

Unit 3

System Status: NOPR NOPT ORAS OST'S
User Status: CRTD STA ESCP ACRO

SONGS

Notification: NN 201340427



Description: battery voltage below 2.13 VDC

Created on: 02/19/2011 Reported By: (b)(6)

Responsible: (b)(6)

Priority: 4 Medium Required Start: 04/13/2011 14:07 End: 08/10/2011 14:07

Order No: 800663593 Code:

Task Exists? [Y]

Func.Loc.: S3.DCPS.3B007 125V STATION BATTERY 3B007

Equipment:

Assembly:

Quality Class: II

Location: Control Building Room: Elevation: Column:

Planner Group: Maint Electrical

WorkCenter: M_PLEI Electrical/I&C/TT Planning

Plant: 1000 SONGS - Services

Reliability Classification: CRITICAL-A

ARC Review Status: C Completed Feedback Req'd? [X]

M Rule: Sig Level: 4 Low Level Problem, Take Action/Trend

Breakdown [] Malfunction Start: 02/19/2011 06:37 Breakdown Duration: H
End:

Description:

02/19/2011 02:49:55 (b)(6)

1. Problem description

while performing order# 800393549 on 3B007 performance test section
6.4.24 of SO23-I-9.97 cell#38 reading of 2.1160 VDC fell below the
acceptable limits of < or = to 2.1317.

2. Impact or consequence

no effect to operability

3. Describe what happened

while performing order# 800393549 on 3B007 performance test section
6.4.24 of SO23-I-9.97 cell#38 reading of 2.1160 VDC fell below the
acceptable limits of < or = to 2.1317.

4. Immediate actions taken

notified srgf, wrote an email to engineer and wrote this NN

5. Extent of Condition (as applicable)

6. Cause (if known)

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Description: battery voltage below 2.13 VDC

Description Continued:

7. Recommended Actions
engineer needs to evaluate

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Func.Loc.: S3.DCPS.3B007 125V STATION BATTERY 3B007

Location: Control Building Room: Elevation: Column:

Task No.: 0001 Code Group:N-TS-IOD Immediate Operability Determination
Short Text:
Task Code: NO30 IOD Equipment OPERABLE
WorkCenter: EM PES Electrical Systems
Responsible: (b)(6)

Task No.: 0002 Code Group:N-EOCO Extent of Condition-Operability
Short Text:
Task Code: E030 CCI BW Sizing
WorkCenter: EM PES Electrical Systems
Responsible: (b)(6)

Task No.: 0003 Code Group:N-POD Prompt Operability Determination
Short Text:
Task Code: PO40 POD Closed
WorkCenter: EM ECE Electrical Programs
Responsible: (b)(6)

Task No.: 0004 Code Group:N-SPT General Support Record
Short Text: trend cell performance
Task Code: ST03 SPT Performing Support
WorkCenter: EM PES Electrical Systems
Responsible: (b)(6)

Task No.: 0005 Code Group:N-RPT Reportability Assessment
Short Text:
Task Code: RP65 RPT Complete Not Reportable
WorkCenter: R C Regulatory Compliance
Responsible: (b)(6)

Task No.: 0006 Code Group:N-P21 10 CFR Part 21 Evaluation
Short Text: based on charge results
Task Code: P101 P21 Evaluation Created
WorkCenter: EM PES Electrical Systems
Responsible: (b)(6)

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Func.Loc.: S3.DCPS.3B007 125V STATION BATTERY 3B007

Part: _____

Damage: _____

Cause: _____

Activity: _____

Part: _____

Damage: _____

Cause: _____

Activity: _____

Part: _____

Damage: _____

Cause: _____

Activity: _____

Part: _____

Damage: _____

Cause: _____

Activity: _____

SONGS

Notification: NN 201340427

Func.Loc.: S3.DCPS.3B007 125V STATION BATTERY 3B007

Location: Control Building Room: Elevation: Column:

Task Details:

Task No.: 0001 Code Group: N-TS-IOD Immediate Operability Determination
 Short Text:
 Task Code: NO30 IOD-Equipment OPERABLE
 WorkCenter: EM PES Electrical Systems
 Responsible: (b)(6)
 Status: TSOS
 Planned Start: 03/15/2011
 Planned End: 04/15/2011
 Complete:

Task Long Text:

IOD; Immediate Operability Determination [KEY POINTS]
 Refer to SO123-XV-52 for guidance

NOTE:

Operability Determinations shall only be completed by the on-shift SRO.
 Other cognizant personnel may complete other sections of the IOD as
 needed.

[1] Notification Number: 201340427

[2] Deficiency Identification and the Affected Functional Location:

S3.DCPS.3B007, 125V STATION BATTERY 3B007

while performing order# 800393549 on 3B007 performance test section
 6.4.24 of SO23-I-9.97 cell#38 reading of 2.1160 VDC fell below the
 acceptable limits of < or = to 2.1317.

[3] Identify the Specified Safety Function(s), include mission time (if
 applicable):

REF: LCO 3.8.4 Bases:

The station DC electrical power system provides the AC emergency power
 system with control power. It also provides both motive and control
 power to selected safety related equipment and preferred AC vital bus
 power (via inverters).

During normal operation, the 125 VDC load is powered from the required
 battery charger with the batteries floating on the system. In case of

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Notification: NN 201340427

Description: battery voltage below 2.13 VDC

loss of normal power to the required battery charger, the DC load is automatically powered from the station batteries.

Class 1E batteries for Trains A and B are sized for 90 minutes of operation without support of a battery charger, while batteries for Trains C and D are sized for 8 hours. By implementing the load reductions during a station blackout event, the blackout duty cycles for Batteries A and B can be met for 4 hours per Battery Sizing Calculation E4C-017. REF UFSAR section 8.3.2.1.2.1

Mission time is 120 days for DC power system. REF: UFSAR table 3.11.2

[4] Conclusion:

Determine OPERABLE/INOPERABLE

OPERABLE
 INOPERABLE

[5] Basis for Conclusion (Provide discussion):

The limit of 2.1317 VDC is an admin limit for individual battery cells. The tech spec limit (LCO 3.8.6 cond A) is 2.07 VDC. A reading of 2.1160 VDC is above the tech spec limit. There is a reasonable expectation that there is enough voltage margin for this battery bank to perform its specified safety function for its mission time and therefore remains operable.

Additional info: Entered LCS 3.8.106 condition C for not meeting surveillance SR 3.8.106.6 (voltage < 2.13 VDC). All required actions are completed. (C.1) Voltage reading is >= 2.07 VDC. (C.2) (b)(6) of engineering, is assigned the task to trend cell performance. (C.3) NMO 800663593 created to restore affected cell to >= 2.13 VDC.

POD created to support conclusion.

[6] Extent of Condition: Address the question: #Does the degraded or nonconforming condition currently exist on the other train/unit?#

Create an EOC Task to address the extent of condition. Yes

[7] If no EOC Task has been created to describe #other train/other unit# findings, then provide justification.

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Description: battery voltage below 2.13 VDC

[8] INITIAL REVIEWS:

SRO/STA Name: (b)(6)

SM Name: (b)(6)

[9] IOD Closure Information (Basis for closure):

The limit of 2.1317 VDC is administratively set for individual battery cells and provides indication of possible cell and battery degradation before reaching LCO limits. The Tech Spec limit (LCO 3.8.6 CONDITION A) and LCS Limit is 2.07 VDC. Monitoring of the cell voltage confirmed cell #38 voltage is being maintained above 2.1317. As such, there is reasonable expectation that the battery bank will perform its specified safety function for its mission time. The battery and cell #38 are continually monitored via the battery surveillance program, which provides an early warning of any changes cell voltage. The early warning provides ample time to take action to return the cell to required voltage or action to replace the cell.

The cell continues to be operable and is maintaining the required design voltage above 2.1317 VDC.

[10] Closure Review

Performer Name:

Peer Check Name:

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Func.Loc.: S3.DCPS.3B007 125V STATION BATTERY 3B007
 Location: Control Building Room: Elevation: Column:

Task Details:

Task No.: 0002 Code Group: N-EOCO Extent of Condition-Operability
 Short Text:
 Task Code: E030 CCI BW Sizing
 WorkCenter: EM_PES Electrical Systems
 Responsible: (b)(6)
 Status: TSCO
 Planned Start: 03/28/2011
 Planned End: 03/28/2011
 Complete: 03/22/2011 06:20

Task Long Text:

EOC (Extent of Condition Assessment) 201340427

Perform an Extent of Condition (EOC) evaluation for an identified deficiency to determine if the deficiency currently exists elsewhere. Do not use this method to determine cause; use a DCE, ACE or RCE as appropriate to determine the cause.

This EOC is for degraded ICV (individual cell voltage) found in cell #38 in battery bank 3B007. On 02/19/2011 while performing order# 800393549 on 3B007 modified performance test completion of the rapid recharge section 6.4.24 of SO23-I-9.97 cell #38 was found at 2.1160 VDC which is below the acceptable administrative limits LCS 3.8.106.6 of 2.1317 VDC.

If the EOC is being used to not delay completion of an Immediate Operability Determination or a Prompt Operability Determination, consider only "other train / other unit" applications.

For all other EOC uses, determine and evaluate scope as necessary.

Refer to SO123-XV-52 and SO123-XV-50 CAP-3.

1. Affected Equipment (See deficiency description or, if the deficiency description is incomplete or incorrect, describe)

The 1E battery banks 3B007 is composed of 60 type 2GN-23 ENERSYS cells. Cell #38 was found degraded with an ICV of 2.1160 VDC after a modified performance surveillance and rapid recharge. SONGS has 8 1E battery banks and 4 non 1E battery banks on site that contain the 2GN-23 type cells. The total number of 1E cells on site amounts to 480 type 2GN-23.

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Battery Banks 2B007, 2B008, 2B009, 2B010, 3B007, 3B008, 3B009, 3B010, each battery bank contain 60 2GN-23 cells. The 4 non-1E battery banks 2B012, 2B016, 3B012 and 3B016 each Non 1E battery banks contain 124 2GN-23 cells each for a total of 496. The total number of 2GN-23 cell on sit is 976 cells.

2. Deficiency Identification (See description or, if the description is incomplete or incorrect, describe)

Degrading ICV (individual cell voltage) found in 2GN-23 type battery cell. Battery 3B007 is made up of 29 battery jars each jar contains 2 cells, with 1 additional spare jar. During a modified performance surveillance and rapid recharge surveillance cell #38 did not return to the expected ICV > 2.2 volts and was below the LCS administrative limit of 2.13 VDC at 2.1160 VDC.

3. Discussion of findings, including the basis for the conclusion:
Over the past 5 years SONGS replaced all 8 of the 1E battery banks with type 2GN-23 battery jars. There are currently 976 cells of this type on site. To date we have experienced one degrading ICV in battery bank 2B008 cell #13 which is same type cell (2GN-23) in battery bank 3B007. The cell was removed and sent to the vendor for testing and evaluation. The results of the evaluation determined that the cell had a manufacturing defect in one separator between a positive and negative plate. The evaluation and testing also determined that the cell was capable of performing its design function despite the defect.

The SONGS Battery surveillance program verifies cell condition on a monthly and quarterly basis. The battery surveillance program documents monthly pilot cell and quarterly Individual Cell Voltage values. Based on review of all surveillance records no other low Individual Cell Voltages were found with a lower than expected individual cell voltage.

As part of the Modified performance test and rapid recharge for 3B007 all other individual cell voltages were verified and found to satisfactory. Therefore, it is reasonably assured that this is an isolated incident and the deficiency does not exist in any other cells.

Prepared by (b)(6)

Reviewed by:

SONGS

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Func.Loc.: S3.DCPS.3B007 125V STATION BATTERY 3B007
 Location: Control Building Room: Elevation: Column:

Task Details:

Task No.: 0003 Code Group: N-POD Prompt Operability Determination
 Short Text:
 Task Code: PO40 POD Closed
 WorkCenter: EM_ECE Electrical Programs
 Responsible: (b)(6)
 Status: TSCO
 Planned Start: 02/21/2011 01:45
 Planned End: 02/21/2011 01:45
 Complete: 02/21/2011 01:45

Task Long Text:

POD, Prompt Operability Determination [KEY POINTS]
 Refer to SO123-XV-52 for guidance

[1] Notification Number: 201340427

(See NN 200834923 for similar type of event involving a pilot cell.)

[2] Describe the as-found condition and the equipment affected, assuring that the problem and scope have been clearly identified:

S3.DCPS.3B007, 125V STATION BATTERY 3B007

while performing order# 800393549 on 3B007 performance test section 6.4.24 of SO23-I-9.97 cell#38 reading of 2.1160 Vdc fell below the acceptable limits of < or = to 2.1317 Vdc.

[3] If it is confirmed at this stage that no degraded, nonconforming or unanalyzed condition exists, record as such and provide justification:

[4] Specified Safety Function(s) of the affected SSC:

REF: LCO 3.8.4 Bases (and LCS 3.8.106):

The station DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment and preferred AC vital bus power (via inverters).

During normal operation, the 125 VDC load is powered from the required battery charger with the batteries floating on the system. In case of loss of normal power to the required battery charger, the DC load is

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Description: battery voltage below 2.13 VDC

automatically powered from the station batteries.

Class 1E batteries for Trains A and B are sized for 90 minutes of operation without support of a battery charger, while batteries for Trains C and D are sized for 8 hours. By implementing the load reductions during a station blackout event, the blackout duty cycles for Batteries A and B can be met for 4 hours per Battery Sizing Calculation E4C-017. REF UPSAR section 8.3.2.1.2.1

Mission time is 120 days for DC power system. REF: UFSAR table 3.11-2

[5] Technical Basis for Determining Impact on Specified Safety Function(s):

The limit of 2.1317 Vdc has been administratively set for individual battery cells. The Tech Spec Limit (LCO 3.8.6 CONDITION A) and LCS Limit is 2.07 Vdc. A reading of 2.1160 Vdc is above these limits. As such, there is reasonable expectation that the battery bank will perform its specified safety function for its mission time.

[6] Specified Safety Function(s) Satisfied (Yes/No):

YES.

[7] Continued Degradation applicability:

Per telecon with the cognizant engineer the Cell # 38 should be charged with a single cell charger to bring up the voltage above the administrative voltage of 2.1317 Vdc. The voltage should be monitored on an hourly basis for 12 hours and if the results are SAT (Cell voltage greater than 2.1317 Vdc) then the cell should be monitored as the pilot cell to assure the performance of Cell# 38.

The above actions are required to meet the Battery Parameters #LCS Section 3.8.106.6 Required Actions (C.1, C.2 and C.3).

NMO #800663593# has been generated to charge Cell# 38 and monitor the status.

The SPT task 4 under this Notification will document the cell voltages for trending.

[8] Compensatory Measures required:

None. Monitoring will be required as described under [7].

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[9] Extent of Condition Consideration

NOTE: This section is only applicable when the SSC does not meet a Specified Safety Function. Address the question: #Does the degraded or nonconforming condition currently exist on the other train/unit?#

Has an EOC Task been created to address the extent of condition (YES or NO)?

Yes.

[10] IF no EOC Task has been created, THEN describe #other train/other unit# findings (if performed) or indicate N/A (if not necessary)

[11] PERFORM POD reviews:

(b)(6) 2/20/2011

POD Performance Engineer/Date
(PQS T3EN13 Required)

Engineering Peer Check/Date (b)(6) 2/20/11
(PQS T3EN13 Required) qualified T3EN13 expires 8/26/12

[12] POD Real Time Review:

Independent Reviewers/Date

(b)(6) / 2-20-11

(PQS PODRTR Required)

Reviewed by: (b)(6) - STA 2/20/2011

Peer Checked by: (b)(6) - SM 2/20/2011

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Notification: NN 201340427

Func.Loc.: S3.DCPS.3B007 125V STATION BATTERY 3B007

Location: Control Building Room: Elevation: Column:

Task Details:

Task No.: 0004 Code Group: N-SPT General Support Record
 Short Text: trend cell performance
 Task Code: ST03 SPT Performing Support
 WorkCenter: EM PES Electrical Systems
 Responsible: (b)(6)
 Status: TSOS
 Planned Start: 02/23/2011
 Planned End: 04/15/2011
 Complete:

Task Long Text:

SPT (General Support Record)

Describe the General support request: 201340427

Trend cell 38 performance per LCS 3.8.106.6 (C2). See NMO 800663593 for cell voltage data.

Engineering reviewed all pervious quarterly surveillance on 3B007 and confirmed that the cell #38 ICV were above the administrative limit. NMO 800663593 was the first time the ICV was found below the 2.13 VDC limit.

NMO 800663593 was generated to perform a single cell charge on cell #38, the object of the single cell charge was to determine if there the cell will respond and return to a normal ICV of approximately 2.2 VDC. The results of the single charge will help determine any further action.

NMO 800663593 Cell #38 voltage was taken and found to be greater than 2.1317 volts (2.1467) and the NMO closed with no further action.

Contact with the vendor Enersys who recommended a single cell charge be performed on cell #38 to determine if cell has degraded ICV. The single cell charge is required to determine if the cell has capability to supply required voltage and current to satisfy its safety design function.

NMO 800676380 issued to perform a single cell charge on cell #38, scheduled for 3/28/2010. This task will be maintained open to track the single cell charge and ICV for this cell. This is expected to be completed by 4/4/11.

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The results of the single cell charge?

What action need to be taken?

Evaluated by:

Peer check by:

SONGS

Notification: NN 201340427

Func.Loc.: S3.DCPS.3B007 125V STATION BATTERY 3B007

Location: Control Building Room: Elevation: Column:

Task Details:

Task No.: 0005 Code Group: N-RPT Reportability Assessment
 Short Text:
 Task Code: RP65 RPT Complete Not Reportable
 WorkCenter: R C Regulatory Compliance
 Responsible: (b)(6)
 Status: TSCO
 Planned Start: 03/28/2011
 Planned End: 03/28/2011
 Complete: 03/16/2011 12:35

Task Long Text:

NN 201340427 task 5

TECHNICAL ASSESSMENT TEMPLATE

NOTE: ENGINEERING JUDGEMENT may be used to answer questions. However, the basis for the judgment needs to be documented to validate the judgment.

For the purposes of determining REPORTABILITY, it is only necessary for the individual responding to these question to identify a single occurrence within the previous three years where the SPECIFIED (SAFETY) FUNCTION was incapable of being fulfilled (i.e., both trains of redundant systems were INOPERABLE OR NON-FUNCTIONAL).

When the requested questions in SECTION 2 are answered, then the assigned individual should reassign the N-RPT to an RP25 status. ONLY an NRA PQS 270QC7 qualified individual may reassign an N-RPT task to a status RP30 or higher.

SECTION 1 - Initial Reportability Assessment (RP10) [To be completed by a PQS 270QC7 Qualified Individual.]

On 02/19/2011 while performing order# 800393549 on 3B007 Battery performance test procedure SO23-I-9.97, during the rapid recharge section 6.4.24 cell #38 as left individual cell voltage reading was 2.1160 VDC which is below the administrative limits of < or = to 2.1317.

Prepared By:

Date:

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Notification: NN 201340427

Description: battery voltage below 2.13 VDC

SECTION 2 - Technical Assessment (RP20) [The REPORTABILITY ENGINEER will determine which questions are to be answered.]

1. Describe the condition being evaluated for reportability:

Battery 3B007 cell#38 was below LCO SR 3.8.106.6 administrative limit of 2.1317 VDC.

2. 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, mission time, and the status of other equipment. If yes, why?

Yes, 3B007 battery and Cell #38 would have been able to supply the required designed safety function to support the DC bus with the required voltage and current.

LCO SR 3.8.106.6 is an administrative limit of 2.1317 VDC, and is an early warning indication of the battery condition and to obtain a normal cell life expectancy (LCS 3.8.106.6 Bases)

The minimum technical specification required limit for cell voltage per LCO 3.8.6. is 2.07 VDC. The 2.07 VDC value is based on calculation E4C-017 which provides the minimum required voltage value for the battery to perform its designed safety function.

Per UFSAR section 8.3.2.1.2.1 Battery Capacity. Class 1E batteries for Trains A and B are sized for 90 minutes of operation without support of a battery charger, while batteries for Trains C and D are sized for 8 hours. By implementing the load reductions during a station blackout event, the blackout duty cycles for Batteries A and B can be met for 4 hours per Battery Sizing Calculation E4C-017.

(on 2/25/11 cell #38 ICV was at 2.1467 VDC)

3. If the conclusion of step 2 is Yes, mark steps 4, 5 and 6 as #Not Applicable, # document task performance/peer check, advance the Task to RP25 and assign to Reportability Compliance for completion of step 7. If the conclusion of step 2 is No, complete steps 4, 5 and 6.

4. When did the SSC fail or first become degraded (break, code not met, out of SR range, etc.)? If the specific time of failure is not known,

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is there any compelling evidence of prior failure?

N/A

5. What was the apparent cause of the failure or degraded condition? (use engineering judgment to determine, if necessary - but also describe the basis for your judgment). If appropriate, generate a cause evaluation assignment.

N/A

6. Did the failure or failure mode affect or potentially affect another SSC or the other unit?

N/A

7. [Additional Questions as indicated by the REPORTABILITY ENGINEER.]

Prepared By: (b)(6) Date: 03/01/11

Peer Reviewer Comments:

Peer Reviewer: (b)(6) Date: 3/3/11

After the peer review is completed, the Advance the RPT Task to RP25 and assign to Reportability Compliance for completion of step 7.

SECTION 3 - Compliance Review and Management Approval (RP25 and RP30)

8. Reportability assessment summary (include references as appropriate. (To be completed by qualified individuals only - see Encode 270QC7: Assessing Events for Reportability).

Not Reportable. A cell on station battery 3B007 was found at 2.1160 VDC, which is below the LCO SR 3.8.106.6 administrative limit of 2.1317 VDC, and consequently failed the surveillance test.

Technical Specification 3.8.6 "Battery Parameters," requires the batteries to be operable to support the DC busses. Condition A

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Description: battery voltage below 2.13 VDC

specifies action if minimum cell voltage is below 2.07 V. LCS 3.8.106 "Battery Parameters," SR 3.8.106.6 requires a quarterly verification each connected cell voltage is e 2.13V. The cell was above the TS limit but less than the LCS limit, which provides additional design margin to support the minimum battery life required safeguards loads. The requirements of LCS Condition C, for failure to pass SR 3.8.106.4 were performed as documented in IOD Task 1. Therefore, the cell as-found was above the Technical Specification limit and no report is required under 50.73(a)(2)(i)(B) "Any operation or condition which was prohibited by the plant's Technical Specifications," or 50.73(a)(2)(v) "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to: (A) Shut down the reactor and maintain it in a safe shutdown condition; (B) Remove residual heat; (C) Control the release of radioactive material; or (D) Mitigate the consequences of an accident."

Prepared By:

(b)(6)

Date: 3-4-11

Management Reviewer Comments: None

Management Reviewer:

(b)(6)

Date: 3/16/11

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Func.Loc.: S3.DCPS.3B007 125V STATION BATTERY 3B007

Location: Control Building Room: Elevation: Column:

Task Details:

Task No.: 0006 Code Group: N-P21 10 CFR Part 21 Evaluation
Short Text: based on charge results
Task Code: P101 P21 Evaluation Created
WorkCenter: EM PES Electrical Systems
Responsible: (b)(6)
Status: TSOS
Planned Start:
Planned End: 04/20/2011
Complete:

Task Long Text:

10 CFR Part 21 Evaluation

Document below a 10CFR21 Evaluation of the component defect described in the referenced Notification. Reference SO123-XXX-3.5 for guidance on 10CFR21 applicability. If determined to be reportable, include reference to reporting record