PPPL NONCONFORMANCE REPORT NO: 3639 Open Date 03/21/06 Rev #: 3 , 10/4/2007

Status 2 - Disposition Needed **Trend** 01-Deviation From Doc/Proc

Department NCSX **Division** WBS 141

Source/Org FABRICATION, OPERATIONS & MAINTENANCE

Item Dwg/Part# SE142C-270 Rev. 0 **Procurement #** _____ **Cost Center** _____

RAP# 3234 **Job Doc #** D-NCSX-MCF-004 **Vendor** VARIOUS

RAP Title Modular Coil Fabrication - Post VPI Activities

☐ HoldTag Applied

Nonconforming Condition (include requirement(s) violated):

The following additional parts for the NCSX modular coil final winding clamp assemblies exhibit a magnetic permeability higher than the maximum allowed per NCSX-ASPEC-GRD-03 paragraph 3.3.1.1 (permeability shall not exceed 1.02). See NCR 3634 for list of additional final winding clamp parts that are over the magnetic permeability limit.
PART #s 3 AND 6 (SEE ATTACHED FOR DETAILS.)

The following parts were found to be acceptable.
PART #9 (SEE ATTACHED FOR DETAILS.)

REV 1: ADDITIONAL PARTS RECEIVED AND INSPECTED. SEE ATTACHMENT.
REV 2: Final winding clamp assembly redsigned, see attachment for revision details. Also see NCR 3634 as it deals with this same issue.
REV 3: Further investigation (part 6 only) with greater details per NCSX Engineering request, see page 2 of Attachment for specifics.

Lot Size Recd 0 **Sample Size Insp** 0 ☐ Lot Rejected **# Rejected** 0

Reported By Phelps C **Validated By** Boscoe J John E. Boscoe Digitally signed by John E. Boscoe DN: cn=John E. Boscoe, c=US, o=PPPL Date: 2007.10.04 12:00:27 -04'00' **Validated Date** 10/04/07

~~**Disposition: Rework*__ Repair*__ Use As Is*__ Return To Vendor*__ Scrap*___**~~

Awaiting test results from outside laboratory to determine whether the permeability of the 316ss parts can be used as is without further work.
C. Phelps, 4/3/07 - Larry D. said Phil will address when he returns.

Please use p. 2 for disposition and approvals .

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

~~**#Hours** _____ **$Est Labor** _____ **$G&A** _____~~

~~**$Material** _____ **$Burden** _____ **$Total** _____~~

~~**Disposition By** _____ **Date** _____~~

~~**Supervisor's Concur** _____ **Date** _____~~

~~**Eng. Dept. Head Concur** _____ **Date** _____~~

~~**WCO/Other** _____ **Date** _____~~

~~**PQA/QC Mgr Dispos Concur** _____ **Date** _____~~

~~**QC Field Verification By** _____ **Date** _____~~

Distribution

Cog J. Chrzanowski
Insp C. Phelps
Proj. Doc Control (when closed)
QC Files
Malsbury J
Boscoe J
T. Meighan
Dudek L
Williams M
Tyrrell M
Simmons B

Disposition: **Rework___** **Repair ___** **Use As Is___** **Return to Vendor___** **Scrap___**

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

 # Hours _____ **$ Est Labor_____** **$ G&A_____**

$ Material _____ **$ Burden _____** **$ Total _____**

Disposition by _____

~~**Supervisor's Concurrence**~~ RLM _____

Eng. Dept. Head Concurrence _____

Other (i.e., WCO/FPE) Concurrence N/A _____

Digitally signed by N/A
DN: cn=N/A, c=US, o=PPPL, ou=QA
Date: 2007.10.04 10:35:13 -04'00'

PQA/QC Mgr Disposition Concurrence _____

QA Field Verification by _____

NCR 3639 ATTACHMENT, R3 (p. 1 of 2)

The following additional parts for the NCSX modular coil final winding clamp assemblies exhibit a magnetic
Permeability higher than the maximum allowed per NCSX-ASPEC-GRD-03 paragraph 3.3.1.1 (permeability shall not exceed 1.02). See NCR 3634 for a list of additional final winding clamp parts that are over the magnetic permeability limit.

Part #	Part Type	Quantity	Sample Size	Results
3	Bushing Spacer	805	30	(5) >1.06, <1.08 (23) >1.08, <1.09
	(silver plated 316)			(2) >1.09, <1.10
6	Keeper Screw (silver plated 316)	1756	40	(21) >1.02, <1.03 (7) >1.03, <1.04
		1464 (2nd shipment)	80	(4) <1.02 (36) >1.02, <1.03 (24) >1.03, <1.04 (14) >1.04, <1.05 (1) >1.05, <1.06

The following parts were found to be acceptable:

Part #	Part Type	Quantity	Sample Size	Results
9	Flat Washer (316)	1980	40	(40) <1.02

REV 2: The final winding clamp has been redesigned requiring new Part 3, the new shipment of Part 3 are below 1.02 Mu (see sampling results below). Part 6 remains unchanged and cannot be annealed due to the silver plating. See results above and NCR 3634 for additional permeability readings on the balance of Part 6.

Part #	Part Type	Quantity	Sample Size	Results
New - 3	Bushing Spacer	910	72	(72) <1.02 Mu

REV 3: 10/4/07 – Upon further discussion and investigation with NCSX Engineering an additional sample of remaining "keeper screws" (pt. #6) was conducted with the intention of better defining specifically which areas of these parts are exhibiting high magnetic permeability. See details of sampling and drawing below.

A quantity of 100 pieces of pt. #6 remain in their original packaging from vacuum prep., a sample of 12 pieces was inspected with the following results.

Sample #	Number of spots >1.02 Mu	Permeability of spots
1	2	Both spots >1.02, <1.03 Mu
2	Entire top face	Entire top surface >1.02, <1.03 Mu
3	2	1 spot >1.02, <1.03 Mu; 1 spot >1.03, <1.04 Mu
4	2	Both spots >1.02, <1.03 Mu
5	3	All spots >1.02, <1.03 Mu
6	0	Entire part <1.02 Mu
7	4	3 spots >1.02, <1.03 Mu; 1 spot >1.04, <1.05 Mu
8	3	All spots >1.02, <1.03 Mu
9	3	2 spots >1/02, <1.03 Mu; 1 spot >1.03, <1.04Mu

10	**5**	**4 spots >1.02, <1.03 Mu; 1 spot >1.03 , <1.04 Mu**
11	**6**	**5 spots >1.02, <1.03 Mu; 1 spot >1.03, <1.04 Mu**
12	**6**	**4 spots >1.02, <1.03 Mu; 1 spot >1.03, <1.04 Mu; 1 spot >1.04, <1.06**

The worst case possible from the data above appears to be the entire top surface of the part at just under 1.06 Mu. Only the outer surfaces of the part was able to be measured due to the configuration of the gauge and part, none of the threads exhibited any permeability and most of the pieces sampled only had a few spots on the top surface around the spanner wrench holes, see drawing below.