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6/8**4** DATE

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SAI ONDFRE NUCLEAR GENERATING STATION ENGINEERING PROCEDURE SO23-SPE-017 UNITS 2 AND 3 EFFECTIVE DATE JAN 0 8 1984 **REVISION 1** CANCEL DATE JAN 0.8 1986

STANDBY POWER CAPACITY TEST

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APPROVED BY:

R. M. ROSENBLUM MANAGER, TECHNICAL

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ENGINEERING PROCEDURE SO23-SPE-017 REVISION 1 PAGE 2 OF 15

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STANDBY POWER CAPACITY TEST

1.0 OBJECTIVE

- 1.1 The objective of this test is to functionally verify that a diesel generator has the ability to supply the worst case emergency loads on one unit plus the worst case shutdown loads on the opposite unit using the 4.1 kV ESF bus tie.
- 1.2 Demonstrate that the installed diesels can satisfy REGULATORY POSITIONS 2.d and 2.e of REGULATORY GUIDE 1.81; Shared Emergency and Shutdown Electric Systems for Multi-Unit Nuclear Power Plants and IEEE standard 308.
- 1.3 Verify that a diesel generator has the capacity to support a 1000 HP HPSI pump by starting two 600 HP HPSI pumps on one train on an ESF signal while maintaining voltage of 4360 \pm 436 volts and frequency of 60 \pm 1.2/-.3 Hz.
- 1.4 Verify the accuracy of Table 8.3-1 in the Final Safety Analysis Report by empiracally measuring various 1E loads and the Diesel Generator load while supplying the worst case accident loads.
 - NOTE: This test is to be performed concurrently during operational surveillance SO23-3-3.12, Integrated ESF Test.

2.0 REFERENCES

- 2.1 Cross-reference to Licensing Commitment Requirements
 - 2.1.1 Final Safety Analysis Report, Section 8.3, Onsite Power Systems, Amendment 32, May 1983
- 2.2 Operating Instructions
 - 2.2.1 SO23-3-3.12, Integrated ESF System Refueling Tests, Rev. 7
 - 2.2.2 SO23-2-17, Component Cooling Water System Operating Instruction, Rev. 5
 - 2.2.3 SO23-6-2, Transferring of 4160 Volt Buses, Rev. 4
 - 2.2.4 SO23-3-5.4.1, Loss of Offsite AC Power to a Unit, Rev. 9
 - 2.2.5 S023-3-2.7, Safety Injection System Operation, Rev. 6
 - 2.2.6 SO23-2-13, Diesel Generator Operation, Rev. 7

SAN ONOFRE NUCLEAR GENERATING STATION

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2.0	REFER	ENCES (Cont	Marke 1
	2.5	Urawings	
		2.3.1	32328, Elementary Diagram Electric Auxiliary - 4.16 kV Bus 3A04 Diesel Generator 3G002 Breaker, Rev 10
		2.3.2	32216, Elementary Diegram Electric Auxiliary - 4.16 kV Bus 3A04 Tie Breaker (3A04), Rev 6
		2.3.3	32258, Elementary Diagram Electric Auxiliary Bus 3B04 MCC 3BD Feeder Breaker, Rev. 3
		2.3.4	32329, Elementary Diagram, Diesel Generator 3G002 Protection AC System, Rev. 9
-		2.3.5	32261, Sheet 1, Elementary Diagram, Electric Auxiliary Bus 3B04 MCC BQ Feeder Breaker, Rev. 4
		2.3.6	32219, Elementary Diagram, Electric Auxiliary 4.16 kV Bus 3A04 Feeder Breaker (3B04), Rev. 3
		2.3.7	32643, Elementary Diagram, Reactor HP Safety Injection Pump P017, Rev. 3
		2.3.8	32645, Elementary Diagram, Reactor HP Safety Injection Pump P018, Rev. 3
		2.3.9	SO23-3O2-2-451-3, Wiring Diagram Control Building Electric Auxiliary 4160 V Switchgear 3AO4
		2.3.10	SO23-302-2-450-4, Wiring Diagram Control Building Electric Auxiliary 4160 V Switchgear
		2.3.11	SO23-302-2-454-0 Wiring Diagram Control Building Electric Auxiliary 4160 V Switchgear 3A04
		2.3.12	SO23-302-2-446-0, Wiring Diagram Control Building Electric Auxiliary 4160 V Switchgear
		2.3.13	SO23-302-2-453-2, Wiring Diagram Control Building Electric Auxiliary 4160 V Switchgear 3A04
•		2.3.14	33763, Sht. 3, Wiring Diagram Control Building Electric Auxiliary 4160 V Switchgear 2A04, Rev. 5
		2.3.15	30219 Elementary Diagram Electric Auxiliary 4.16 kV Bus 2A04 Feeder Breaker Metering, Rev. 3
		2.3.16	30259 Elementary Diagram Electric Auxiliary Bus 2B04 MCC 2BY Feeder Breaker, Rev. 3
	i	2.3.17	30260 Elementary Diagram Electric Auxiliary Bus 2B04 MCC 2BE Feeder Breaker, Rev. 3

SAN ONOFRE NUCLEAR GENERATING STATION

ENGINEERING PROCEDURE SO23-SPE-017 REVISION 1 PAGE 4 OF 15 TTUD 1-1

2.0 REFERENCES (Continued)

- 2.3.18 30261 Elementary Diagram Electric Auxiliary Bus 2B04 MCC BQ Feeder Breaker, Rev. 4
 - 2.3.19 S023-403-12-69 (-10), 4700 kW, 4360 V, 3 Ø, 60 Hz, .8 PF Emergency Diesel Generator
- 2.4 Other
 - 2.4.1 Regulatory Guide 1.81, Rev. 1, Shared Emergency and Shutdown Electric Systems for Multi-Unit Nuclear Power Plants
 - 2.4.2 IEEE Standard 308, Section 8, 1978

2.4.3 10 CFR 50, General Design Criterion 5, Appendix A

3.0 PREREQUISITES

INITIALS/DATE

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- NOTE: This test is to be performed concurrently during operational surveillance SO23-3-3.12, Integrated ESF Test.
- 3.1 Prior to use of an uncontrolled (pink) copy of this Station Document to perform work, verify it is current by utilizing one of the following methods:
 - 3.1.1 Checking a controlled copy and any TCNs.
 - 3.1.2 Accessing an SCE Document Configuration System (SDCS) TSO Terminal.
 - 3.1.3 Referencing a current (within one week) Configuration Control Log and associated daily update.
 - 3.1.4 Contacting CDM by telephone or through counter inquiry.

Obtain the information requested in Attachment +.

3.1.5 Obtaining an uncontrolled (pink) copy of the Station Document from CDM.

VERIFIED BY:

NOTE:

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Step 3.2 may be performed at any time and is not required for the completion of this test.

3.2

VERIFIED BY:

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ENGINEERING PROCEDURE SO23-SPE-017

STANDBY POWER CAPACITY TEST

3.0 PREREQUISITES (Continued)

INITIALS/DATE

MMA

- 3.3 Have the Station Electrical Test Department attach a multiple channel recorder to record the parameters listed in Attachment 8.
- 3.4 Unit 3 is in Mode 5 or 6. If Unit 3 is in Mode 6, all reactivity changes must be suspended for the duration of this test.
- 3.5 No LCOAR exists against any Unit 2, Load Group B ECCS subsystems.
 - 3.5.1 The Unit 2 LOCAR log has been reviewed and is satisfactory for the performance of this test.
 - 3.5.2 The Unit 2 EDMR log has been reviewed and is satisfactory for the performance of this test.
- 3.6 Charging pump 2P191 is aligned to 2B04.
- 3.7 The following Unit 2 Load Group A Shutdown loads are available:
 - 3.7.1 1 CCW pump (Component Cooling Water) (2P024 or 2P025)
 - 3.7.2 1 SWC pump (Saltwater Cooling) (2P112 or 2P114)
 - 3.7.3 1 LPSI pump (Low Pressure Safety Injection) (2P015)
 - 3.7.4 2 Charging pumps (2P190, 2P191)
 - 3.7.5 1 Motor Driven AFP (Auxiliary Feedwater Pump) (2P141)

3.7.6 2 Dome Circulating Fans (2A071 and 2A074)

- 3.8 HPSI pump 3P018 is aligned to Train A per Ref. 2.2.5, and tested per Check-Off List 2 of Ref. 2.2.1. (Mark this step N/A if Section 6.2 is not to be performed.)
 - 3.9 Unit 2 noncritical CCW loop is being supplied from Train B per Ref. 2.2.2.

NOTE 1: 2 PIQI CLEARED FOR MAINTENANCE

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1.1.1.1.24

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ENGINEERING PROCEDURE S023-SPE-017 NAVISION 1 PAGE 6 OF 15

3.0 PREREQUISITES (Continued)

INITIALS/DATE

NOTE: All jumpers are to be installed with spade. lugs.

3.10 Have the Station Electrical Test Department install a switched jumper accross AE7 and AE8 in cubicle 3A0416. This will permit the diesel generator to operate in the speed control mode with bus-tie breaker 3A0416 closed. Verify that the switch is open. (Ref. E.D. 32328, W.D. S023-302-2-453-2, S023-403-12-69)

Second Verification

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3.11 2P-140, Turbine-driven AFP is operable.

- 4.0 PRECAUTIONS
 - 4.1 Performing step 6.1.5 will enable Unit 3 4.16 kV ESF bus 3A04 tie breaker 3A0416 to be closed simultaneously with 3A0413, 3G002 diesel generator feeder breaker.
 - 4.2 If Unit 2 is in Modes 1, 2, 3 or 4, performance of this test may exceed the provisions of LCO (Limiting Condition for Operation) 3.8.1.1 and 3.8.3.1. The duration of this test is expected to be less than 15 minutes. It may be required to initiate LCOARs (Limiting Condition for Operation Action Requirements) for the following:
 - 4.2.1 Placing 2G002 in Maintenance Lockout (step 6.1.6).
 - 4.2.2 4.16 kV ESF bus 2A04 energized from 3G002 (step 6.1.11).
 - 4.2.3 De-energizing bus 2A04 (step 6.1.9).

NOTE: The following applies only if Unit 2 is in Modes 1, 2, 3, or 4 while 4.16 kV ESF bus 2A04 is connected to 3G002.

4.3 If Unit 2 receives a SIAS while 2A04 is connected to 3G002, immediately perform the following to restore bus 2A04 to normal status:

4.3.1 Open bus tie 2A0417 by pressing TRIP on 2HS-1660A1 at 2CR-63.



ENGINEERING PROCEDURE SO23-SPE-017 REVISION 1 PAGE 7 OF 15

4.0 PRECAUTIONS (Continued)

4.3.2 Place 2G002 in service by performing the following:

.1 Select 2G002 to NORMAL on keyswitch 2HS-1767-1, 2G002 Maintenance on 2CR63.

.2 Depress LOCKOUT RESET on 2HS-1661-1, Diesel Gen 2G002 Lockout Relay Reset on 2CR63.

CAUTION

- If 2G002 fails to start, immediately refer to S023-3-5.4.1, Loss of Offsite AC Power to a Unit.
- .3 Verify 2G002 is starting.
- .4 Verify 2A0413 closes, using 2HS-1664-1 on 2CR63, energizing 2A04. b.15
- 4.5 Prior to lifting the wire in step **6.9**, verify that 4.16 kV ESF bus tie breaker 2A0417 transfer switch is selected to manual. Lifting this wire removes the interlock which prevents 4.16 ESF bus tie breaker 3A0416 to be closed while Diesel Generator feeder breaker 3A0413 is closed. Having 2A0417 in manual will prevent an asynchronous auto transfer of 2A04 to 3A04 in the event of an LOVS on Unit 2.
- 4.6 Verify that 4.16 kV ESF bus 2A04 voltage is essentially 0 (residual voltage <30% nominal) prior to energizing 2A04 from 3A04 via the cross-tie while 3A04 is energized from 3G002.
- 4.7 Attachment 8.3 serves as a summary of the sequence of events performed by this test and should be referenced often to ensure test continuity.
- 4.8 Do not load any diesel generator greater than 5200 kW at any time during this test.

5.0 CHECK OFF LIST(S)

5.1 None

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ENGINEERING PROCEDURE SO23-SPE-017 **REVISION 1** PAGE & UP LU

6.0 PROCEDURE VERIFIED BY/DATE

6.1 Diesel Generator 2G002 Load Capacity Test

- 6.1.1 Verify that step 2.2.1 in Check-Off List 2 of SO23-3-3.12, Integrated ESF System Refueling Test, has been completed.
- 6.1.2 Secure boration of the RCS by performing the following:
 - Override and stop Charging Pump 3P-190 .1 using 3HS-9228-1
 - .2 Override and stop Charging Pump 3P-191 using 3HS-9229-1
 - .3 Override and stop Charging Pump 3P-192 using 3HS-9230-2
- 6.1.3 Verify/place 4.16 kV ESF 3A04 bus-tie transfer switch in MANUAL using 3HS-1660B1 on 3CR63.
 - CAUTION Hot bus transfer of 2A04 to ====== 3A04 with 3A04 energized from 3G002 and 2A04 energized from Reserve Auxiliary Transformer 2XR1 must not occur as the voltages are asynchronous.
- 6.1.4

Verify/place 4.16 kV ESF 2A0417 bus-tie transfer switch in MANUAL using 2HS-1660B1 on 2CR63.

.1 Open/Verify open 4.16kV ESF 2A0417 bus-t using 2HS-1660B1.

NOTE: After step 6.1.5 has been completed, the interlock between 4.16 kV ESF bus tie 3A0416 and diesel generator feeder breaker 3A0413 will be defeated.

6.1.5

Request the Station Electrical Test Department to lift and isolate wire C32 from termination AE14 in 3A0416 (Reference E.D. 32328 and W.D. SO23-302-2-453-2).

Second Verification

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ENGINEERING PROCEDURE SO23-SPE-017 SAN ONOFRE NUCLEAR GENERATING STATION PACE 9 OF 15 UNITS 2 AND 3 REVISION 1 VERIFIED BY/DATE 6.0 PROCEDURE (Continued) Place 20002 in MAINTENANCE LOCKOUT using Chiles 6.1.6 keyswitch 2HS-1767-1 on 2CR63. 6.1.7 Close the switch in the jumper installed in 3A0416 cubicle. (This will maintain the diesel generator in speed control mode(111124 with 3A0416 closed). 6.1.8 Press SYNC on 2HS-1660Al on 2CR63. 2 AO417 Bus - he. .1 Prese CLOSE on 2HS-1660A1 on 2CR63, 2AUHIT BUS. HE. Press STAC on 2HS-166041. 12 Press STNC on 3HS-1660Al on 3CR63, 6.1.9 110/84 3ACHIG BUS tre. A SYNC MASTER CUNTRO Select ESF -1 110124 πΝ 31+5-1627-1 to ON on 3CR63. Nore: Perform steps 6.1.10,1,6.1.10.2,6.1.11, and 6.1.11.1 in rapid succession. Adjust 36002 voltage using 3HS-166A-1 DIESEL GEN 36,002 VOLTAGE REGULARUP CONTROL, and 36,002 GEN 34,002 GOVERANCE CONTROL to match the incominity 6.1.10 frequency and willage so that the synch scope is manify slowly in the clickwise direction. when the synch score is within Sminites of the string Ut up position depress close on 345-1660AI, 4.16 KV BUS AND 3 A04 Bus fie, Open the switch in the jumper installed in 3Ac416 cubicle and verity "Droup In" illuminated on 37-1-1768-1 m3cR63, 13 Remore 376416 from the synchronizing circuit. 6.1.11 on the -attached next Perform 6.1.12 Verify in-service/start the following Unit 2 loads and record the flow rates as required (these loads represent the worst case shutdown loads. Ref. 2.1.1): SWC pump (circle one) 2P-112/(3P-307) with . 1 111124 flow as read from 2FI-6400 gpm. CCW pump (circle one) (2P-02)/2P-025 with . 2 flow as read from 2FI-6277 on 2CR64 gpm (Critical loop A) and 2FI-6312 on 20R64 (Noncritical loop) gpm. AFW pump P-141 with flow as read from . 3 2FI-4725-1 gpm. 1.10184 Charging pump 2P-190 .4

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6.0 PROCEDURE _(Cont	inued)	VERIFIED BY/DATE
6.1.12.5	Charging pump 2P-191 with flow as read from 2FI-0212gpm.	Then 1 though
.6	Upper Dome Air Circulating Fan 2A-071	mere 11/10/24
.7	Upper Dome Air Circulating Fan 2A-074	These 1 1/10/04
.8	Containment Emergency Fan 2E-399	mor 1/14/04
.9	Containment Emergency Fan 2E-402	Jul 1 / 10/84
. 10	AFW Pump Room Fan 2A-394	HAN / 1110/04
.11	Safety Equipment Building Pump Room Air Conditioning Units 2E-417 and 2E-517	90156 11/11/BY
. 12	Fuel Handling Building Accident Air Conditioning Units 2E-370	mr 1.110/84
.13	Fuel Handling Building Pump Room Emergen Air Conditioning Unit 2E-441	icy Quiz, 1/10/84
. 14	Intake-Structure Cooling Fans 2A-370 and 2A-373 ZA373 ON-1	mist /1/10/04
. 15	Charging Pump Area Air Conditioning Unit 2E-437 and 2E-438	s Jona 1
. 16	BAMU Pump Area Emergency Air Conditionin Units 2E-439 and 2E-440	g mes, vlidey
. 17	CCW Building Pump Room Emergency Air Conditioning Units 2E-453 and 2E-454	Wer 11/1/84
. 18	Control Room Cabinet Emergency Air (Conditioning Unit 2E-424	mln , 1/10/84
. 19	1E-Pressurizer heaters, red train, using 2HS-0100F1	non 1 1/10/8-
6.1.13	Start Charging Pump 3P-190 by pressing START on 3HS-9228-1 on 3CR58	n~ 1 110/84
6.1.14	Start Charging Pump 3P-191 by pressing START on 3HS-9229-1 on 3CR58	W 1/1/04

348 ENGINELRING PROCEDURE SO23-SPE-017 SAN ONOFRE NUCLEAR GENERATING STATION PAGE 11 OF 15 **REVISION** 1 2 AND 3 TCN 1-1 VERIFIED BY/DATE 6.0 PROCEDURE (Continued) Diesel Generator S22420MG002 has 6.1.15 supplied emergency AC power to the Unit 3, Load Group A, ECCS subsystem loads required to mitigate the worst case accident and supplied emergency power to the Unit 3, Load Group A, ECCS subsystem load required for the worst case shutdown 1 1/10/84 scenario. Record the following Diesel Generator data 6.1.16 at 3A0413: 4380 3G002 Volts: ABØ BCØ 4380 4300 CAØ -----

6.1.17

Secure Unit 3 RCS boration by performing step $\frac{2 \cdot 2 \cdot 1 \cdot 1}{2}$ in Check-Off List $\frac{1}{2}$ in S023-3-3.12. $2 \cdot 2 \cdot 2$

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6.1.18 Synchronize 2A04 to Reserve Auxiliary Transformer 2XR1 as follows (Ref. 2.2.3).

3G002 Vars:

3G002 Watts:

3G002 Amperes: AØ

3G002 Frequency:

- .1 Select ESF A SYNC MASTER CONTROL, 2HS-1627-1 to ON on 2CR63.
- .2 Place the Reserve Auxiliary Transformer 2XR1 feeder breaker to 2A0418 in the sync circuit by depressing SYNC on 2HS-1659-1.
- .3 Adjust 3GD02 voltage using 3HS-1669-1, DIESEL GEN 3GD02 VOLTAGE REGULATOR CONTROL, and 3GD02 frequency using 3HS-1671-1, DIESEL GEN 3GD02 GOVERNOR CONTROL to match the incoming frequency and voltage so that the synch scope is moving slowly a in the clockwise direction.

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SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

ENGINEERING PROCEDURE S023-SPE-017 **REVISION 1** PAGE 12 OF 15

6.0 PROCEDURE (Continued)

CAUTION ******

Perform steps 6.1.18.4 and 6.1.18.5 in rapid succession. This will ensure smooth transfer of diesel generator operating mode from speed control to droop control. Failure to do so may result in motoring of the diesel generator.

6.1.18.4 When the synch scope is within 5 minutes of the straight up position, depress CLOSE on 2HS-1659-1, 4.16 kV BUS 2A04 RES AUX XFMR 2XR1 FDR BKR, 2A0418.

> .5 Open the switch in the jumper installed in 3A0416 cubicle to transfer the diesel generator from speed control mode to droop control mode. Verify "Droop In" illuminated on 3ZL-1768-1 on 3CR63.

6.1.18.6 Verify proper voltage on 2A04, then remove 3A0418 from the sync circuit.

> CAUTION Perform steps 6.1.18.8 and ====== 6.1.18.7 in rapid succession. This will ensure smooth transfer of diesel generator operating mode from droop control to speed control.

- Open 2A04 bus-tie 2A0417 by pressing TRIP .7 on 2HS-1660A-1. CLOSE
 - Open the switch in the jumper installed in cubicle 3A0416 and verify 3G002 in speed control by observing "Droop In" not illuminated on 37L-1768-1 on 3CR63.

6.1.19

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NOTE:

- Stop the strip chart recorder started in step 6.1.8.
 - Do not secure Dome Air Circulating Fans unless they have been in service for 15 minutes.

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SAN ONOFRE NUCLEAR GENERATING STATION ENGINEERING PROCEDURE SO23-SPE-D17 UNITS 2 AND 3 **REVISION 1** PAGE 13 OF 15 6.0 PROCEDURE (Continued) VERIFIED BY/DATE 6.1.20 Secure loads, as required, that were Min placed in service per step 6.1.12. / પાત્રીયન 6.1.21 Request the Station Electrical Test Department to terminate the wire lifted per step 6.1.5. Second Verification June Auguchow 1 11184 PER TELECON 6.1.22 Request the Station Electrical Test Department to remove the switched jumper intalled in step 3.10. 11/10/84 Second Verification JOHN ANBULADON 6.1.23 After the interlock between the bus-tie and the diesel has been reinstalled, perform the following: .1 Place 2G002 in NORMAL using keyswitch 11/10/04 2HS-1767-1 on 2CR63. Depress LOCKOUT RESET on 2HS-1662-1. .2 Diesel Gen 2G002 Lockout Relay Reset on 2CR63. 6.1.23.3 Place the 4.16 kV ESF 2A04 bus-tie transfer switch in AUTO using 2HS-1660B1 11/24 on 2CR63. 6.1.24 Perform operability test on 2G002 using 1/11/44 Ref. 2.2.6. 6.2 Diesel Generator Permanently Connected Load Capacity Test CAUTION Ensure the switch in the jumper to be ----installed is open. Closing the switch will auto start HPSI pump 3P017.

NOTE:

Step 6.2.1 may be performed prior to the completion of section 6.1.

6.2.1

Request the Station Electrical Test Department to install a switched jumper in the following location:

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4 06 3 ENGINEERING PROCEDURE SO23-SPE-017 SAN ONOFRE NUCLEAP GENERATING STATION **REVISION 1** PAGE 14 OF 15 TCA 1-1 VERIFIED BY/DATE 6.0 PROCEDURE (Cost of) 6.2.1 .1 Across terminations BR1 and BR2 (P1 and P41) in 3A0409 (Ref. E.D. ٨ 32643 and 32645, W.D. S023-302-2-446-0) SECOND VERIFICATION DATE 6.2.2 Open/verify open the switch in the jumper. 6.2.3 Rack in HPSI pump, 3P017, on Train A and close the D.C. breaker and ready the pump for service per SO23-3-2.7. 6.2.4 Verify step 2.2.3 in Check-Off List 2 in S023-3-3.12 has been completed. 6.2.5 Station an operator at the switched jumper previously installed and establish communications. Perform step 2.2.4 and 2.2.5 in Check-Off 6.2.6 List 2 in S023-3-3.12. 6.2.7 Have the operator close the switch in the jumper after verifying the diesel generator breaker 3A0413 has opened. and 4.16 kV ESF bus 3A04 has shed all its loads. PERFORM STEPS 2.2.6 AND 2.2.7 IN CHECK-OFF LIST 2 IN SO23-3-3.12 6.2.7.1 Verify that two HPSI pumps start when 3A04 6.2.8 is energized. _____ 2.2.8 Secure HPSI pump 3P0174 on Train A from 6.2.9 TO 3CR57 after step 2:2:9 has been completed in Check-Off List + in S023-3-3.12. 6.2.10 Open the switch in the jumper. Have operations open the D.C. breaker and 6.2.11 rack out the breaker of HPSI pump 3P017 on Train A. 6.2.12 Have the Station Electrical Test TCI Department remove the jumper installed in step 6.2.2. 6.2.1. SECOND VERTFICATION

<i>,</i>	SAN ONOFR		GENERATING STATION		GINEERING VISION 1	B PROCE	DURE SO23-SPE-017 PAGE 15 OF 15 TCM 1-	
′(6.0 PROCE	DURE (Cont	tinued)				VERIFIED BY/DATE	
		6.2.13	Analyze the strip cl and record the info	hart re rmation	corder ti below:	races		
				Min	Max	Time	(O sec≕time when 2A0413 closed)	
·		.1	Voltage - 4.16 kV		· • · · • • • • •		-	
		.2	Voltage - 480 V			·	-	
	•	.3	Frequency - Hz	<u> </u>			-	
			3G002 has started t maintaining voltage the acceptance crit	and fr	equency '	within		
					RECO	RDED	BY: /	
		6.2.14	2.2 Return to step 2.2. in SO23-3-3.12, Int Refueling Test.	6 in Ch	eck-Off ESF Sys	List 2 tem		
		6.2.15	Notify the Shift Su test has been compl		or that t	his	/	
•			VERIFIED BY: Shift	: Superv	visor	<u>/</u>		
·		6.2.16	Remove the multiple terminations instal	e channe lled per	el record step 3.	ler and 7.		ti
	1.0 RECO	RDS				3		
	7.1	None						
	8.0 ATTA	CHMENTS						
	8.1	ESF Load	Determination					

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8.2 Test Connections for Diesel Generator Capacity Test

8.3 Standby Power Capacity Test Sequence of Events

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ENGINEERING PROCEDURE SO23-SPE-017 REL 1 PAGE 1 OF 9 ATTACHMENT 8.1

ESF LOAD DETERMINATION

1.0 DISCUSSION

The objective of this attachment is to measure the as-built loads of certain ESF components when in service at their rated capacities.

Load calculations are made using the following formula:

$$L = \left(\frac{I_{AQ} + I_{BQ} + I_{CQ}}{3}\right) \times V \times PF \times \sqrt{3}$$
TCN

where

L = Load in watts

 $I_{A\emptyset} = A\emptyset$ current in amps $I_{B\emptyset} = B\emptyset$ current in amps $I_{C\emptyset} = C\emptyset$ current in amps V = Bus Voltage

PF = Cosine of the phase angle or Power Factor. Power Factor may be obtained from the equipment description in the FSAR, Station Manual, or from field measurements.

2.0 PROCEDURE

VERIFIED BY

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2.1 Auxiliary Building Emergency Chiller

2.1.1 Request the Station Electrical Test Department to measure the phase current and bus voltage of Chiller E335 or E336.

2.1.2 Chiller tested (circle one): E335, E336

Date Time

FNGINEERING PROCEDURE S023-SPE-017 ATTACHMENT 8.1 PAGE 2 OF 9

PROCE	DURE		VERIFIED B
	2.1.3	Phase current measured:	
		A B C	/
	2.1.4	Bus voltage measured volts	/
-	2.1.5	Phase angle measured:	/
•	2.1.6	Load Calculation	/
2.2	Low Press	sure Safety Injection Pump (LPSI)	
	2.2.1	Request the Station Electrical Test Department to measure the phase current and bus voltage o LPSI pump 2/3 PO15, PO16 at approximately 4150 gpm.	f/
	2.2.2	LPSI pump tested (circle one): 2P015, 2P016,	
	,	3P015, 3P016	
		gpm (FE0306)	
		Date Time	
	2:2.3	Phase current measured:	
		A B C	/
	2.2.4	Bus voltage measured volts	/
	2.2.5	Phase angle measured:	/
	2.2.6	Load calculation	/
2.3	High Pres	ssure Safety Injection Pump (HPSI)	
	2.3.1	Request the Station Electrical Test Department to measure the phase current and bus voltage of HPSI pump, 2/3 P017, P018 or P019 at approximately 650 gpm.	/

SAN ONOI UNITS 2	FRE NUCLEAF AND 3	R GENERATING STATION	ENGINEERING PROCEDURE SO23-S REVISION 1 PAGE 3 ATTACHMENT 8.1	
2.0 PROC	CEDURE			VERIFIED BY
•	2.3.2	HPSI pump tested:		
		(circle o	ne) 3P017, 3P018, 3P019	
		gpm Date	Time	/
	2.3.3	Phase current meas		
•		Α	B C	/
	2.3.4		red volts	/
	2.3.5	Phase angle measur		/
	2.3.6	Load calculation:		/
2.4	Containm	ent Spray Pump		
	2.4.1	to measure the pha of a Containment S	n Electrical Test Department se current and bus voltage pray pump 2P012, 2P013 approximately 1900 gpm.	/
	2.4.2	Containment Spray	<pre>pump tested (circle one):</pre>	
			2P012, 2P013,	
			3P012, 3P013	/
		gpm Date	Time	
	2.4.3	Phase current meas	ured:	
		Α	B C	/
	2.4.4	Bus voltage measur	ed volts	/
	2.4.5	Phase angle measur	ed:	
•	2.4.6	Load calculation:		/
2.5	, Saltwater	Cooling (SWC) Pump		
· .	2.5.1	of SWC pump, 2P112	n Electrical Test Department se current and bus voltage , 2P113, 2P114, 2P307, 4 or 3P307 at approxi-	. /

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ENGINEERING PROCEDURE S023-SPE-017 REVISION 1 SAGE HEAD AND A

2.0 PROC	EDURE					VERIFIED BY
	2.5.2	SWC pump	tested (ci	rcle one)	:	
			2P112,	2P113, 2	P114, 2P307,	
			3P112,	3P113, 3	P114, 3P307	/
		gpm	Date		Time	/
	2.5.3	Phase curi	rent measur	red:		
,			Α	B	C	/
	2.5.4	Bus volta	je measured	d <u> </u>	volts	/
	2.5.5	Phase angl	le measured	1:		/
	2.5.6	Load calcu	lation:			· /
2.6	Component	Cooling Wate	er (CCW) Pu	ump		-
	2.6.1	to measure of a CCW p	e the phase oump 2PO24, BPO26 while	e current , 2PO25 2P	al Test Departme and bus voltage 2026, 3P024, upplying the	
	2.6.2	CCW pump t	ested (cir	cle one):		
			-	2P024	, 2P025, 2P026	
	,			3P024	, 3P025, 3P026	
	·	gpm	Date	1	ime	1
	2.6.3	Phase curr	ent measur	red:		
			Α	В	C	/
	2.6.4	Bus voltag	e measured		volts	/
•	2.6.5	Phase angl	e measured	l:	 .	1
	2.6.6	Load calcu	lation:			
2.7	Auxiliary	Feedwater Pu	mp (AFW)			
	2.7.1	to measure	the phase -driven AF	 current W pump, 2 	1 Test Departme and bus voltage P141, 2P504, 700 gpm.	

ENGINEERING PROCEDURE SO23-SPE-017 REVISION 1 PAGE 5 OF 9 ATTACHMENT 8.1

2.0 PRO	CEDURE		VERIFIED BY
	2.7.2	AFW pump tested (circle one):	
		2P141, 2P504, 3P141, 3P504	
		gpm Date Time	/
	2.7.3	Phase current measured:	
		A B C	/
	2.7.4	Bus voltage measuredvolts	/
	2.7.5	Phase angle measured:	/
	2.7.6	Load calculation:	/
2.8	Charging	Pump	
	2.8.1	Request the Station Electrical Test Department to measure the phase current and bus voltage of a Charging pump, 2P190, 2P191, 2P192, 3P190, 3P191, 3P192.	/
	2.8.2	Charging pump tested (circle one):	
		2P190, 2P191, 2P192,	•
		3P190, 3P191, 3P192	
		gpm Date Time	/
	2.8.3	Phase current measured:	
		A B C	/
	2.8.4	Bus voltage measured volts	/
	2.8.5	Phase angle measured:	/
	2.8.6	Load calculation:	/
• 2.9	Control R	oom Emergency Air Conditioning Unit	
	2.9.1	Request the Station Electrical Test Department to measure the phase current and bus voltage of a Control Room Emergency Air Conditioning Unit, E418 or E419.	·/

ENGINEERING PROCEDURE SO23-SPE-017 REVISION 1 PAGE 6 OF 9 ATTACHMENT 8.1

2.0 PROCE	EDURE		VERIFIED BY
	2.9.2	Emergency Air Conditioning Unit tested (circle one): E418 or E419	
		gpm Date Time	. /
	2.9.3	Phase current measured:	
. "		A B C	/
	2.9.4	Bus voltage measured volts	/
	2.9.5	Phase angle measured:	/
	2.9.6	Load calculation:	/
2.10	Battery Cha	arger	
	2.10.1	Request the Station Electrical Test Department to measure the phase current and bus voltage of a Battery Charger, 28001, 28002, 28003, 28004, 38001, 38002, 38003, 38004.	
	2.10. 2	Battery Charger tested (circle one):	
	,	2B001, 2B002, 2B003, 2B004	· .
		3B001, 3B002, 3B003, 3B004	
	,	Date Time	/
	2.10.3	Phase current measured:	. /
		A B C	/
	2.10.4	Bus voltage measured volts	/
	2.10.5	Phase angle measured:	/
	2.10.6	Load calculation:	/
2.11	Upper Dome	Air Circulating Fan	
	2.11.1	Request the Station Electrical Test Department measure the phase current and bus voltage of a	

Upper Dome Air Circulating Fan, 2A071, 2A072, 2A073, 2A074, 3A071, 3A072, 3A073, 3A074.

SAN ONOFRE NUCLEAR GENERATING STATION

ENGINEERING PROCEDURE S023-SPE-017 REVISION 1 PAGE 7 OF 9 ATTACHMENT 8.1

2.0 PROCI	EDURE		VERIFIED BY
	2.11.2	Upper Dome Air Circulating Fan tested (circle o	ne):
		2A071, 2A072, 2A073, 2A074	
		3A071, 3A072, 3A073, 3A074	
		Date Time	/
· .	2.11.3	Phase current measured:	
		A B C	/
	2.11.4	Bus voltage measured volts	/
. ·	2.11.5	Phase angle measured:	/
	2.11.6	Load calculation:	/
2.12	Containment	Emergency Fan	
	2.12.1	Request the Station Electrical Test Department measure the phase current and bus voltage of a Containment Emergency Fan, 2E399, 2E400, 2E401, 2E402, 3E399, 3E400, 3E401, 3E402.	to /
	2.12.2	Containment Emergency Fan tested (circle one):	
		2E399, 2E400, 2E401, 2E402	
		3E399, 3E400, 3E401, 3E402	
		Date Time	/
	2.12.3	Phase current measured:	
	•	A B C	/
	2.12.4	Bus voltage measured volts	. /
•	2.12.5	Phase angle measured:	/
•	2.12.6	Load calculation:	
2.13	Emergency Ch	niller Water Pump	
	2.13.1	Request the Station Electrical Test Department to measure the phase current and bus voltage of an Emergency Chiller Water Pump, 2P160, 2P162, 3P16 3P162 at approximately 650 gpm.	



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ENGINEERING PROCEDURE SO23-SPE-017 REVISION 1 PAGE 8 OF 9 ATTACHMENT 8.1

2.0 PROC	EDURE		VERIFIED BY
	2.13.2	Emergency Chiller Water Pump tested (circle one	e):
		2P160, 2P162, 3P160, 3P162	
		Date Time	/
	2.13.3	Phase current measured:	
		A B C	1
		gpm Discharge Pressure	
	2.13.4	Bus voltage measuredvolts	1
	2.13.5	Phase angle measured:	1
	2.13.6	Load calculation:	
2.14	Diesel Rad	diator Fan	
	2.14.1	Request the Station Electrical Test Department measure the phase current and bus voltage of a Diesel Radiator Fan, 2E546, 2E550, 2E547, 2E549 3E546, 3E550, 3E547, and 3E549.	
	2.14.2	Diesel Radiator Fan tested (circle one):	
		2E546, 2E550, 2E547, 2E544	
		3E546, 3E547, 3E549, 3E550	
		Date Time	/
	2.14.3	Phase current measured:	
		A B C	/
	2.14.4	Bus voltage measured volts	/
	2.14.5	Phase angle measured:	/
•	2.14.6	Load calculation:	/
2.15	Diesel Gen	erator Building Emergency Supply Fan	
	2.15.1	Request the Station Electrical Test Department measure the phase current and bus voltage of a Diesel Generator Building Emergency Supply Fan, 2A274, 2A275, 2A276, 2A277, 3A274, 3A275, 3A276, 3A277.	

SAN ONOFRE NUCLEAR GENERATING STATION ENGINEERING PROCEDURE SO23-SPE-017 UNITS 2 AND 3 **REVISION 1** PAGE 9 OF 9 ATTACHMENT 8.1 2.0 PROCEDURE VERIFIED BY 2.15.2 Diesel Generator Building Emergency Supply Fan tested (circle one): 2A274, 2A275, 2A276, 2A277 3A274, 3A275, 3A276, 3A277 Date Time 2.15.3 Phase current measured: A _____ B ____ C ____ ____/ Bus voltage measured volts 2.15.4 / Phase angle measured: 2.15.5 2.15.6 / Load calculation: 2.16 Boric Acid Makeup Pump (BAMU Pump) 2.16.1 Request the Station Electrical Test Department to measure the phase current and bus voltage of a BAMU Pump, 2P174, 2P175, 3P174, or 3P175 at approximately 200 gpm flow. / 2.16.2 BAMU Pump tested (circle one): 2P174, 2P175, 3P174, 3P175 Date Time _____/ 2.16.3 Phase current measured: A _____ B _____ C _____ / . Bus voltage measured _____ volts 2.16.4 /____ 2.16.5 Phase angle measured: / 2.16.6 Load calculation: /____

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SAN ONOFRE NUCLEAR GENERATING STATION

ENGINEERING PROCEDURE SO23-SPE-017 REVISION 1 PAGE 1 OF 2 ATTACHMENT 8.2 7 57-8 TG1 1-1

TEST CONNECTIONS FOR DIESEL CAPACITY TEST

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1.1 Connect/verify connected the following load group A parameters to a visicorder(s) or equivalent multiple-input recorder to monitor and record test data.

NOTE: All connections are to be made with spade lugs so that the permanent wiring will not be disconnected while connecting/ disconnecting test equipment.

It	em	Bkr. No.	Parameter (Terminations)	Trace No.	W.D. #	E.D. #	
	Α.	3A041 4	Diesel Generator 3G002 Frequency RA42(F2) RA43(F1)		33763 -2/ S023-302-2-451-	32329 3	
	Β.	3A0414	Diesel Generator 3G002 Voltage RA22(1B31) RA23(1B32)		33763 -2/ \$023-302-2-451-	32329 3	R
بر بر بر	C.	3A0413	Diesel Generator 3G002 Breaker Position RX1(P11) RX6(C13)		33763 -2/ \$023-302-2-450-	32328 •4	
	D.	3A041 3	Diesel Generator 3G002 Current RY39(112) RY40(111)		33763 -2/ 5023-302-2-450	3232 9 -4	
	Ε.	2A0417 3A0416	Bus Tie 3A04 Current RX25(A1) RX25 (A11) Rx26		31763 SH 17 33763-31 5023-302-2-453	30 216 3 <u>2216</u> - 2 -	TCA
	F.	3A0417	MCC 3B04 Current RX1(A1) RX2(A11)	.	33763-3/ 5023-302-2-454	32219 0	
	G.	2A042 0	MCC 2804 Current RX1(A1) RX2(A11)		31763-20	3021 9	
	ң.	2B0415	MCC 2BY Current Clamp on Ammeter		N/A	3025 9	
	[.	260414	MCC 2BE AØ Current Clamp on Ammeter		N/A	.3026 0	
	J.	380415	MCC 38Y AØ Current Clamp on Ammeter		N/A	3025 9	

-8 856 ENGINEERING PROCEDURE SO23-SPE-017 SAN UNOFRE NUCLEAR GENERATING STATION TCn 1-PAGE 2 OF 2 **REVISION 1** UNLESS 2 AND 3 ATTACHMENT 8.2 E.D. # Trace No. W.D. # Bkr. No. Parameter (Terminations) n, 380414 MCC 3BE AØ Current K. 30260 N/A Clamp on Ammeter MCC BQ AØ Current L. 2/380417 30261/ N/A Clamp on Ammeter 32261 380407 MCC 2BD AØ Current Μ. 32258 N/A Clamp on Ammeter ITEMS H. THROUGH M. TCH OPTION AL. ARE NOTE:

N. JAOHIS ZAOH 4.16KV Voltage 127FI Resid. Voltage relay studs Bond 9

5073-302-2 452-2 3220 TON

N/1 30263

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4Bur Voltage Bus UV device 27 CV-2 Studs Bund of SAN ONOFRE NUCLEAR GENERATING STATION

ENGINEERING PROCEDURE SO23-SPE-017 ADVICTOR O PAGE 1 OF 2 ATTACHMENT 8.3

Sequence of Events Summary

The following is a summary of the sequence of events during the performance of SO23-SPE-017, Standby Power Capacity Test.

- 1. Station Electrical Test to install and make operable test recorders.
- 2. LOVS concurrent with SIAS, CRIS, CCAS, CSAS, EFAS-1, and EFAS-2. (Step 2.2.1 in Check-Off List 1 in SO23-3-3.12).
- 3. Place red train transfer switch in manual. (6.1.3 and 6.1.4)
- Remove bus-tie breaker and diesel generator breaker interlock on Unit 3. (6.1.5)
- 5. Place 2G002 in MAINTENANCE LOCKOUT. (6.1.6)
- 6. Start test recorder. (6.1.8)
- 7. De-energize 2A04, (6.1.9)
- 8. Energize 2A04 from 3G002 using bus-tie. (6.1.11)
- 9. Place worst case shutdown loads in-service on Unit 2. (6.1.12)
- 10. Take required test data. (6.1.16)
- 11. Parallel and connect 2A04 to 2XR1. (6.1.18)
- 12. Open bus-tie. (6.1.18)
- 13. Stop test recorder. (6.1.19)
- 14. Replace bus-tie breaker and diesel generator breaker interlock. (6.1.21)
- 15. Return 2G002 to NORMAL. (6.1.22)
- 16. Return bus-tie breaker transfer switches to AUTO. (6.1.22)
- 17. Have Station Electrical Test install switched jumper to defeat Kirk key interlock in 3P017 control circuit. (6.2.1)
- 18. Verify open/open switch in jumper. (6.2.2)

ENGINEERING PROCEDURE S023-SPE-017 REVISION 0 PAGE 2 OF 2 ATTACHMENT 8.3

19.	Rack in 3A0409 and close D.C. breaker. (6.2.3)
20.	Emergency loads in-service energized from diesel generators for greater than 15 minutes. (2.2.2 in Check-Off List 1 in SO23-3-3.12)
21.	Start strip chart recorder (6.2.6)
22.	Open diesel generator breakers. (2.2.4 in Check-Off List 1 in SO23-3-3.12)
23.	Close switch in jumper after bus strips. (6.2.7)
24.	Secure 3P017 after loads have sequenced. (6.2.9)
25.	Stop test recorder. (2.2.8 in Check-Off List 1 in SO23-3-3.12)
26.	Remove jumper, rack out 3A0404. (6.2.11 and 6.2.12)

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ENCLOSURE VI

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ENCLOSURE VII

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CONFORMANCE WITH NRC GUIDELINES

The following Regulatory Guides and General Design Criteria were reviewed during the evaluation of the proposed Emergency Diesel Generator Cross-Connect design change. The proposed change was found to be in conformance with the guidance or requirements of each as currently committed to by SCE for SONGS 2 and 3:

- o 10 CFR 50, Appendix A, GDC 5, 17, 18, 33, 34, 35, 38, 41, 44, revised as of January 1, 1985.
- Regulatory Guide 1.6 (Safety Guide 6), "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems," Rev. 0, March 1987.
- Regulatory Guide 1.32, "Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants," Rev. 1, March 1976.
- Regulatory Guide 1.93, "Availability of Electric Power Sources," December 1974.
- Regulatory Guide 1.47, "Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems," Rev. 0, May 1973.
- Regulatory Guide 1.75, "Physical Independence of Electric Systems," Rev. 1, January 1975.
- Regulatory Guide 1.81, "Shared Emergency and Shutdown Electric Systems for Multi-Unit Nuclear Power Plants," Rev. 1, January 1975.

Specifically, with respect to GDC 5, "Sharing of Structures, Systems and Components," and GDC 17, "Electric Power Systems," the following information is provided.

o General Design Criterion (GDC) 5 requires that:

"Structures, systems, and components important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units."

As supported by the Failure Modes and Effects Analysis (FMEA) and single failure evaluation performed for the proposed cross-connect, as well as the review of SONGS Units 2 and 3 FSAR safety analyses, implementation of the proposed diesel generator cross-connect will not impair the ability of the plant ESF systems and components to perform their intended safety functions, nor will it compromise:

The integrity of the reactor coolant pressure boundary;

- The capability to shut down the reactor and maintain it in a safe condition; or
- The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposure of 10 CFR 100.

Therefore, it was determined that the proposed design change complies with the requirements of GDC 5.

o General Design Criterion 17 requires (in part) that:

"An onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

The onsite electric power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure . . .

Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies."

The results of the FMEA and single failure evaluation performed for the proposed cross-connect coupled with the review of SONGS Units 2 and 3 FSAR safety analyses demonstrate the compliance of the proposed cross-connect with the requirements of GDC 17. The safety function of the emergency standby power systems will not be impaired by implementation of the proposed design change. The proposed cross-connect will not compromise:

- The integrity of the reactor coolant pressure boundary;
- The capability to shut down the reactor and maintain it in a safe condition; or

- The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposure of 10 CFR 100.

Therefore, it was determined that the proposed design change complies with the requirements of GDC 17.

APPLICATION OF SINGLE FAILURE CRITERION TO SHARED SYSTEMS

The sequence of events for a loss of offsite power with the proposed design change installed and one of the transfer enable switches in the AUTO position would be:

- o preferred source lost
- o backup preferred source lost
- o associated diesel generator not available
- o opposite unit diesel generator in same train supplies power to vital buses
- o vital loads are supplied in both units.

The single failure analysis and the failure modes and effects analysis evaluated the failure of each component in the ESF power supply system (i.e. diesel generator, tie breaker, feeder breaker, vital bus etc.). These evaluations showed that the worst case single failure was the loss of a vital bus (either through loss of a cross-tied diesel generator, cross-tie breaker, feeder breaker or bus failure) which has been analyzed for in the FSAR previously and found not to impact the safety of the plant, since in each case at least one train of ESF equipment was available.

SCE's interpretation of the Single Failure Criterion satisfying the guidance of SRP Section 3.8.1.111.4, Regulatory Guide 1.81 C.2.b., and SECY-77-439 is the application of a single failure to the onsite emergency AC electric system, a part of which is the <u>shared</u> portion of the system. Further, per Regulatory Guide 1.81 C.2.b, one of the single failures considered in the evaluation of the set of possible single failures should be "a false or spurious accident signal at the system level in the non-accident unit."

It should be noted here that SCE's interpretation somewhat parallels the design basis for Prairie Island Units 1 and 2 where there are two diesel generators cross-connected to support both units. Prairie Island FSAR Section 8.4.1 discusses application of the Single Failure Criterion as follows:

". . . the question becomes whether it is credible to assume that in addition to the most restrictive single failure already assumed, if one diesel generator fails to start, another single failure must be hypothesized to occur generating the spurious safety injection signal in such a manner as to deny the unit with the accident adequate diesel power to supply its Engineered Safety Features. The probability of these two single failures occurring simultaneously is so low as to represent no hazard to the public." In addition, Section 9.1.2.3 of the Grand Gulf Nuclear Station Units 1 and 2 FSAR describes the shared standby service water system. Specifically, the design basis is:

"The system operation analysis for Mode III is based on the following assumptions:

- a. LOCA occurs in one unit, assumed to be Unit 1.
- b. Normal shutdown of the other unit, Unit 2.
- c. Total loss of offsite power for both units.
- d. Worst single active failure occurs in the unit experiencing a LOCA. The worst active failure for this analysis is the loss of one of the two standby diesel generators which removes one of the standby service water loops from operation. The Unit 1 A standby diesel generator is assumed to fail.
- e. No makeup water is available to the SSW cooling tower basins for 30 days
- f. Worst 30-day site meteorology for heat rejection.

These assumptions will result in the greatest heat rejection rate for the ultimate heat sink during the most severe meteorology for cooling tower heat rejection.

Cooling requirements for shutdown of the two units are satisfied by:

- a. Unit 1 SSW Loop A and HPCS Service Water Loop C
- b. Unit 2 SSW Loop A and SSW Loop B

The licensed Prairie Island and Grand Gulf positions are precedents which support SCE's interpretation of available regulatory guidance.

COMPLIANCE WITH REG. GUIDE 1.81 POSITIONS

a. Regulatory Position C.2.b regarding the application of single failures.

Regulatory Guide 1.81, Regulatory Position C.2.b, and Standard Review Plan, Section 8.3.1, Subsection 111.4, address application of the single failure criterion.

o SRP Section 8.3.1.111.4, on page 8.3.1-14, states:

"... to ensure that the selected capacity is sufficient to power the minimum ESF loads in any unit and safely shut down the remaining units in the event of an accident in one unit and a single failure or spurious or false accident signal from another unit and loss of preferred power to all the units." o Regulatory Guide 1.81, Regulatory Position C.2.b states:

"A single failure (a false or spurious accident signal at the system level in the non-accident unit should be considered as a single failure) should not preclude the capability to automatically supply minimum engineered safety feature (ESF) loads in any one unit and safely shut down the remaining unit, assuming a loss of the offsite power."

SCE's interpretation of the Single Failure Criterion satisfying the guidance of Regulatory Guide 1.81 C.2.b, SRP Section 3.8.1.111.4 and SECY-77-439 is the application of a single failure to the onsite emergency AC electric system, a part of which is the <u>shared</u> portion of the system. Further, per Regulatory Guide 1.81 C.2.b, one of the single failures considered in the evaluation of the set of possible single failures should be "a false or spurious accident signal at the system level in the non-accident unit."

b. Regulatory Position C.2.e regarding the need for procedural control of any additional operator actions (e.g., unit-to-unit enable switch position, override of spurious SIAS signal).

Regulatory Guide 1.81, Regulatory Position C.2.e, addresses the necessity for coordination between unit operators.

o Regulatory Guide 1.81, Regulatory Position C.2.3, states:

"Coordination between the unit operators should not be necessary in order to meet Regulatory Positions 2.b and 2.c. Coordination required to meet Regulatory Position 2.d should be minimized."

The issues here are:

- Written procedures for control of the unit-to-unit load transfer enable switch for each train; and
- Operator action to override the dual unit SIAS signal, in particular, if this is an immediate action necessary to mitigate the consequences of an accident.

For the design change evaluated, this action is not required to mitigate the consequences of an accident. However, administrative procedures will also be required to prevent the control room operator, on the unit with the actual LOCA, from resetting the SIAS signal while the shared diesel generator is carrying LOCA loads. If the SIAS signal is reset, then a false/spurious SIAS signal, from the non-LOCA unit, would not cause the bus tie breaker to open and could overload the diesel generator. The common control operator has responsibility for:

- Electrical Power distribution switching equipment in Units 2 and 3
- 2) All four diesel generators at Units 2 and 3
- 3) All diesel generator tie breakers

Before any plant modification is declared operable, an evaluation of the station's Emergency Operating Instructions (EOIs) and FSAR accident analyses will be performed. This evaluation will ensure that there are no existing requirements, in either the EOIs or FSAR, that the SIAS signal be reset for accident mitigation.

c. Regulatory Position C.3 regarding the NRC preferred configuration.

Regulatory Guide 1.81, Regulatory Position C.3, states:

"In the case of multi-unit nuclear power plants for which the construction permit application was made on or after June 1, 1973, each unit should have separate and independent onsite emergency and shutdown electric systems, both a.c. and d.c., capable of supplying minimum ESF loads and the loads required for attaining a safe and orderly cold shutdown of the unit, assuming a single failure and loss of offsite power.''

The regulatory guide allows conformance to Regulatory Position C.2 or C.3 for multi-unit nuclear power plants for which the construction permit application was made <u>prior to</u> June 1, 1973, as was the case for SONGS 2 and 3. The current design does in fact meet Regulatory Position C.3, which endorses the NRC's preferred configuration. The proposed design change will involve SCE conformance to Regulatory Position C.2 which provides an alternative to C.3 deemed acceptable to the NRC.

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ENCLOSURE I

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AUXILIARY FEEDWATER PUMP START AT 30 SECONDS

UNIT 2 TRAIN A DIESEL (2G002)

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LOAD APPLIED	VOLTS (LO/HI)	FREQUENCY (LO/HI)	TEST DATE
NORMAL LOADS	3850/4655 Nominal 4360	59.7/60.4 NOMINAL 60.1	05/12/86
NORMAL LOADS	3920/4725	59.8/60.4	11/18/83
PLUS A SECOND CCW PUMP	NOMINAL 4445	NOMINAL 60.0	
NORMAL LOADS PLUS A	4025/4850	60.0/60.5	11/19/83
SECOND HPSI PUMP	NOMINAL 4550	NOMINAL 60.1	

SUMMARY: As the connected load increases, the voltage and frequency dips are reduced for those loads sequenced on as the load sequence continues. The more connected load that the diesel has already accelerated to monimal voltage and frequency, the less the dips from the starting of additional loads.

LOAD SEQUENCE AT TIME ZERO

UNIT 2 TRAIN A DIESEL (2G002)

LOAD APPLIED	VOLTS (LO/HI)	FREQUENCY (LO/HI)	TEST DATE
NORMAL LOAD SEQUENCE	3850/4743 NOMINAL 4515 LIMITS 3386/5644	59.54/60.64 NOMINAL 60.08 LIMITS 57.07/63/08	05/12/86
NORMAL LOAD SEQUENCE	3589.5/4900	59.0/60.7	11/19/83
PLUS ONE EXTRA CCW	NOMINAL 4325	NOMINAL 60.0	
PUMP AT 1.2 SECONDS	LIMITS 3281/5469	LIMITS 57.0/63.0	
NORMAL LOAD SEQUENCE	3570/5285	59.5/61.0	11/19/83
PLUS ONE EXTRA HPSI	NOMINAL 4550	NOMINAL 60.7	
PUMP AT TIME ZERO	LIMITS 3412.5/5687.5	LIMITS 57.1/63.1	

ENCLOSURE IV

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	E418	18	<u>5 +/- 0.5 sec</u>	5.15 Sec	<u>Sat / Unsat</u>	
	P012	20	10 +/- 0.5 sec	9.85 Sec	Sat / Unsat	
	E546	9	<u>10 +/- 0.5 sec</u>	10.05 Sec 9.45 Sec	Sat / Unsat Sat / Unsat	/.
	E550		10 +/- 0.5 sec	9.95 Sec 14.2 Sec	Sat / Unsat	
	A274	12	15 + / - 0.5 sec	14,5 Sec	Sat / Unsat	
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	P112, 307		<u>15 +/ - 0.5 sec</u> 20 +1.0 -0.5 sec	19.35 Sec	Sat / Unsat	
	P141	25	30 + 0.5 - 1.0 sec	24.85 Sec	Sat / Unsat	
	E336	26	34.5 - 77.0 sec	51.85 Sec	Sat / Unsat	
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