

Action Request Print: 070300161

Status ACTION WORKING

Important to Safety

Priority/Urgency: 3C

AR Restraint: 0.0

Def. Tag Hung? No

Sig Code: 3

Operable Determination: D

Lcoar/Edmr Flag: Y

Project Code: N/A

Nomel Flag: N Committee Closure Required:

Originated by: (b)(6)

Pax:

Dept: A3400

on: 3/3/2007 23:15:17

Owner: (b)(6)

Org: L1000

AR Due date:

Last updated by: (b)(6)

on: 9/4/2007 15:20:15

MRC Review Date: 9/5/2007

Description (General Tab)

3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3.3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3.3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3.3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Equipment (General Tab)

Type	ID	CRC	Functional Description
EQ-MEL	3HS1648-2	Critical	DIESEL GEN 3G003 VOLT REG CONTROL

Assignment Tab

Assignment	Reference	Assignee	Org	Status	Forecast	Due Date	Pri
1 - (FS) Field Support		(b)(6)	L3300	CLOSED	3/4/2007	4/3/2007	3C
2 - (MO) Maintenance Order (Reference)	2007030374000		M5200	CLOSED	3/10/2007	3/10/2007	2A
3 - (DCE) Direct Cause Evaluation	3G003 AVR A		L3300	CLOSED		9/30/2007	3A
4 - (MO) Maintenance Order	2007032145000		M5200	CLOSED	6/26/2007	6/26/2007	3C
5 - (RPT) Reportability Assessment	Not Reportable -		R3100	CLOSED		4/14/2007	3B
6 - (FS) Field Support	Common Cause		L3000	CLOSED		4/18/2007	3C
7 - (PRO) PROCEDURE CHANGE REQUEST DG-476			A5400	CLOSED		7/15/2007	3C
8 - (ACE) Apparent Cause Evaluation	3G003 AVR PR		L1000	CLOSED		9/28/2007	3A
9 - (FS) Field Support			L0000	CLOSED		4/24/2007	3A
10 - (DOC) misc document changes			L3000	CLOSED	5/18/2007	5/30/2007	3C
11 - (FS) Field Support			L4000	CLOSED	5/31/2007	6/15/2007	3C
12 - (FS) Field Support			W4000	CLOSED		6/15/2007	3C
13 - (FS) Field Support			L4000	CLOSED	6/15/2007	6/15/2007	3C
14 - (FS) Field Support			R1100	CLOSED	5/31/2007	6/15/2007	3C
15 - (FS) Field Support			R1100	CLOSED	6/15/2007	6/15/2007	3C
16 - (TND) Trending Assignment			W4000	CLOSED		6/22/2007	3C
17 - (DOC) misc document changes	BASES B 3.8.1		R1100	WORKING	10/1/2007	11/1/2007	3C
18 - (OTH) Other Assignment			L4000	CLOSED	10/15/2007	10/15/2007	3C
19 - (FS) Field Support			L4200	CLOSED	9/12/2007	8/12/2008	3C
20 - (DCE) Direct Cause Evaluation			L4200	CANCELLED	9/7/2007	9/20/2007	3A
21 - (FS) Field Support			L4200	CANCELLED		9/30/2007	3C
22 - (ACE) Apparent Cause Evaluation	MRFF 3G003 AV		L4200	CANCELLED		10/5/2007	3A
23 - (FS) Field Support			L4000	CANCELLED		9/12/2007	3A
24 - (MRE) Maintenance Rule Program Evalua			L4200	CLOSED	10/11/2007	11/11/2007	3A

Approvals Tab

Action Request Print: 070300161

Userid	Timestamp	Comments
(b)(6)	12/3/2007 09:22:15	AR assignment #24 - MRE closed.
	11/18/2007 09:59:17	AR assignment #2 - MO closed.
	11/6/2007 17:21:54	AR assignment #2 - MO closed.
	10/1/2007 07:17:10	AR assignment #8 - ACE closed.
	9/14/2007 10:10:39	AR assignment #18 - OTH closed.
	9/11/2007 09:34:38	AR assignment #21 - FS cancelled.
	9/11/2007 09:31:58	AR assignment #22 - ACE cancelled.
	9/11/2007 09:24:28	MRE assignment created.
	9/10/2007 14:55:43	AR assignment #23 - FS cancelled.
	9/10/2007 14:54:21	AR assignment #20 - DCE cancelled.
	9/5/2007 13:33:10	FS assignment created.
	9/5/2007 11:18:51	ACE assignment created.
	9/4/2007 15:20:16	MRC Review Date was changed by (b)(6) from 8/20/2007 to 9/5/07
	8/31/2007 08:10:19	FS assignment created as child of DCE .
	8/30/2007 11:58:18	AR assignment #19 - FS closed.
	8/26/2007 00:59:26	AR assignment #3 - DCE closed.
	8/22/2007 12:58:25	AR assignment #16 - TND closed.
	8/20/2007 05:49:08	rtw
	8/20/2007 05:34:38	MRC Review Date was changed by (b)(6) from 4/18/2007 to 08/20/07
	8/17/2007 16:07:56	DCE assignment created.
	8/13/2007 11:53:28	FS assignment created.
	7/25/2007 15:49:56	AR assignment #8 - ACE closed.
	7/18/2007 07:27:26	OTH assignment created.
	7/13/2007 15:22:50	AR assignment #7 - PRO closed.
	7/9/2007 09:27:33	AR assignment #4 - MO closed.
	6/28/2007 07:57:57	AR assignment #4 - MO closed.
	6/26/2007 16:40:55	AR assignment #4 - MO closed.
	6/25/2007 07:30:45	AR assignment #16 - TND closed.
	6/13/2007 09:18:07	AR assignment #8 - ACE closed.
	6/11/2007 08:21:38	AR assignment #13 - FS closed.
	6/11/2007 07:31:45	AR assignment #12 - FS closed.
	5/31/2007 10:15:24	AR assignment #11 - FS closed.
	5/25/2007 10:37:18	AR assignment #15 - FS closed.
	5/25/2007 09:50:31	AR assignment #14 - FS closed.
	5/22/2007 07:51:04	DOC assignment created.
	5/21/2007 08:40:13	AR assignment #10 - DOC closed.
	5/17/2007 09:59:28	AR assignment #2 - MO closed.
	5/16/2007 17:19:06	Created Assignment Type: TND from RCE/ACE/RCT process
	5/16/2007 16:59:44	FS assignment created.
	5/16/2007 16:52:38	FS assignment created.
	5/16/2007 16:48:34	FS assignment created.
	5/16/2007 16:45:50	FS assignment created.
	5/16/2007 16:36:37	FS assignment created.
	5/16/2007 16:14:00	DOC assignment created.
	4/20/2007 15:34:54	AR assignment #9 - FS closed.
	4/17/2007 08:04:24	Created Assignment Type: FS from ACE process
	4/17/2007 06:08:21	atw
	4/17/2007 06:08:16	Resp Org was changed by (b)(6) from to L1000
	4/17/2007 06:08:16	AR Owner was changed by (b)(6) from " to (b)(6)
	4/17/2007 06:07:48	Sig Code was changed by (b)(6) from 4 to 3
	4/17/2007 06:00:52	MRC Review Date was changed by (b)(6) from 4/2/2007 to 04/18/07

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Userid	Timestamp	Comments
(b)(6)	4/16/2007 14:18:48	ACE assignment created.
	4/2/2007 09:12:25	AR assignment #6 - FS closed.
	3/29/2007 14:49:05	MRC Review Date was changed by (b)(6) from 3/16/2007 to 4/2/07
	3/22/2007 14:35:55	PRO assignment created.
	3/19/2007 15:15:27	FS assignment created.
	3/16/2007 08:20:12	AR assignment #5 - RPT closed.
	3/16/2007 05:54:32	rtw
	3/16/2007 05:53:14	MRC Review Date was changed by (b)(6) from 3/5/2007 to 3/16/07
	3/15/2007 14:09:29	RPT assignment created.
	3/12/2007 00:55:50	AR assignment #2 - MO closed.
	3/12/2007 00:55:50	Operable Determination changed to 'D' due to assignment: 1 Type: XXX old value was "N"
	3/9/2007 07:18:01	MO assignment created.
	3/8/2007 07:21:45	AR assignment #1 - FS closed.
	3/5/2007 10:57:12	atw
	3/5/2007 10:56:09	Operable flag was changed by (b)(6) from D to N
	3/5/2007 05:05:25	AR operable = 'D' but has assignment that is a restriction to operability
	3/5/2007 05:05:00	MRC Review Date was changed by (b)(6) from " to 03/05/07
	3/4/2007 14:37:35	Operable Determination changed to 'D' due to assignment: 1 Type: FS old value was "N"
	3/4/2007 14:37:34	AR assignment #1 - FS closed.
	3/4/2007 13:26:53	DCE assignment created.
	3/4/2007 11:59:20	MO assignment created.
	3/4/2007 02:33:37	FS assignment created.
	3/3/2007 23:55:10	Operable flag was changed by (b)(6) from X to N
	3/3/2007 23:18:25	Action Request Created

Notes Tab

MRC to re-review for appropriate level of CE for MREE. Per SO123-XV-50, REv 6, page 33 of 37, Repeat Equipment function failures require an ACE vs a DCE (b)(6)

Review by MRC. DCE to be performed by SE due to FAILURE TO IDENTIFY THE AVR FAILURE THAT OCCURED IN MARCH AS A MAINTENANCE RULE FUNCTIONAL FAILURE UNTIL AUGUST. 8/20/07 (b)(6)

Review by MRC for possible ACE assignment as a result of meeting of NRC with NRA, OPS and Engineering in March.

User ID: (b)(6) Time: 3/7/2007 12:45:09

Text:

The affected inoperable equipment is AVR A for 3G003. 3G003 remains operable aligned to AVR B.

User ID: (b)(6) Time: 3/11/2007 17:59:18

Text:

Testing in the Test Tech on the removed AVR A could not duplicate the reported failure. It is considered to be a random, electronic failure at this time. The removed AVR A will be sent to the vendor for a failure analysis to determine the root cause.

References Tab

Type	Reference	Description
AR	CFT	

End of Print

Date Printed: 12/6/2007 15:28:58

Maintenance Order (Reference)

Action Request #: 070300161 -- 02

Assignment Type: MO

Resp Org: M5200
(b)(6)

Category: 90 CLOSED

Priority: 2A

Assignee: (b)(6)

Forecast Date: 3/10/2007 00

Reference: 2007030374000

Due Date: 03/10/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6) A3400 (b)(6)
Added: (b)(6) 3/4/2007 11:59:2

Updated: (b)(6) 11/18/2007 09:55

Problem Description:

Notification text -- NONE

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT-----

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RFO			(b)(6)	3/5/2007 05:05:25	
Required for Operability has changed for assignment: 2 Type: MO old value was "Y"					
CHG-RESTR			(b)(6)	3/5/2007 05:05:25	
AR Restraint has changed for assignment: 2 Type: MO old value was "0.0"					

Notes Tab Information:

----- END OF REPORT -----

Field Support

Action Request #: 070300161 -- 01

Assignment Type: FS

Resp Org: L3300

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date: 3/4/2007 00:

Reference:

Due Date: 04/03/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

3/4/2007 02:33:3

Updated:

(b)(6)

3/8/2007 07:21:3

Problem Description:

Notification text -- determine whether or not there is a common cause failure of AVR 'A' on 3G003. 24 hour requirement due 3/4/07 at 2215.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARS OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARS CHANGED FROM -3 MVARS TO -0 MVARS BACK TO HIGH AT 3.8 MVARS (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT -2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- This is the common cause assessment that was completed within 24 hours per T.S. 3.8.1. Do not revise. Issue another FS if clarification is needed. (b)(6)

The FS (Field Support) may serve as a feedback record (formalized email), as a record of field support efforts, or to document engineering assessments, but should not be used as a standalone record of changes to design documents, calculations, or operational methods. Changes of this nature need to be processed per the appropriate assignment type, (PRO, DOC, CLC, etc). This includes creating MO assignments and notifying maintenance when existing MOs are not required. For issues of potential consequence, peer checks of conclusions reached in the FS assignment are encouraged.

Scope Definition/Clarification:

On March 3, 2007 at approximately 21:36, during 3G003 monthly Tech Spec surveillance testing, MVAR was erratic in droop mode. AVR channel A was the selected voltage regulator. Operations subsequently switched to AVR channel B and successfully completed the surveillance testing. 3G003 was declared OPERABLE at approximately 02:30 on March 4, 2007.

This assignment was generated to Engineering to perform common cause assessment required per Tech Spec action 3.8.1.B.3.1 for all 4 EDGs 2G002, 2G003, 3G002 and 3G003

Applicability to other Systems/Components/Processes (extent of condition assessment):

AVR Channels A, B in 2(3)G002 and 2(3)G003

Cause of issue/problem (initiate a TND/ACE/RCE assignment, reference SO123-XV-50, attachment 4 if applicable):

The exact cause can not be determined at this time because no troubleshooting has been performed yet.

Troubleshooting MO 07030374000 will be performed to determine the cause.

Based on the erratic MVAR output, it is speculated that a dirty wiper on one of the AVR adjustment potentiometers could be the cause. These potentiometers have an open type housing which allows dirt and dust intrusion thereby developing unclean contact between the moving arm and the resistor causing unstable resistance which results in erratic fluctuation of MVAR output. Degradation of the potentiometers is a long term random failure mode resulting from random factors such as cleanliness, oxidation, vibration, humidity, salty air and manufacturing tolerances. Based on this, it is unlikely that potentiometer failures would occur simultaneously on multiple AVRs. SONGS operating experience supports this conclusion in that we have never experienced erratic output on more than one AVR at any given time. Therefore, erratic AVR output is not considered to be a Common Cause Failure mechanism.

Conclusion with basis/facts:

Based on the discussion above, there is no common cause concern for the AVRs in 2G002, 2G003, 3G002 or 3G003.

Identify other needed actions and list the tracking AR Assignment Numbers:

- 1) MO (assignment 2) # 07030374 to perform troubleshooting.
- 2) DCE (assignment 3) to determine cause and recommend corrective actions.

Document/describe any communication with requester upon completion, as appropriate:

The conclusion of this Common Cause Assessment was discussed with and agreed to, by the (b)(6) (STA) and (b)(6) (Shift Manager)

Reviewed by: (b)(6) ME, PAX (b)(6) 3/4/07

Approved by: (b)(6) ME, 3/4/07 (Per telecon)

Approval Tab Information:

Code	To	Status	From	By	Timestamp	Pax
CHG-RESTR				(b)(6)	3/8/2007 07:21:45	
				AR Restraint has changed for assignment: 1 Type: FS old value was "0.0"		
CHG-RFO				(b)(6)	3/8/2007 07:21:45	
				Required for Operability has changed for assignment: 1 Type: FS old value was "N"		
A	90		10	(b)(6)	3/8/2007 07:21:39	(b)(6)
CHG-RFO				(b)(6)	3/7/2007 13:10:39	
				Required for Operability has changed for assignment: 1 Type: FS old value was ""		
CHG-RESTR				(b)(6)	3/7/2007 13:10:39	
				AR Restraint has changed for assignment: 1 Type: FS old value was ""		
X	10		90	(b)(6)	3/7/2007 13:10:23	(b)(6)
				Reopened per (b)(6) req		
CHG-RESTR				(b)(6)	3/4/2007 14:37:35	
				AR Restraint has changed for assignment: 1 Type: FS old value was "0.0"		
CHG-RFO				(b)(6)	3/4/2007 14:37:35	
				Required for Operability has changed for assignment: 1 Type: FS old value was "N"		
A	90		10	(b)(6)	3/4/2007 14:37:12	(b)(6)
CHG-ASGN				(b)(6)	3/4/2007 11:07:03	
				Assignee has changed for assignment: 1 Type: FS old value was (b)(6)		

Notes Tab Information:

----- END OF REPORT -----

Maintenance Order

Action Request #: 070300161 -- 04

Assignment Type: MO

Resp Org: M5200

Category: 90

CLOSED

Priority: 3C

Assignee:

Forecast Date: 6/26/2007 00

Reference: 2007032145000

Due Date: 06/26/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6) A3400 (b)(6)
Added: 3/9/2007 07:18:0 Updated: (b)(6) 7/9/2007 09:27:3

Problem Description:

Notification text -- Perform troubleshooting of the removed AVR A from 3G003 in Test Tech Shop.
DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~ 0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT-----

Approval Tab Information:

Notes Tab Information:

----- END OF REPORT -----

Reportability Assessment

Action Request #: 070300161 -- 05

Assignment Type: RPT

Resp Org: B3100
(b)(6)

Category: 90 CLOSED

Priority: 3B

Assignee: (b)(6)

Forecast Date:

Reference: Not Reportable - EDG AVR

Reportable: N

Due Date: 04/14/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added: (b)(6)

3/15/2007 14:09:

Updated: (b)(6)

3/16/2007 08:20:

Problem Description:

Notification text -- Assignee should be left as the NRA default, to facilitate initial screening by NRA of all RPT issues within 24 hours. NRA will then redirect to the associated subject matter expert.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARS OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARS CHANGED FROM ~3 MVARS TO ~0 MVARS BACK TO HIGH AT 3.8 MVARS (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT-----

REPORTABILITY ASSESSMENT TEMPLATE

NOTE: Timely assessment for reportability consideration is important. RPT assignment due date as a function of priority is as follows based on system defaults: Pri 2/3A (7 days), pri 3B (30 days), pri 3C (60 days)

1. When did the SSC fail or first become degraded (break, code not met, out of SR range, etc.)? An SSC can be considered "failed when found" only if there is no compelling evidence of earlier failure.
2. What was the apparent cause (use engineering judgement to determine, if necessary - but also describe the basis for your judgement) of the failure or degraded condition? If appropriate, generate a cause evaluation assignment.
3. Would the SSC have been able to fulfill all its intended safety function(s) as defined in the UFSAR (reference specific sections) since the failure (Operable)? Consider all plant operating Modes and the status of other equipment. If yes, why?
4. Did the failure or failure mode affect or potentially affect another SSC or the other unit?
5. (BY NRA) Reportability assessment summary (include references as appropriate):

LCO 3.8.1, Condition B is entered when one required diesel generator (DG) is inoperable while in Modes 1 through 4. When this condition is entered, either Required Action B.3.1 or B.3.2 must be performed. Action B.3.2 is to perform SR 3.8.1.2 on the OPERABLE DG. Alternatively, Action B.3.1; i.e., to determine the OPERABLE DG is not inoperable due to a common cause failure, must be performed within 24 hours. The intent of this alternative is to avoid unnecessary testing of OPERABLE DGs.

At 2215 on March 3, 2007, DG 3G003 was declared inoperable when a degraded condition was noticed during the

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performance of a surveillance test. Although the surveillance requirements were met satisfactorily, the MVARs oscillated excessively throughout the test. At 2315, AR 070300161 was initiated with a FS assignment to engineering to perform a common cause evaluation within 24 hours (by 2215 on March 4). The FS assignment was completed within 24 hours (1437 on March 4) and concluded there was no common cause concern for the AVR's in the other DGs.

At 0330 on March 4, 3G003 was declared OPERABLE after it was switched to AVR "B" and the surveillance was run satisfactorily.

Based on the above, the Technical Specification (TS) requirement (Action B.3.1) was met since a common cause evaluation was performed within 24 hours that determined there was no common cause concern. Therefore, this event is not reportable.

If the common cause concern is found to be inadequate, this event could be subject to NRC enforcement. Based on discussions with Maintenance Engineering, the common cause evaluation will be updated to more accurately reflect the thought processes at the time the evaluation was completed.

(b)(6)

3/15/07

Concur: CEW 3/16/07

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RESTR			(b)(6)	3/16/2007 08:20:12	
AR Restraint has changed for assignment: 5 Type: RPT old value was "0.0"					
A	90	30	(b)(6)	3/16/2007 08:20:06	(b)(6)
CHG-RESTR			(b)(6)	3/16/2007 07:58:35	
AR Restraint has changed for assignment: 5 Type: RPT old value was ""					
A	30	20	(b)(6)	3/16/2007 07:58:30	(b)(6)
CHG-RESTR			(b)(6)	3/16/2007 07:58:28	
AR Restraint has changed for assignment: 5 Type: RPT old value was ""					
A	20	15	(b)(6)	3/16/2007 07:58:23	(b)(6)
CHG-RESTR			(b)(6)	3/15/2007 14:58:38	
AR Restraint has changed for assignment: 5 Type: RPT old value was ""					
A	15	10	(b)(6)	3/15/2007 14:58:13	(b)(6)

Notes Tab Information:

----- END OF REPORT -----

Field Support

Action Request #: 070300161 -- 06

Assignment Type: FS

Resp Org: L3000

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date:

Reference: Common Cause Analysis

Due Date: 04/18/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

3/19/2007 15:15:

Updated:

(b)(6)

3/20/2007 09:36:

Problem Description:

Notification text -- Update the common cause failure analysis

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARS OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARS CHANGED FROM ~3 MVARS TO ~0 MVARS BACK TO HIGH AT 3.8 MVARS (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT-----

Common Cause Failure Analysis 070300161

This common cause analysis was originally completed on March 4, 2007 and has been updated to include the results of AVR testing on March 10, 2007.

Event

On March 3, 2007, a monthly surveillance load test was performed on Emergency Diesel Generator (EDG) 3G003 (AVR 'A' in service). The diesel started successfully and met procedural requirements for voltage, frequency, and electrical load. Although monthly surveillance acceptance criteria were met, MVARS oscillated excessively when at full load. MVARS changed from ~3 to ~0 then back to 3.8 in a short time span. 3G003 was declared inoperable at 2215. The EDG was returned to operable status on AVR 'B' at 0013 on March 4, 2007. At 0330 the monthly surveillance was completed satisfactorily on AVR 'B'.

Common Cause Failure Analysis Requirement

SONGS 3 Technical Specification 3.8.1 requires two EDGs to be operable in Modes 1 through 4. With one EDG inoperable, required action B.3.1 is to "Determine OPERABLE DG is not inoperable due to common cause failure" or start the Operable EDG and verify it achieves rated voltage and frequency with a completion time of 24 hours

The Technical Specification Basis contains the guidance that if the cause of inoperability exists on the other EDG it would be declared inoperable upon discovery. If the cause of the initial inoperable DG cannot be confirmed not to exist on the remaining EDG, the start test suffices to provide assurance of continued Operability of that DG. Once the failure is repaired the common cause failure no longer exists and Required Action B.3.1 is satisfied.

Terminology

NRC inspection guideline 71111.12, "Maintenance Effectiveness" describes a common cause failure as a failure of two or more SSCs due to a single specific event or cause. For example, a design deficiency, operation and maintenance errors, a natural phenomenon, personnel-induced event, or an unintended cascading effect from any other operation or failure within the plant or a change in ambient conditions.

Analysis

SONGS EDG Automatic Voltage Regulators (AVRs) are Basler Model SR8A2B06B3A voltage regulators. They have generally provided very dependable service. Previously they had a design weakness with the motor operated potentiometer (MOP) used to adjust the output voltage. The MOP was affected by dirt and corrosion from the environment in the EDG building which occasionally resulted in MVAR oscillations. The MOPs were replaced with digital reference units (DRUs) in 3G003 in September 2004 by MO 03111395 when the obsolete speed governor was replaced. The DRUs are not susceptible to this specific cause. The DRUs were the subject of a 10 CFR 21 letter from Engine Systems, Inc. because of an increase in the failure rate of an integrated circuit (IC). As a result, the DRUs were replaced with new DRUs not susceptible to the Part 21 problem in July 2006 by MO 06020490.

The AVRs contain a potentiometer (variable resistor) R3 that is subject to corrosion and dirt from the environment similar to the MOPs, but R3 does not change position except during maintenance that involves changing an AVR or DRU component. When the DRUs were changed out in the past, R3 was repositioned so that the wiper was over a spot in the resistance strip that had been exposed to the environment. The increased erratic resistance resulted in MVAR oscillations. Two failures occurred during return to service testing before the EDG was declared Operable following DRU replacement, 3G003 in July 2006 and 3G002 in September 2006. One in service AVR failure was attributed to R3, in August 2006, one month after replacing a DRU in 2G003. AR 060800603 contains a design change to replace R3 with a different design that is sealed and not affected by the environment. The new style "sealed" potentiometers were used in the replacement AVR 'A' that was installed after this event on March 10, and is scheduled for the remaining AVRs in the four SONGS EDGs during their next scheduled BOW. The scheduled BOW dates for the replacement of R3 and R4 potentiometers are as follows:

2G002	MO 07020569	4/9/07
2G003	MO 07020570	5/21/07
3G002	MO 07020571	8/6/07
3G003	MO 07020572	6/25/07 (AVR 'B')

However, the AVR involved in this event in 3G003 is a new component installed in July 2006 by MO 06071309. The R3 resistor (and the entire AVR) is a new part and thus not subject to the specific problem (dirty wiper) seen with a repositioned R3 after it had been in service for an extended time. Thus, it is concluded there are no known specific design deficiencies that would affect the Operable EDG, 3G002.

Maintenance Engineering personnel were present when AVR 'A' was removed troubleshooting on March 10, 2007. Examination of the AVR during the removal process did not reveal any maintenance errors such as a loose connection or mis-wiring that could have contributed to the problem.

The removed AVR was transported to the Test Technician shop for troubleshooting. The AVR appeared to be in good condition with no signs of damage from maintenance or operation. Resistor R3 was measured at 52 ohms, which is considered to be in the expected range. Rapid temperature rise from 70 degrees F to 120 degrees F using a hot air gun and mechanical agitation resulted in resistance fluctuation in R3. This temperature rise and agitation was much more severe than the AVR sees in service. Next the AVR, in its as-found condition, was installed in the test rig designed to verify AVR operation in the shop. The AVR was energized and the output monitored. The AVR performed properly when energized. The AVR also operated properly when the AVR and R3 were heated using a hot air gun to 120 degrees F while energized. Additional measurements were made based on the troubleshooting guide in the AVR technical manual. No abnormal conditions were found. Testing was halted to avoid losing evidence of the problem and the AVR was placed in a shipping box for return to the manufacturer and failure analysis. Thus, it is concluded there are no known specific operation or maintenance deficiencies that would affect the Operable EDG, 3G002.

There was no natural phenomenon, such as abnormal weather, at the time of the event. There was no known personnel induced event such as maintenance in the local area or on related equipment that could have contributed to the event. There were no cascading effects from plant operation or failures, such as a fire water sprinkler system operation, flooding, smoke, chemical release, etc. that would have contributed to this event.

Action Request Assignment Report

Date Printed: 12/06/07 15:29:13

This event occurred approximately eight months after the AVR was installed. The one other EDG AVR in service failure that occurred since 2005 was the 2G003 AVR 'A' failure in August 2006 due to dirt in R3 described above. Therefore the AVR failure is considered to be an isolated electronic failure. The AVR will be returned to ESI for failure analysis. The results of the cause evaluation will be documented in SONGS direct cause evaluation (DCE) 070300161-3.

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RESTR			(b)(6)	4/2/2007 09:12:25	
AR Restraint has changed for assignment: 6 Type: FS old value was "0.0"					
CHG-RFO			(b)(6)	4/2/2007 09:12:25	
Required for Operability has changed for assignment: 6 Type: FS old value was "N"					
A	90	10	(b)(6)	4/2/2007 09:12:20	(b)(6)

Notes Tab Information:

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---- END OF REPORT ----

PROCEDURE CHANGE REQUEST

Action Request #: 070300161 -- 07

Assignment Type: PRO

Resp Org: A5400

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date:

Reference: DG-476

Due Date: 07/15/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator:

(b)(6)

A3400

(b)(6)

Added:

3/22/2007 14:35:

Updated:

(b)(6)

7/13/2007 15:22:

Problem Description:

NOTIFICATION TEXT -- SO23-3-3.23 HAS A "GUIDELINE" ON MVARs (PG 158) AND A STEP 2.9.11 TO LOOK AT MVARs (PG. 159). THIS STEP SHOULD BE CLARIFIED TO INDICATE AT WHAT MVAR READINGS THE EDG SHOULD BE DECLARED INOPERABLE. ALSO AFFECTS SO23-2-13 AND SO23-3-3.23.1.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- Action was
completed as requested/defined: Yes: X No:

The intent of this assignment is to ensure that the requested changes are completed as described and that a review is performed of existing documents to check for other impacts. Searches may be accomplished by using the TOPIC Information Server, Procedure references listed in the document being modified or by author knowledge of impact of changes.

If not done as requested, then describe why and actions taken:

Identify the documents changed:

Document Number:Revision/TCN:

Date Issued:

SO23-3-3.23, REV 29, 7/13/07

SO23-3-3.23.1, REV 23, 7/13/07

SO23-2-13, REV 29, 7/13/07

Identify other affected procedures not covered by this AR and list the tracking AR Assignment Numbers:

Other information required to support/clarify the action taken such as type of search used to determine extent of review:

Approval Tab Information:

Action Request Assignment Report

Date Printed: 12/06/07 15:29:16

Code	To Status	From	By	Timestamp	Pax
CHG-RFO			(b)(6)	7/13/2007 15:22:50	
Required for Operability has changed for assignment: 7 Type: PRO old value was "N"					
CHG-RESTR			(b)(6)	7/13/2007 15:22:50	
AR Restraint has changed for assignment: 7 Type: PRO old value was "0.0"					
A	90	10	(b)(6)	7/13/2007 15:22:45	(b)(6)
CHG-DD			(b)(6)	6/7/2007 08:25:43	
Due date not valid, due date reassessed by assignee/supervisor (describe in COMMENTS)					
CHG-DD			(b)(6)	6/7/2007 08:25:43	
Due Date has changed for assignment: 7 Type: PRO Old value was "6/15/2007 00:00:00"					
EST-DD			(b)(6)	3/28/2007 14:06:11	
Prior to plant need					
EST-DD			(b)(6)	3/28/2007 14:06:11	
Due Date has changed for assignment: 7 Type: PRO Old value was "4/5/2007 14:28:19"					

Notes Tab Information:

----- END OF REPORT -----

Apparent Cause Evaluation

Action Request #: 070300161 -- 08

Assignment Type: ACE

Resp Org: L1000

Category: 90

CLOSED

Priority: 3A

Assignee: (b)(6)

Forecast Date:

Reference: 3G003 AVR PROBLEM RESPONSE

Due Date: 09/28/07

Owner: Maintenance/System Human/Programmatic Perf: ☒Common Cause: ☐Implementation Awaiting Equipment: ☐

Event Title: WORK DELAYS RELATED TO 3G003 AVR

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

4/16/2007 14:18:

Updated:

(b)(6)

9/28/2007 17:04:

Problem Description:

Notification text -- PERFORM AN APPARENT CAUSE EVALUATION OF THE EVENT(S) ON THE REFERENCED AR. Evaluate site response to this event with respect to communication, common cause evaluation, delay getting work done, scheduling surveillance on Saturday.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARS OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARS CHANGED FROM ~3 MVARS TO ~0 MVARS BACK TO HIGH AT 3.8 MVARS (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Type	Reference	Description
CED	(b)(6)	Facilitator

Text Tab Information:

-----EVALUATION----- Document

the ACE in accordance with SO123-XV-50.39, Attachment 2.

Do Not Delete the Default Template.

ACE EVALUATOR/TEAM:

ACEs must be conducted, led or reviewed by at least one person with the Encode CEPQS1 or ACETRN.

(Ref: SO123-XV-50.39, Step 6.2.1).

(Team Leader)
(Operations)
(NO&A Facilitator)
(b)(6) (System Engineer)
(Electrical System Engineer)
(Work control)
(NRA)

Individual with Encode CEPQS1 or ACETRN: Name (b)(6)
CEPQS1 or ACETRN verified in EQIS: Name: (b)(6) Date: 5/11/07

PROBLEM STATEMENT:

During a routine surveillance run of 3G003 on 3/3/07 Operations noted fluctuations of MVARS when paralleled with offsite sources. The "A" Automatic Voltage Regulator (AVR) was declared "inoperable" and the surveillance was re-performed successfully on the "B" AVR and the EDG was made "operable".

There was no safety consequence because the AVR was swapped and declared operable and the other train EDG was subsequently tested satisfactorily. Due to SONGS response to this event there is elevated regulatory concern.

FACTS SUPPORTING THE PROBLEM STATEMENT:

Various aspects of the SONGS site performance in response to this failure lacked a sense of urgency and coordination for such a significant piece of equipment. This and SONGS use of Common Cause Evaluation drew criticism from the NRC. This ACE is to investigate the SONGS site response to this incident and will as a minimum investigate the following areas:

Communications deficiencies,
Procedural inadequacies,
Delays in getting the work done,
Work control problems,
Common cause evaluation inadequacy,
Documentation to demonstrate TS requirements were met,
Why we schedule routine EDG surveillances on Saturday nights

SEQUENCE OF EVENTS:

July 2006 - 3G003 AVR erratic failure occurred during post maintenance return to service testing. (Installed new AVR A (with new old style R3 & R4 potentiometers))

August 2006 - 2G003 AVR erratic failure occurred during monthly surveillance test. (Installed new old style R3 in AVR A&B)

September 2006 - 3G002 AVR erratic failure occurred during post maintenance return to service testing. (Installed new old style R3 in AVR A)

March 3, 2007 (2215) - 3G003 AVR erratic failure occurred during monthly surveillance test. Ops sent a page to ME and OPS management and NRC.

3/4/2007 (0013) - 3G003 swapped to AVR B and declared operable, common cause evaluation later requested per TS 3.8.1 B.3.1.

3/4/2007 (0330) - 3G003 using AVR B surveillance completed satisfactory

3/4/2007 (1000) - Maintenance Engineering (ME) engineer initiated common cause evaluation. The ME engineer and the STA discussed the failure and reviewed data that shows both the erratic MVAR output of the failed AVR A and the smooth output of the functional AVR B. (ME concluded that failure mechanisms were expected and random with infrequent occurrence therefore no common cause present).

IA#1 ME engineer generated the common cause evaluation, stating no common cause, using the justification that the failure was expected and random with infrequent occurrence.

3/4/2007 (1437) - Common cause evaluation 070300161-1 completed, tech spec 3.8.1 B.3.1 is exited.

IA#2 - ME Supervisor did not provide a detailed communication to Management and NRC on Monday morning.

3/5/2007 (0600) - 3G003 AVR A replacement scheduled for 3/9/2007

3/7/2007 - ME Supervisor met with NRC. (ME Supervisor told NRC failed AVR replacement scheduled for 3/9/07)

3/7/2007 (am) - SRGF turnover shows 3G003 AVR A on Management Focus List to start on 3/9/07

3/8/2007 - 3G003 AVR A re-scheduled for 3/10/07 at 1300 production meeting.

3/10/2007 - 3G003 AVR A replacement delayed.

3/11/2007 - 3G003 AVR A removed for failure analysis and replaced with spare AVR containing new style sealed R3 & R4. Failed AVR was examined, finding no damage, incorrect wiring or loose connections. Then under testing a

resistance fluctuation was produced by heat cycling and mechanical agitation. This was inconclusive since it was more severe than what is experienced during normal operation. Note: cause of failure was later determined by the vendor to be intermittent high resistance caused by foreign material in pot - see DCE 070300161-3.

3/13/2007 - ME Supervisor and Nuclear Regulatory Affairs (NRA) met with NRC. (NRC communicated that the common cause evaluation was considered inadequate).

3/15/2007 - ME/SE and NRA Managers met with the NRC. NRC communicated that the site response to the AVR failure was too slow and placed other EDG's at risk. This statement refers to the removal of the failed AVR for analysis because until this could be removed and cause of failure confirmed, the extent of condition could not be determined with total confidence (see further analysis of this issue in Background section below).

3/16/2007 and 3/19/2007 - NRC senior inspector met with ME and OPS Managers. (NRC asked additional questions regarding initial page notification, evaluation level (ACE), and why test scheduling was on Saturday).

3/18/2007 Routine Surveillance test run of 3G002 is performed successfully.

4/2/2007 - Updated common cause evaluation 070300161-6 stating this was an isolated electronic failure of AVR.

BACKGROUND -

Originally the technical specifications did not have a provision for performing a common cause evaluation. When a failure occurred on an EDG, the other train would be started. This provision was added in 1993. The operations surveillance procedure SO23-3-3.23 was updated in 1997 to include steps to determine if cause exists on other train EDG and if so, declare it inoperable. Procedure was updated in 1999 to determine if cause exists on other train EDG and if so, either start other train EDG or declare it inoperable. Procedure was updated again in 2002 to allow 24 hours instead of 8 hours to complete common cause and to have it documented in FS assignment.

EDG surveillances are tracked separately on AVR A & B. AVR use alternates between A & B each month and a test with either the A or the B AVR can be used to satisfy the Technical Specification monthly requirement.

Timeliness of Removing the Failed AVR for Inspection

The schedule for removing the failed AVR for inspection and replacement was set on Monday (3/5) to be done on Friday (3/9). This decision was made considering conflicting work on an AFW pump and the need for spare parts and preparatory work. It was suspected that the problem was caused by a noisy R3 pot which was a known problem that already had an ECP issued to replace it with a new style sealed pot. It was desired to install this ECP at the same time in order to maximize the benefit per unit work for the plant. On Thursday (3/8), it was rescheduled to Saturday (3/10) due to resource issues because it is important to have the right people work on this important equipment. Then on Saturday it was rescheduled to Sunday (3/11) due to emergent work on channel A PPS.

History of EDG Surveillance Testing

The NRC questioned why SONGS schedules the EDG surveillance test on Saturdays.

EDG testing is performed on Saturday dayshift for the following reasons (details found in attached HistoryofEDGSurvTesting.doc):

- Reduces train conflict and risk on weekdays;

- !!-Allows Ops personnel to remain proficient in the operation of the EDGs; vs. Ops Testing

Group performing the testing during the week.

- !!-Minimizes the distractions to Ops while performing the testing;

- Minimizes the number of times EDGs have to be rescheduled to different shifts;

- !!-Lessens the environmental effects on other site personnel.

Before the current schedule the plant tried Wednesday night shift, Wednesday day shift, and Sunday night shift. It is the opinion of the ACE team that the current schedule is good in most respects and should not be changed at this time even though there are some disadvantages (such as being done when engineering is not normally on shift). The ME/SE division has expectations for engineers to monitor their systems. A specific expectation for how often system and maintenance engineers will be present during weekly EDG runs has not been established. A corrective action (unassociated) has been generated to establish this expectation.

ANALYSIS AND CAUSES:

Method of Analysis: [mark with X to identify the method(s) used]:

☒ X_ Event and Causal Factors Analysis - operating events, equipment, human performance
☐ Process Analysis - common cause/repetitive problems within a process
☐ Supplemental Analysis: ☐ Barrier, ☐ Change, ☐ Failure Modes, ☐ Task, ☐ Technical
☐ Other Method - describe methods and identify approving manager

Summary of Analysis

IA#1 - ME engineer generated the common cause evaluation, stating no common cause, using the justification that the failure was expected and random with infrequent occurrence.

The tech spec section was changed in 1993 to allow the option for not starting the other EDG every time a failure occurs if the other EDG could be determined not to be inoperable due to common cause failure. This option was added to operations surveillance procedure SO23-3-3.23 in 1997 and updated in 1999 and 2002. This option is not frequently used.

The ME considered the AVR-A failure an expected failure of a subcomponent that is random with infrequent occurrence. However Basis B 3.8.1 B.3.1 states "If the cause of the initial inoperable EDG cannot be confirmed not to exist on the remaining DG, then performance of SR 3.8.1.2 suffices to provide assurance of confirmed operability of the other DG". Without additional interpretation, this cannot clearly be satisfied by showing that the failure was expected and random with infrequent occurrence. The ME should not have used the option.

The ME and supervisor had been involved with only one previous common cause evaluation for an EDG which concluded the same results as this one.

The tech spec option was not frequently used and not clearly defined which had something to do with it not being correctly (conservatively) interpreted. However, an engineer should err on the conservative side of nuclear safety when an interpretation is not clear. Evaluation of performance leads to the conclusion that this was a negligent error, to some degree, because it was not conservative and because several similar failures had occurred in the prior 6 months. The engineer and the supervisor have been counseled.

AC#1 Program/Process Manager Performance: Inadequate program/process

The ME engineer did not correctly (conservatively) interpret the technical specification for the common cause evaluation because the program does not provide adequate guidance. CA #1 will provide clear instruction for performing this common cause evaluation.

IA#2 ME supervisor did not provide timely, clear, and accurate information to management and NRC.

After completing the common cause evaluation over the weekend, resulting in no common cause, neither the ME engineer nor his supervisor thought there was a need to put together a special communication for ME management or for the NRC and thus did not.

They used their experience and judgment to arrive at this conclusion because they had no formal guidance to direct them.

AC#2 Program/Process Manager Performance: Inadequate Communication Methods

The ME Supervisor did not provide timely, clear, and accurate information to Management and NRC because an established requirement did not exist. CA#2, 3 and 4 will address this.

IA#3 Timeliness of Removing the Failed AVR for Inspection: Work Control reschedules 3G003 AVR A removal for extent of condition examination and for ECP replacement from 3/9/07 to 3/10/07 due to resources even though this was the most critical work.

The schedule for removing the failed AVR for inspection and replacement was set on Monday (3/5) to be done on Friday (3/9). This decision was made considering conflicting work on an AFW pump and the need for spare parts and preparatory work. It was suspected that the problem was caused by a noisy R3 pot which was a known problem that already had an ECP issued that would replace it with a new style sealed pot. It was desired to install this ECP at the same time in order to maximize the benefit per unit work for the plant.

The fact that this work was required to determine the extent of condition was no longer obvious to most of the site, since it now looked more like corrective work. There was not a single document that communicated clearly to the site organizations that extent of condition is required and waiting to be done. On Thursday (3/8), it was rescheduled to Saturday (3/10) due to resource issues because it is important to have the right people work on this important

equipment. Then on Saturday it was rescheduled to Sunday (3/11) due to emergent work on channel A PPS.

AC#3 Inadequate Program/Process

The process for work priority and scheduling does not differentiate priority of critical extent of condition work from other high priority work. Site focus was not kept on the need to quickly complete the extent of condition work. CCA#4 addressed this.

EXTENT OF CONDITION AND CAUSE:

Extent of Condition IA#1

Are there other areas of Common Cause Evaluation that could conclude a non-conservative answer?

No, requirement to perform a Common Cause Evaluation in the SONGS Tech Specs is only found in T.S. 3.8.1 B.3.1 specific to EDG's.

Extent of Cause AC#1

Are there other evaluation requirements for diesel operability that don't have adequate guidance?

Yes, when one AVR has failed and the redundant AVR is switched in and the EDG tested satisfactory, there should no longer be a need for a common cause evaluation per basis B 3.8.1 B.3.1. CA#5 will address this.

Extent of Condition IA#2

Are there other SE/ME Supervisors that work with critical components with serious problems (Tech spec <72 hr, Trip Hazards, or Load Reduction) over the weekend that should immediately communicate to Management and NRC on Monday?

Yes, but the CA#2, 3 and 4 will adequately address this.

Extent of Cause AC-2:

Does the potential exist for other areas of inadequate communication?

Yes, but the CA#2, 3 and 4 will adequately address this.

Extent of Condition IA#3

Are there other cases where critical extent of condition work could be rescheduled because of other reasons?

Yes, but CA for AC#3 will help the site not lose focus on the importance of extent of condition work.

Extent of Cause AC#3

Does the potential exist for focus to be lost on other critical work when it is scheduled with other high priority work. Maybe the potential exists, but we are not aware of it.

OPERATING EXPERIENCE:

A search was performed for other recent site AVR erratic behaviors. The following three items document the most relevant results of the search. A search of industry related events was performed. The additional two items document the most relevant results of the search. Additionally a search was performed for extent of condition work being performed on plant equipment with an untimely schedule. No applicable OE was found internally or externally within the last four years.

Site Operating Experience

Document Number: MO 06071309

Title: 3G003 AVR erratic due to dirty R3 during return to service after replacing DRU

Date: 7/2006

Applicability to Event: Similar type failure

Repeat Problem: __Yes __X__ No

This failure was the first recognized failure after the DRU modification. This item was treated as a broke-fix item and not evaluated further.

Site Operating Experience

Document Number: MO 06080817

Title: 2G003 AVR erratic due to dirty R3 during in service test one month after replacing DRU

Date: 8/2006

Applicability to Event: Same type failure

Repeat Problem: ☒ Yes ☐ No

This failure was the second recognized failure after the DRU modification. This failure and the next failure were combined and evaluated using the DCE process. The DCE recognized a common cause of R3 and R4 potentiometers resulting in an ECP to change out the potentiometers to a new hermetically sealed design. The parts were ordered.

Document Number: MO 06090140

Title: 3G002 AVR erratic due to dirty R3 during return to service after replacing DRU

Date: 9/2006

Applicability to Event: Similar type failure

Repeat Problem: ☒ Yes ☐ No

This failure was the third recognized failure after the DRU modification. This failure and the previous failure were combined and evaluated using the DCE process. The DCE recognized a common cause of R3 and R4 potentiometers resulting in an ECP to change out the potentiometers to a new hermetically sealed design. The parts were ordered.

Industry Operating Experience

Document Number: EPRI Report RS 1011109

Title: Baslar SR8A Voltage Regulators for Emergency Diesel Generators

Date: 12/2004

Applicability to Event: Describes failure of R3 potentiometers (expected failure, low frequency occurrence). States that R3 failure can be corrected by moving wiper back and forth or by replacement with new potentiometer if necessary.

Industry Operating Experience

Document Number: None (report attached in special notes)

Title: Survey of 5 nuclear plants on how they use tech spec 3.8.1 B.3.1 Common Cause Evaluation

Date: 5/2007

Applicability to Event: Response shows 3 plants conservatively run the other diesel, 2 plants have a written guide to perform common cause evaluation, and 1 plant has a different technical specification.

COMPLETED CORRECTIVE ACTIONS:

Completed Corrective Action #1:

OWNER: (b)(6)

AR ASSIGNMENT/TRACKING DOCUMENT: 070300161-6

Revised the first common cause evaluation

COMPLETION DATE: 4/2/07

Completed Corrective Action #2:

OWNER: (b)(6)

AR ASSIGNMENT/TRACKING DOCUMENT: 070300161-3

Sent failed AVR out to ESI and then to Baslar for failure analysis

COMPLETION DATE: 5/10/07

Results of failure analysis is that R3 was the cause of failure. At Baslar the failure was duplicated. By tapping on it, R3 intermittently open circuited.

Completed Corrective Action #3

OWNER: (b)(6)

Pulled up the schedule for change out of all EDG AVR potentiometers from August to June.

COMPLETION DATE: 5/15/07

AC#3/EO Condition#3 - Completed Corrective Action #4

OWNER: (b)(6)

AR 061000328-19 PRO for SO123-XV-50.39 to create Extent of Condition evaluations

Extent of condition work will be identified by an assignment type of EOC, which will track and focus attention on the need to complete the extent of condition and help the site organizations to not lose focus amid other important work.

COMPLETION DATE: 9/14/07

PLANNED CORRECTIVE ACTIONS [must be linked on CA Tab]:

AC #1 - CA#1

OWNER: (b)(6)

AR ASSIGNMENT: DOC 070300161-10 Develop and implement program/process guidance for generation of T.S. 3.8.1 B.3.1 common cause evaluation and communicate it to site.

DUE DATE: 5-18-07

AC #2/EO Condition#2/EO Cause#2 - CA#2

OWNER: (b)(6)

AR ASSIGNMENT: FS 070300161-11 Develop and issue guidance on the Engineering web page for responding to plant problems and communicating with Management and NRC.

DUE DATE: 5-31-07

AC #2/EO Condition#2/EO Cause#2 - CA#3

OWNER: (b)(6)

AR ASSIGNMENT: FS 070300161-12 Provide required reading assignment to MESE Engineering on the guidance issued for responding to plant problems and communicating with Management and NRC.

DUE DATE: 5-31-07

AC #2/EO Condition#2/EO Cause#2 - CA#4

OWNER: (b)(6)

AR ASSIGNMENT: FS 070300161-13 Discuss at EPOD the guidance issued for responding to plant problems and communicating with Management and NRC and request Engineering Supervisors to discuss with reports.

DUE DATE: 5-31-07

EO Cause#1 - CA#5

OWNER: (b)(6)

AR ASSIGNMENT: FS 070300161-14 Evaluate Technical Specification basis B 3.8.1 B.3.1 and determine if when the EDG has been declared operable after swapping to the second AVR due to failure of the first does the common cause evaluation still need to be performed per technical specification.

DUE DATE: 5-31-07

Other Corrective Actions (not linked to ACE)

OWNER: (b)(6)

AR ASSIGNMENT: FS 070300161-15 Evaluate Technical Specification 3.8.1 B.3.1 and determine if its intended purpose to avoid unnecessarily running the other EDG includes the case of an expected failure of a sub component that will occur infrequently.

DUE DATE: 6-15-07

OWNER: (b)(6)

AR ASSIGNMENT: OTH 070300161-18

The ME/SE division has expectations for engineers to monitor their systems. A specific expectation for how often system and maintenance engineers will be present during weekly EDG runs has not been established. Determine at what frequency engineers will be present during EDG runs and communicate to the ME/SE engineers involved.

SUPPORTING EVALUATIONS:

N/A

-----EVALUATION-CONT.-----

-----CANCELLATION-NOTES-----

Approval Tab Information:

Code	To	Status	From	By	Timestamp	Pax
CHG-RESTR				(b)(6)	10/1/2007 07:17:11	
				AR Restraint has changed for assignment: 8 Type: ACE old value was "0.0"		
A	90		80	(b)(6)	10/1/2007 07:17:00	(b)(6)
CHG-RESTR				(b)(6)	9/28/2007 17:04:44	
				AR Restraint has changed for assignment: 8 Type: ACE old value was ""		
A	80		50	SYSTEM	9/28/2007 17:04:43	
				Child assignments closed		
A1	50		45	(b)(6)	9/28/2007 17:04:37	(b)(6)
CHG-DD				(b)(6)	9/24/2007 10:37:14	
				Due date not valid, due date reassessed by assignee/supervisor (describe in COMMENTS)		
CHG-DD				(b)(6)	9/24/2007 10:37:14	
				Due Date has changed for assignment: 8 Type: ACE Old value was "9/21/2007 00:00:00"		
CHG-DD				(b)(6)	9/8/2007 14:08:03	
				CARB Comments: Clarify whether the potentiometer failures included one of the new type (hermetically sealed). Analysis doesn't clearly document the slow response and coordination issue. Operating Experience section doesn't focus on slow response and coordination issues.		
				Action: Maintenance Engineering revise ACE:		
				1. Clarify whether the potentiometer failures included one of the new type (hermetically sealed).		
				2. Revise analysis to clearly document the slow response and coordination i		
CHG-DD				(b)(6)	9/8/2007 14:08:03	
				Awaiting completion of supporting assignment (describe in COMMENTS)		
CHG-DD				(b)(6)	9/8/2007 14:08:03	
				Due Date has changed for assignment: 8 Type: ACE Old value was "8/3/2007 00:00:00"		
CHG-RESTR				(b)(6)	9/8/2007 14:07:09	
				AR Restraint has changed for assignment: 8 Type: ACE old value was ""		
D	45		90	(b)(6)	9/8/2007 14:06:35	(b)(6)
				CARB Comments: Clarify whether the potentiometer failures included one of the new type (hermetically sealed). Analysis doesn't clearly document the slow response and coordination issue. Operating Experience section doesn't focus on slow response and coordination issues.		
				Action: Maintenance Engineering revise ACE:		
				1. Clarify whether the potentiometer failures included one of the new type (hermetically sealed).		
				2. Revise analysis to clearly document the slow response and coordination i		
CHG-RESTR				(b)(6)	7/25/2007 15:49:57	
				AR Restraint has changed for assignment: 8 Type: ACE old value was "0.0"		
A	90		80	(b)(6)	7/25/2007 15:49:46	(b)(6)
CHG-RESTR				(b)(6)	7/18/2007 10:29:23	
				AR Restraint has changed for assignment: 8 Type: ACE old value was ""		
A	80		50	SYSTEM	7/18/2007 10:29:22	
				Child assignments closed		
A1	50		45	(b)(6)	7/18/2007 10:28:58	(b)(6)
CHG-DD				(b)(6)	7/7/2007 10:46:45	
				Provide a more rigorous analysis of the untimely corrective action in replacing AVR potentiometers. Include a Engineer Performance Review corrective action for inadequate TS common cause evaluation of the AVR failure (stating it was a random failure after repeated failures). Reassess expectations to have Engineers present during EDG tests/runs and the test/runs of other important to safety equipment.		
CHG-DD				(b)(6)	7/7/2007 10:46:45	
				Awaiting completion of supporting assignment (describe in COMMENTS)		

Code	To	Status	From	By	Timestamp	Pax
CHG-DD				(b)(6)	7/7/2007 10:46:45	
					Due Date has changed for assignment: 8 Type: ACE Old value was "6/16/2007 00:00:00"	
CHG-RESTR				(b)(6)	7/7/2007 10:45:26	
					AR Restraint has changed for assignment: 8 Type: ACE old value was ""	
D	45		90	(b)(6)	7/7/2007 10:42:56	(b)(6)
					ACE is placed into Cat 45 to incorporate CARB comments from the 7/5/07 meeting. The ME/SE Manager to present at the next CARB on 7/19.	
CHG-RESTR				(b)(6)	6/13/2007 09:18:07	
					AR Restraint has changed for assignment: 8 Type: ACE old value was "0.0"	
A	90		80	(b)(6)	6/13/2007 09:17:59	(b)(6)
A	80		50	SYSTEM	6/11/2007 08:21:35	
					Child assignments closed	
CHG-RESTR				(b)(6)	5/16/2007 17:19:06	
					AR Restraint has changed for assignment: 8 Type: ACE old value was ""	
GEN-TND				(b)(6)	5/16/2007 17:19:06	
					Created Assignment Type: TND from RCE/ACE/RCT process	
A	50		20	(b)(6)	5/16/2007 17:19:00	(b)(6)
CHG-DD					5/16/2007 17:18:55	
					Due date not valid, due date reassessed by assignee/supervisor (describe in COMMENTS)	
CHG-DD				(b)(6)	5/16/2007 17:18:55	
					Due Date has changed for assignment: 8 Type: ACE Old value was "6/15/2007 00:00:00"	
EST-DD				(b)(6)	5/16/2007 17:18:03	
					Prior to plant need	
EST-DD					5/16/2007 17:18:03	
					Due Date has changed for assignment: 8 Type: ACE Old value was "5/16/2007 14:12:56"	
CA TAB				(b)(6)	5/16/2007 17:16:59	
					AR# 070300161 - 9 DUE_DATE_ACCEPT_REJECT_FLAG was changed by: old value: N new value: Y	
CA TAB				(b)(6)	5/16/2007 17:16:49	
					AR# 070300161 - 9 DUE_DATE_ACCEPT_REJECT_FLAG was changed by: old value: Y new value: N	
CA TAB				(b)(6)	5/16/2007 17:16:05	
					AR# 070300161 - 15 DUE_DATE_ACCEPT_REJECT_FLAG was changed by: old value: new value: Y	
CA TAB				(b)(6)	5/16/2007 17:16:03	
					AR# 070300161 - 14 DUE_DATE_ACCEPT_REJECT_FLAG was changed by: old value: new value: Y	
CA TAB				(b)(6)	5/16/2007 17:16:01	
					AR# 070300161 - 13 DUE_DATE_ACCEPT_REJECT_FLAG was changed by: old value: new value: Y	
CA TAB				(b)(6)	5/16/2007 17:16:00	
					AR# 070300161 - 12 DUE_DATE_ACCEPT_REJECT_FLAG was changed by: old value: new value: Y	
CA TAB				(b)(6)	5/16/2007 17:15:58	
					AR# 070300161 - 11 DUE_DATE_ACCEPT_REJECT_FLAG was changed by: old value: new value: Y	
CA TAB				(b)(6)	5/16/2007 17:15:56	
					AR# 070300161 - 10 DUE_DATE_ACCEPT_REJECT_FLAG was changed by: old value: new value: Y	
CA TAB				(b)(6)	5/16/2007 17:15:55	
					AR# 070300161 - 9 DUE_DATE_ACCEPT_REJECT_FLAG was changed by: old value: new value: Y	
CHG-RESTR				(b)(6)	5/16/2007 17:15:42	
					AR Restraint has changed for assignment: 8 Type: ACE old value was ""	

Code	To Status	From	By	Timestamp	Pax
A	20	10	(b)(6)	5/16/2007 17:15:36	87209
ASSOC				5/16/2007 17:00:15	
	Associated assignment AR#: 070300161 Seq: 15				
ASSOC			(b)(6)	5/16/2007 16:52:58	
	Associated assignment AR#: 070300161 Seq: 14				
ASSOC			(b)(6)	5/16/2007 16:49:04	
	Associated assignment AR#: 070300161 Seq: 13				
ASSOC			(b)(6)	5/16/2007 16:46:11	
	Associated assignment AR#: 070300161 Seq: 12				
ASSOC			(b)(6)	5/16/2007 16:37:07	
	Associated assignment AR#: 070300161 Seq: 11				
ASSOC			(b)(6)	5/16/2007 16:14:40	
	Associated assignment AR#: 070300161 Seq: 10				
CREATE			(b)(6)	4/17/2007 08:04:24	
	FS Assignment Type Created from CA tab.				
CA TAB			(b)(6)	4/17/2007 08:04:17	
CA TAB				4/17/2007 08:03:46	

Notes Tab Information:

CARB meeting results for 7/5/07:

CARB Comments: Provide a more rigorous analysis of the untimely corrective action in replacing AVR potentiometers. Include a Engineer Performance Review corrective action for inadequate TS common cause evaluation of the AVR failure (stating it was a random failure after repeated failures). Reassess expectations to have Engineers present during EDG tests/runs and the test/runs of other important to safety equipment.

Action: ACE will be placed into Cat 45 to incorporate CARB comments. The ME/SE Manager to present at the next CARB on 7/19.

CA Tab Information:

AR/SEQ/TYPE	Resp Org	Assignee	Due Date	Status	QA	REQ	Priority	MO Type
070300161 16 TND	W4000	(b)(6)	06/22/2007	90	N		3C	
TRENDING ASSIGNMENT CREATED FROM ACE 070300161-8: AVR ISSUES								
070300161 9 FS	L0000	(b)(6)	04/24/2007	90	Y		3A	
FOR THE ACE/RCE, CONDUCT A MANAGER'S REVIEW OF THE PROBLEM, ADEQUACY OF IMMEDIATE/INTERIM ACTIONS, IMPACT ON PLANT OPERABILITY/RESTART, AND ACE/RCE DUE DATE.								
070300161 10 DOC	L3000	(b)(6)	05/30/2007	90	Y		3C	
Notification text -- Develop and implement program/process guidance for generation of T.S. 3.8.1 B.3.1 common cause evaluation and communicate it to site.								
DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.								
FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).								

CA Tab Information:

AR/SEQ/TYPE	Resp Org	Assignee	Due Date	Status	QA REQ	Priority	MO Type
070300161 11 FS	L4000	(b)(6)	06/15/2007	90	Y	3C	
<p>Notification text -- Develop and issue guidance on the Engineering web page for responding to plant problems and communicating with Management and NRC.</p> <p>DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM -3 MVARs TO ~ 0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.</p> <p>FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).</p>							
070300161 12 FS	W4000	(b)(6)	06/15/2007	90	Y	3C	
<p>Notification text -- Provide required reading assignment to MESE Engineering on the guidance issued for responding to plant problems and communicating with Management and NRC.</p> <p>DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM -3 MVARs TO ~ 0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.</p> <p>FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).</p>							
070300161 13 FS	L4000	(b)(6)	06/15/2007	90	Y	3C	
<p>Notification text -- Discuss at EPOD the guidance issued for responding to plant problems and communicating with Management and NRC and request Engineering Supervisors to discuss with reports.</p> <p>DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM -3 MVARs TO ~ 0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.</p> <p>FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).</p>							
070300161 14 FS	R1100	(b)(6)	06/15/2007	90	Y	3C	
<p>Notification text -- Evaluate Technical Specification basis B 3.8.1 B.3.1 and determine if when the EDG has been declared operable after swapping to the second AVR due to failure of the first does the common cause evaluation still need to be performed per technical specification</p> <p>DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM -3 MVARs TO ~ 0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.</p> <p>FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).</p>							

CA Tab Information:

AR/SEQ/TYPE	Resp Org	Assignee	Due Date	Status	QA REQ	Priority	MO Type
070300161	15 FS	R1100	(b)(6)	06/15/2007	90	Y	3C

Notification text -- Evaluate Technical Specification 3.8.1 B.3.1 and determine if its intended purpose to avoid unnecessarily running the other EDG includes the case of an expected failure of a sub component that will occur infrequently.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~ 0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

----- END OF REPORT -----

**** This assignment is a credited action for a RCE/ACE/RCT ****

Field Support

Action Request #: 070300161 -- 09

Assignment Type: FS

Resp Org: L0000

Category: 90

CLOSED

Priority: 3A

Assignee: (b)(6)

Forecast Date:

Reference:

Due Date: 04/24/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator:

N4200

(b)(6)

Added: SYSTEM 4/17/2007 08:04:

Updated:

(b)(6)

4/19/2007 15:21:

Problem Description:

FOR THE ACE/RCE, CONDUCT A MANAGER'S REVIEW OF THE PROBLEM, ADEQUACY OF IMMEDIATE/INTERIM ACTIONS, IMPACT ON PLANT OPERABILITY/RESTART, AND ACE/RCE DUE DATE.

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- REQUIRED

FOR ALL ACE/RCEs

1. Problem Statement (Ref: SO123-XV-50.39, Attachment 2):

On March 3, 2007 during a monthly tech spec surveillance of EDG 3G003, the "A" AVR exhibited erratic behavior. Although the surveillance criteria was met, Operations conservatively declared the EDG and "A" AVR inoperable, switched to the "B" AVR, and performed the surveillance again satisfactorily. The EDG was then declared OPERABLE. The erratic "A" AVR was removed 8 days later for investigation. Various aspects of the SONGS site performance in response to this event exhibited a lack of urgency and coordination for a plant critical component:

1. Common cause evaluation criticized - Requirements, procedural guidance, should we have started the other EDG
2. Time to investigate failed component criticized - Priority (tie to common cause evaluation), work process
3. Communication problems noted - management not called, communication with NRC, ME/OPS communication
4. Scheduling of surveillance on Saturday (night) when plant staff not here questioned - history/reasons, benchmark?

2. Immediate/interim actions taken to address the problem/cause pending completion of the evaluation/corrective action implementation, including AR assignments used to track the actions with their completion or due dates. If applicable, list impacts to work windows, mode changes and plant operability.

None

3. Actions taken to address the extent of condition, including AR assignments used to track the actions with their completion or due dates. If applicable, list impacts to work windows, mode changes and plant operability.

None

REQUIRED IF REQUESTING AN ACE/RCE DUE DATE EXTENSION

1. Requested due date:

2. Reason for extension:

3. Potential safety, regulatory or reliability impact in extending the due date:

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RESTR			(b)(6)	4/20/2007 15:34:54	
CHG-RFO				4/20/2007 15:34:54	
A	90	10		4/20/2007 15:34:36	(b)(6)

Notes Tab Information:

----- END OF REPORT -----

**** This assignment is a credited action for a RCE/ACE/RCT ****

misc document changes

Action Request #: 070300161 -- 10

Assignment Type: DOC

Resp Org: L3000

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date: 5/18/2007 00

Reference:

Due Date: 05/30/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

5/16/2007 16:14:

Updated:

(b)(6)

5/21/2007 08:40:

Problem Description:

Notification text -- Develop and implement program/process guidance for generation of T.S. 3.8.1 B.3.1 common cause evaluation and communicate it to site.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARS OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARS CHANGED FROM ~3 MVARS TO ~ 0 MVARS BACK TO HIGH AT 3.8 MVARS (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- The intent of this assignment is to ensure that the requested changes are completed as described and that a review is performed of existing documents to check for other impacts. Searches may be accomplished by using the TOPIC Information Server, references listed in the document being modified or by author knowledge of impact of changes

Describe actions taken:

Transmitted the following template to the EDG mechanical and electrical cog engineers:

Based on previous EDG common causes and work by Bob Pate's Root Cause Group, here is the current thinking on how to do an EDG common cause analysis that justifies not starting the other EDG. The current thinking is that we have to be positive that a failure in one EDG does not exist in the other in order to justify a common cause does not exist, the idea that a random failure occurred is not enough justification.

.....

XG00Y Common Cause Failure Analysis (AR number)

Event

(Also obtain a paper copy of the Ops surveillance test results that show the EDG failure)

Common Cause Failure Analysis Requirement

SONGS 2 (or 3) Technical Specification 3.8.1 requires two EDGs to be operable in Modes 1 through 4. With one EDG

inoperable, required action B.3.1 is to "Determine OPERABLE DG is not inoperable due to common cause failure" or perform surveillance 3.8.1.2 to start the Operable EDG and verify it achieves rated voltage and frequency with a completion time of 24 hours

The Technical Specification Basis contains the guidance that if the cause of inoperability exists on the other EDG it would be declared inoperable upon discovery. If the cause of the initial inoperable DG cannot be confirmed not to exist on the remaining EDG, the start test suffices to provide assurance of continued Operability of that DG. Once the failure is repaired the common cause failure no longer exists and Required Action B.3.1 is satisfied.

Terminology

NRC inspection guideline 71111.12, "Maintenance Effectiveness" describes a common cause failure as a failure of two or more SSCs due to a single specific event or cause. For example, a design deficiency, operation and maintenance errors, a natural phenomenon, personnel-induced event, or an unintended cascading effect from any other operation or failure within the plant or a change in ambient conditions.

NRC NUREG/CR-6819, Vol. 1, "Common-Cause Failure Event Insights, Emergency Diesel Generators", uses the criteria that the component failures or degradations must result from both a single shared cause and coupling mechanism. Common cause failures can be thought of as resulting from the coexistence of two main factors: one that provides a susceptibility for components to fail or become unavailable due to a particular cause of failure and a coupling factor (or coupling mechanism) that creates the condition for multiple components to be affected by the same cause. An example is a case where two relief valves fail-to-open at the required pressure due to set points being set too high. Because of personnel error (the proximate cause), each of the two valves fails due to an incorrect setpoint. What makes the two valves fail together, however, is a common calibration procedure and common maintenance personnel. These commonalties are the coupling factors of the failure event in this case.

Troubleshooting

A troubleshooting plan was developed to investigate this problem. The following potential causes were addressed:

Potential failure mode	Troubleshooting Action

Testing Results

Based on completed troubleshooting, the cause of the event is known to be.... (if cause is not certain, then you cannot complete a common cause evaluation)!

Common Cause Analysis

The guidance in NRC inspection guideline 71111.12, is used to determine with certainty that no single specific event or cause is present that would cause the failure of XG00X. (Review MOs and procedure changes implemented since the last successful performance of a surveillance test to complete the following discussion)

Was the cause of failure a design deficiency that does not exist on XG00X... (Use any SONGS OE with failure of this equipment. You could also use TIS to check for industry experience.)

Was there was an Operating error involved with this event that would not or did not occur on XG00X. (Explain how the equipment was operated and any errors made and why this would not occur on XG00X)

Was there a maintenance error involved with this event that would not occur on XG00X. (discuss the troubleshooting results and why this would not occur on XG00X)

Was there natural phenomenon, such as abnormal weather, at the time of the event. Was there a known personnel induced event such as maintenance in the local area or on related equipment that could have contributed to the event. Was there cascading effects from plant operation or failures, such as a fire water sprinkler system operation, flooding, smoke, chemical release, etc. that would have contributed to this event. (add discussion if

any of these apply of why they would not affect XG00X)

(You should be able to say here that you have visually inspected the same equipment on the other EDG to confirm it does not have indications of tampering, damage, overheating, loose wiring, etc.)

Based on the results of this review there are no design deficiencies, operation or maintenance errors, natural phenomena, personnel-induced errors, or unintended cascading effect that would act as a common cause for failure of EDG XG00X (the other EDG).

Identify the document(s) changed:

Document Number:

Revision:

Date Issued:

none. There is no documented guidance for an EDG CCFA. The previous common cause analyses are used for reference, but each common cause analysis is a separate analysis.

Description of change:

n/a

Identify other affected documents and list the tracking AR Assignment Numbers:

none

Other information required to support/clarify the action taken:

none

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RFO			(b)(6)	5/21/2007 08:40:13	
Required for Operability has changed for assignment: 10 Type: DOC old value was "N"					
CHG-RESTR			(b)(6)	5/21/2007 08:40:13	
AR Restraint has changed for assignment: 10 Type: DOC old value was "0.0"					
A	90	10	(b)(6)	5/21/2007 08:40:07	(b)(6)
CHG-ASGN			(b)(6)	5/17/2007 07:10:59	
Assignee has changed for assignment: 10 Type: DOC old value was (b)(6)					
CHG-ASGN			(b)(6)	5/16/2007 17:11:54	
Assignee has changed for assignment: 10 Type: DOC old value was (b)(6)					

Notes Tab Information:

----- END OF REPORT -----

**** This assignment is a credited action for a RCE/ACE/RCT ****

Field Support

Action Request #: 070300161 -- 11

Assignment Type: FS

Resp Org: L4000

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date: 5/31/2007 00

Reference:

Due Date: 06/15/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

5/16/2007 16:36:

Updated:

(b)(6)

5/31/2007 10:14:

Problem Description:

Notification text -- Develop and issue guidance on the Engineering web page for responding to plant problems and communicating with Management and NRC.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM -3 MVARs TO ~ 0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- The FS (Field Support) may serve as a feedback record (formalized email), as a record of field support efforts, or to document engineering assessments, but should not be used as a standalone record of changes to design documents, calculations, or operational methods. Changes of this nature need to be processed per the appropriate assignment type, (PRO, DOC, CLC, etc). This includes creating MO assignments and notifying maintenance when existing MOs are not required. For issues of potential consequence, peer checks of conclusions reached in the FS assignment are encouraged.

Scope Definition/Clarification:

Applicability to other Systems/Components/Processes (extent of condition assessment): N/A

Cause of issue/problem (initiate a TND/ACE/RCE assignment, reference SO123-XV-50, attachment 4 if applicable): N/A

Conclusion with basis/facts:

The "Responding to a Plant Problem" flow chart was posted on the Engineering WebPage under Engineering Practices and Expectations tab.

Identify other needed actions and list the tracking AR Assignment Numbers:

Document/describe any communication with requestor upon completion, as appropriate:

Action Request Assignment Report

Date Printed: 12/06/07 15:29:34

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RFO			(b)(6)	5/31/2007 10:15:24	
Required for Operability has changed for assignment: 11 Type: FS old value was "N"					
CHG-RESTR			(b)(6)	5/31/2007 10:15:24	
AR Restraint has changed for assignment: 11 Type: FS old value was "0.0"					
A	90	10	(b)(6)	5/31/2007 10:15:01	(b)(6)
Guidance posetd on Engineering Web page.					
CHG-ASGN			(b)(6)	5/17/2007 09:39:44	
Assignee has changed for assignment: 11 Type: FS old value was (b)(6)					
CHG-ASGN			(b)(6)	5/16/2007 17:13:02	
Assignee has changed for assignment: 11 Type: FS old value was (b)(6)					

Notes Tab Information:

----- END OF REPORT -----

**** This assignment is a credited action for a RCE/ACE/RCT ****

Field Support

Action Request #: 070300161 -- 12

Assignment Type: FS

Resp Org: W4000

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date:

Reference:

Due Date: 06/15/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

5/16/2007 16:45:

Updated:

(b)(6)

6/11/2007 07:30:

Problem Description:

Notification text -- Provide required reading assignment to MESE Engineering on the guidance issued for responding to plant problems and communicating with Management and NRC.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- The FS (Field Support) may serve as a feedback record (formalized email), as a record of field support efforts, or to document engineering assessments, but should not be used as a standalone record of changes to design documents, calculations, or operational methods. Changes of this nature need to be processed per the appropriate assignment type, (PRO, DOC, CLC, etc). This includes creating MO assignments and notifying maintenance when existing MOs are not required. For issues of potential consequence, peer checks of conclusions reached in the FS assignment are encouraged.

Scope Definition/Clarification: A required reading assignment was issued to ME/SE personnel with a link to the Responding to Plant Problems flowchart on the SONGS Engineering Web Page. The text is copied in the the NOTES section.

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RESTR			(b)(6)	6/11/2007 07:31:45	
AR Restraint has changed for assignment: 12 Type: FS old value was "0.0"					
CHG-RFO			(b)(6)	6/11/2007 07:31:45	
Required for Operability has changed for assignment: 12 Type: FS old value was "N"					

Action Request Assignment Report

Date Printed: 12/06/07 15:29:39

Code	To Status	From	By	Timestamp	Pax
A	90	10	(b)(6)	6/11/2007 07:31:00	(b)(6)
Required reading assignment was issued to ME/SE personnel. The text is copied in the NOTES section of this assignment.					
CHG-ASGN			(b)(6)	5/17/2007 07:14:58	
Assignee has changed for assignment: 12 Type: FS old value was (b)(6)					
CHG-ASGN			(b)(6)	5/16/2007 17:13:32	
Assignee has changed for assignment: 12 Type: FS old value was (b)(6)					

Notes Tab Information:

Work Delays Related to 3G003 AVR
ACE 070300161-8

Recent reviews of plant issues and how we responded to emergent plant issues has identified that management expectations have not been provided to ensure prompt and consistent handling of all issues. The attached flow chart attempts to provide a method so that each time we respond to a plant issue we deal with it in the right sense of urgency, with the right notifications, and assurance that we are headed on a well planned and documented completion path. Obviously, this is a minimum approach guideline and additional actions are often required and are situational dependent. It makes use of assigned duty personnel since those individuals should always be available but the general expectation that you contact your direct supervision for information / assistance should still be followed as applicable. The underlying thoughts behind this approach is that we want to make sure the plant is getting the best support possible to resolve problems and the management team is aware of what is happening so they can provide their support.

The attached "Responding to a Plant Problem" flowchart is on the Engineering webpage under the tab "Additional HU Tools and Ref." Please contact your Supervisor should you have any additional questions or suggestions to this flowchart.

----- END OF REPORT -----

**** This assignment is a credited action for a RCE/ACE/RCT ****

Field Support

Action Request #: 070300161 -- 13

Assignment Type: FS

Resp Org: L4000

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date: 6/15/2007 00

Reference:

Due Date: 06/15/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

5/16/2007 16:48:

Updated:

(b)(6)

6/11/2007 08:21:

Problem Description:

Notification text -- Discuss at EPOD the guidance issued for responding to plant problems and communicating with Management and NRC and request Engineering Supervisors to discuss with reports.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- The FS (Field Support) may serve as a feedback record (formalized email), as a record of field support efforts, or to document engineering assessments, but should not be used as a standalone record of changes to design documents, calculations, or operational methods. Changes of this nature need to be processed per the appropriate assignment type, (PRO, DOC, CLC, etc). This includes creating MO assignments and notifying maintenance when existing MOs are not required. For issues of potential consequence, peer checks of conclusions reached in the FS assignment are encouraged.

Scope Definition/Clarification:

Applicability to other Systems/Components/Processes (extent of condition assessment): Yes but the scope of the assignment covers all applications.

Cause of issue/problem (initiate a TND/ACE/RCE assignment, reference SO123-XV-50, attachment 4 if applicable): N/A

Conclusion with basis/facts:

A required reading assignment as listed below was issued to Engineering. In addition the flowchart and the basis behind it was discussed on two separate occasions at the EPOD.

You are notified to read the following document(s) posted on the Required Reading Web page.

Document ID: AR070300161

Work Delays Related to 3G003 AVR

Due Date: 07/11/2007

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Date Printed: 12/06/07 15:29:41

Please open the attached LDR file to start Required Reading.

Contact (b)(6) with any technical questions concerning this required reading assignment.

Identify other needed actions and list the tracking AR Assignment Numbers:

Document/describe any communication with requestor upon completion, as appropriate:

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RFO			(b)(6)	6/11/2007 08:21:38	
Required for Operability has changed for assignment: 13 Type: FS old value was "N"					
CHG-RESTR			(b)(6)	6/11/2007 08:21:38	
AR Restraint has changed for assignment: 13 Type: FS old value was "0.0"					
A	90	10	(b)(6)	6/11/2007 08:21:24	(b)(6)
CHG-FC			(b)(6)	6/6/2007 13:15:40	
Forecast Date has changed for assignment: 13 Type: FS old value was "5/31/2007 00:00:00"					
CHG-ASGN			(b)(6)	5/17/2007 09:40:38	
Assignee has changed for assignment: 13 Type: FS old value was (b)(6)					
CHG-ASGN			(b)(6)	5/16/2007 17:12:17	
Assignee has changed for assignment: 13 Type: FS old value was (b)(6)					

Notes Tab Information:

----- END OF REPORT -----

**** This assignment is a credited action for a RCE/ACE/RCT ****

Field Support

Action Request #: 070300161 -- 14

Assignment Type: FS

Resp Org: R1100

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date: 5/31/2007 00

Reference:

Due Date: 06/15/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

5/16/2007 16:52:

Updated:

(b)(6)

5/23/2007 12:34:

Problem Description:

Notification text -- Evaluate Technical Specification basis B 3.8.1 B.3.1 and determine if when the EDG has been declared operable after swapping to the second AVR due to failure of the first does the common cause evaluation still need to be performed per technical specification

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARS OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARS CHANGED FROM ~3 MVARS TO ~ 0 MVARS BACK TO HIGH AT 3.8 MVARS (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- The FS

(Field Support) may serve as a feedback record (formalized email), as a record of field support efforts, or to document engineering assessments, but should not be used as a standalone record of changes to design documents, calculations, or operational methods. Changes of this nature need to be processed per the appropriate assignment type, (PRO, DOC, CLC, etc). This includes creating MO assignments and notifying maintenance when existing MOs are not required. For issues of potential consequence, peer checks of conclusions reached in the FS assignment are encouraged.

Scope Definition/Clarification: Evaluate Technical Specification basis B 3.8.1 B.3.1 and determine if when the EDG has been declared operable after swapping to the second AVR due to failure of the first does the common cause evaluation still need to be performed per technical specification

Applicability to other Systems/Components/Processes (extent of condition assessment): N/A

Cause of issue/problem (initiate a TND/ACE/RCE assignment, reference SO123-XV-50, attachment 4 if applicable):

Missing information in the Bases see Conclusion and AR 070300161-17

Conclusion with basis/facts:

In the event that an EDG is declared inoperable and then repaired within 24 hours, a "prompt" completion of the common cause evaluation and actions to preclude its recurrence, must be completed in accordance with 10 CFR 50, Appendix B and should not be treated as a Technical Specification requirement. A bases change is being implemented to provide additional clarification as discussed below.

During the Technical Specification improvement process SCE submitted the Combustion Engineering Standard Technical Specifications NUREG 1432 Revision 0. It contained a Note in the Condition Column that stated "Required Action B.3.1 or B.3.2 shall be completed if this condition is entered."

Prior to NRC approval and issuing Amendments 127 (Unit 2) and 116 (Unit 3), that note was removed from the Technical Specification and the discussion of that note was removed from the Bases. The following paragraph should have been added to the Bases. "In the event the inoperable DG is restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the [plant corrective action program] will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B." A search of the submittal documentation did not reveal any reason for not adding the paragraph. AR assignment AR 070300161 - 17 has been created to track a Bases change to add the paragraph and make the Bases consistent with NUREG 1432, Revision 3.

With the incorporation of the change above it will be clear that the common cause failure must always be performed. In the case where the DG is returned to operable within the 24 hour period, the common cause failure analysis must be completed promptly in accordance with the SONGS Cause Evaluation Procedure SO123-XV-50.39, but is no longer a Technical Specification Action. The following discussion was used to support the change to the Standard Technical Specification.

The following discussion supported the change to the Standard Technical Specifications for the BWROG, CEOG, and the WOG in BWR-07 submitted to the NRC on 4/22/1993:

"In all vendor's NUREG STS ACTIONS for one inoperable DG (Condition B of LCO 3.8.1), there is a provision for Required Action B.3.1 or B.3.2 to be completed, even if the completion is after the DG is restored to OPERABLE. Normally TS Required Actions are not required to be completed once compliance with the LCO is restored. Thus this provision represents an exception to LCO 3.0.2."

"One intent of these Required Actions (B.3.1, B.3.2) is related to the determination that no common cause failure exists, whether or not the originally discovered inoperable DG has already been restored. A second intent is to provide an increased level of assurance that redundant safety systems are not concurrently inoperable."

"In regard to the first intent, "common-cause" evaluations (or more routinely called "root-cause" evaluations) are required by plant procedures for all significant safety related deficiencies (as would be the case for inoperable DGs). These procedures require "prompt" completion of the evaluation and actions to preclude its recurrence, regardless of whether the initial corrective action is completed. This 10 CFR 50, Appendix B program/procedure should adequately assure the necessary evaluations without necessitating abnormal requirements within the TS ("abnormal" being the exception to LCO 3.0.2)."

"In regard to the second intent, the desire for near-term added assurance that redundant power systems are not inoperable is warranted, and addressed by the Required Actions B.3.1 and B.3.2. However, this concern is obviated once the original DG is restored to OPERABLE status, and the Condition exited (i.e., redundant DGs could no longer be inoperable). Once restored to OPERABLE, the immediacy of the common cause verification is relaxed, since at worst only one DG might be inoperable. In fact, if it were inoperable, 72 hours would be provided to complete restoration of that inoperability. Therefore, continuing a 24-hour requirement to complete this "common cause" verification is excessively restrictive."

"Furthermore, the "abnormal" requirement (to continue to require the common-cause verification after restoration of the inoperable DG) has recently been identified by a lead plant review to result in unwarranted plant shutdowns or unnecessary DG starting in certain circumstances. As discussed in addressing the second intent above, once the initial inoperable DG is restored to OPERABLE, the immediacy of the action should be relaxed. As currently required by the exception to LCO 3.0.2, if the common-cause verification (B.3.1), or DG start (B.3.2), is not completed within 24 hours, it becomes a "Required Action not met in the associated Completion Time." In this event an immediate plant shutdown (either by LCO 3.8.1 Condition G, or by LCO 3.0.3; its not exceedingly clear which would apply) would be required. This would seem to be clearly excessive; one DG has recently been restored to OPERABLE, the other DG has no specific reason to be suspected to be inoperable, and it has been only 24 hours since the original DG became inoperable."

"If the original DG is restored to OPERABLE in less than 24 hours it would seem acceptable to allow a significantly longer time to complete the accelerated verification of the remaining DG. (If not restored to OPERABLE within 24

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hours, then the accelerated verification would be required and is not suggested to be affected by this proposed change.) Once agreed that it is acceptably prudent to, allow a longer time to complete the common-cause verification, then it should be acceptable to allow the plant program/procedures for Appendix B evaluations to complete the "prompt" evaluation, and not require a TS directed action necessitating an exception to LCO 3.0.2, and potentially resulting in an unnecessary plant shutdown."

Identify other needed actions and list the tracking AR Assignment Numbers: 070300161-17

Document/describe any communication with requestor upon completion, as appropriate: Communicated with (b)(6) (b)(6) prior to closure.

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RFO			(b)(6)	5/25/2007 09:50:31	
				Required for Operability has changed for assignment: 14 Type: FS old value was "N"	
CHG-RESTR			(b)(6)	5/25/2007 09:50:31	
				AR Restraint has changed for assignment: 14 Type: FS old value was "0.0"	
A	90	10	(b)(6)	5/25/2007 09:50:22	(b)(6)
CHG-ASGN			(b)(6)	5/18/2007 13:59:52	
				Assignee has changed for assignment: 14 Type: FS old value was (b)(6)	
CHG-ASGN			(b)(6)	5/17/2007 09:38:22	
				Assignee has changed for assignment: 14 Type: FS old value was (b)(6)	
CHG-ASGN			(b)(6)	5/16/2007 17:14:40	
				Assignee has changed for assignment: 14 Type: FS old value was (b)(6)	

Notes Tab Information:

----- END OF REPORT -----

**** This assignment is a credited action for a RCE/ACE/RCT ****

Field Support

Action Request #: 070300161 -- 15

Assignment Type: FS

Resp Org: R1100

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date: 6/15/2007 00

Reference:

Due Date: 06/15/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

5/16/2007 16:59:

Updated:

(b)(6)

5/23/2007 12:45:

Problem Description:

Notification text -- Evaluate Technical Specification 3.8.1 B.3.1 and determine if its intended purpose to avoid unnecessarily running the other EDG includes the case of an expected failure of a sub component that will occur infrequently.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM -3 MVARs TO - 0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT -2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- The FS (Field Support) may serve as a feedback record (formalized email), as a record of field support efforts, or to document engineering assessments, but should not be used as a standalone record of changes to design documents, calculations, or operational methods. Changes of this nature need to be processed per the appropriate assignment type, (PRO, DOC, CLC, etc). This includes creating MO assignments and notifying maintenance when existing MOs are not required. For issues of potential consequence, peer checks of conclusions reached in the FS assignment are encouraged.

Scope Definition/Clarification: Evaluate Technical Specification 3.8.1 B.3.1 and determine if its intended purpose to avoid unnecessarily running the other EDG includes the case of an expected failure of a sub component that will occur infrequently.

Applicability to other Systems/Components/Processes (extent of condition assessment): N/A

Cause of issue/problem (initiate a TND/ACE/RCE assignment, reference SO123-XV-50, attachment 4 if applicable): N/A

Conclusion with basis/facts:

One intent of these Required Actions (B.3.1, B.3.2) is related to the determination that no common cause failure exists, whether or not the originally discovered inoperable DG has already been restored. A second intent is to provide an increased level of assurance that redundant safety systems are not concurrently inoperable.

The Bases states: "Required Action B.3.1 provides an allowance to avoid unnecessary testing of OPERABLE DGs." That allowance is restricted by the following: "If it can be determined that the cause of the inoperable DG does not

Action Request Assignment Report

Date Printed: 12/06/07 15:29:46

exist on the OPERABLE DG, SR 3.8.1.2 does not have to be performed." There is no exclusion provided for subcomponents that are expected to fail infrequently. The failure of concern is any common cause failure that would affect the other EDGs.

See (SEE AR 070300161 - 14 and -17), as the Bases is being clarified as to when the common cause failure needed to be completed within the 24 hours per Technical Specification or when a "prompt" common cause failure is required per 10 CFR 50, Appendix B.

Identify other needed actions and list the tracking AR Assignment Numbers: 070300161 - 14 and -17

Document/describe any communication with requestor upon completion, as appropriate: Communicated with (b)(6) prior to closure.

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RFO			(b)(6)	5/25/2007 10:37:18	
Required for Operability has changed for assignment: 15 Type: FS old value was "N"					
CHG-RESTR			(b)(6)	5/25/2007 10:37:18	
AR Restraint has changed for assignment: 15 Type: FS old value was "0.0"					
A	90	10	(b)(6)	5/25/2007 10:37:11	(b)(6)
CHG-ASGN			(b)(6)	5/18/2007 13:59:34	
Assignee has changed for assignment: 15 Type: FS old value was (b)(6)					
CHG-ASGN			(b)(6)	5/17/2007 09:38:54	
Assignee has changed for assignment: 15 Type: FS old value was (b)(6)					
CHG-ASGN			(b)(6)	5/16/2007 17:15:06	
Assignee has changed for assignment: 15 Type: FS old value was (b)(6)					

Notes Tab Information:

----- END OF REPORT -----

Trending Assignment

Action Request #: 070300161 -- 16

Assignment Type: TND

Resp Org: W4000

Category: 90 CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date:

Reference:

Due Date: 06/22/07

Owner: Maintenance/System

Work Group: L1000 - MAINTENANCE/SYSTEM ENGRG - COMPUTER ENGRG MANAGER

Worker Type: Edison Employee

General Tab Information:

Event Title: WORK DELAYS RELATED TO 3G003 AVR

Event Date: 08/13/2007

Identifying Org: Line

QA Activity: Yes

Event Shift:

Initiating Document: ACE

Significance: None

Unit: N

Plant Status: Non-Outage

Error Type:

Reliability Classification:

Performance Mode:

Originator:

Added: SYSTEM 5/16/2007 17:19:

Updated: (b)(6) 5/22/2007 12:58:

Problem Description:

TRENDING ASSIGNMENT CREATED FROM ACE 070300161-8: AVR ISSUES

Reference Tab Information:

Text Tab Information:

-----EVENT-SUMMARY-----

Responses are copied from ACE 070300161-08

What happened:

Various aspects of the SONGS site performance in response to this 3G003 AVR #A failure lacked a sense of urgency and coordination for such a significant piece of equipment. This and SONGS use of Common Cause Evaluation drew criticism from the NRC

IA#1 ME engineer generated the common cause evaluation, stating no common cause, using the justification that the failure was expected and random with infrequent occurrence.

IA#2 - ME Supervisor did not provide a detailed communication to Management and NRC on Monday morning [3/5/2007]

Why it happened:

AC#1 Program/Process Manager Performance: Inadequate program/process

The ME engineer did not correctly (conservatively) interpret the technical specification for the common cause evaluation because the program does not provide adequate guidance for generation of the common cause evaluation. CA #1 will address this.

AC#2 Program/Process Manager Performance: Inadequate Communication Methods

The ME Supervisor did not provide timely, clear, and accurate information to Management and NRC because an established requirement did not exist. CA#2, 3 and 4 will address this.

What is the significance/Consequence:

There was no safety consequence because the AVR was swapped and declared operable and the other train EDG was subsequently tested satisfactorily. Due to SONGS response to this event there is elevated regulatory concern.

What actions were taken or are planned:

See ACE 070300161-08

-----DIRECT-CAUSE-EQUIPMENT-----
 -----DIRECT-CAUSE-EQUIPMENT-2-----
 -----DIRECT-CAUSE-EQUIPMENT-3-----
 -----HUMAN-PERFORMANCE-----
 -----INDUSTRIAL-SAFETY-----

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
A	90	45	(b)(6)	8/22/2007 12:58:18	(b)(6)
D	45	90		8/22/2007 12:56:45	
Need to reset Engineering Event-Free Clock					
C	90	10	(b)(6)	6/25/2007 07:30:39	
EST-DD				5/17/2007 09:09:46	
Prior to plant need					
EST-DD				5/17/2007 09:09:46	
Waiting on completion of associated ACE, 070300161-8					
EST-DD			(b)(6)	5/17/2007 09:09:46	
Due Date has changed for assignment: 16 Type: TND Old value was "6/6/2007 17:19:05"					

Notes Tab Information:**Trending Tab Information:**

1 -> HUMAN PERFORMANCE TRENDING

2 ->

3 -> PROGRAM: What Site/Division program do you want to trend?

57 -> ☒ Maintenance Program

58 -> ☒ Corrective Maintenance

95 -> ☒ Regulatory Affairs, Licensing and Permits

115 -> ACTIVITY: What activity do you want to trend?

116 -> ☒ Analysis/Evaluation

139 -> ☒ Maintenance/Construction/Fabrication

165 -> ☒ Reporting/Notification

208 -> CAUSE(S): What cause(s) do you want to trend?

262 -> ☒ Program/Process Manager Performance

263 -> ☒ Inadequate Program/Process

265 -> ☒ Inadequate Communication Methods

277 -> SPOTLIGHTS: What spotlight do you want to trend?

Trending Tab Information:

- 279 -> ☒ Division Event-Free Clock reset issue
- 304 -> ☒ Human Performance Tools
- 305 -> ☒ Formal Communication
- 310 -> ☒ Questioning Attitude
- 401 -> **ACTIONS: What corrective action do you want to trend?**
- 402 -> ☒ Coaching
- 415 -> **ERROR PRECURSOR : (Applicable only to ACE/RCE)**
- 452 -> **End of questionnaire**

----- END OF REPORT -----

misc document changes

Action Request #: 070300161 -- 17

Assignment Type: DOC

Resp Org: R1100

Category: 10

WORKING

Priority: 3C

Assignee: (b)(6)

Forecast Date: 10/1/2007 00

Reference: BASES B 3.8.1

Due Date: 11/01/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

5/22/2007 07:51:

Updated: (b)(6)

8/31/2007 14:39:

Problem Description:

NOTIFICATION TEXT -- REVISE THE BASES B 3.8.1 AC SOURCES OPERATING, ACTIONS B.3.1 AND B.3.2, TO ADD THE FOLLOWING PARAGRAPH FROM THE CEOG STANDARD TECHNICAL SPECIFICATIONS NUREG 1432, REVISION 3. "IN THE EVENT THE INOPERABLE DG IS RESTORED TO OPERABLE STATUS PRIOR TO COMPLETING EITHER B.3.1 OR B.3.2, THE [PLANT CORRECTIVE ACTION PROGRAM] WILL CONTINUE TO EVALUATE THE COMMON CAUSE POSSIBILITY. THIS CONTINUED EVALUATION, HOWEVER, IS NO LONGER UNDER THE 24 HOUR CONSTRAINT IMPOSED WHILE IN CONDITION B.

RELATED TO AR 070400953 -- SEE ASSIGNMENT 7 FOR SCREEN.

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- The intent of this assignment is to ensure that the requested changes are completed as described and that a review is performed of existing documents to check for other impacts. Searches may be accomplished by using the TOPIC Information Server, references listed in the document being modified or by author knowledge of impact of changes

Describe actions taken:

Identify the document(s) changed:

Document Number:

Revision:

Date Issued:

Description of change:

Identify other affected documents and list the tracking AR Assignment Numbers:

Other information required to support/clarify the action taken:

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-DD			(b)(6)	8/31/2007 14:39:22	
Due Date has changed for assignment: 17 Type: DOC Old value was "9/4/2007 00:00:00"					
CHG-DD			(b)(6)	8/31/2007 14:39:22	
Work window rescheduled					
CHG-FC			(b)(6)	8/31/2007 14:39:06	
Forecast Date has changed for assignment: 17 Type: DOC old value was "9/4/2007 00:00:00"					
CHG-ASGN			(b)(6)	8/1/2007 09:56:22	
Assignee has changed for assignment: 17 Type: DOC old value was (b)(6)					

Action Request Assignment Report

Date Printed: 12/06/07 15:29:50

Code	To Status	From	By	Timestamp	Pax
CHG-FC			(b)(6)	8/1/2007 09:50:01	
	Forecast Date has changed for assignment: 17 Type: DOC old value was "7/30/2007 00:00:00"				
CHG-DD			(b)(6)	7/20/2007 11:59:06	
	Work window rescheduled				
CHG-DD				7/20/2007 11:59:06	
	Due Date has changed for assignment: 17 Type: DOC Old value was "7/30/2007 00:00:00"				
CHG-FC			(b)(6)	5/22/2007 07:52:35	
	Forecast Date has changed for assignment: 17 Type: DOC old value was "null"				
EST-DD			(b)(6)	5/22/2007 07:52:08	
	Due Date has changed for assignment: 17 Type: DOC Old value was "6/5/2007 07:45:14"				
EST-DD			(b)(6)	5/22/2007 07:52:08	
	Prior to plant need				

Notes Tab Information:

----- END OF REPORT -----

Other Assignment

Action Request #: 070300161 -- 18

Assignment Type: OTH

Resp Org: L4000

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date: 10/15/2007 C

Reference:

Due Date: 10/15/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added: 7/18/2007 07:27:

Updated: (b)(6) 9/14/2007 10:10:

Problem Description:

Notification text -- Determine at what frequency ME/SE engineers will be present during weekly EDG runs per ACE 070300161-8.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARS OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARS CHANGED FROM ~3 MVARS TO ~ 0 MVARS BACK TO HIGH AT 3.8 MVARS (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- Action was
completed as requested/defined: Yes: ☒ No: ☐

If No, provide a brief description of the action taken and reason for the change:

Summarize requested action:

Conduct a review as to the industry norms for Engineers to be present during normal planned testing of EDG's and based on industry norms determine what actions SONGS will take.

Conclusions/Action Taken

List references that support and document completion of action:

Doug Foote, EDG System Engineer, conducted an informal survey at the EMD User Group Meeting on 7/17-7/20/2007. Additionally, input from Columbia Generating Station, Diablo Canyon, and Palo Verde was obtained regarding the use of Engineers observing routine EDG testing runs. It was found that the majority of the surveyed plants conduct their routine surveillance runs of their EDG's during the normal work week because of ability to better support any emergent issues that might arise. Also, most plants surveyed including Columbia, Diablo Canyon, and Palo Verde have the expectation that an Engineer be present for "most" routine runs of the EDG's.

If no or incomplete references exist, provide a summary of the specific action taken, or the scope and conclusions of the evaluation performed, that support completion:

Applicability to other Systems/Components/Processes (extent of condition assessment): None

Cause of issue/problem (initiate a TND/ACE/RCE assignment, reference SO123-XV-50, attachment 4 if applicable): N/A

Identify other needed actions and list the tracking AR Assignment Numbers:

The Work Control Manager was notified of the survey findings and is reviewing methods to move the EDG runs to a normal work week timeframe in order to ensure more timely support. Engineering Management will arrange for an Engineer to be available to observe routinely scheduled EDG's the majority of the times they are run and begin implementation of this by 10/1/07.

Document/describe any communication with requestor upon completion, as appropriate:

-----TEXT-CONTINUATION-----

-----EFFECTIVENESS-REVIEW-----

EFFECTIVENESS REVIEW should include the following AR review:

Are the required assignments complete? (Yes/No)

Does assignment documentation support closure? (Yes/No)

Does the aggregate of required assignments support problem resolution? (Yes/No)

If problem resolution is not complete, then add appropriate assignments to complete problem resolution.

-----JUSTIFICATION-FOR-EXTENSION----- 1.

Provide the technical and/or business justification for not completing the corrective actions to resolve the problem within the appropriate timeframe.

2. State any impacts to procedures, plant operations, compensatory measures, etc., as a result of this extension.

3. State the new approved schedule date for completing the corrective actions.

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RFO			(b)(6)	9/14/2007 10:10:40	
Required for Operability has changed for assignment: 18 Type: OTH old value was "N"					
CHG-RESTR			(b)(6)	9/14/2007 10:10:40	
AR Restraint has changed for assignment: 18 Type: OTH old value was "0.0"					
A	90	10	(b)(6)	9/14/2007 10:10:23	(b)(6)
CHG-DD				9/12/2007 06:57:13	
Due Date has changed for assignment: 18 Type: OTH Old value was "9/15/2007 00:00:00"					
CHG-DD			(b)(6)	9/12/2007 06:57:13	
Work window rescheduled					
CHG-FC				9/12/2007 06:57:00	
Forecast Date has changed for assignment: 18 Type: OTH old value was "9/15/2007 00:00:00"					
CHG-FC			(b)(6)	7/18/2007 08:12:26	
Forecast Date has changed for assignment: 18 Type: OTH old value was "null"					
EST-DD			(b)(6)	7/18/2007 08:12:19	
Due Date has changed for assignment: 18 Type: OTH Old value was "8/1/2007 07:23:43"					
EST-DD			(b)(6)	7/18/2007 08:12:19	
Prior to plant need					

Notes Tab Information:

----- END OF REPORT -----

Field Support

Action Request #: 070300161 -- 19

Assignment Type: FS

Resp Org: L4200

Category: 90

CLOSED

Priority: 3C

Assignee: (b)(6)

Forecast Date: 9/12/2007 00

Reference:

Due Date: 08/12/08

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

8/13/2007 11:53:

Updated: (b)(6)

8/30/2007 11:58:

Problem Description:

NOTIFICATION TEXT -- ENGINEERING TO RE-EVALUATE FINAL VENDOR FAILURE ANALYSIS RESULTS FOR THE MARCH 3 3G003 MONTHLY TECH. SPEC. SURVEILLANCE TEST AND TO RE-EVALUATE WHETHER THIS EVENT IS A MAINTENANCE RULE FUNCTIONAL FAILURE.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARS OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARS CHANGED FROM ~3 MVARS TO ~0 MVARS BACK TO HIGH AT 3.8 MVARS (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- The FS (Field Support) may serve as a feedback record (formalized email), as a record of field support efforts, or to document engineering assessments, but should not be used as a standalone record of changes to design documents, calculations, or operational methods. Changes of this nature need to be processed per the appropriate assignment type, (PRO, DOC, CLC, etc). This includes creating MO assignments and notifying maintenance when existing MOs are not required. For issues of potential consequence, peer checks of conclusions reached in the FS assignment are encouraged.

Scope Definition/Clarification:

ENGINEERING TO RE-EVALUATE FINAL VENDOR FAILURE ANALYSIS RESULTS FOR THE MARCH 3 3G003 MONTHLY TECH. SPEC. SURVEILLANCE TEST AND TO RE-EVALUATE WHETHER THIS EVENT IS A MAINTENANCE RULE FUNCTIONAL FAILURE.

Applicability to other Systems/Components/Processes (extent of condition assessment):

This particular event is common to all EDGs since each one has identical components in their respective AVRs. Subsequent testing of the failed AVR by the vendor, per direction of SONGS ME, was able to replicate the failure seen during this surveillance run.

Cause of issue/problem (initiate a TND/ACE/RCE assignment, reference SO123-XV-50, attachment 4 if applicable):

Per DCE and vendor analysis the cause of the problem was the R3 pot opening or having poor contact which would make the AVR drive the EDG output voltage to zero volts. If the EDG were in isochronus mode (holding 1E bus by itself) there would have been no voltage support on the 1E bus and such a failure of the R3 pot would not have kept 1E bus voltage within required parameters.

Conclusion with basis/facts:

The behaviour of the R3 pot will be considered a failure of the AVR component which prevents the EDG from performing its intended safety function.
This will be considered a functional failure of 3G003 per maintenance rule expert panel 8/16/07 with concurrence by Systems Engineering.

Identify other needed actions and list the tracking AR Assignment Numbers:

Assign a functional failure to 3G003

Document/describe any communication with requestor upon completion, as appropriate:

Discussed with all parties during MREP meetings

(b)(6) 8/17/07

(b)(6) 8/30/07

Approval Tab Information:

Code	To	Status	From	By	Timestamp	Pax
CHG-RFO				(b)(6)	8/30/2007 11:58:18	
Required for Operability has changed for assignment: 19 Type: FS old value was "N"						
CHG-RESTR				(b)(6)	8/30/2007 11:58:18	
AR Restraint has changed for assignment: 19 Type: FS old value was "0.0"						
A	90		10	(b)(6)	8/30/2007 11:58:10	(b)(6)
CHG-FC				(b)(6)	8/16/2007 07:06:20	
Forecast Date has changed for assignment: 19 Type: FS old value was "null"						
EST-DD				(b)(6)	8/16/2007 07:06:10	
Management/program expectation based on priority (system default)						
EST-DD				(b)(6)	8/16/2007 07:06:10	
Due Date has changed for assignment: 19 Type: FS Old value was "9/12/2007 11:41:18"						
CHG-ASGN				(b)(6)	8/16/2007 07:06:08	
Assignee has changed for assignment: 19 Type: FS old value was (b)(6)						
CHG-ASGN				(b)(6)	8/13/2007 12:01:27	
Assignee has changed for assignment: 19 Type: FS old value was (b)(6)						
CHG-ASGN				(b)(6)	8/13/2007 12:01:26	
The following email text was added by (b)(6) This is to document the decision from last week regarding previous failure and whether it was a Maint Rule Functional Failure. I think (b)(6) already decided but we need to document it.						
Thanks, (b)(6)						

Notes Tab Information:

----- END OF REPORT -----

Direct Cause Evaluation

Action Request #: 070300161 -- 20

Assignment Type: DCE

Resp Org: L4200

Category: 99 CANCELLED

Priority: 3A

Assignee: (b)(6)

Forecast Date: 09/07/07

Reference:

Due Date: 09/20/07

Owner: Maintenance/System

Work Group: L4100 - MAINTENANCE/SYSTEM ENGRG - ELECTRICAL / I&C

Worker Type: Edison Employee

Human Performance: ☒Industrial Safety: ☐Equipment: ☐

General Tab Information:

Event Title: FAILED TO PROMPTLY RECOGNIZE AVR FAILURE AS A "MAINTENANCE RULE FUNCTIONAL F/

Event Date: 08/17/2007

Identifying Org: Line

QA Activity: Yes

Event Shift:

Initiating Document: N/A

Significance: Low

Unit: 3

Plant Status: Non-Outage

Error Type:

Reliability Classification:

Performance Mode:

Originator: (b)(6)

A3400

(b)(6)

Added: 8/17/2007 16:07:

Updated: (b)(6) 9/10/2007 09:18:

Problem Description:

Notification text -- Perform a Direct Cause Evaluation on the below occurrence. Failure to identify the AVR failure that occurred in March as a Maintenance Rule Functional Failure until August.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----EQUIP-DCE-PAGE-1----- See HU

Dropdown

-----EQUIP-DCE-PAGE-2-----

-----EQUIP-DCE-PAGE-3-----

-----COMPONENT-TYPE-CATEGORIES-----

-----HUMAN-PERFORMANCE-DCE----- HUMAN

PERFORMANCE DIRECT CAUSE EVALUATION/TND DOCUMENTATION (refer to SO123-XV-50.39 for guidance)

What was the event and actual/potential consequences?

The March 2007 3G003 EDG Automatic Voltage Regulator (AVR) unstable potentiometer event during testing was determined to be a Maintenance Rule Functional Failure (MRFF) by Electrical Maintenance Engineering, even though the Systems Engineer initially believed otherwise. Testing by AVR vendor demonstrated that the voltage regulator could not have performed its function in all instances. Therefore, the initial call made by the Systems Engineering regarding this event was in error.

Declaring a MRFF is expected to be performed in a timely manner. That expectation is generally within 30 days by

industry practice but considered acceptable if made within 90 days pending the discovery of pertinent facts.

What was the extent of condition?

As of 8/26/2007 all EDG AVRs have been upgraded with the 10 turn potentiometer (R3 pot) which corrects the MVAR fluctuations seen in the failure of this AVR. There are no further corrective actions required to be performed on the EDG AVRs.

What were the immediate actions taken?

Initial determination that erratic AVR action was not a maintenance rule functional failure was based on information that was available at the time. Operations surveillance performance criteria was met during the execution of the surveillance. Due to erratic MVAR fluctuations Operations performed a second surveillance on the opposite AVR as a pre-cautionary measure.

Two weeks after the initial event an updated common cause assessment (assignment 6) still clearly stated that the surveillance criteria was met. It was known to System and Maintenance Engineering and communicated to the MRFF program that internal components in the AVR were the most likely culprit for the erratic behavior but that condition had to be verified before formally declaring the AVR erratic behavior as a MRFF. Contrary to the opening statement above there were not two competitive stances on status of this equipment behavior and no formal statement by anyone that this was a MRFF. All parties waited for failure analysis results before making a MRFF conclusion.

During past instances of erratic AVR behavior during a surveillance (especially prior to the installation of the Digital Reference Unit, DRUs) it was determined that the AVRs would have performed their function since the AVR is operated differently when the EDG is in droop vis isochronos (in droop mode the EDG is sharing the bus with other power sources where there is frequency and voltage support from the bus. In isochronos mode the EDG is the sole power source on the bus). This is still the case and it was the consensus of engineering that a root cause on the component would ultimately determine if this erratic behavior would have also been present in the isochronos mode.

After the event, the AVR in question was tested per procedure here at SONGS. No problem with the AVR could be found.

The AVR was then shipped to ESI the EDG vendor for a failure analysis. The AVR performed as required when subjected to vendor's test procedure.

The AVR was then shipped to the manufacturer for additional testing. Initially Basler could not replicate the failure. After some time with direction from SONGS engineering, Basler did replicate the failure and stated that in a report dated 5/2/07 but the real implication for the EDG was not understood and conveyed to the stake holders

Subsequent to the report from Basler, there was additional information exchanged (7/2007) with Basler confirming that the failure mechanism would have been present in the isochronos mode. At this point the MRFF expert panel and engineering agreed that the erratic behavior of the AVR was indeed a MRFF and accepted it as such. The gap in time between the Basler report and determination of the EDG system implications did not meet industry expectations

Obtaining a failure analysis on this AVR that had a definitive cause and its affect on the equipment took a significant amount of time. As the failure could not be easily replicated, even by testing the suspected component within the AVR, it would have been hasty and premature to call a MRFF. Had a MRFF been called right after the erratic MVAR incident and engineering ran with the R3 pot as the culprit, the AVR may not have been as rigorously tested as it was which could have masked another AVR problem. The untimely MRFF determination was partly a result of extensive testing that assured SONGS that there was no other issues with the AVR beside the R3 pot but also the time gap in critical information exchange between vendors and SONGS personnel.

What was the undesirable action (inappropriate action)?

Waiting for a failure assessment report that confirmed our original assessment.

How and why did the undesirable action occur (ask why 1 or 2 times)?

Engineering waited for a factual assessment before making a MRFF call on the event.

Action Request Assignment Report

Date Printed: 12/06/07 15:30:00

Although this action may appear to be good practice, the past history of the component and our knowledge of it made engineering relatively certain as to what the cause was going to be. There was an unacceptable delay in the time from the Basler report to the time we concluded what the failure impact was to the EDG.

DIRECT CAUSE:

Per attachment 13 of SO23-XV-50.39 the direct cause was individual performance due to a failure to provide information in a timely manner.

What corrective actions have been taken and need to be taken?

FS 070300161-21, will review all AVR failures for the last 3 years to ensure if any others should be classified as MRFF based on this new vendor information.

||||

Hours taken by the evaluator to complete and document evaluation?

4 hours

-----INDUSTRIAL-SAFETY-DCE-----

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
X	99	20	(b)(6)	9/10/2007 14:54:10	(b)(6)
This is a new issue being investigated under AR070900431					
D	20	35	(b)(6)	9/10/2007 14:53:00	(b)(6)
This is a new issue being investigated under AR070900431					
CHG-ASGN			(b)(6)	9/4/2007 08:14:52	(b)(6)
Assignee has changed for assignment: 20 Type: DCE old value was (b)(6)					
CHG-ASGN			(b)(6)	9/4/2007 08:14:51	(b)(6)
The following email text was added by (b)(6)					
I understood from our discussion last Friday, that you would rewrite this DCE. So here it is.					
(b)(6) P3000					
CHG-ASGN			(b)(6)	8/31/2007 08:14:34	(b)(6)
Assignee has changed for assignment: 20 Type: DCE old value was (b)(6)					
A1	35	20	(b)(6)	8/31/2007 08:14:27	(b)(6)
ASSOC			(b)(6)	8/31/2007 08:12:26	(b)(6)
Associated assignment AR#: 070300161 Seq: 21					
CHG-ASGN			(b)(6)	8/29/2007 14:40:54	(b)(6)
Assignee has changed for assignment: 20 Type: DCE old value was (b)(6)					
A	20	10	(b)(6)	8/29/2007 14:40:09	(b)(6)
CHG-FC			(b)(6)	8/20/2007 09:49:25	(b)(6)
Forecast Date has changed for assignment: 20 Type: DCE old value was "null"					
EST-DD			(b)(6)	8/20/2007 09:48:58	(b)(6)
Due Date has changed for assignment: 20 Type: DCE Old value was "9/16/2007 16:03:59"					
EST-DD			(b)(6)	8/20/2007 09:48:58	(b)(6)
CHG-ASGN			(b)(6)	8/20/2007 09:48:37	(b)(6)
Assignee has changed for assignment: 20 Type: DCE old value was (b)(6)					
CHG-ASGN			(b)(6)	8/20/2007 09:27:12	(b)(6)
Assignee has changed for assignment: 20 Type: DCE old value was (b)(6)					

Notes Tab Information:

CA Tab Information:

AR/SEQ/TYPE	Resp Org	Assignee	Due Date	Status	QA	REQ	Priority	MO Type
070300161 21 FS	L4200	(b)(6)	09/30/2007	99		Y	3C	

NOTIFICATION TEXT -- PLEASE EVALUATE PREVIOUS AVR FAILURES TO DETERMINE IF THERE WERE ADDITIONAL UNRECORDED MRFF SIMILIAR TO THAT FOUND IN DCE 070300161-20 FOR THE LAST 3 YEARS.

----- END OF REPORT -----

Field Support

Action Request #: 070300161 -- 21

Assignment Type: FS

Resp Org: L4200

Category: 99

CANCELLED

Priority: 3C

Assignee: (b)(6)

Forecast Date:

Reference:

Due Date: 09/30/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

8/31/2007 08:10:

Updated: (b)(6)

8/31/2007 08:12:

Problem Description:

NOTIFICATION TEXT -- PLEASE EVALUATE PREVIOUS AVR FAILURES TO DETERMINE IF THERE WERE ADDITIONAL UNRECORDED MRFF SIMILAR TO THAT FOUND IN DCE 070300161-20 FOR THE LAST 3 YEARS.

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- The FS (Field Support) may serve as a feedback record (formalized email), as a record of field support efforts, or to document engineering assessments, but should not be used as a standalone record of changes to design documents, calculations, or operational methods. Changes of this nature need to be processed per the appropriate assignment type, (PRO, DOC, CLC, etc). This includes creating MO assignments and notifying maintenance when existing MOs are not required. For issues of potential consequence, peer checks of conclusions reached in the FS assignment are encouraged.

Scope Definition/Clarification:

Applicability to other Systems/Components/Processes (extent of condition assessment):

Cause of issue/problem (initiate a TND/ACE/RCE assignment, reference SO123-XV-50, attachment 4 if applicable):

Conclusion with basis/facts:

Identify other needed actions and list the tracking AR Assignment Numbers:

Document/describe any communication with requestor upon completion, as appropriate:

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RESTR			(b)(6)	9/11/2007 09:34:38	
AR Restraint has changed for assignment: 21 Type: FS old value was "0.0"					
CHG-RFO			(b)(6)	9/11/2007 09:34:38	
Required for Operability has changed for assignment: 21 Type: FS old value was "N"					
X	99	10	(b)(6)	9/11/2007 09:33:48	(b)(6)
Associated DCE 070300161-20 has been cancelled and replaced by ACE 070900431-1					

Notes Tab Information:

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----- END OF REPORT -----

Apparent Cause Evaluation

Action Request #: 070300161 -- 22

Assignment Type: ACE

Resp Org: L4200

Category: 99

CANCELLED

Priority: 3A

Assignee: (b)(6)

Forecast Date:

Reference: MRFF 3G003 AVR

Due Date: 10/05/07

Owner: Maintenance/Systerr Human/Programmatic Perf: ☒ Common Cause: ☐ Implementation Awaiting Equipment: ☐

Event Title: MRFF OF THIS COMPONENT/EQUIPMENT (3G003 AVR)

General Tab Information:

Originator: (b)(6) A3400 (b)(6)
Added: 9/5/2007 11:18:5 Updated: (b)(6) 9/8/2007 07:51:3

Problem Description:

Notification text -- PERFORM AN APPARENT CAUSE EVALUATION OF THE EVENT(S) ON THE REFERENCED AR due to the MRFF of this component/equipment. Please cancel the DCE previously identified for this issue.
DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Type	Reference	Description
CED	(b)(6)	Facilitator

Text Tab Information:

-----EVALUATION----- Document

the ACE in accordance with SO123-XV-50.39, Attachment 2.

Do Not Delete the Default Template.

ACE EVALUATOR/TEAM:

ACEs must be conducted, led or reviewed by at least one person with the Encode CEPQS1 or ACETRN.
(Ref: SO123-XV-50.39, Step 6.2.1).

Individual with Encode CEPQS1 or ACETRN: Name _____

CEPQS1 or ACETRN verified in EQIS: Name: _____ Date: _____

PROBLEM STATEMENT:

FACTS SUPPORTING THE PROBLEM STATEMENT:

SEQUENCE OF EVENTS: [Identify the Equipment Failures/Inappropriate Actions (EF/IA) where they fit in the sequence.
Label each EF/IA with a Seq #.]

ANALYSIS AND CAUSES:

Method of Analysis: [mark with X to identify the method(s) used]:

- ☐ Event and Causal Factors Analysis - operating events, equipment, human performance
☐ Process Analysis - common cause/repetitive problems within a process
☐ Supplemental Analysis: ☐ Barrier, ☐ Change, ☐ Failure Modes, ☐ Task, ☐ Technical
☐ Other Method - describe methods and identify approving manager

[List each EF/IA with its Seq #, summarize the analysis, and identify the cause. Label each cause with a Seq#]

EXTENT OF CONDITION AND CAUSE:

Extent of Condition [Seq. #]:

Description:

Extent of Cause [Seq. #]:

Description:

OPERATING EXPERIENCE:

Site Operating Experience

Document Number:

Title:

Date:

Applicability to Event:

Repeat Problem: ☐ Yes ☐ No [mark with X]

COMPLETED CORRECTIVE ACTIONS (Reference the tracking record/document):

RC/AC/EOC (Seq #):

OWNER:

AR ASSIGNMENT/TRACKING DOCUMENT:

COMPLETION DATE:

PLANNED CORRECTIVE ACTIONS [must be linked on CA Tab]:

RC/AC/EOC (Seq #):

OWNER:

AR ASSIGNMENT:

DUE DATE:

OTHER ACTIONS: [if not applicable, mark N/A]

SUPPORTING EVALUATIONS: [if not applicable, mark N/A]

-----EVALUATION-CONT.-----

-----CANCELLATION-NOTES----- User ID:

(b)(6) Time: 9/11/2007 09:31:58

Comments:

1) WHAT HAPPENED:

ACE 070300161-22 addresses a new issue therefore, it should not have been written against AR 070300161.

2) WHY DID IT HAPPEN: ACE 070300161-22 was generated as an upgrade on DCE 070300161-20. DCE 070300161-20's autho overlooked that it addressed a new issue.

3) WHAT IS THE SIGNIFICANCE/CONSEQUENCE: None: ACE moved to a new AR

4) WHAT ACTIONS WERE TAKEN OR ARE PLANNED: New AR 070900431 was generated and ACE 070900431-1 was generated (FOR PLANNED ACTIONS, LIST AR ASSIGNMENT NUMBERS)

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
CHG-RESTR			(b)(6)	9/11/2007 09:31:58	
AR Restraint has changed for assignment: 22 Type: ACE old value was "0.0"					
X	99	10	(b)(6)	9/11/2007 09:26:17	(b)(6)
NOTE - comments available on Cancellation Text Tab					
ASSOC			(b)(6)	9/5/2007 13:34:10	
Associated assignment AR#: 070300161 Seq: 23					
CHG-ASGN			(b)(6)	9/5/2007 13:14:41	
Assignee has changed for assignment: 22 Type: ACE old value was (b)(6)					
CHG-ASGN			(b)(6)	9/5/2007 13:14:40	
The following email text was added by (b)(6) This ACE is to replace the DCE for the MRFF.					

Notes Tab Information:

CA Tab Information:

AR/SEQ/TYPE	Resp Org	Assignee	Due Date	Status	QA	REQ	Priority	MO	Type
070300161 23 FS	L4000	(b)(6)	09/12/2007	99		Y	3A		
Notification text -- FOR THE ACE/RCE, CONDUCT A MANAGER'S REVIEW OF THE PROBLEM, ADEQUACY OF IMMEDIATE/INTERIM ACTIONS, IMPACT ON PLANT OPERABILITY/RESTART, AND ACE/RCE DUE DATE.									
DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.									
FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A/7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).									

----- END OF REPORT -----

**** This assignment is a credited action for a RCE/ACE/RCT ****

Field Support

Action Request #: 070300161 -- 23

Assignment Type: FS

Resp Org: L4000

Category: 99

CANCELLED

Priority: 3A

Assignee: (b)(6)

Forecast Date:

Reference:

Due Date: 09/12/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

9/5/2007 13:33:1

Updated:

(b)(6)

9/5/2007 13:34:1

Problem Description:

Notification text -- FOR THE ACE/RCE, CONDUCT A MANAGER'S REVIEW OF THE PROBLEM, ADEQUACY OF IMMEDIATE/INTERIM ACTIONS, IMPACT ON PLANT OPERABILITY/RESTART, AND ACE/RCE DUE DATE.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~ 0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT ~2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- REQUIRED

FOR ALL ACE/RCEs

1. Problem Statement (Ref: SO123-XV-50.39, Attachment 2):

2. Immediate/interim actions taken to address the problem/cause pending completion of the evaluation/corrective action implementation, including AR assignments used to track the actions with their completion or due dates. If applicable, list impacts to work windows, mode changes and plant operability.

3. Actions taken to address the extent of condition, including AR assignments used to track the actions with their completion or due dates. If applicable, list impacts to work windows, mode changes and plant operability.

REQUIRED IF REQUESTING A FS DUE DATE EXTENSION

1. Requested due date:

2. Reason for extension:

3. Potential safety, regulatory or reliability impact in extending the due date:

Approval Tab Information:

Action Request Assignment Report

Date Printed: 12/06/07 15:30:08

Code	To Status	From	By	Timestamp	Pax
CHG-RFO			(b)(6)	9/10/2007 14:55:43	
Required for Operability has changed for assignment: 23 Type: FS old value was "N"					
CHG-RESTR			(b)(6)	9/10/2007 14:55:43	
AR Restraint has changed for assignment: 23 Type: FS old value was "0.0"					
X	99	10	(b)(6)	9/10/2007 14:55:21	(b)(6)
This is a new issue being investigated under AR070900431					
EST-DD			(b)(6)	9/5/2007 13:33:37	
Due Date has changed for assignment: 23 Type: FS Old value was "10/5/2007 13:32:48"					
EST-DD			(b)(6)	9/5/2007 13:33:37	
Regulatory commitment					
CHG-PRI			(b)(6)	9/5/2007 13:33:28	
Priority1 has changed for assignment: 23 Type: FS old value was "3C"					

Notes Tab Information:

----- END OF REPORT -----

Maintenance Rule Program Evaluation

Action Request #: 070300161 -- 24

Assignment Type: MRE

Resp Org: L4200

Category: 90

CLOSED

Priority: 3A

Assignee: (b)(6)

Forecast Date: 10/11/2007 C

Reference:

Due Date: 11/11/07

AR Restraint:

REQ For OPER:

General Tab Information:

Originator: (b)(6)

A3400

(b)(6)

Added:

9/11/2007 09:24:

Updated:

(b)(6)

10/22/2007 14:45

Problem Description:

Notification text -- Evaluate equipment performance trend which has been flagged by the Maintenance Rule program. AVR failures have been determined to be Repetitive by the Maintenance Rule Expert Panel, and requires an Maintenance Rule Evaluation for (a)(1) goal setting.

DESCRIPTION -- 3G003 AVR 'A'. WHILE PERFORMING LOAD TEST IAW SO23-3-3.23 ON 3G003 (AVR 'A' IN SERVICE), MVARs OSCILLATED EXCESSIVELY WHEN AT FULL LOAD. MVARs CHANGED FROM ~3 MVARs TO ~ 0 MVARs BACK TO HIGH AT 3.8 MVARs (CR INDICATION) IN A SHORT SPAN (SEARCH PLANT COMPUTER SYSTEM ON 3-3-07 AT -2136, POINT ID: C_JTRG003). THIS OCCURRED AT FULL MW LOADING. OSCILLATIONS CONTINUED THROUGHOUT THE TEST, HOWEVER, THE TEST WAS COMPLETED. SWAPPED TO AVR 'B' AND RE-PERFORMED LOAD TEST IAW SO23-3-3.23 L&S 4.3.

FS IS REQUIRED TO BE GENERATED PER SO23-3-3.23 A7 STEP 4.10 TO COMPLETE A COMMON CAUSE REVIEW FOR THE INOPERABILITY, ENSURING OTHER DIESEL GENERATORS ARE NOT AFFECTED (24 HOUR REQUIREMENT IAW TECH SPEC 3.8.1.B).

Reference Tab Information:

Text Tab Information:

-----ASSIGNMENT-TEXT----- Use the
"Maintenance Rule (MRE) Evaluation Guideline" [a "Reference Use" desktop guide] and procedure SO123-XV-5.3
"Maintenance Rule Program" to complete the MRE.

PQS 223190 Verification:

MRE Performed by: (b)(6)

Date Performed: 10/21/07

PQS Verified by: (b)(6)

Date Verified: 9/19/08

SUMMARY OF RESULTS

Two failures on the EDG AVRs are repeat MRFFs which exceed the EDG functional failure performance criteria of a single repeat MRFF over a period of 36 months.

The Automatic Voltage Regulator (AVR) on channel A of S22420MG003 failed to control EDG MVAR loading during a surveillance run. The AVR channel A on S32420MG003 failed to control EDG MVAR loading during a surveillance run. Inability of the EDG AVR to hold voltage and/or MVAR loading would cause voltage drops and oscillations on the 1E bus during a LOVS or SIAS and would prevent the EDG from performing its safety function of providing power to the 1E bus.

The goal for the EDGs is to have normal voltage and MVAR control during all surveillances until the end of 4Q07

1. DESCRIPTION

On 8/6/06 AR 060800603 was generated after a normally scheduled surveillance run on S22420MG003. Voltage oscillations and instability were observed during the surveillance. Operations swapped to the alternate AVR B and completed the surveillance without incident. On 3/3/07 AR 070300161 was generated after a normally scheduled surveillance run on S32420MG003 when MVAR oscillations were observed. Operations swapped to the other AVR B and completed the surveillance without incident.

In both of the above events, it was determined that the R3 potentiometers (voltage range) on the AVRs were either in a dirty spot on the potentiometer wiper or intermittently opening up. These conditions affected the ability of the AVRs to maintain control of EDG voltage as well as the MVAR loading. After factory testing of the AVR from S32420MG003 it was determined that the R3 had opened intermittently while the EDG was running. Factory reps indicated that with R3 opening the entire AVR circuit opens and control of 1E bus voltage by the AVR can go to zero if open long enough (within in a few seconds).

2. PERFORMANCE CRITERIA ASSESSMENT

The functional failure exceedence criterion is based on EDG operability testing for both Train A and Train B EDGs. The functional failure exceedence criterion is 3 functional failures in 20 demands, 4 functional failures in 50 demands, 6 functional failures in 100 demands, and 4 functional failures or 1 repeat (same root cause) functional failure over the 36-month monitoring period. This criteria is based upon NUMARC 87-00, Appendix D.

The performance criteria remains reasonable. A single repeat failure should be cause for exceeding the EDG functional failure criteria due the to safety significance of the EDG and that it can fail another safety related component. Past FF history indicates that the EDGs are a robust system and that failures are rare and that repeat failure are even less likely to happen. Determining corrective actions for this repeat MRFF will be performed.

These functional failures are due to the same root cause and will be considered repeat functional failures.

|||||

3. CAUSE DETERMINATION

The failure mechanism was dirt intrusion, exposure to the environment and subsequent opening/poor contact of the R3 potentiometer (voltage adjust) contacts on both AVRs.

ACE 070300161-8 was generated to address common cause evaluations that failed to identify these two common failures on the AVR potentiometer.

ACE 070900341-1 was generated to address the lack of timeliness by System Engineer in calling the two AVR failures a repeat MRFF and how the Maintenance Rule program failed to capture these two failures.

4. CORRECTIVE ACTIONS

All corrective equipment actions have been performed. As of 8/30/2008 all R3 and R4 potentiometers on all eight AVRs (two per train) have been replaced with sealed multiturn gold plated potentiometers. These potentiometers are not susceptible to the environment and dirt intrusion. Since the replacement of these potentiometers, there have been over 20 successful EDG runs on AVRs and the new potentiometers with no trouble in voltage and/or MVAR support on the EDG output. To date the results of the corrective actions have been successful.

5. SYSTEM REVIEW

To assure that the potentiometer replacements will remain successful a monitoring period of a minimum of 4 surveillances on each AVR should be performed. From the maintenance activities on 3G003 AVR A that were performed to the time that the AVR failed included approx 4 surveillances. This time frame and number of runs (4 or more) is sufficient to test the AVRs on multiple occasions to eliminate infant failures and to have them in service for a period of time that exposes the AVR module to the environment. A monitoring period up to the end of the fourth quarter 2007 would be more than adequate to have the new potentiometers on all 8 AVRs in service with the above stated number of starts.

The goal for the EDGs is to have normal voltage and MVAR control during all surveillances until the end of 4Q07. This goal will test all the components (AVRs) at their component level and the train level through voltage and MVAR output. With both trains being tested the system level reliability will be tested as well.

A. SSC Level Analysis

The component is the AVR. The EDG has two AVRs per EDG (train). However only one AVR can be in service at any time. Correct output of the AVR is essential to the generator for delivering the correct voltage to the 1E bus. The AVR is therefore an essential component of the EDG train and failure of an AVR will render that EDG train inoperable. Any common failure mechanisms can render the EDG system inoperable.

B. Review of Industry Indicators and Experience

Industry Operating Experience

Document Number: EPRI Report RS 1011109

Title: Baslar SR8A Voltage Regulators for Emergency Diesel Generators

Date: 12/2004

Applicability to Event: Describes failure of R3 potentiometers (expected failure, low frequency occurrence). States that R3 failure can be corrected by moving wiper back and forth or by replacement with new potentiometer if necessary.

Although not directly applicable to this event, SONGS LER 2-01-001 "Missed Technical Specification Surveillance for the Emergency Diesel Generators Automatic Voltage Regulators" relates in that SONGS AVRs have had critical issues associated with them in the past and sensitivity to AVR issues should always be heightened.

C. PM Adequacy

This component failure was not a direct result of the Preventative Maintenance program. The first failed potentiometer revealed itself during a maintenance window to replace the Digital Reference Unit (DRU). Setting up the DRU and the AVR required moving the potentiometers from a home position that the wiper has been resting at for a significant period of time. Our maintenance actions included cleaning and wiping the potentiometer, which were consistent with the above referenced EPRI document but the quality of the potentiometer and age were the pre-dominant factors that contributed to the AVR failure. Every time an R3 potentiometer is manipulated, the EDG must go through a testing sequence (fast start and full load rejection). These post maintenance testing steps makes routine maintenance on the potentiometer problematic. The potentiometer once set does not required adjustment and is therefore a static internal component of the AVR. Testing the output of the AVR which is performed regularly via EDG surveillances should be adequate to verify the functionality of the R3 potentiometer. Additional PMs requiring R3 and R4 potentiometer replacement (every 8 years) have been implemented recently, other PMs would serve no added benefit to establishing potentiometer health.

D. Optimizing Availability and Reliability

The maintenance activities required to maintain the AVR components, namely the R3 and R4 potentiometers, can be performed within a normally scheduled AOT or BOW and should not have a material effect on unavailability. Since there have been no subsequent failures of the AVRs at all since the new potentiometers have been installed and intrusive maintenance should be not required until the 8 year PM comes due, the reliability and unavailability appears to be balanced out.

E. Review of Effectiveness of Corrective Actions

6. GOALS

The goal for the EDGs is to have normal voltage and MVAR control during all surveillances until the end of 4Q07

7. MONITORING

A. Monitoring actions: Review surveillance data taken by operations

B. Performance Trend: Review voltage and MVAR output on EDG surveillances of stability and support as part of

action A.

Approval Tab Information:

Code	To Status	From	By	Timestamp	Pax
A	90	80	(b)(6)	12/3/2007 09:22:04	(b)(6)
A	80	50	SYSTEM	10/22/2007 14:49:02	
	Child assignments closed				
A	50	30	(b)(6)	10/22/2007 14:48:52	
CHG-ASGN				10/22/2007 14:48:52	
	Assignee has changed for assignment: 24 Type: MRE old value was (b)(6)				
A	30	20	(b)(6)	10/21/2007 08:20:11	(b)(6)
CHG-ASGN				10/21/2007 08:19:51	
	Assignee has changed for assignment: 24 Type: MRE old value was (b)(6)				
A	20	10	(b)(6)	10/21/2007 08:19:44	(b)(6)
CHG-ASGN				9/14/2007 15:56:07	
	Assignee has changed for assignment: 24 Type: MRE old value was (b)(6)				
CHG-FC			(b)(6)	9/11/2007 10:15:29	
	Forecast Date has changed for assignment: 24 Type: MRE old value was "null"				
EST-DD			(b)(6)	9/11/2007 10:15:18	
	Due Date has changed for assignment: 24 Type: MRE Old value was "10/11/2007 09:22:02"				
EST-DD			(b)(6)	9/11/2007 10:15:18	
	Prior to plant need				

Notes Tab Information:

----- END OF REPORT -----