
<u>COMMENTS:</u>		

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*3. Response: Flex hose is disconnected and brief hiss of air sound is heard.</p> <p>CUE: If step 2 not performed, prompt that a continued hiss of air is heard from the piping at the hose quick disconnect.</p>	Disconnect flex hose at normal air connection.	Flex hose end labeled "IRV-320" is disconnected from "NORMAL CONTROL AIR SUPPLY FROM 2-EPT-320 TO 2-IRV-320 HOSE CONNECTION."
COMMENTS:		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*S+4. Response: Flex hose is connected to Emergency Control Air Supply.</p>	Reconnect flex hose at emergency control air connection.	Flex hose end labeled "IRV-320" is connected to connection "EMERGENCY CONTROL AIR TO 2-IRV-320 HOSE CONNECTION."
COMMENTS: S+ - Step 3 must be performed first.		

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*5. Response: Resistance is felt when further attempt to turn emergency air supply valve IRV-320 in CCW direction.	Open emergency control air supply to emergency connection.	Valve "EMERGENCY" CONTROL AIR SUPPLY TO 2-IRV-320" is opened fully.
<u>COMMENTS:</u>		

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
<p>*6. CUE: CONTROL ROOM DIRECTS YOU TO DECREASE FLOW THROUGH RHR HX 2-AV-35, air regulator pressure indicates 0 psig.</p> <p>Response: Air regulator 2-AV-35 pressure indication is increasing (as the regulator control handle is turned.) Give values for pressure - e.g. 4 psig, 5 psig, etc. - Up to maximum of 15 psig.</p>	<p>Adjust pressure regulator to control valve.</p>	<p>Air regulator "2-AV-35, WEST RHR HEAT EXCH HE-17W OUTLET FLOW CTRL VALVE IRV-320 CURRENT TO PNEU XDCR PRESSURE REG is turned right to increase air pressure.</p>
<p><u>COMMENTS:</u></p>		

TERMINATING CUE

Valve IRV-320 has been locally throttled in closed direction.

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

QUESTION: #1

Where can you find a local indication of West RHR loop flow?

ANSWER: #1

Outside of West RHR pump room.

REFERENCES: OHP 4025.LS-7, Section LS-7-2

K/A NUMBER: 008000 K1.02

K/A IMPORTANCE: SRO 3.4 RO 3.3

TIME: 4 MINUTES

COMMENTS:

8/ilafjpm/lf

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Revision 4

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

QUESTION: #2

Unit 2 is in Mode 5 cooling down. The West RHR train is in service with heat exchanger outlet and heat exchanger bypass flow established. The West RHR Heat Exchanger is provided with 5000 gpm of CCW flow. The control air line to IRV-320 breaks off while the valve is in a mid position. Explain how this failure affects RCS temperature.

ANSWER: #2

RCS temperature will decrease since more RHR flow will now pass through the Hx (which is supplied with cooling.)

REFERENCES: OP-5143

K/A NUMBER: 005000 A1.02
K/A NUMBER: 005000 K6.11

K/A IMPORTANCE: SRO 3.4 RO 3.3
K/A IMPORTANCE: SRO 2.7 RO 2.3

TIME: 4 MINUTES

COMMENTS:

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

QUESTION: #3

If IRV-320 is closed during the injection phase of an SI, how is the West RHR pump protected against operating at shutoff head?

ANSWER: #3

The West RHR pump recirculation valve automatically opens.

REFERENCES: RO-C-NS08

K/A NUMBER: 005000 K4.06

K/A IMPORTANCE: SRO 3.0 RO 2.7

TIME: 2 MINUTES

COMMENTS:

TITLE: Locally Control West RHR Heat Exchanger Flow
using Flow Control Valve IRV-320

AE-O-E236

QUESTION: #4

SRO/RO ONLY

Unit 2 is aligned for cold leg recirculation following a Large Break LOCA. IRV-320 is inadvertently fully closed. Explain whether this action removes the Safety Injection pump suction supply.

ANSWER: #4

Suction cross-connect piping from W RHR taps off before IRV-320, so SI pump suction is still supplied from W RHR.

OR

E RHR can still supply SI pump suction using CCP-SIP suction cross-connect.

REFERENCES: OP-5143

K/A NUMBER: 006000 A2.02

K/A IMPORTANCE: SRO 4.3 RO 3.9

TIME: 5 MINUTES

COMMENTS:

11/ilafjpm/lf

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Revision 4

AE-O-E236

JPM STUDENT EVALUATION WORKSHEET

TASK TITLE: Locally Control West RHR Heat Exchanger Flow using Flow Control Valve IRV-320

TASK NUMBER: RO 3000250501 PLANT IMPORTANCE: SRO 5.0 RO 5.0

TASK NUMBER: SRO 3410140302 PLANT IMPORTANCE: SRO 5.0 RO 5.0

K/A CROSS REFERENCE: 005 SG9 K/A IMPORTANCE: SRO 3.6 RO 3.6

EVALUATION SETTING: PLANT _____ SIMULATOR _____ CONTROL ROOM (UNIT _____)

EVALUATION METHOD: PERFORM _____ SIMULATE _____

COMPLETION TIME: _____ (Not to be used as an evaluation standard)

OPERATOR'S NAME: _____ DATE _____

OPERATOR'S STATUS: SRO RO NLO (CIRCLE ONE)

SSN: _____

THE OPERATOR'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JOB PERFORMANCE MEASURE AND DETERMINED TO BE:

(CIRCLE ONE) SATISFACTORY UNSATISFACTORY

COMMENTS:

(If unsatisfactory, reason must be stated.)

EVALUATOR'S SIGNATURE: _____ DATE _____

1/ilafjpm/lf.

INITIAL CONDITIONS

The Shift Supervisor has implemented Emergency Remote Shutdown Procedure OHP 4025.001.001 due to inability to control the plant from the control room or Hot Standby Panel. Control air is available.

INITIATING CUE

The SS has directed you to establish local control of the Unit 2 West RHR heat exchanger flow control valve (IRV-320) from its station outside the RHR Heat Exchanger rooms and provides you with Section R-12-16. You are the Auxiliary Building Tour Operator.

NOTE: The evaluator may elect to conduct this JPM for 1-IRV-320. The control station location description is the same as that for 2-IRV-320.

TERMINATING CUE

IRV-320 has been locally throttled in closed direction.



TITLE: Locally Control West RHR Heat Exchanger
Flow using Flow Control Valve IRV-320

AE-O-E236

QUESTIONS

Q.1

Where can you find a local indication of West RHR loop flow?

A.1

Outside of West RHR pump room.

*Student Answer: S/U

Q.2

Unit 2 is in Mode 5 cooling down. The West RHR train is in service with heat exchanger outlet and heat exchanger bypass flow established. The West RHR Heat Exchanger is provided with 5000 gpm of CCW flow. The control air line to IRV-320 breaks off while the valve is in a mid position. Explain how this failure affects RCS temperature.

A.2

RCS temperature will decrease since more RHR flow will now pass through the Hx (which is supplied with cooling.)

*Student Answer: S/U

Circle Satisfactory (S) or Unsatisfactory (U)

*Only incomplete or unsatisfactory answers need to be recorded.



TITLE: Locally Control West RHR Heat Exchanger
Flow using Flow Control Valve IRV-320

AE-O-E236

QUESTIONS

Q.3

If IRV-320 is closed during the injection phase of an SI, how is the West RHR pump protected against operating at shutoff head?

A.3

The West RHR pump recirculation valve automatically opens.

*Student Answer: S/U

Q.4

SRO/RO ONLY

Unit 2 is aligned for cold leg recirculation following a Large Break LOCA. IRV-320 is inadvertently fully closed. Explain whether this action removes the Safety Injection pump suction supply.

A.4

Suction cross-connect piping from W RHR taps off before IRV-320, so SI pump suction is still supplied from W RHR.

OR

E RHR can still supply SI pump suction using CCP-SIP suction cross-connect.

*Student Answer: S/U

Circle Satisfactory (S) or Unsatisfactory (U)

*Only incomplete or unsatisfactory answers need to be recorded.

TITLE: Locally Control West RHR Heat Exchanger
Flow using Flow Control Valve IRV-320

AE-O-E236-HO-2

QUESTION: #1

Where can you find a local indication of West RHR loop flow?

1/ilafjpm/lf

Page 1 of 4
Revision 4

TITLE: Locally Control West RHR Heat Exchanger
Flow using Flow Control Valve IRV-320

AE-O-E236-HO-2

QUESTION: #2

Unit 2 is in Mode 5 cooling down. The West RHR train is in service with heat exchanger outlet and heat exchanger bypass flow established. The West RHR Heat Exchanger is provided with 5000 gpm of CCW flow. The control air line to IRV-320 breaks off while the valve is in a mid position. Explain how this failure affects RCS temperature.

2/ilafjpm/lf

Page 2 of 4
Revision 4

TITLE: Locally Control West RHR Heat Exchanger
Flow using Flow Control Valve IRV-320

AE-O-E236-HO-2

QUESTION: #3

If IRV-320 is closed during the injection phase of an SI, how is the West RHR pump protected against operating at shutoff head?

3/ilafjpm/lf

Page 3 of 4
Revision 4

TITLE: Locally Control West RHR Heat Exchanger
Flow using Flow Control Valve IRV-320

AE-O-E236-HO-2

QUESTION: #4

SRO/RO ONLY

Unit 2 is aligned for cold leg recirculation following a Large Break LOCA. IRV-320 is inadvertently fully closed. Explain whether this action removes the Safety Injection pump suction supply.

4/ilafjpm/lf

Page 4 of 4
Revision 4

AE-O-E250

TITLE	Shift TDAFP Suction to ESW
PROGRAM	Regualification

REVISION	8
TIME	10 minutes

SCOPE OF REVISION:

Revision 8: Major Revision.

- No marginal markings.
- Modified critical standard for tell-tale closure sequence.
- Added two new questions.

DATE

DEVELOPING INSTRUCTOR(S)

Lisa Tatrault

REVIEWED BY:

APPROVED BY

1/ilafjpm/gh

Page 1 of 12
Revision 8

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

REFERENCES

► 1-OHP 4022.055.003

TRAINING AIDS/TOOLS/EQUIPMENT

Flashlight (optional)

SPECIAL SAFETY INSTRUCTIONS

Any JPM conducted in plant is to be simulated only.

ATTACHMENTS

Attachment 1: JPM Student Evaluation Worksheet

Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

Current copy of 1-OHP 4022.055.003

AE-O-E250-HO-1 Initial Conditions and Initiating and Terminating Cues.

AE-O-E250-HO-2 Questions.

TASK STANDARD

1-ESW-115 and 1-WMO-753 are open. 1-ESW-110 (tell-tale drain) is closed.

SIMULATOR SETUP

None. This task must be simulated in plant.

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

DIRECTIONS

When I tell you to begin you are to SIMULATE ALIGNING ESW TO THE SUCTION OF THE TURBINE-DRIVEN AUXILIARY FEEDWATER PUMP. I will provide you with any required information as to plant conditions and/or parameters needed to simulate the task. You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

INITIAL CONDITIONS

Unit 1 has NO AC power. U-1 CST is at the low-low alarm level and U-2 CST is at its technical specification low limit.

INITIATING CUE

The "Contingency Team Leader" (ASS) directs you to align ESW to provide a suction to the turbine-driven auxiliary feedwater pump by performing 1-OHP 4022.055.003 step 13. Notify the control room upon completion.

TERMINATING CUE

ESW has been manually aligned to provide a suction for the TDAFP. The tell-tale ESW drain has been closed.

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1.	Locates 1-ESW-110.	Correct valve found.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
2. RESPONSE: When appropriate say "seal is off."	Removes seal.	Seal is removed.
<u>COMMENTS:</u>		

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*3. When appropriate say "resistance is felt while turning valve clockwise."	Closes 1-ESW-110.	1-ESW-110 is operated in the clockwise direction.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4.	Locates 1-ESW-115.	Correct valve found.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
5. RESPONSE: When appropriate say "seal is removed."	Removes seal.	Seal is removed.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*S+6 When appropriate say "handle is pointing down or handle has reached the stop." If tell-tale drain is still open, State: Water is pouring from that valve (point to tell-tale).	Opens 1-ESW-115.	1-ESW-115 is operated in the <u>clockwise</u> direction until handle is pointing down.

COMMENTS:

S+ Tell-tale drain (1-ESW-110) must be closed before 1-ESW-115 is opened or when cued.

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*7. CUE: (As control room) say "open 1-WMO-753 locally, we have NO control power." If asked, state that the breaker has been opened.	Locates 1-WMO-753.	Correct valve found.
<u>COMMENTS:</u>		

7/ilafjpm/gh

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Revision 8

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*8. RESPONSE: When appropriate say "resistance is felt while turning valve counterclockwise."	Opens 1-WMO-753 locally.	Operator does the following: a. Moves declutch lever in direction of arrow. b. Rotates handwheel in counterclockwise direction.

COMMENTS:

TERMINATION CUE:

Valve 1-ESW-115 and 1-WMO-753 are open.

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

QUESTION: #1

Given that the assigned task (shifting TDAFP suction to ESW) has been completed, (including the start of the TDAFP) what is currently cooling the governor oil system?

ANSWER: #1

ESW (self-supplied by discharge flow).

REFERENCES: System Piping Layout; AFW System Flowprint

K/A NUMBER: 061000 A2.04

K/A IMPORTANCE: SRO 3.8 RO 3.4

TIME: 2 MINUTES

COMMENTS:

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

QUESTION: #2

A total loss of AC to both Units has occurred. What is the next available water source to the Unit 1 TDAFP? (Neither Unit's CSTs are available.)

ANSWER: #2

Fire Water (Diesel Driven Fire Pump)

REFERENCES: ESW System Flowprint

K/A NUMBER: 076000 A2.01

K/A IMPORTANCE: SRO 3.7 RO 3.5

TIME: 1 MINUTE

COMMENTS:

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

QUESTION: #3

Assume that the JPM task just completed was performed in the following situation:

- ▶ Complete loss of AFW
- ▶ No capability to provide AFW from the other unit
- ▶ MFW and condensate unavailable as sources of water
- ▶ Bleed and feed is in progress, but only one PRZ PORV is open.
- ▶ Core exit thermocouple temperatures are 600°F and increasing
- ▶ All steam generator pressures are 600 psig
- ▶ The TDAFP will not start.

Describe how feed would be established to the steam generators to restore heat sink.

ANSWER: #3

One steam generator to be supplied
Conditions required to maximize flow are:

AFW IMO fully opened
SG at 0 psig

(Underlined concepts required to pass question)

REFERENCES: OHP 4023.FR-H.1

K/A NUMBER: 000054 EK3.04

K/A IMPORTANCE: SRO 4.6

RO

TIME: 1 MINUTE

COMMENTS:

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

QUESTION: #4

Given that the assigned task (shifting TDAFP to ESW suction) has been completed and the TDAFP has been started, what would be providing cooling for the TDAFP bearings?

ANSWER: #4

TDAFP discharge (ESW)

REFERENCES: AFW flowprint

K/A NUMBER: 000054 EA1.03

K/A IMPORTANCE: SRO 3.7 RO

TIME: 1 MINUTE

COMMENTS:

AE-O-E250

JPM STUDENT EVALUATION WORKSHEET

TASK TITLE: Shift TDAFP Suction to ESWTASK NUMBER: 0619990401 PLANT IMPORTANCE: SRO 2.7 RO 2.7K/A CROSS REFERENCE: 061000 K1.07 K/A IMPORTANCE: SRO 3.8 RO 3.6

EVALUATION SETTING: PLANT _____ SIMULATOR _____ CONTROL ROOM (UNIT _____)

EVALUATION METHOD: PERFORM _____ SIMULATE _____

COMPLETION TIME: _____ (Not to be used as an evaluation standard)

OPERATOR'S NAME: _____ DATE _____

OPERATOR'S STATUS: SRO RO NLO (CIRCLE ONE)

SSN: _____

THE OPERATOR'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JOB PERFORMANCE MEASURE AND DETERMINED TO BE:

(CIRCLE ONE)

SATISFACTORY

UNSATISFACTORY

COMMENTS:

(If unsatisfactory, reason must be stated.)

EVALUATOR'S SIGNATURE: _____ DATE _____

1/ilafjpm/gh

INITIAL CONDITIONS

Unit 1 has NO AC power. U-1 CST is at the low-low alarm level and U-2 CST is at its technical specification low limit.

INITIATING CUE

The "Contingency Team Leader" (ASS) directs you to align ESW to provide a suction to the turbine-driven auxiliary feedwater pump by performing 1-OHP 4022.055.003 step 13. Notify the control room upon completion.

TERMINATING CUE

ESW has been manually aligned to provide a suction for the TDAFP. The tell-tale ESW drain has been closed.

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

QUESTIONS

Q.1

Given that the assigned task (shifting TDAFP suction to ESW) has been completed, (including the start of the TDAFP) what is currently cooling the governor oil system?

A.1

ESW (self-supplied by discharge flow).

*Student Answer: S/U

Q.2

A total loss of AC to both Units has occurred. What is the next available water source to the Unit 1 TDAFP? (Neither Unit's CSTs are available.)

A.2

Fire Water (Diesel Driven Fire Pump)

*Student Answer: S/U

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

QUESTIONS

Q.3

Assume that the JPM task just completed was performed in the following situation:

- ▶ Complete loss of AFW
- ▶ No capability to provide AFW from the other unit
- ▶ MFW and condensate unavailable as sources of water
- ▶ Bleed and feed is in progress, but only one PRZ PORV is open.
- ▶ Core exit thermocouple temperatures are 600°F and increasing
- ▶ All steam generator pressures are 600 psig
- ▶ The TDAFP will not start.

Describe how feed would be established to the steam generators to restore heat sink.

A.3

One steam generator to be supplied
Conditions required to maximize flow are:

AFW IMO fully opened
SG at 0 psig

(Underlined concepts required to pass question)

*Student Answer: S/U

TITLE: Shift TDAFP Suction to ESW

AE-O-E250

QUESTIONS

Q.4

Given that the assigned task (shifting TDAFP to ESW suction) has been completed and the TDAFP has been started, what would be providing cooling for the TDAFP bearings?

A.4

TDAFP discharge (ESW)

*Student Answer: S/U

Circle Satisfactory (S) or Unsatisfactory (U)

*Only incomplete or unsatisfactory answers need to be recorded.



TITLE: Shift TDAFP Suction to ESW

AE-O-E250-HO-2

QUESTION: #1

Given that the assigned task (shifting TDAFP suction to ESW) has been completed, (including the start of the TDAFP) what is currently cooling the governor oil system?

1/ilafjpm/gh

Page 1 of 4
Revision 8

TITLE: Shift TDAFP Suction to ESW

AE-O-E250-HO-2

QUESTION: #2

A total loss of AC to both Units has occurred. What is the next available water source to the Unit 1 TDAFP? (Neither Unit's CSTs are available.)

2/ilafjpm/gh

Page 2 of 4
Revision 8

QUESTION: #3

Assume that the JPM task just completed was performed in the following situation:

- Complete loss of AFW
- No capability to provide AFW from the other unit
- MFW and condensate unavailable as sources of water
- Bleed and feed is in progress, but only one PRZ PORV is open.
- Core exit thermocouple temperatures are 600°F and increasing
- All steam generator pressures are 600 psig
- The TDAFP will not start.

Describe how feed would be established to the steam generators to restore heat sink.

QUESTION: #4

Given that the assigned task (shifting TDAFP to ESW suction) has been completed and the TDAFP has been started, what would be providing cooling for the TDAFP bearings?

AE-O-E217

TITLE	RCP Seal Injection via CVCS Cross-Tie to Maintain Pressurizer Level
PROGRAM	Regualification

REVISION	7
TIME	25 minutes

SCOPE OF REVISION:

Revision 7: Minor Revision

- ▶ Updated references to procedure numbers.
- ▶ In Step 16 and the termination cue changed "actual" to "indicated" pressurizer level.
- ▶ Added questions 3 and 4.

DATE

DEVELOPING INSTRUCTOR(S)

Roger Anderson

Roger Anderson

11-28-95

REVIEWED BY:

APPROVED BY

1/ilafjpm/gh

Page 1 of 16
Revision 7



TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

REFERENCES

- ▶ 1-OHP-4025.LS-6 (Rev. 0) Emergency Remote Shutdown Procedure, Subprocedures LS-6-1 and LS-6-2.
- ▶ 2-OHP-4025.LS-6 (Rev. 1) Emergency Remote Shutdown Procedure, Subprocedures LS-6-1 and LS-6-2.
- ▶ Unit 1 Technical Specifications

TRAINING AIDS/TOOLS/EQUIPMENT

- ▶ General Safety Equipment

SPECIAL SAFETY INSTRUCTIONS

- ▶ All in plant JPMs are to be simulated only.

ATTACHMENTS

Attachment 1: JPM Student Evaluation Worksheet
Attachment 2: Question/Answer Summary Sheet

STUDENT HANDOUTS

AE-O-E217-HO-1: Initial Conditions and Initiating and Terminating Cues.
AE-O-E217-HO-2: Questions

TASK STANDARD

- ▶ Seal Injection Established via CVCS Cross-Tie and increased to maintain pressurizer level within procedural range.

SIMULATOR SETUP

- ▶ None. This JPM must be simulated in plant.



TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

DIRECTIONS

When I tell you to begin you are to SIMULATE ALIGNING SEAL INJECTION TO UNIT 1 RCPs VIA CVCS CROSS-TIE TO MAINTAIN PRESSURIZER LEVEL. I will provide you with a copy of 4025.LS-6, and any required information as to plant conditions and/or parameters needed to simulate the task.) You should read aloud each step of the task before simulating it and indicate the parameters used to verify the step is completed.

INITIAL CONDITIONS

Unit 1 has sustained a complete loss of charging pumps all LSI panels are in service and operable.

INITIATING CUE

Shift Supervisor directs you to re-establish Unit 1 RCP seal injection from Unit 2 in accordance with 1-OHP-4025.LS-6. You are to accomplish this task by first performing LS-6-1, "Seal Injection from CVCS Cross-Tie" to establish supply from Unit 2 and then by performing LS-6-2, "Pressurizer Level Control via CVCS Cross-Tie" through step 2 to establish seal injection flow.

TERMINATING CUE

Unit seal injection has been established and pressurizer level is being controlled.

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
1. Provide the student . with a copy of 1-OHP-4025.LS-6.	Begins with LS-6-1, step 1.	Procedure opened to LS-6-1 step 1.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
2. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction.	Verify 1-CS-536 (CVCS Unit 1 cross tie valve) CLOSED.	Locates valve operator for 1-CS-536, verifies valve closed.

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
3. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction.	Verify 1-CS-535 (Unit 1 seal injection bypass valve) CLOSED.	Locates valve operator for 1-CS-535, verifies valve closed.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
4. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction.	Verify 1-CS-534 (Unit 1 BIT inlet bypass valve) CLOSED.	Locates valve operator for 1-CS-534, verifies valve closed.
<u>COMMENTS:</u>		

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
5. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction.	Verify 2-CS-534 (Unit 2 BIT inlet bypass valve) CLOSED.	Locates valve operator for 2-CS-534, verifies valve closed.
<u>COMMENTS:</u>		

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
6. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction.	Verify 2-CS-535 (Unit 2 seal injection bypass valve) CLOSED.	Locates valve operator for 2-CS-535, verifies valve closed.
<u>COMMENTS:</u>		

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
7. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction. <u>OR</u> When the placard is checked, state that the valve is closed.	Close/verify closed 1-CS-548 (CVCS charging pump discharge cross-tie to Unit 2 drain valve).	Closes or verifies closed valve. Either of the following: <ul style="list-style-type: none">• Enters 2W CCP room to locate and close valve.• Verifies valve position closed by observation of placard below flow meter.

COMMENTS:

If ALARA concerns pre-empt entry to the Unit 1 W CCP room, the evaluator may state the valve has been closed.

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
8. Response: When valve is located state that resistance is felt with attempt to turn in the CW direction. <u>OR</u> When the placard is checked, state the valve is closed.	Close/verify closed 2-CS-548 (CVCS charging pump discharge cross-tie to Unit 1 drain valve).	Closes or verifies closed valve. Either of the following: <ul style="list-style-type: none">• Enters 2WCCP room to locate and close valve.• Verifies valve position closed by observation of placard below flow meter.

COMMENTS:

If ALARA concerns pre-empt entry to the Unit 2 W CCP room, the evaluator may state the valve has been closed.



TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*9. Response: When valve operator is located, state that after approx. 15 turns in CCW direction (if valve is in the open direction), he is no longer able to move the operator.	Slowly open 2-CS-536 (CVCS Unit 2 cross-tie valve).	Locates valve operator for 2-CS-536, and fully opens valve.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*10. Response: When valve is located state that after approx. 6 turns in CW direction (assuming valve is turned in the close direction), he is no longer able to turn the valve.	Isolate air to the EPT for 1-QRV-200.	Locates air isolation valve for EPT for 1-QRV-200 and closes the valve.

COMMENTS:



TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
11. Response: State that flow indicates 0.	Verify 0 flow on 12-QFI-201 (CVCS cross-tie flow indicator).	Locates 12-QFI-201.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*12. Response: When valve is simulated open several turns, state that flow is .25 gpm.	Slowly open 1-CS-535 (Unit 1 seal injection bypass valve) to obtain 25 gpm indication on 12-QFI-201.	Locates and simulates operating 1-CS-535 <u>and</u> observes flow on 12-QFI-201.

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
*13. Response: When level indication located, state that level is 22% and decreasing slowly (if asked .05%/min.)	Observe pressurizer level indication on local shutdown panel 1-LSI-3.	Locates pressurizer level indicator on panel 1-LSI-3.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
14.	Report CVCS cross-tie operations are in progress.	Makes overt announcement <u>or</u> report.

COMMENTS:

CUE: The BIT injection alignment (LS-6-3) has not been completed.

CUE: (Adequate) CCW flow exists through RCP thermal barrier coolers.

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
15. Response: When pressure indication located, state that RCS pressure is 1100 psig.	Observe RCS pressure indication (NPS-122) on LSI-3.	Locates RCS pressure indicator on panel 1-LSI-3.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
16. Response: State that flow has increased to 30 gpm.	Throttle 1-CS-535 (Unit 1 seal injection bypass valve) OPEN to maintain indicated pressurizer level between 20% and 39%.	Simulates throttling 1-CS-535 open and observes flow indication on 12-QFI-201.

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
S 17. Following candidate response, state that level is 21% and stable.	Monitor pressurizer level (1-NLI-151) or 1-LSI-3.	Candidate observes pressurizer level (1-NLI-151) indication on 1-LSI-3.

COMMENTS:

CUES NOTES TO EXAMINER	ELEMENT	STANDARD
18.	Report pressurizer level control in progress.	Candidate makes overt announcement or report.

COMMENTS:

TERMINATION CUE:

Seal injection established and pressurizer level is controlled between 20% and 39% indicated level.

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

QUESTION: #1

At what point in this procedure (LS-6) was seal injection water actually supplied to the RCP seals?

ANSWER: #1

When 1-CS-535 is throttled open. (Procedure Step LS-6-2 1c).

REFERENCES:

K/A NUMBER: 000022 SG6

K/A NUMBER: 000022 EA1.01

K/A IMPORTANCE: SRO 3.3 RO 3.3

K/A IMPORTANCE: SRO 3.3 RO 3.4

TIME: 3 MINUTES

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

QUESTION: #2

Pressurizer level is 30% and increasing when first observed after initiating CVCS cross-tie operation in Step 1 of LS-6-2. Assuming CVCS flow is 30 gpm, what action should be taken with respect to charging flow.

ANSWER: #2

Reduce flow to 25 gpm.

REFERENCES:

K/A NUMBER: 000022 SG6
K/A NUMBER: 000022 EA1.01

K/A IMPORTANCE: SRO 3.3 RO 3.3
K/A IMPORTANCE: SRO 3.3 RO 3.4

TIME: 2 MINUTES

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

QUESTION: #3

When it becomes necessary to establish CVCS Cross-tie in accordance with 1-OHP 4025.LS-6, it is reported that the boron concentration in U-2 RWST is greater than the Tech. Spec. required minimum, but less than the concentration in U-1 RCS.

How do the operators justify diluting the U-1 RCS?

ANSWER: #3

The Tech Spec LCO states that for the purpose of satisfying "Appendix R" requirements the addition of water from the RWST, which is at a greater than the minimum required boron concentration does not constitute a dilution.

REFERENCES: Technical Specification 3.1.2.3.b, 3.1.2.7.b

K/A NUMBER: 000022 SG.03

K/A IMPORTANCE: SRO 3.4 RO 2.8

TIME: 3 MINUTES

COMMENTS:

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217

QUESTION: #4

With RCP Seal Injection established via the CVCS Cross-tie, a Safety Injection occurs.

What effect will receipt of the Safety Injection have on RCP Seal Injection flow?

ANSWER: #4

A Safety Injection will not effect the flow rate through the cross-tie since it is manually throttled. However, open BIT valves in response to a SI actuation would reduce the amount of water going to the RCP seals.

REFERENCES: OP 1-5129-26

K/A NUMBER: 000022 SG.03

K/A IMPORTANCE: SRO 3.5 RO 2.5

TIME: 3 MINUTES

COMMENTS:

Page 1 of 1
Revision 7

TITLE: RCP Seal Injection via CVCS Cross-Tie
to Maintain Pressurizer Level

AE-O-E217-HO-1

INITIAL CONDITIONS

Unit 1 has sustained a complete loss of charging pumps all LSI panels are in service and operable.

INITIATING CUE

Shift Supervisor directs you to re-establish Unit 1 RCP seal injection from Unit 2 in accordance with 1-OHP-4025.LS-6. You are to accomplish this task by first performing LS-6-1, "Seal Injection from CVCS Cross-Tie" to establish supply from Unit 2 and then by performing LS-6-2, "Pressurizer Level Control via CVCS Cross-Tie" through step 2 to establish seal injection flow.

TERMINATING CUE

Unit seal injection has been established and pressurizer level is being controlled.

TITLE: RCP Seal Injection via CVCS Cross-Tie
to Maintain Pressurizer Level

AE-O-E217

QUESTIONS

Q.1

At what point in this procedure (LS-6) was seal injection water actually supplied to the RCP seals?

A.1

When 1-CS-535 is throttled open. (Procedure Step LS-6-2 1c).

*Student Answer: S/U

Q.2

Pressurizer level is 30% and increasing when first observed after initiating CVCS cross-tie operation in Step 1 of LS-6-2. Assuming CVCS flow is 30 gpm, what action should be taken with respect to charging flow.

A.2

Reduce flow to 25 gpm.

*Student Answer: S/U

TITLE: RCP Seal Injection via CVCS Cross-Tie
to Maintain Pressurizer Level

AE-O-E217

QUESTIONS

Q.3

When it becomes necessary to establish CVCS Cross-tie in accordance with 1-OHP 4025.LS-6, it is reported that the boron concentration in U-2 RWST is greater than the Tech. Spec. required minimum, but less than the concentration in U-1 RCS.

How do the operators justify diluting the U-1 RCS?

A.3

The Tech Spec LCO states that for the purpose of satisfying "Appendix R" requirements the addition of water from the RWST, which is at a greater than the minimum required boron concentration does not constitute a dilution.

*Student Answer: S/U

Q.4

With RCP Seal Injection established via the CVCS Cross-tie, a Safety Injection occurs.

What effect will receipt of the Safety Injection have on RCP Seal Injection flow?

A.4

A Safety Injection will not effect the flow rate through the cross-tie since it is manually throttled. However, open BIT valves in response to a SI actuation would reduce the amount of water going to the RCP seals.

*Student Answer: S/U

Circle Satisfactory (S) or Unsatisfactory (U)

*Only incomplete or unsatisfactory answers need to be recorded.

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217-HO-2

QUESTION: #1

At what point in this procedure (LS-6) was seal injection water actually supplied to the RCP seals?

1/ilafjpm/gh

Page 1 of 4
Revision 7

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217-HO-2

QUESTION: #2

Pressurizer level is 30% and increasing when first observed after initiating CVCS cross-tie operation in Step 1 of LS-6-2. Assuming CVCS flow is 30 gpm, what action should be taken with respect to charging flow.

2/ilafjpm/gh

Page 2 of 4
Revision 7

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217-HO-2

QUESTION: #3

When it becomes necessary to establish CVCS Cross-tie in accordance with 1-OHP 4025.LS-6, it is reported that the boron concentration in U-2 RWST is greater than the Tech. Spec. required minimum, but less than the concentration in U-1 RCS. .

How do the operators justify diluting the U-1 RCS?

TITLE: RCP Seal Injection via CVCS Cross-Tie to
Maintain Pressurizer Level

AE-O-E217-HO-2

QUESTION: #4

With RCP Seal Injection established via the CVCS Cross-tie, a Safety Injection occurs.

What effect will receipt of the Safety Injection have on RCP Seal Injection flow?

4/ilafjpm/gh

Page 4 of 4
Revision 7

Alternate question 6

Which of the following statements are TRUE regarding the use of "Ground Straps" on electrical equipment?

- a. Ground straps must be placed on components prior to hanging tags on the electrical circuit.
- b. Ground straps must be removed from any components prior to removing tags from the electrical circuit.
- c. Ground straps are only required on circuits/components of 4160 volts or higher.
- d. Ground straps may only be installed with prior approval of the Shift Supervisor.

Reference: RO-C-PM01, objective #6
PMI-2110

ANS. B

History

First used: RO16 Audit Exam (May 18 - 22, 1992)
Last exam/quiz usage: SRO Program (RO17) 1993

Alternate Question 3

During performance of a spray additive system valve lineup, the operator found the Spray Additive Tank room door closed. To enter the room, the operator must...

- a. obtain a key from the shift supervisor as this is a locked controlled area.
- b. contact health physics and have a radiation survey performed immediately prior to entry.
- c. check the room environment for habitability prior to entry.
- d. inform the control room to expect a door alarm upon entry.

Reference: RO-C-PM01
RO-C-OD01
PMSO.064

ANS: C

History

First used: RO16 NRC Exam (June 1992)
Last exam/quiz usage: SRO Program (RO17) 1993 and STA program 1993

1

SRO01 294001 K1.01 3.7

The Unit 2 East ESW Pump has been removed from service to permit repairs on its discharge valve, 2-WMO-703, which is stuck open. In order to isolate the Unit 2 East ESW header, the crosstie valve to Unit 1, 2-WMO-708, has been closed. The initial valve lineup has been completed.

Which ONE of the following methods is UNACCEPTABLE to use during Independent Verification to verify the position of 2-WMO-708 without further review by the Unit Supervisor.

- a. The green limit switch light is lit; the red light is out.
- b. The valve stem position indicator shows zero (0) percent.
- c. The pressure indicated on WPI-708 (on the Unit 2 side of 2-WMO-708) is zero (0).
- d. The movement of 2-WMO-708 in the open direction.

Reference: OHI-4014, p 2.

ANS: D

How do you verify a valve closed by opening it?

✓

3
2
SRO02 294001 K1.02 4.1

Linda from I&C was the only person signed on to a red tag clearance permit. The job under clearance must be picked up at once. Linda is away and cannot be reached. State who can sign off the clearance in Linda's absence.

- a. Unit Supervisor.
- b. Shift Supervisor.
- c. Clearance Group Supervisor.
- d. An I&C Section Supervisor.

Reference: PMI-2110, Clearance Permit System, Section 3.9

ANS: D

SRO03 294001 K1.02 4.1

The requirement that an operator be assigned as "Initial Positioner" in only one unit can be waived by the US/ASS/SS:

- a. To avoid calling someone in on overtime to complete critical path work in an outage.
- b. If a thorough briefing is conducted to prevent cross-unit errors.
- c. To avoid turning over a complex lineup to the next shift.
- d. Only during emergency conditions.

Reference: OHI-4011, p 3.

ANS: D

Almost anything
can be
waived in an
emergency

SR004

294001 K1.07 3.7

Pressurizer Pressure Channel 1, NPP-151, is Inoperable. The Unit Supervisor contacts the Auxiliary Building Tour Operator and directs him to open breaker 2-ABV-D-5C for 2-QMO-225. The minimum protective equipment required to perform this task is/are:

- a. - Safety glasses with side shields.
- b. - Safety glasses with side shields or goggles.
- leather work gloves.
- c. - Hard hat
- Safety glasses with side shields or goggles.
- Leather work gloves.
- d. - Hard hat.
- Safety glasses with side shields or goggles
- Face shield.
- Insulating protective gloves.
- Flash coat.

Reference: OSO.084, p 3.

ANS: C

Is the circuit
an instrument power
source or what?
Hard hat would be
inval of the if you
choose to do gloves or
goggles
600 VAC

question
(always wear face shield)
HH in the field

SRO05 294001 K1.07 3.7

The East Charging Pump motor is to be cleared for motor replacement. A grounding strap ~~must~~ be installed:

- a. Unless waived by a Maintenance Electrical Supervisor.
- b. According to Planning Group instructions.
- c. By the operator hanging the clearance.
- d. After independent verification of electrical isolation points.

Reference: PMI-2110, Clearance Permit System, p 14.

ANS: D

Why is B wrong?

Why is D right?
(not covered by the permit system)

No Right Answer?

SR006 294001 K1.14 3.6

An NLO is to enter the Unit 1 AB Diesel Generator Lube Oil Pit to obtain a filter differential pressure reading. A Confined Space Blanket Permit is posted at the pit.

Atmospheric monitoring requirements:

- a. are not in effect for this entry. — "None of the above"
- b. are met by sampling prior to entry.
- c. are met by sampling during the entry.
- d. are met by sampling both prior to and during the entry.

Reference: 12-PMP 6090.CSE.600, p 4.

ANS: D

D is
obvious - b' were correct & if
would - D' & if
C will correct - D'
no would - D'
⇒ D must be correct

SRO07

294001 A1.15

3.8

3.4

7

Which ONE of the following collection tanks would pose an explosive mixture hazard if it were aligned to receive off-gas from VCT "burps" during a Unit 1 cooldown?

- a. In-service Gas Decay Tank.
- b. Standby Gas Decay Tank.
- c. North CVCS Holdup Tank.
- d. Middle CVCS Holdup Tank.

Reference: **12-OHP 4021.006.001, 1.4, p 1.

ANS: D



Explain
(~~can~~ can H/T
be aligned to
receive gas?)

(why is 'c' wrong?)
(a/b obvious!)

1/2

Call SID
8:00-
12:00

SRO08

294001 A1.03 3.4

A licensed operator has recently experienced a few fainting spells associated with a previously identified high blood pressure condition.

In accordance with OHI-2071, "Notification of Incapacitating Disability", the operator is required to:

- a. Notify the Cook Medical Review Officer.
- b. Notify the Operations Training Supervisor.
- c. ~~Phone NPC Region III.~~ *Notify the Nuclear Regulatory Commission (VIA ATT.i)?*
- d. ~~Complete and submit the appropriate form to the Operations Superintendent.~~ *Notify the OS*

Reference: OHI-2071, p 2.

ANS: D

Why is B wrong?

The Unit Supervisor is monitoring radio traffic between the RO and the Auxiliary Tour NLO who has been assigned to perform the manual valve alignment for Excess Letdown. The exchange proceeds as follows:

RO: Unit 2 Control Room calling Portable Unit 5.

NLO: Portable 5. Go ahead Unit 2.

RO: We are ready for you to close CS-370 and open CS-369 as we discussed earlier.

NLO: Copy. WXL-815 clear.

Which ONE radio practice was performed correctly in the above conversation?

- a. Sign-off
- b. Repeat back. — there was none; how could it possibly be performed correctly?
- c. Control room and remote unit designation.
- d. Component designation.

Reference: PMSO.123, p 4 & Attachment 1.

ANS: C

[illegible]

Latest SRO Exam
(alt. Q.100 included)

SRO01 194001 K1.01 3.7

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- d. The movement of 2-WMO-708 in the open direction.

Reference: OHI-4014, p 2.

ANS: D

SRO02 194001 K1.02 4.1

Linda from I&C was the only person signed on to a red tag clearance permit. The job under clearance must be picked up at once. Linda is away and cannot be reached. State who can sign off the clearance in Linda's absence.

- a. Unit Supervisor.
- b. Shift Supervisor.
- c. Clearance Group Supervisor.
- d. An I&C Section Supervisor.

Reference: PMI-2110, Clearance Permit System, Section 3.9

ANS: D

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The requirement that an operator be assigned as "Initial Positioner" in only one unit can be waived by the US/ASS/SS:

- a. To avoid calling someone in on overtime to complete critical path work in an outage.
- b. If a thorough briefing is conducted to prevent cross-unit errors.
- c. To avoid turning over a complex lineup to the next shift.
- d. Only during emergency conditions.

Reference: OHI-4011, p 3.

ANS: D

SR004 194001 K1.07 3.7

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- c. - Hard hat
 - Safety glasses with side shields or goggles.
 - Leather work gloves.
- d. - Hard hat.
 - Safety glasses with side shields or goggles.
 - Face shield.
 - Insulating protective gloves.
 - Flash coat.

Reference: OSO.084, p 3.

ANS: C

SRO05 194001 K1.07 3.7

The East Charging Pump motor is to be cleared for motor replacement. A grounding strap must be installed:

- a. Unless waived by a Maintenance Electrical Supervisor.
- b. According to Planning Group instructions.
- c. By the operator hanging the clearance.
- d. After independent verification of electrical isolation points.

Reference: PMI-2110, Clearance Permit System, p 14.

ANS: D

SR006 194001 K1.14 3.6

An NLO is to enter the Unit 1 AB Diesel Generator Lube Oil Pit to obtain a filter differential pressure reading. A Confined Space Blanket Permit is posted at the pit.

Atmospheric monitoring requirements:

- a. are not in effect for this entry.
- b. are met by sampling prior to entry.
- c. are met by sampling during the entry.
- d. are met by sampling both prior to and during the entry.

Reference: 12-PMP 6090.CSE.600, p 4.

ANS: D

SRO07 194001 A1.15 3.8

Which ONE of the following collection tanks would pose an explosive mixture hazard if it were aligned to receive off-gas from VCT "burps" during a Unit 1 cooldown?

- a. In-service Gas Decay Tank.
- b. Standby Gas Decay Tank.
- c. North CVCS Holdup Tank.
- d. Middle CVCS Holdup Tank.

Reference: **12-OHP 4021.006.001, 1.4, p 1.

ANS: D

SRO08

194001 A1.03 3.4

A licensed operator has recently experienced a few fainting spells associated with a previously identified high blood pressure condition.

In accordance with OHI-2071, "Notification of Incapacitating Disability", the operator is required to:

- a. Notify the Cook Medical Review Officer.
- b. Notify the Operations Training Supervisor.
- c. Phone NRC Region III.
- d. Complete and submit the appropriate form to the Operations Superintendent.

Reference: OHI-2071, p 2.

ANS: D

SR009 194001 A1.04 3.2

The Unit Supervisor is monitoring radio traffic between the RO and the Auxiliary Tour NLO who has been assigned to perform the manual valve alignment for Excess Letdown. The exchange proceeds as follows:

RO: Unit 2 Control Room calling Portable Unit 5.

NLO: Portable 5. Go ahead Unit 2.

RO: We are ready for you to close CS-370 and open CS-369 as we discussed earlier.

NLO: Copy. WXL-815 clear.

Which ONE radio practice was performed correctly in the above conversation?

- a. Sign-off.
- b. Repeat back.
- c. Control room and remote unit designation.
- d. Component designation.

Reference: PMSO.123, p 4 & Attachment 1.

ANS: C

SRO10 194001 A1.06 3.4

The West ESW Pump was undergoing its normally scheduled surveillance. The sequence of events is as follows:

- The surveillance was started and the start time was recorded in the Control Room Log.
- A non surveillance related entry was made.
- Ten minutes into the surveillance, both sides of the discharge strainer clog and the pump is stopped.

Which ONE of the following statements correctly describes a logging requirement for this situation?

- a. The information is to be logged into the OPEN ITEMS.
- b. The surveillance is to be logged as completed with the completion time recorded on the previous log entry for surveillance start.
- c. The surveillance is to be logged as completed with the completion time recorded as a new entry.
- d. The pump status is to be logged using black ink.

Reference: OHI-2211, pp 3 & 4.

ANS: A

Why is the correct answer the only one with CAPS?

CH 2 / 12

Handwritten scribbles and notes at the bottom right of the page.

SRO11 194001 A1.09 3.9

When must the extra UNIT SUPERVISOR be present in the Control Room? *CAPS*

During:

- a. Control rod withdrawal to criticality.
- b. The Main Turbine roll.
- c. Startup of the second Main Feedwater Pump. *FIRST*
- d. Manual steam generator level control.

Reference: OPP.5, Rev.1, p 4.

ANS: B

SRO12 194001 A1.10 3.9

Unit 1 is at 50% power. Annunciator 118, Drop 83 (Heater Drain Pump Rm Sump Level High) is received. In accordance with the annunciator response procedure, you dispatch an operator to investigate the alarm.

Your briefing to the operator should include:

- a. Direction to first enter the AB Diesel/Fuel Oil Transfer Pump Room to observe the water level in the Sub Basement (via the grating near the DG ESW Cooling Water Supply Valves).
- b. Direction to verify the overflow valves to/from the ESW Pipe Tunnel are open.
- c. Direction to open the door to the Main Condenser Pit to allow overflow to the Turbine Room Sump.
- d. Direction to use the stairway instead of the Turbine Building elevator.

Reference: 01-OHP 4024.118 Drop 83, p 121.
Safety philosophy/practice.
Cook Simplified Plant Drawings

ANS: D



SR013 194001 A1.13 4.1

With Unit 2 at 80% power, which ONE of the following configurations/conditions would cause the Auxiliary Feedwater System to be considered Inoperable?

- a. The manual isolation valve directly upstream of the ESW Supply to Turbine Driven AFW Pump Suction (2-WMO-753) is CLOSED.
- b. Both East and West Motor Driven AFW Pump control switches are in the "AUTO" position.
- c. The Turbine Driven AFW Pump steam supply valve from #22 SG (2-MCM-221) is closed while Maintenance adjusts its limit switches. The steam supply from #23 SG, 2-MCM-231, is open with its power removed.
- d. The room entry doors to both Units 1 and 2 Turbine Driven AFW Pumps are mechanically held open. Entry doors to both Units 1 and 2, East and West Motor Driven AFW Pumps are closed.

Reference: Unit 2 Technical Specifications, 3.7.1.2 and 3.7.10*.

ANS: C

*need different
distinction!
(normal configuration C)*

*Is the system
unable to perform or is its
function affected by these
conditions?*

[Signature]

SRO14 194001 A1.14 2.9

Which ONE of the actions below was incorporated in "CVCS Demineralizer Operation" (**01/2-OHP 4021.004.001) to prevent unexpected reactivity changes?

- a. The time required to borate a new mixed bed demineralizer is calculated in advance.
- b. The pre-job briefing must include all Operations (including STA) and Chemistry personnel involved in the evolution. *← nothing to do with Rx change.*
- c. The Chemistry Technician who is to take the demineralizer sample must accompany the NLO assigned to change the demineralizer alignment. *←*
- d. The piping downstream of the CVCS Blender must contain a volume of boric acid sufficient to compensate for an RCS temperature increase of one (1) degree F. *— not an "action"*

Reference: **OHP-4021.004.001, p 3.

ANS: B

*Are you sure
this was added
specifically
unexpected
for
Rx change?*

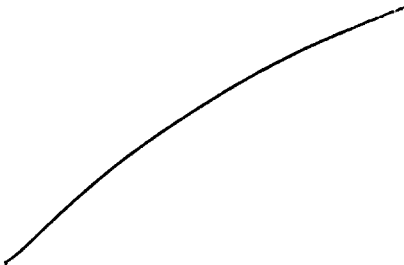
SRO15 194001 A1.15 3.4

Which ONE of the following situations would result in an invalid subcooling calculation being displayed by the Plant Process Computer (PPC)?

- a. Loop 2 Wide Range Pressure (NPS-121) - has failed HIGH.
- b. Channel 1 Pressurizer Pressure (NPP-151) - has failed LOW.
- c. Core Exit Thermocouple readings - are displayed in RED.
- d. Core Exit Thermocouple readings - are displayed in PURPLE.

Reference: Technical Data Book, Figure 16.1
AEP U-2 PPC Users Manual, pp 1-4 & 1-5.

ANS: D



SRO16

194001 A1.16 4.4

You are the Shift Supervisor when Unit 2 experiences a large break LOCA. Neither RHR pump will start and core exit thermocouple temperatures continue to rise. You have previously declared a Site Area Emergency and implemented the Emergency Plan. You continue to function as the Site Emergency Coordinator. The TSC, EOF, and OSA are fully staffed and activated. The Unit Supervisor has just implemented the Inadequate Core Cooling (4023.FR-C.1) procedure and an upgrade to General Emergency is forthcoming.

In addition to the EAL upgrade classification, you are responsible for ensuring that:

- a. Maintenance teams are briefed and dispatched to return an RHR pump to operating status.
- b. A Protective Action Recommendation is being developed.
- c. Site boundary dose monitoring teams are briefed and dispatched.
- d. Evacuation of unnecessary site personnel is completed.

Reference: PMP 2081 EPP.305, 4.2.3, p 2.

ANS: B

W.E. is responsible for this stuff.

implemented

SRO17

194001 A1.17⁶ 4.4

(W)

You are the Shift Supervisor. For which ONE of the following events would you require the Nuclear Emergency Alarm to be sounded?

- Does not effect primary plant*
- a. A hydrogen fire has occurred in the Main Generator.
 - b. A steamline break has generated an SI signal. Steamline Isolation has successfully occurred
 - c. A large break LOCA has occurred. The ECCS has actuated as designed.
 - d. A new fuel assembly, dropped in the Transfer Canal, has released some gases.

Reference: PMP 2080 EPP.101, Exhibit A, ECC-14, p 19.
PMP 2080 EPP.104, 3.7, p 2.

ANS: C

Change
" A "

SRO18 001000 A2.03 4.2

After exercising control rods, one rod in Control Bank D is believed to be stuck at a height nine steps further into the core than the remainder of the rods in that group. Which ONE of the following indications support the rod actually being stuck in?

- a. Quadrant Power Tilt Ratio (QPTR) decreased in the quadrants nearest the quadrant with the stuck rod.
- b. Power Range detector current increased in the quadrant with the stuck rod.
- c. An incore flux map indicates Axial Flux Difference (AFD) has become less negative in the assembly with the stuck rod.
- d. An incore thermocouple adjacent to the stuck rod indicates a lower temperature than prior to the rod exercising.

Reference: 02-OHP 4022.012.005
RO-C-NS10, pp 5&6

ANS: D

*a' could be right
for upper detector*

*b' could be right
for lower detector*

*9 steps are meaningless
if 'D' is full out - then
no correct answer.*

SRO19 003000 K3.02 3.8

Unit 2 is at 60 percent power when Reactor Coolant Pump #22 trips, causing the reactor to trip. After a couple of minutes, #22 Steam Generator steam flow and pressure will indicate as follows (with respect to the other three SGs):

- a. Steam flow will be higher; pressure will be ~~higher~~ *lower*.
- b. Steam flow will be lower; pressure will be ~~lower~~ *higher*.
- c. Steam flow will be higher; pressure will be approximately the same.
- d. Steam flow will be lower; pressure will be approximately the same.

Reference: RO-C-TN31, Obj.1b, p 6.

ANS: D

SRO20 003000 K1.08 3.0

All Reactor Coolant Pumps (RCPs) must be tripped following a Containment Isolation Phase B because:

- a. RCP seals #2 and #3 leakoff flows fall to unacceptable values under high backpressure conditions..
- b. RCPs cannot be operated in a steam environment.
- c. Motor bearing temperatures will become excessively high following a Phase B.
- d. Containment spray design is not sufficient to remove RCP heat in addition to the energy contained in the Reactor Coolant System.

Reference: RO-C-NS2P, p 12-14.

ANS: C

Handwritten scribbles and notes:
Why is it tripped?
Containment spray?
RCP seals?
Motor bearing temperatures?
Containment spray design?
RCP heat in addition to the energy contained in the Reactor Coolant System?

SRO21 004000 SG.05 3.8

Which ONE of the following conditions would require that a Unit 2 Boric Acid Storage Tank (BAST) or its identified Technical Specification flowpath be declared Inoperable while in Mode 5?

- a. The power supply breakers tripped on the heat trace circuits between the BA blender and the charging pump suction. *water*
- b. BAST volume of 6,400 gallons.
- c. BAST temperature of 165 degrees F.
- d. BAST boric acid concentration of 23,000 ppm.

Reference: Unit 2 Technical Specifications, 3.1.2.1 & 3.1.2.7.

ANS: D

SRO22 004010 A1.05 3.2

Select the ONE choice below that describes the response of the plant to the following conditions:

Unit 1 is at full load. All Chemical and Volume Control System (CVCS) controllers are in automatic, Volume Control Tank (VCT) level is 34%, and letdown valves are aligned for 120 gpm. VCT level Channel I (QLC-451) fails full scale HIGH.

Assuming no operator actions are taken:

- a. A high level alarm will be generated and VCT level will eventually be stabilized at a higher level by the VCT Divert Valve (QVR-303).
- b. An actual loss of level will occur with automatic CVCS makeup eventually causing VCT level to stabilize slightly above the low level alarm setpoint.
- c. An actual loss of level will occur with subsequent actuation of a Refueling Water Sequence.
- d. A VCT high level alarm will occur initially, subsequently followed by a VCT low level alarm.

Reference: 01-OHP 4022.013.017, p 3.
RO-C-NS06, TP-8.

ANS: D

REPLACE

See
JPM
comment

✓

2/2
125. -

SRO23 013000 K4.01 4.3

Which ONE of the following conditions would PREVENT the "Reset" of a Unit 1 Feedwater Isolation Signal?

- a. Reactor trip breakers closed with Tavg at 543 degrees.
- b. Reactor trip breakers closed with all SG levels at 60%.
- c. Reactor trip breakers open following reset of a Safety Injection.
- d. Reactor trip breakers open with Tavg at 547 degrees.

Reference: OP-1-98508, Sheet 3.

ANS: C

*P 4?
I don't
think so.*

SRO24 013000 A4.01 4.8

Unit 2 is at full power with the following equipment in service:

East Charging Pump
East Component Cooling Water Pump
East Essential Service Water Pump
North Non-Essential Service Water Pump
(All Train B components are idle)

A large LOCA occurs followed by a loss of offsite power when fast bus transfer fails (SI/Blackout). Both diesels start and energize their respective vital buses.

Which ONE of the following pumps will NOT be ~~verified as~~ RUNNING when checked in procedure E-0?

- a. South Non-Essential Service Water Pump.
- b. West Charging Pump.
- c. West Essential Service Water Pump.
- d. West Component Cooling Water Pump.

Reference: RO-C-AS03, Obj.7, p 19.

ANS: A

2

only "South"
only "Non-Essential"
answer is fairly obvious replace??

CHANGE STEP
TO MAKE
BETTER

SRO25 014000 A1.02 3.6

While performing the "Full Length Control Rod Operability Test" (STP-015), Control Bank C is inserted 8 steps and then returned to its fully withdrawn position of 231 steps. The operator is cautioned against holding the Full Length Rod Control Lever in the "OUT" position after the rods reach their fully withdrawn position. Holding the lever in the "OUT" position longer than necessary to return the rods to their fully withdrawn position will result in:

- a. Rod misalignment.
- b. A rod control "urgent failure" alarm.
- c. Failure of the stationary gripper coils.
- d. Failure of the movable gripper coils.

Reference: 01-OHP 4030.STP.015, p 2

ANS: A

3

reference copy
"may"

No
correct
answer?

2011-11-11 14:11:11

SRO26 015000 K4.07 3.8

Which ONE of the following SSPS INPUT SIGNALS will cause a Unit 1 reactor trip at 75% power?

- a. A single RCS loop low flow.
- b. A single RCP bus underfrequency.
- c. A single RCP breaker indicates open.
- d. A single RCP bus undervoltage.

Reference: Logic Diagram OP-1-98502 & 98512.
RO-C-NS11, pp 56, 57, & 67.

ANS: A

please explain

*3 RCP problems
& 1 RCS (repleme?)*

*RCS
RCP -
RCP -
RCP -*

(P)

SRO27 015000 A3.02 3.9

The "Source Range Detector Voltage Failure" annunciator is not lit when the plant is at power, even though both Source Range detectors are deenergized. What condition(s) permits this annunciator "black-board" feature?

- a. The alarm is blocked by placing both High Flux at Shutdown Defeat Switches in BLOCK.
- b. The alarm is automatically blocked when Permissive P-6 is active.
- c. The alarm is blocked by placing both Source Range High Flux Trip Defeat Switches in BLOCK.
- d. The alarm is automatically blocked when Permissive P-10 is active.

Reference: Logic diagram OP-1-98504.
1-OHP 4024.110, Drop 2.

ANS:B



SRO28 017020 K4.02 3.6

Which ONE of the following plant systems/equipment would show that a "third cycle" fuel assembly has been loaded in the place of a new fuel assembly?

- a. Incore Thermocouples.
- b. Excore Fission Chambers (N21 & N23).
- c. Loop Differential Temperature (ΔT) Indication.
- d. Overtemperature Delta Temperature (OT ΔT) Indication.

Reference: RO-C-NS10, p 6.

ANS: A

one incore
and three excore
- pretty obvious indication
(excore?)

SRO29 *will* 025000 A4.02 2.5

Which ONE of the following conditions/equipment configurations could result in opening containment ice condenser doors during power operation?

- it will
it or won't
it.*
- a. A Hydrogen Recirculation Fan is started with its backdraft damper blocked closed.
 - b. A Hydrogen Recirculation Fan is started with its suction damper open.
 - c. A Containment Pressure Relief Fan is started with its suction dampers closed.
 - d. A Containment Pressure Relief Fan is started with its suction dampers open.

Reference: RO-C-AS08, pp 21, 22, & 34.

ANS: B

Please explain.



SRO30

025000 A4.04 3.5

2

A small LOCA has occurred and recovery procedures permit removing one train of Containment Spray (CTS) from service. Which ONE of the following actions is required, to remove the standing autostart signal, so that the CTS pump will not restart immediately after it is stopped?

- a. Depressing CTS Reset Switches.
- b. Depressing Containment Isolation Phase B Reset Switches.
- c. Rotating the CTS pump control switch to the "Pull to Lockout" position prior to returning it to the "Neutral" position.
- d. Operating the combined CTS/Phase B Actuation Reset Switches.

Reference: Diagram OP-1-98285.
RO-C-NS15, Obj.8a, p 19.

ANS: B

If CS actuation
signal is no longer present,
"D" would also be
correct?

SRO31 059000 K4.19 3.4

Which ONE of the following conditions will cause an automatic Feedwater Isolation Signal to be generated.


- a. A Unit ONE trip from 25% power.
- b. A Unit TWO trip from 25% power.
- c. A Unit ONE Steam Generator level of 65%.
- d. A Unit TWO Steam Generator level of 65%.

Reference: Logic Diagram OP-1/2-98508.

1-OHP 4024.111.001

2-OHP 4024.211.001

ANS: B



SRO32 061000 K4.04 3.4

The Loss of All AC Power (OHP 4023.ECA-0.0) procedure provides a maximum flowrate of 340,000 lbm/hour (total) for auxiliary feedwater. This feed rate limit based upon:

- What's the difference?*
- a. Ensuring pump runout protection.
 - b. Limiting RCS cooldown rate *for brittle fracture.*
 - c. ~~Limiting~~ positive reactivity addition rate.
 - d. Conserving Condensate Storage Tank (CST) inventory.

Reference: 1-OHP 4023.ECA-0.0, p 22

ANS: A

SRO33 061000 K2.01 3.1

Which ONE of the following features would be AVAILABLE to a Turbine Driven Auxiliary Feedwater Pump if its N Train 250 VDC power was lost while the pump was in operation?

- a. Turbine overspeed protection.
- b. Restart capability from the Control Room.
- c. Runout protection via Flow Retention.
- d. Manual Trip from the Control Room.

Reference: RO-C-AS11, Obj.4, p 11 & 23.

ANS: A

*is there an electric
overspeed trip?
What do mechanical
trips have to do
w/ DC power?
(makes answer obvious)*

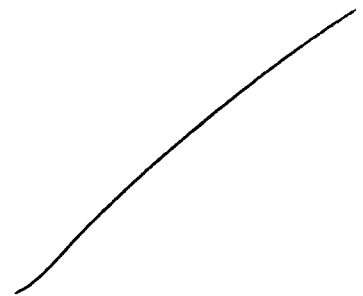
SRO34 063000 K2.01 3.1

Which ONE of the following Unit 1 capabilities would be UNAVAILABLE if 250 VDC Bus 1AB is lost?

- a. Main Generator Hydrogen Sealing Oil System.
- b. Main Turbine Bearing Lubrication.
- c. Control Room Annunciators.
- d. Containment Control Air.

Reference: 01-OHP 4022.082.002AB, pp 2-4.

ANS: D



SRO35 068000 A4.03 3.8

The release of a CVCS Monitor Tank is being made via the Unit 1 Circwater Discharge Tunnel. Which ONE of the following conditions would require that the release be terminated?

- a. ~~Unit 1~~ ^{Automatic} Reactor Trip.
- b. ~~Low~~ Sample Flow ~~Alarm~~ (Radiation Monitor 1001) ^{of 98%}
- c. ~~Unit 1~~ Main Condenser ~~severe~~ tube leakage. ^{of} —
- d. ~~Increasing~~ Steam Jet Air Ejector air flow. ^{of} —

Reference: **12-OHP 4021.006.004, p 8.

ANS: B



SRO36 071000 K5.04 3.1

Which ONE of the following is limited in the Gaseous Waste Disposal System Vent Header to prevent explosive mixtures from occurring?

- a. Hydrogen.
- b. Oxygen.
- c. Nitrogen.
- d. Hydrazine.

inert!
chlorine?

Reference: Technical Specifications, 3.11.2.5.

ANS: B

1/2 question
(C, D not plausible)

2

SRO37 002000 K1.07 3.7

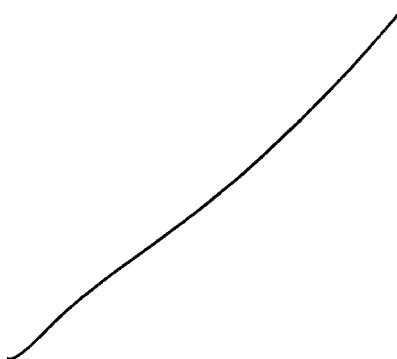
Which ONE of the following Reactor Vessel Level Indicating System (RVLIS) indications (channels) should be used to monitor reactor vessel head void growth in the Reactor Coolant System for the conditions provided below?

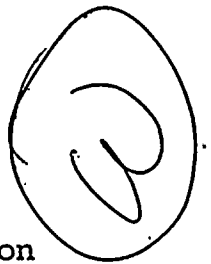
Unit 2 has tripped from full power. After the trip, reserve transformer 201CD failed, causing Diesel Generator 2CD to start and energize its respective vital buses. A cooldown has been started in accordance with plant emergency procedures.

- a. Upper Plenum Range.
- b. Narrow Range.
- c. Wide Range - 4 RCPs running.
- d. Wide Range - No RCPs running.

Reference: 2-OHP 4023.ES-0.2, p 9.
RO-C-RVLS, pp 17 & 18.

ANS: A





A large LOCA has occurred. Transfer to Cold Leg Recirculation (ES-1.3) was commenced at 32% RWST level and the West Train components were aligned in accordance with the procedure. Just prior to proceeding with the East Train realignment steps, annunciator "RWST Level Low-Low RHR Pump Trip" becomes active. What action must be taken to prevent equipment damage?

- a. Stop the East Containment Spray (CTS) Pump.
- b. ~~Stop the East CTS and North Safety Injection (SI) Pumps.~~
- c. ~~Stop the East CTS, North SI, and East Charging Pumps.~~
- d. ~~Stop the East CTS and both East and West Charging Pumps.~~

Reference: 01-OHP 4023.ES-1.3, pp 2-9.

ANS: A

The correct answer is in all 4 distractors → therefore 'A' is obviously correct (rephrase?)

(B) ~~Stop the East CTS and North Safety Injection (SI) Pumps.~~

SRO39 006000 A3.03 4.2

While at full power conditions, a large LOCA occurs, resulting in maximum ECCS injection. During implementation of the Reactor Trip or Safety Injection (4023.E-0) procedure, the following valves are indicated as being out of position by ESW/CCW/ECCS status lights. — 2. *List ~~any~~ valves here*

Which ONE set of valves below should be repositioned?

- a. WMO-734 (WMO-738), ESW from East (West) CCW Hx - Valves are Throttled.
- b. CMO-419 (CMO-429), CCW from East (West) RHR Hx - Valves are Throttled.
- c. IMO-314 (IMO-324), East (West) RHR Pump Disch. Xtie - Valves are Closed.
- d. IMO-312 (IMO-322), East (West) RHR Pump Recirc. - Valves are Open.

Reference: Simulator Observation
RO-C-NS12, p 21.
RO-C-NS08, p 32 & 40.

ANS: D

Are these valves really out of position?

SRO40 0100000 A1.08 3.3

In Unit 1, preparations are being made to align Pressurizer Auxiliary Spray for aiding in Pressurizer cooldown. Which ONE of the following conditions would be UNACCEPTABLE for Auxiliary Spray use?

	Pzr Vapor Space Temp.	Regen. Hx Outlet
ΔT 325	a. 650 degrees	325 degrees
315	b. 650 degrees	335 degrees
305	c. 615 degrees	310 degrees
300	d. 600 degrees	300 degrees

Reference: Unit 1 Technical Specifications, 3.4.9.2

ANS: A

if "d" were correct \Rightarrow all of answers would be correct. Since "A" has highest correct. Since "A" is automatically correct. (replace?)

[Signature]

Another "NOT" question

SR041 011000 K1.02 3.8

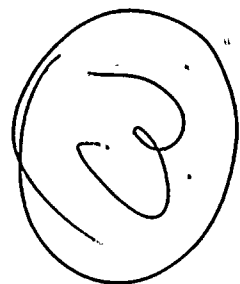
Unit 1 is at full load with all CVCS related control systems in automatic. CVCS Letdown is aligned for 75 gpm flowrate. A steady power reduction is started with plans to be at 80% load in one hour. How will the Charging Flow Control Valve (2-QRV-251) respond to maintain pressurizer level during this power decrease?

- a. Throttle closed.
- b. Throttle closed enough to receive "RCP Seal Water Injection Flow Low" annunciators.
- c. Maintain approximately the same position.
- d. Throttle open.

Reference: RO-C-NS03, p 8.

ANS: D

*Some answer
need need
distraction)*



Which ONE of the following is an example of the Reactor Protection System (RPS) design criteria - "REDUNDANCY".

- a. Each steam generator has three Narrow Range level channels that input to the RPS.
- b. When a steam generator pressure channel loses its power source, its respective channel senses a "tripped" condition.
- c. The reactor trip breaker control switches are installed about 3 feet from each other on the control board.
- d. The RPS uses Loop Delta T, Power Range NIS, and Turbine Impulse Pressure as reactor power measurement methods.

Reference: RO-C-NS11, Obj.2, p 16.

ANS: A

Replace

Intermedley
Basic

concept

could
have work
if have to

SRO43 012000 A3.05 3.7

A Unit 2 plant shutdown is in progress with preparations being made to remove the Main Turbine/Generator from service by operating its Solenoid Trip Switch. The RO reports that all status lights (4 power range and 1 "master") associated with Permissive P-10 are NOT LIT.

Which ONE of the following actions AND reasons is correct?

- a. TRIP the turbine; a reactor trip due to a turbine trip will not occur with P-10 inactive.
- b. TRIP the turbine IF the "master" Permissive P-13 status light is also verified as NOT LIT.
- c. DO NOT TRIP the turbine IF the "master" P-13 status light is verified as NOT LIT.
- d. DO NOT TRIP the turbine; the status lights associated with P-10 indicate power is above 10%.

Reference: Logic Diagram OP-2-98505 & 98509
2-OHP 4021.001.003, p 8
RO-C-NS11, Obj.9, p 59.

ANS: C

Please explain

Double Negative!

SR044 033000 SG.07 2.6

Unit 1 is in Mode 4, performing a cooldown with RHR. Both Unit 1 CCW Pumps are in service. Unit 1 is also maintaining Spent Fuel Pit (SFP) temperature with the West CCW Pump and Heat Exchanger lined up to the North SFP Heat Exchanger.

The Unit 1 West CCW Pump trips on overload. What action should be taken to maintain SFP cooling?

- a. Unit 2 should align CCW cooling water to Unit 1 via the unit cross tie configuration.
- b. Unit 2 should align CCW cooling water to the North SFP Heat Exchanger and start the North SFP Cooling Pump.
- c. Unit 2 should align CCW cooling water to the South SFP Heat Exchanger and start the South SFP Cooling Pump.
- d. Unit 1 should reduce CCW flow to the RHR Heat Exchanger to ensure sufficient cooling is available to supply SFP cooling.

Reference: RO-C-AS05, TP-1.
**01-OHP.4021.017.001, p 2

Is this plausible?

ANS: C

Replace

/

SRO45 035000 A4.06 4.6

Unit 2 has tripped as a result of a steam break in #24 Steam Generator. In order to fully isolate the #24 SG, it may be necessary to CLOSE which of the following valves? SGs 21, 22, 23 ~~are~~ have NOT functioned.

- a. The AFW supply valve from the 2 East Motor Driven AFW Pump.
- b. The steam supply valve to the Turbine Driven AFW Pump.
- c. The main steam line warming valves.
- d. The isolation valve for a SG safety valve.

Reference: OP-2-5105, 5105D
2-OHP 4023.E-2, p 3

ANS: C

could this be interpreted as "tagging" a SG Safety?

yes, if 115#15 don't shut.

SRO46 039000 K4.08 3.4

(2)

A tube rupture has occurred in #23 SG. The SG is isolated in accordance with procedure E-3 and a cooldown using the three intact Sgs has been completed. While attempting to stabilize RCS temperature, a Main Steam Line Isolation Signal was generated by low pressure in the intact Sgs. You notice that both MSIV dump valves for #23 SG are open.

The MSIV dump valves should be closed by:

- Resetting the Main Steam Line Isolation signal and then placing the MSIV dump valve control switches to CLOSE.
- Waiting for intact SG pressure to restore above the Main Steam Line Isolation setpoint.
- Placing both Steamline Isolation Block/Reset Switches to BLOCK and then placing the MSIV dump valve control switches to TRIP/RESET.
- Placing both MSIV dump valve control switches to LOCKOUT.

Reference: 2-OHP 4023.E-3, p 4.
OP-2-98538

ANS: D

Handwritten notes and scribbles:
Have to do MS isolation dump valves
control switches must be closed
A correct
D

Unit 1 is in Mode 5 with electrical loads being supplied by the 101AB and 101CD Reserve Transformers. Heavy system electrical usage has caused grid voltage to be significantly reduced. Two minutes after the West RHR pump is started, 4KV vital buses T11A and T11B deenergize. 1DGAB starts and automatically reenergizes buses T11A and T11B.

This sequence was initiated by which ONE of the following conditions?

- a. Low bus voltage on 4KV RCP Bus 1A
- b. Low bus voltage on 4KV Vital Bus T11A
- c. Low bus voltage on 4KV Vital Bus T11B
- d. Overcurrent trip of the RCP Bus 1A Tie Breaker to T11A

Reference: RO-C-PG14, pp 35 & 36

ANS: B

"1A" not even mentioned
in stem => ~~answer is B~~
1/2 question

RHR Pump
power from
T11A

Unit 2 is operating at full load with Auxiliary Transformers 2AB and 2CD supplying all in-house electrical buses. An electrical fault occurs in the windings of Transformer 21C (4KV/600V Supply to Vital Bus 21C), causing its HEA to trip. Which ONE of the following electrical plant responses occurs?

- a. Diesel Generator 2DGCD will not start and Vital 4KV Bus T21C will remain deenergized. 600V Bus 21C will reenergize.
- b. Diesel Generator 2DGCD will start and its output breaker will automatically close to reenergize Vital 4KV Bus T21C.
- c. Diesel Generator 2DGCD will start but its output breaker to Vital 4KV Bus T21C will not automatically close. 600V Bus 21C will not reenergize.
- d. The HEA will deenergize 600V Bus 21C and prevent automatic closing of the 600V Bus Tie Breaker 21AC.

Reference: RO-C-PG14, p 34.

ANS: A

Not mentioned in stem

1/2 function

OK

SR049

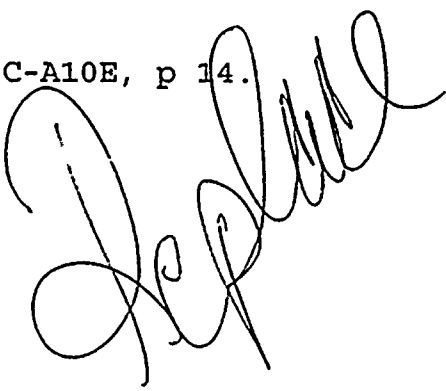
064000/4.10 4.0

A reactor trip occurs from 50% power. Shortly after, a loss of offsite power occurs. Which ONE of the following systems will require a pump to be manually started to reestablish flow?

- a. CVCS/Charging
- b. CCW
- c. ESW
- d. NESW

Reference: RO-C-A10E, p 14.

ANS: A



During mitigation of a SG tube rupture, we desire Chemistry to sample each SG individually for activity. Which action must be performed in the Control Room to enable SG sampling?

- a. Reset Safety Injection.
- b. Reset CIS Phase A.
- c. Reset R-19 (S/G Blowdown Monitor).
- d. Operate the sample override switch.

*was it
in alarm?*

Reference: RO-C-PG01, Obj.8, p 22.

ANS: B

*Is there such
a thing?*

*What if
CIS Phase A
did not occur?*

*No correct
answer?*

*State in
stem you're in
E-3*

SRO51 079000 A3.03 3.2

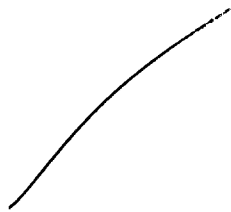
The operating Plant Air Compressor (PAC) has tripped and the standby PAC has automatically started in the other unit.

Which action must you dispatch an AEO to perform?

- a. Open the cooling water supply valve to the PAC Aftercooler.
- b. Verify that the PAC Auxiliary Lube Oil Pump has started.
- c. Reset the PAC Surge Valve.
- d. Adjust the PAC Unloading Valve.

Reference: 01-OHP 4021.064.001, pp 3 & 4 and Att.1, p 2
RO-C-AS12, p 31.

ANS: D



SRO52 086000 A4.02 3.5

While operating at full power, the operators in Unit 1 Control Room respond to the following:

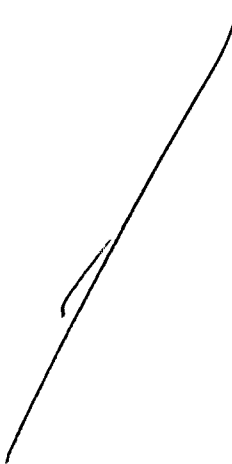
- Annunciator Panel 101 / Drop 41, "FIRE" alarm.
- Annunciator Panel 101 / Drop 94, "REACTOR COOLANT PUMP FIRE OR ABN" alarm.
- Below the #11 RCP control switch, the operators note the following status lights LIT:
 - (White) OPEN/LEAK
 - (Red) FIRE

Which ONE of the following describes the status of the #11 RCP fire protection system?

- a. NESW water is being sprayed on #11 RCP.
- b. Fire Suppression System water is being sprayed on #11 RCP.
- c. #11 RCP fire protection system is ready for manual initiation.
- d. #11 RCP fire protection system will automatically initiate spray water to the RCP approximately 2 minutes after the red and white status lights both became LIT.

Reference: 01-OHP 4022.066.001, pp 2-5.
 RO-C-AS17, p 25-26.

ANS: C



SRO53 103000 K3.01 3.7

Which ONE of the following conditions would constitute a VIOLATION of "Containment Closure", if it were instituted with less than 23 feet of water above the fuel assemblies?

- a. The equipment hatches are in place with four bolts each.
- b. A SG PORV is removed for maintenance.
- c. All penetrations ^{to (providing)} provided direct access to the Containment atmosphere are physically isolated.
- d. Both personnel airlock doors are open momentarily while transferring equipment into containment.

Reference: PMP-4100, Att.2, 3.0, p 1.

ANS: D

SR054 005000 K2.03 2.8

Which method is used to ensure availability of the RHR safety valve when it is being utilized to meet "Overpressure Protection Systems" operability requirements?

- a. The safety valve manual isolation valve is tagged open under a Shift Supervisor clearance permit.
- b. The air operated RHR suction valve from Loop 2 Hot Leg has a stem blocking device installed in the open position.
- c. The power is removed to the RHR suction valves under Shift Supervisor clearance permit.
- d. The RHR suction valve control key-switches are locked with the keys held by the Shift Supervisor.

Reference: **01-OHP 4021.017.002 Att.1, p 4.

ANS: C

*new
dist.*

SRO55 008000 K3.01 3.5

2

Which ONE of the following would be a probable cause of "Water Hammer" in the Component Cooling Water (CCW) System?

- a. Opening the RHR Heat Exchanger Bypass Flow Control Valve (IRV-311) with CCW previously throttled to the inservice RHR Heat Exchanger.
- b. Failure to split (separate trains) CCW after transferring the ECCS to cold leg recirculation following a LOCA.
- c. Reestablishing CVCS injection at an excessive rate while restoring from "Loss of All AC Power".
- d. Restoration of CCW to RCP Thermal Barrier Heat Exchangers while restoring from "Loss of All AC Power".

Reference: ECA-0.0 Background, p 93.

ANS: D

new dist.



SRO56 0410²~~00~~ K3.02 ^{3.6}~~3.9~~

A complete loss of condenser vacuum has caused a Unit 2 turbine/reactor trip from 100% power. While verifying RCS temperature in recovery procedure ES-0.1, you should expect RCS Tavg to be approximately:

- a. 541 degrees F
- b. 547 degrees F
- c. 550 degrees F
- d. 554 degrees F

Reference: RO-C-PG12, p 13.
Steam Tables

ANS: C

please explain



*What is
setpoint?*

SRO57 078000 K3.02 3.6

Unit 1 is in MODE 3 awaiting reactor startup. Which ONE of the following valves CANNOT be opened if the Control Air System were to become depressurized?

- a. A Main Feedwater Regulating Valve.
- b. A Main Steam Isolation Valve.
- c. A Steam Generator Power Operated Relief Valve (PORV).
- d. The Condensate Storage Tank Cross Tie Valve (CRV-251).

Reference: 01-OHP 4025.001.001, LS-2-5/LS-3-3/LS-4-3.
01-OHP 4023.FR-H.1, P 10.
OP-1-5105D

ANS: B

W

Another "NOT" question.

4/7/1
#70
[Signature]

SR058 000001 SG.10 4.0

(3)

Unit 2 is at 80% power with all systems operating in automatic control. Control Bank D rods begin to withdraw at approximately 8 steps per minute. The RO places rod control in manual. Rods continue to withdraw at approximately 8 steps per minute.

The crew should:

- a. Adjust turbine load reduction to maintain Tav_g and Tref within 3 degrees F.
- b. Borate to maintain Tav_g within 3 degrees of Tref.
- c. Perform a shutdown in accordance with **02-OHP 4021.001.003, Power Reduction.
- d. Manually trip the reactor.

Reference: 02-OHP 4022.012.003, p 2.

ANS: D

too obvious
What would be required if
rod motion stopped in manual but
rods could not be moved in
manual?

[Signature]

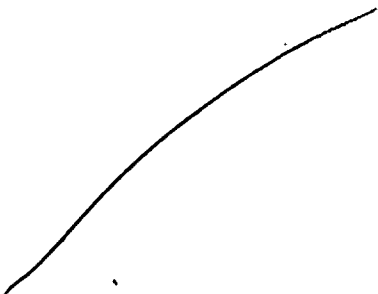
SRO59 000003 EK1.11 3.5

In the Dropped Rod (1-OHP 4022.012.00?) procedure, the rod must be recovered very slowly at a reduced plant power level. Which ONE of the following is the reason for the very slow withdrawal rate?

- a. This prevents excessive kW/ft in the fuel assembly containing the affected rod.
- b. This prevents exceeding Axial Flux Difference (AFD) limits.
- c. This addresses Shutdown Margin concerns.
- d. This allows for making adjustments to boron concentration to keep power and temperature constant during the recovery.

Reference: 02-OHP 4022.012.005, p 11.
RO-C-TN34, SHO2 (INPO SOER 84-02).

ANS: A



SR060 000011 EK3.13 4.2

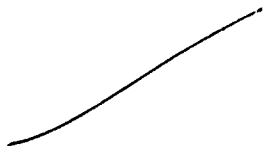
Which ONE of the following is the basis for transferring from ECCS cold leg recirculation lineup to ECCS hot leg recirculation lineup following a LOCA?

This prevents a potential loss of:

- a. Shutdown Margin due to concentration of boric acid in the RCS hot legs.
- b. Shutdown Margin due to concentration of boric acid in the reactor vessel.
- c. Core cooling due to concentration of boric acid in the RCS hot legs.
- d. Core cooling due to a concentration of boric acid in the reactor vessel.

Reference: Background ES-1.4, p 2.

ANS: D



SRO61 000011 EK3.12 4.6

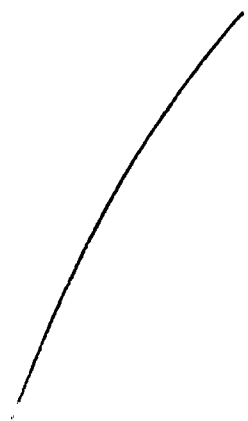
While exercising the Loss of Reactor or Secondary Coolant (E-1) procedure to address a small LOCA, you are directed to reduce unnecessary Containment Spray (CTS) flow. The procedure directs you to remove one CTS pump and close its discharge valves.

Failure to close the CTS pump discharge valves will result in which ONE of the following conditions?

- a. Unnecessary reduction of Refueling Water Storage Tank (RWST) level.
- b. Partial backflow of the remaining CTS pump flow to the RWST.
- c. Excessive pump current in the remaining CTS pump.
- d. A radioactive release path to the Auxiliary Building when the transfer to cold leg recirculation is made.

Reference: OP-1-5104C

ANS: A



SR062 000015 EA2.08 3.5

In accordance with Malfunction of a Reactor Coolant Pump (01-OHP 4022.002.001), which ONE of the following RCP parameter values would require an immediate trip of the reactor coolant pump?

- a. #1 seal leakoff temperature of 175 degrees.
- b. RCP motor bearing temperature of 175 degrees.
- c. RCP lower bearing water temperature of 230 degrees.
- d. RCP thermal barrier CCW return flow of 0 (zero) gpm for three minutes.

Reference: 01-OHP 4022.002.001, p 11.

ANS: C

*What are setpoints
for other parameters
— make A, B, C temps the same
and most limiting parameter
as correct concern.*

SRO63 000024 EA1.02 3.5

An ATWS is in progress in Unit 1 and Emergency Boration has been aligned via the Emergency Boration Valve (QMO-410). The Emergency Boration Flow meter (QFI-410) indicates a flowrate of approximately 18 gallons per minute. The cause of this lower than expected flowrate can be attributed to:

- a. The North BAST Recirculation Valve (QRV-410) has failed closed.
- b. The Boric Acid Transfer Pump is in slow speed.
- c. The Boric Acid to Blender Valve (QRV-411) has not opened fully.
- d. The Normal Charging to RCS Loop 4 Isolation Valve (QRV-62) has failed closed.

Reference: OP-1-5104B
01-OHP 4023.FR-S.1, p 3.

ANS: B

SRO64 000026 EA2.06 3.1

Which ONE of the following components will be damaged in the shortest time following a loss of Component Cooling Water?

- a. Charging Pump.
- b. Residual Heat Removal Pump.
- c. Containment Spray Pump.
- d. Residual Heat Removal Heat Exchanger.

Reference: 02-OHP 4023.E-0, p 7.

ANS:A

get RCP
in question

RCP? ii

Following a Safety Injection actuation, a large leak occurs in the East CCW Pump at its suction piping. Choose the ONE correct statement concerning leak isolation to ensure long term operation of the unaffected portion of the CCW system.

- a. The CCW Surge Tank Baffle is configured to maintain availability of the West CCW Safeguards Header (only) without operator action.
- b. The West CCW Safeguards & Miscellaneous Headers will remain available if either CCW Suction Header Crosstie Valve (CMO-411 or 413) AND either CCW Discharge Header Crosstie Valve (CMO-412 or 414) are closed.
- c. The West CCW Safeguards & Miscellaneous Headers will remain available if the West CCW Suction Header Crosstie Valve (CMO-413) AND the West CCW Discharge Header Crosstie Valve (CMO-414) are closed.
- d. The West CCW Safeguards & Miscellaneous Headers will remain available if the East CCW Suction Header Crosstie Valve (CMO-411) AND the East CCW Discharge Header Crosstie Valve (CMO-412), and the East CCW Supply to the Miscellaneous Header Valve (CMO-415) are closed.

Reference: RO-C-AS01, TP-1.

ANS: D

only one that correct answer is shut. has 3 times to
If "A" were correct then
"D" would have to be correct also.
(admittedly "A" is correct also.)
responsibility immediately

SR066 000029 EK3.12 4.7

In the Response to Nuclear Power Generation/ATWS procedure, the AMSAC Actuation Switch is the preferred method to trip the main turbine. Which ONE of the following is the reason that the AMSAC Actuation Switch is preferred?

- a. It provides multiple (diverse) methods to trip the main turbine.
- b. It is a quicker method of limiting the cooldown.
- c. It is an efficient method of maintaining the secondary heat sink.
- d. It sends a diverse signal to generate a reactor trip.

Reference: 01-OHP 4023.FR-S.1, p 2.
FR-S.1 Background, p 5; 23-25.

ANS: C

SRO67 000029 EK3.12 4.7

The Response to Nuclear Power Generation/ATWS (OHP 4023.FR-S.1) procedure does NOT use the Safety Injection Actuation Switches as a means to rapidly align and inject borated water into the RCS to add negative reactivity. Which ONE of the following is the reason for avoiding use of SI to insert negative reactivity?

- a. SI actuation will result in a loss of Main Feedwater flow.
- b. SI actuation will cause Auxiliary Feedwater to start early in the event and would lead to a greater RCS cooldown.
- c. SI actuation provides a lower concentration of boric acid than necessary to mitigate the accident.
- d. SI actuation early in the event would result in an unanalyzed RCS overpressure condition.

Reference: FR-S.1 Background, p 79.
OP-1/2 98508.

ANS: A



(B)

A large loss of reactor coolant may result in steam generator indications that appear very similar to those found in a faulted steam generator condition. The Reactor Trip or Safety Injection (E-0) procedure contains a diagnostic step (23) to determine "if SG secondary pressure boundaries are intact". A check of all SG pressures indicates that they are all slowly decreasing.

Which ONE of the following indications will support that this SG pressure decrease is due to a large loss of reactor coolant instead of a faulted steam generator?

- a. Increased containment pressure.
- (b.) RCS loop temperatures less than temperatures corresponding to steam generator pressures.
- c. RCS loop temperatures approximately equal to temperatures corresponding to steam generator pressures.
- (d.) All steam generator pressures approximately equal and decreasing at the same rate.

Reference: 01-OHP 4023.E-0, p 16.
Steam Tables

ANS: B

↑ repeats steam

— If LOCA AND Faulted SG is could be true. ?



SRO69 000040 EK3.04 4.7

Which ONE of the following is a basis of the minimum Auxiliary Feedwater flowrate limit imposed when all four steam generators are faulted (ECA-2.1)?

- a. It prevents a heatup and the resulting RCS pressure increase.
- b. It prevents steam generator dryout and resulting accelerated crevice corrosion.
- c. It ^{MINIMIZES} ~~ensures that steam will be available for the Turbine Driven AFW Pump. the possibility of entering RCS feed and~~ _{feed operations}
- d. It minimizes thermal stresses in the steam generator tube sheet.

Reference: ECA-2.1 Background, p 24.

ANS: D

SRO70 000040 EK3.02 4.4

Which ONE of the following UNIT ONE post trip condition sets requires an automatic closure signal to all Main Steam Isolation Valves?

- a. Steam generator Pressures: #11 - 800 psig..
#12 - 910 psig..
#13 - 790 psig..
#14 - 800 psig.
- b. Steam generator Pressures: #11 - 600 psig..
#12 - 610 psig..
#13 - 550 psig..
#14 - 690 psig.
- c. Steam generator Steam Flow: #11 - 1.75 Klbm/hour..
#12 - Zero Klbm/hour..
(All Tavgs 543 degrees) #13 - Zero Klbm/hour..
#14 - Zero Klbm/hour.
- d. Steam generator Steam Flow: #11 - 1.50 Klbm/hour..
#12 - 1.55 Klbm/hour..
(All Tavgs 540 degrees) #13 - Zero Klbm/hour..
#14 - Zero Klbm/hour.

Reference: OP-1-98506.

ANS: D

*How is
A' plausible?*

*A needs
Bridged*

SR071 000051 SG.10 2.9


Unit 2 is at a 20% power chemistry hold during plant startup when all three main condenser low vacuum annunciators (Ann. 218, Drops 12, 13 and 14) alarm. Vacuum indicates 24.5 inches of Hg and ~~slowly decreasing on all control room indications.~~

According to procedure 02-OHP 4024.218, Drops 12, 13, or 14, what action should be taken?

- a. Start additional Circulating Water Pumps as necessary to increase condenser cooling.
- b. Verify that adequate steam supply pressure is available to the air ejectors.
- c. Reduce turbine load as necessary to restore vacuum.
- d. Trip the reactor and main turbine.

Reference: 02-OHP 4024.218, Drops 12/13/14, pp 22/24/26.

ANS: D



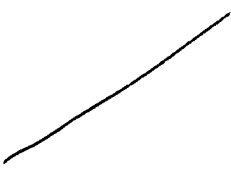
SR072 000055 EK3.02 4.6

Which ONE of the following should receive the highest priority during a Unit 2 Loss of All AC Power event?

- a. Maintaining #22 SG as an intact heat sink.
- b. Resetting the N Train Battery Charger as soon as possible after a Safety Injection occurs.
- c. Establishing Auxiliary Feedwater crosstie capability from the other unit.
- d. Aligning power to the 4KV Emergency Buses from Unit 1 via the Emergency Power (EP) crosstie lineup.

Reference: OHP 4023.ECA-0.0, Caution, p 14.

ANS: A



SRO73 000055 EA1.07 4.5

Following a loss of all AC power, while energizing the 4KV Non-Vital RCP Bus from Reserve Power, two knife switches must be opened prior to closing the feeder breaker. "Supplement #2: Restoration of Reserve Power to 4KV" requires the two knife switches to be opened prior to feeder breaker closure in order to accomplish which ONE following?

- a. Defeat the Undervoltage trip of the feeder breaker.
- b. Defeat the Overcurrent trip for the feeder breaker.
- c. Remove the "standing" Loadshed trip on the feeder breaker.
- d. Remove the automatic closing signals to the feeder breaker.

Reference: OHP 4023.SUP.002, p 2.
OP-1/2-98041

ANS: D

SRO74 000055 EA2.04 4.1

During mitigation of a loss of all AC power in accordance with procedure OHP 4023.ECA-0.0, the procedure has alternate (RNO) action that dispatches an operator to locally operate the SG Power Operated Relief Valves. This alternate action is anticipated because:

- a. Control air may be lost.
- b. CRID power may be lost.
- c. Valve controller power may be lost.
- d. DC control power may be lost.

Reference: RO-C-ER06, p 29.

ANS: A

2

Not for
Sizing

[Large handwritten signature]

#57
#79: Done

SR075 000057 EA1.05 3.4

Unit 2 has tripped from full power. CRID I has failed and cannot be reenergized without lengthy repairs.

Which ONE of the following control room power indications will be OPERABLE?

- a. Gammametrics Channel N23.
- b. Source Range Channel N31.
- c. Intermediate Range Channel N35.
- d. Power Range Channel N41

Reference: OP-2-12050

ANS: A

SRO76 000067 EA2.17 4.3

A serious fire has developed in the Unit 1 West Steam Valve Enclosure (West MSIV) area. Which equipment/component/capability is in jeopardy due to this fire.

- a. Loss of means to dump steam from #11 and #14 SGs.
- b. Loss of the Turbine Driven Auxiliary Feedwater Pump.
- c. Loss of Containment Pressure Relief Capability.
- d. Loss of the Unit 1 Diesel Generators.

Reference: Fire Hazards Analysis, p 729.

*need new
restriction*

ANS: B

replace
get
replace

2000



SRO77 000068 EK2.01 4.0

Which ONE of the following conditions has its status indication available on the Unit 1 Hot Standby Panel?

- a. Reactor Trip
- b. Safety Injection
- c. Containment Isolation - Phase A
- d. Main Feedwater Isolation

Reference: Panel Indications
OP-1-98222

ANS: A

SRO78

000068 EK3.18 4.5

WOOF should

Unit 2 Control Room Evacuation/Appendix R (02-OHP 4025.001.001) procedure, ~~provides many actions to be performed (if time permits) prior to leaving the control room, which ONE of the following is one of these to be performed?~~

a. Safety Injection

b. Main Steamline Isolation

c. Containment Isolation - Phase A

d. Closing ^e Main Steam Lead and Bypass Header Drains

Reference: 02-OHP 4025.001.001, p 16.

ANS: B

SR079 000068 EA1.01 4.5

The Control Room and Hot Standby Panel have been evacuated AND a complete loss of Control Air has occurred. Which ONE of the following tasks can be accomplished by plant personnel?

- a. Control CVCS Letdown flowrate.
- b. Perform a cooldown of the RCS.
- c. Control lower containment temperature.
- d. Borate the RCS via the CVCS Blender.

Reference: 02-OHP 4025.001.001, LS-3 & LS-4.

ANS: B

Same as # 747

also similar to # 57


SRO80 000074 EK3.11 4.4

What is the reason (basis) for the steam generator depressurization step in the Response to Inadequate Core Cooling (OHP 4023.FR-C.1) procedure?

- a. Depressurize the RCS to permit injection cooling.
- b. Increase "reflux boiling" to cool the core.
- c. Enable water in the RCS intermediate (crossunder) loop to flow into the vessel.
- d. Increase natural circulation cooling flowrate.

Reference: FR-C.1 Background, p 36.

ANS: A



SRO81 000074 SG.11 4.6

Which ONE of the following is a RED PATH condition for the CORE COOLING (F-0.2) Status Tree?

- a. RVLIS Narrow Range Level 70% with Incore T/Cs at 1250 degrees F.
- b. RVLIS Wide Range Level at 30% with Incore T/Cs at ~~500~~ 750 degrees F.
- c. RVLIS Narrow Range level 20% with Incore T/Cs at 600 degrees F.
- d. ~~RVLIS Narrow~~ ^{WIDE} Range Level at 45% with Incore T/Cs at ~~750~~ 1100 degrees F.

Reference: OHP 4023.F-0.2, p 1

ANS: A

SRO82 000007 EK3.01 4.6

A reactor trip has occurred from full power due to undetermined causes. At Step 1 of Reactor Trip or Safety Injection (OHP 4023.E-0) procedure, two shutdown bank rods are observed ~~at their~~ at their fully withdrawn position. The correct action to take is:

- a. Manually trip the reactor to attempt to insert the two rods.
- b. Start a Shutdown Margin determination ~~when procedurally directed~~
- c. Commence an Emergency Boration and then verify that no SI signals are present.
- d. Start a 10 gpm boration ~~when procedurally directed~~.

Reference: 02-OHP 4023.ES-0.1, p 8.

ANS: D

SRO83 000007 EA1.03 4.1

A reactor trip has occurred from full power. All CVCS and Pressurizer controls were initially in the automatic mode. When the main generator tripped, auxiliaries failed to transfer to reserve causing both diesels to start and reenergized their respective vital buses.

Which ONE of the following conditions will be observed?

- a. Charging header flowrate-at approximately its pre-trip value.
- b. Letdown flowrate at approximately its pre-trip value.
- c. Pressurizer heaters ~~operating as necessary to control RCS pressure.~~ energize to restore RCS pressure
- d. Pressurizer PORVs operating as necessary to control RCS pressure.

Reference: RO-C-NS06, Various
OP-98273, Both CCPs trip from "Loadshed"
OP-98274, LD orifices isol. on loss of CCPs
OP-98199, Pzr heaters trip from "Loadshed"
Loss of Stm Dump causes RCS-pressure-increase

ANS: D

*please
explain*

SRO84 000009 EK3.23 4.3

Reactor Coolant Pumps (RCPs) must be tripped when the criteria of "less than 1250 psig" is met in various emergency procedures addressing loss of reactor coolant accidents. What is the consequence of failing to trip RCPs when the criteria is met?

- a. A potential for severe RCP seal damage.
- b. Loss of RCPs due to Overcurrent trip.
- c. Loss of ECCS cooling flow to the core.
- d. A potential rapid uncovering of the core.

Reference: EOP Generic Issues, p 8.

ANS: D

After 1 minute elapsed
SRO85 000009 EA2.33 3.8

Unit 1 is at full power with 87 gpm Charging Header Flow (QFI-200) and 75 gpm Letdown Flow (QFI-301). An apparent RCS leak is recognized and the Reactor Operator takes action to stabilize pressurizer level. The second charging pump is started, Charging Header Flow is increased to approximately 200 gpm, and CVCS letdown is isolated. RCS pressure is 2200 psig and decreasing slowly. The RO states that pressurizer level has decreased by 3% in the ~~past~~ minute.

The RCS leakrate is approximately:

- a. 125 gpm.
- b. 225 gpm.
- c. 450 gpm.
- d. 575 gpm.

Reference: OP-1/2-5104B.

ANS: C

Please explain

*Rew To Make
The "Minute" - After
AC Turns
→ Also Add Calculations
to Key.*

SRO86 000022 EK3.02 3.8

Unit 1 is at full power. The running charging pump trips on overload. The other charging pump control switch breaks during an unsuccessful start attempt.

The ONE action for the crew to take is:

- a. Attempt to restore a charging supply to the RCP seals. If seal injection flow cannot be reestablished, trip the reactor.
- b. Attempt to restore a charging supply to the RCP seals. If seal injection flow cannot be reestablished, perform a shutdown in accordance with 01-OHP 4021.001.003.
- c. Attempt to restore charging. If any RCP lower radial bearing approaches the alarm setpoint, trip all RCPs and then trip the reactor.
- d. Remove normal letdown from service. Decrease CCW temperature, if necessary, to maintain RCP seal temperatures below their alarm setpoints.

Reference: 01-OHP 4024.108, Drop 20

ANS: A

Unit 2 is at a reduced inventory with the East RHR Pump in service. Loop 2 Hot Leg level is 614'-6" with pressurizer spray valve maintenance in progress. Total RHR flowrate at 2000 gpm. The East RHR Pump ammeter and RHR heat exchanger flowrate are fluctuating.

The correct action to address this problem is:

- a. Increase RHR flowrate as necessary to sweep any entrapped air from the RHR suction piping.
- b. Start the West RHR pump. Reduce flowrate through the East RHR pump while maintaining total RHR flowrate above the minimum requirement.
- c. Stop the East RHR Pump. Vent the RHR suction piping. Start the pump when the suction is free of air.
- d. ~~Rapidly~~ increase inventory in the RCS until the cavitation stops.

Reference: 02-OHP 4022.017.001, pp 13-18.

ANS: C

Check



SR088 000025 SG.10 3.9

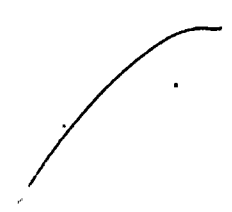
Procedure OHP-4022.017.001, "Loss of RHR Cooling" provides three alternate methods of decay heat removal to be used if the loss of RHR cooling occurs with refueling in progress.

Which of the following describes ONE of these methods?

- a. Manually open the Ice Condenser lower doors and start a Containment Recirculation (CEQ) Fan.
- b. With the fuel transfer tube and SFP weir gate open, maximize SFP cooling.
- c. Feed and bleed the RCS via gravity feed.
- d. Fill one SG to greater than 6% NR and start the RCP in that loop.

Reference: 02-OHP 4022.017.001, ATT.D

ANS: B





SR089 000027 EA2.15 4.0

Unit 1 is at full power when the controlling channel of Pressurizer Pressure (NPP-151) fails HIGH. Which ONE of the following actions is required?

- a. Close Pressurizer Power Operated Relief Valve(s) associated with NPP-151.
- b. Close Pressurizer Spray Valves associated with NPP-151.
- c. *Manually energize* ~~Verify~~ Pressurizer Backup Heaters ~~have automatically energized to maintain~~ RCS pressure.
- d. *restore* Transfer Pressurizer Cyclic (Variable) Heaters to their alternate power supply.

Reference: 01-OHP 4022.013.009, p 2.

ANS: B

SR090 000032 SG.03 3.3

Fuel is being loaded into the Unit 2 reactor vessel. An assembly has been positioned directly above the core, ~~location it will be loaded~~. The audible count rate speaker in the containment stops "beeping".

The SRO-Core Alterations should direct which ONE of the following?

- a. Have the Refueling Crane operator cease all operations until further notice.
- b. Have the assembly lowered onto its designated position on the core plate.
- c. Have the assembly moved directly away from the core and lowered near the fuel transfer tube.
- d. Continue with the reload and notify the control Room of the speaker malfunction.

Reference: Unit 2 Technical Specifications, LCO 3.9.2.
Technical Specification Clarification #25.

ANS: A

SRO91 000033 EK2.01 2.9

Unit 1 is in a normal plant shutdown. Just prior to reducing power below 10%, the crew notices that Intermediate Range Channel I (N35), High Flux Trip status light is LIT. The crew determines that the N35 channel is inoperable and takes action in accordance with the abnormal procedure - including placing the N35 Level Trip Bypass Switch in the "Bypass" position.

Power level is now at 5% and I&C technicians have been troubleshooting the inoperable N35 channel. The Lead Technician informs the Unit Supervisor that she will be removing the Instrument Power fuses, in accordance with the troubleshooting procedure, and to expect a couple of alarms.

The Unit Supervisor should:

- a. NOT PERMIT the Technician to remove the fuses because it will generate a reactor trip.
- b. NOT PERMIT the Technician to remove the fuses as it will prevent the Source Range channels from reenergizing later in the shutdown.
- c. ALLOW the fuses to be pulled and notify the crew that the Source Ranges will require manual reset at the P-6 setpoint.
- d. ALLOW the fuses to be pulled for further troubleshooting.

Reference: RO-C-NS09,TP-33.
01-OHP 4022.013.003

ANS: D

SRO92 000037 EK3.05 4.0

A Steam Generator Tube Leak has occurred in Unit 2 and procedure 02-OHP 4022.002.001 has been implemented. At step 11, the required volume of boric acid from the BAST must be calculated to ensure SDM requirements are met prior to a plant cooldown. The following information is provided:

- South BAST level: 96%
- Core Burnup from PPC: 2885 EFPH
- Most recent RCS Boron: 1300 pcm

Using the attached references, calculate the final South BAST level required to provide adequate Shutdown Margin for the cooldown.

- a. 89%
- b. 84%
- c. 80%
- d. 76%

Reference: 02-OHP 4022.002.021, pp 8&9, 23&24.
Technical Data Book Figures 4.5 and 7.5.3

ANS: B

Could we provide a shutdown and CR Log book?

While using SG Tube Rupture - Backfill Recovery (4023.ES-3.1) procedure, we are required to perform Shutdown Margin (SDM) calculations approximately every 30 minutes. This increased attention to SDM is required because:

- a. The cooldown that is performed will add positive reactivity.
- b. The continuous charging during the plant cooldown will cause boron concentration changes.
- c. The backfill process will cause boron concentration changes.
- d. ~~The backfill process will occur at the time period when fission product poisons are decaying at a high rate.~~
the primary to secondary boundary has been breached.

Reference: ES-3.1 Background, p 22.

ANS:C

SR094

000038 EK3.08 4.2

A Steam Generator Tube Rupture has occurred and procedure 4023.E-3 is in progress. The Steam Dump has been used to cooldown the plant to the "target" temperature. The RCS depressurization with Pressurizer Spray Valves is in progress when an observer alerts the crew that the pressurizer level is zero (0) percent and RCS pressure is 1050 psig. The correct action to take is: *Leave RCP running; stop the depressurization and restore PZR level.*

- a. ~~Trip all Reactor Coolant Pumps (RCPs).~~ *Leave RCP running; stop the depressurization and restore PZR level.*
- b. Trip all RCPs IF at least one Charging or SI pump is injecting into the RCS.
- c. Trip all RCPs IF subcooling has decreased below 50 degrees F. *Leave RCPs running)*
- d. Continue with depressurization until the ~~criteria for closing spray valves is reached.~~ *target RCS pressure is reached*

Reference: E-3 Background, p 52.

ANS: D

SRO95 000054 EK3.04 4.6

3

The Loss of Heat Sink (4023.FR-H.1) procedure contains a caution statement that has us start the "bleed and feed" process promptly when its starting criteria is reached. What is the reason (basis) for starting bleed and feed "without delay" when the criteria is met?

- a. Core damage may occur at any time following bleed and feed initiation criteria.
- b. The ability to cool the core by all available methods may become unavailable if bleed and feed is delayed.
- c. Steam generator dryout cannot be observed, therefore action must be taken at decreased SG levels.
- d. Pressurizer PORVs may not open ~~when required~~ and alternative action may be required.

Reference: FR-H.1 Background, p 35.

ANS: B

why is A wrong?

change A

A failure of all Auxiliary Feedwater Pumps has caused Unit 2 to enter the Loss of Heat Sink (4023.FR-H.1) procedure. Due to an inability to restart either Main Feedwater Pump, the crew has started to depressurize a SG to "establish feed from the condensate system". *for* ~~At what approximate value of SG pressure will feed flow start?~~ ^{to}

- a. 600 psig
- b. 400 psig
- c. 200 psig
- d. 100 psig

WOOF is the MINIMUM

Reference: Observation of Unit 2 feedpump suction gauges (CPI-201/201) at no-load conditions. CBP discharge pressure approximately 425 to 435 psig & OP-5104A.

ANS: B

SR097 000058 EA2.03 3.9

The "Loss of 250 VDC to AB and CD Buses" (01-OHP 4022.082.003) procedure cautions against opening the Main Generator output breakers K & K1. With Unit 1 initially at 100% power, opening the generator output breakers K & K1 while a loss of both 250 VDC buses is occurring will result in:

- a. The trip of all four RCPs.
- b. A loss of all onsite AC power.
- c. Deenergizing both buses in the 345 KV switchyard.
- d. A failure of both Diesel Generators to start.

Reference: 01-OHP 4022.082.003, p 3.

ANS: B

If B is right, why is A wrong?

Change A

SRO98 000028 EA2.08 3.5

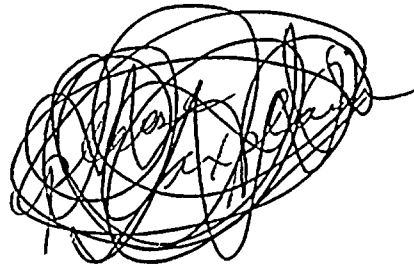
Unit 2 is at 76% power when the Reference Temperature Calculation Module (Tref) fails to a zero (0) output. Control rods have been returned to their previous height and are in manual.

At what level value should the pressurizer be manually controlled?

- a. 33%
- b. 41%
- c. 46%
- d. 52%

Reference: Tech Data Book, 2-Figure 2-3.

ANS: C



SR099 000036 SG.10 3.8

Unit 1 core reload is in progress when the Spent Fuel Pool Supervisor alerts the control room that an irradiated fuel assembly has been damaged during transport to the fuel transfer tube area.

Control Room action should include:

- a. Verifying that both Fuel Handling Area Exhaust (AFX) Fans are running.
- b. Starting one Fuel Handling Area Supply (AFS) Fan.
- c. Initiating evacuation of both Auxiliary Buildings.
- d. Stopping all ~~SFP Cooling and Purification~~ pumps.

Reference: PMP 4050.029.004, p 2.

ANS: C

Leave
CD 10

SRO100 000056 EK2.08 2.1

Which ONE of the following functions is provided by the Unit and/or Overall Differential Lockout Relays (87X-U and/or 87X-OA)?

- a. Stopping of the Generator Stator Water Cooling Pumps.
- b. Starting of the Main Turbine Emergency DC Lube Oil Pumps.
- c. Starting of the Main Turbine Bearing Lift Oil Pumps.
- d. Opening of the Main Steam Lead and Bypass Header Drains.

Reference: RO-C-PG14, p 31.

ANS: A



SRO100 B/U 000056 EA2.56 3.7

A loss of the 34.5KV bus has occurred shortly following a reactor trip. The Vital 4KV ("T") buses are energized from their respective emergency diesel generators.

Which ONE of the following RCS temperature monitoring capabilities is UNAVAILABLE for use in performing a plant cooldown?

- a. RCS Average Temperature (Tave) Meters.
- b. Loop 1 and 4 Temperature Recorders.
- c. Loop 2 and 3 Temperature Recorders.
- d. Incore Thermocouples.

Reference:

ANS: A

6-10-68

10-10-68

