

Status 9-Closed Trend 01-Deviation From Doc/Proc  
 Department NCSX Division WBS 121  
 Source/Org FABRICATION, OPERATIONS & MAINTENANCE  
 Item Dwg/Part# SE121-004 Rev 2 Procurement # \_\_\_\_\_ Cost Center \_\_\_\_\_  
 RAP# 3268 Job Doc # D-NCSX-FPA-001 Vendor \_\_\_\_\_  
 RAP Title Field Period Assembly Station One

HoldTag Applied

**Nonconforming Condition (include requirement(s) violated):**

CSPEC 185-01-00, Para. 4.2.5.1, and D-NCSX-FPA-001, Para. 6.12.2, specify an electrical isolation of 10 meg ohms min. @ 5KV. The test was actually performed at 600V. In addition, resistance measurements are below the minimum. Resistance readings range from .5 meg ohms to 2.5 meg ohms on VVSA #1 and .5 meg ohms to 2.8 meg ohms on VVSA#2.

UPDATE 10/11/07: Rev. 1 of the CSPEC, issued 7/31/07, specifies the thermocouple electrical isolation requirements as >1.5 MOhms at a minimum of 500V. VVSA #3 was tested at 500V and many of the thermocouples did not meet the >1.5 MOhm requirement. See Attachment 1, page 3, for more detail.

Lot Size Recd 210 Sample Size Insp 180  Lot Rejected # Rejected 106  
 Reported By Boscoe J Validated By Phelps C Validated Date 10/11/07

Disposition: Rework\*\_\_ Repair\*\_\_ Use As Is\* **X** Return To Vendor\*\_\_ Scrap\*\_\_ Use As Is

Recheck at 500V - Return to vendor those that do not pass.  
 From: Goranson, Paul L. [mailto:goransonpl@ornl.gov]  
 Sent: Wednesday, August 22, 2007 9:12 AM  
 To: Michael E. Viola; Mike Cole  
 Cc: Lawrence E. Dudek; John W. Edwards; Lynne H. Yager; Phil Heitzenroeder  
 Subject: RE: NEW NCR 3719 - Needs Disposition  
 Note that CSPEC has been revised to minimum of 1.5 megohms at 500 volts dc. Anything less is subject to rejection as this is guaranteed by supplier.

Revision 1: Disposition revised by NCSX Project Engineering from retest and return to vendor to use as is, see explanation on page 2.

~~For rework or repair of vendor supplied equipments, fill in information below:~~

#Hours _____	\$Est Labor _____	\$G&A _____
\$Material _____	\$Burden _____	\$Total _____

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~~Disposition By \_\_\_\_\_ Date \_\_\_\_\_~~  
~~Supervisor's Concur \_\_\_\_\_ Date \_\_\_\_\_~~  
~~Eng. Dept. Head Concur \_\_\_\_\_ Date \_\_\_\_\_~~  
~~WCO/Other \_\_\_\_\_ Date \_\_\_\_\_~~

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~~PQA/QC Mgr Dispos Concur \_\_\_\_\_ Date \_\_\_\_\_~~  
~~QC Field Verification By \_\_\_\_\_ Date \_\_\_\_\_~~

**Distribution**  
 Cog M. Viola  
 Insp Boscoe J  
 Proj. Doc Control (when closed)  
 QC Files  
 Malsbury J  
 Boscoe J  
 J. Edwards  
 L. Dudek  
 Williams M  
 Tyrrell M  
 Phelps C  
 Simmons B

Disposition: Rework\_\_\_ Repair \_\_\_ Use As Is\_\_\_ Return to Vendor\_\_\_ Scrap\_\_\_

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For rework or repair of vendor supplied equipment, fill in information below:

# Hours \_\_\_\_\_ \$ Est Labor \_\_\_\_\_ \$ G&A \_\_\_\_\_  
\$ Material \_\_\_\_\_ \$ Burden \_\_\_\_\_ \$ Total \_\_\_\_\_

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Disposition by \_\_\_\_\_

Supervisor's Concurrence \_\_\_\_\_

Eng. Dept. Head Concurrence \_\_\_\_\_

Other (i.e., WCO/FPE) Concurrence \_\_\_\_\_

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PQA/QC Mgr Disposition Concurrence \_\_\_\_\_

QA Field Verification by \_\_\_\_\_

## NCR 3719 Rev. 1 Attachment 1 – Additional Detail & Disposition Revision – 10/11/07

### Non-Conforming Condition(s):

CSPEC 185-01-01, paragraphs 4.2.2.1.2 and 4.2.51 specifies the thermocouple electrical isolation requirements as >1.5 MOhms at a minimum of 500V.

Actual testing of the installed thermocouples on all three VVSA's (58 thermocouples/VVSA) indicate that, in many instances (105 out of the total of 174 measured), these requirements were not met. Specifically, the testing indicated:

- VVSA #1: Measurements ranged between 0.60 – 1.40 MOhms at 600V long T/C
- VVSA #1: Measurements ranged between 0.45 – 2.70 MOhms at 600V short T/C
- VVSA #2: Measurements ranged between 0.40 – 1.80 MOhms at 600V long T/C
- VVSA #2: Measurements ranged between 1.60 – 2.80 MOhms at 600V short T/C
- VVSA #3: Measurements ranged between 0.43 – 0.80 MOhms at 500V long T/C
- VVSA #3: Measurements ranged between 1.00 – 2.00 MOhms at 500V short T/C

In addition, bench checking of a sampling of combination of 5 short and long thermocouples, resulted in the following readings:

- Short thermocouples :
  - #050 – 1.00 MOhms at 500V and 0.80 MOhms at 600V
  - #051 – 1.20 MOhms at 500V and 0.95 MOhms at 600V
  - #053 – 1.50 MOhms at 500V and 1.30 MOhms at 600V
- Long thermocouples:
  - #184 – 0.55 MOhms at 500V and 0.50 MOhms at 600V
  - #207 – 0.40 MOhms at 500V and 0.325 MOhms at 600V

### Disposition:

- **Use as is:** Confirmed that there is a dedicated rack that does provide insulation from ground and is connected to the vessel so that the rack floats with the vessel. Additionally, initial analysis indicates disruption voltages in the 100 volt range - well below the below the 500 volt test voltage. At this low voltage, an electrical insulation reading of >0.4 MOhms is adequate to prevent high ground loop circulating currents.
- **Do NOT revise CSPEC** to preclude setting precedence for potentially reduced requirements on future experimental devices. Include the insulation requirement in the PRL for future purchases and handle any future non-conformances via the NCR process.