

PPPL NONCONFORMANCE REPORT NO: 3758 Open Date 05/01/08

Status 9-Closed Trend 06-Workmanship/Needs Repair

Department NCSX Division NCSX Project

Source/Org Vendor

Item Dwg/Part# _____ Procurement # PE006813-W

Cost Center 9450-1***-1204-41 WBS/Other _____

RAP# 3264 Job Doc # PE006813-W Vendor US Hose Corp

RAP Title NCSX VV Heating and Cooling Hoses

HoldTag Applied

Nonconforming Condition (include requirement(s) violated):

During pressure testing after installation, eleven of the hoses were found to leak. The hoses were not tested prior to installation since all had documentation of successful leak testing from the supplier. The returned hose lengths are:

- 116.5" - two
- 128" - four
- 131" - one
- 166" - one
- 167.5" - three

Lot Size Recd 180 Sample Size Insp 180 Lot Rejected # Rejected 11

Reported By Edwards J Validated By Malinowski F Validated Date 05/01/08

Distribution

Cog Dudek L

Insp Bush E

Proj. Doc Control (when closed) QC Files Malsbury J Boscoe J

Tyrrell M Dudek L Williams M Lumberger J White A Bush E 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 _____

Eng. Dept. Head Concurrence _____

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

N/A

Note: US Hose CA attached.

PQA Disposition Concurrence _____

QA Field Verification by _____

Calculate the heat being released from the largest leak found to date:

$$q := \frac{6}{\text{sec}} \quad \text{Largest leak rate found (bubble rate) at 360 psig Helium in water}$$

$$T_1 := 672 \cdot \text{K} \quad T_2 := 77 \cdot \text{K}$$

$$D := 2 \cdot \text{mm} \quad \text{Size of the leak bubbles}$$

$$c_p := 1.24 \cdot \frac{\text{cal}}{\text{gm} \cdot \text{K}} \quad \text{Specific heat of Helium at STP}$$

$$V := \frac{\pi \cdot D^3}{6} \quad V = 4.189 \cdot 10^{-3} \cdot \text{cm}^3 \quad \text{Single bubble volume}$$

$$\rho := 1.56 \cdot 10^{-4} \cdot \frac{\text{gm}}{\text{cm}^3} \quad \text{Density of helium at STP}$$

$$V' := V \cdot q \quad V' = 0.025 \cdot \text{sec}^{-1} \cdot \text{cm}^3 \quad \text{Volumetric leak rate}$$

$$m' := \rho \cdot V' \quad m' = 3.921 \cdot 10^{-9} \cdot \text{kg} \cdot \text{sec}^{-1} \quad \text{Leak mass flowrate}$$

$$Q' := \rho \cdot V' \cdot (T_1 - T_2) \cdot c_p \quad Q' = 2.893 \cdot 10^{-3} \cdot \frac{\text{cal}}{\text{sec}} \quad \text{Heat capacity of helium relative to LN2 temperature}$$

Calculate heating rate to a chill plate:

Chill plate size and mass:

$$w := 1.5 \cdot \text{in}$$

Chill plate approx. width

$$l := 5 \cdot \text{in}$$

Chill plate approx length

$$t := 0.04 \cdot \text{in}$$

Chill plate thickness

$$\rho_{\text{cu}} := 8.96 \cdot 62.4 \cdot \frac{\text{lb}}{\text{ft}^3}$$

Density of copper

$$m := w \cdot l \cdot t \cdot \rho_{\text{cu}}$$

$$m = 44.029 \cdot \text{gm}$$

Chill plate mass

$$c_p := 2.843 \cdot \frac{\text{cal}}{63.54 \text{ gm} \cdot \text{K}}$$

Copper specific heat

$$\Delta T := \frac{c_p \cdot m}{Q'}$$

$$\Delta T = 11.35 \cdot \frac{\text{min}}{\text{K}}$$

Temperature rise assuming
100% Helium thermal transfer



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Corrective Action Response Form

CAR NO.: 1090

Customer Requested [checked]

Princeton Plasma Physics lab is the customer. Customer claims several hose assemblies leaked at their facility upon initial setup tests. (11) assemblies on RGA 10005 were returned and it was found 8 of them indeed leaked. Customer would like to know the root cause of why leaking units were received since we certified they were tested. Customer is requesting formal corrective action report.

ISSUED TO: Jose A DEPT: 303 DATE: 5/22/2008 DUE: 5/29/2008

CONTAINMENT PLAN:

N/A

ROOT CAUSE:

Unknown due to age of assemblies being over year old. Leakage was found at cap welds were found on returned material. Assemblies were tested prior to shipment as shown on router and memory of operators.

CORRECTIVE ACTION:

Modify router for longer leak test time in and ensure assemblies are dry internally prior to testing.

PLAN BY: Jose Avila PLAN DATE: 6/18/2008

APPROVED BY: Ed Ostrowski APPROVED DATE: 6/18/2008

Frank A. Malinowski

From: Edward G. Bush
Sent: Thursday, June 26, 2008 12:32 PM
To: Lawrence E. Dudek
Cc: For Great Plains - RCVG; John W. Edwards; John T. Hynes
Subject: RE: NOTIFICATION OF RI ITEM, US HOSE CORP. PE-6813-W (REPL)

Larry,

The 12 hoses have been pressure tested and accepted by Jack Hynes. The hoses were given to John Edwards. Paperwork will be completed and sent to you shortly.

Ed

From: Spencer K. Holcombe
Sent: Monday, June 09, 2008 3:48 PM
To: Lawrence E. Dudek; Edward G. Bush
Cc: John J. Luckie; Spencer K. Holcombe; RINotify
Subject: NOTIFICATION OF RI ITEM, US HOSE CORP. PE-6813-W (REPL)

Hi Larry, Ed,

We have received (12) replacement hoses (various sizes) from US Hose Corp. originally purchased on PE-6813-W.

NOTICE: THESE ITEMS ARE IN QUARANTINE AT RECEIVING AND WILL NOT BE RELEASED UNTIL RECEIVING INSPECTION REQUIREMENTS HAVE BEEN MET IN ACCORDANCE WITH LAB PROCEDURE QA-003

The above listed items have been received, but are awaiting your receipt inspection. Payment will be held for up to 10 work days while you inspect. Documentation of inspection is required. The item(s) will be released to you upon receipt of documentation (email preferred) that the items have been inspected and accepted or will be inspected within the next 10 work days (in accordance with Lab Procedure QA-003). Be sure to include Receiving, PQA, & Accounting on the email - Reply to All will do this.

If QA assistance is desired for the inspection or if problems are discovered contact QA (PQA@pppl.gov or ext 2203. Any conditions that do not meet drawing, specification, or other purchase document requirements must be documented on a Nonconformance Report (NCR), whether you intend to accept as-is or have corrective action taken. Contact QA (PQA@pppl.gov or ext 2203) to initiate an NCR.

After 10 days, if your emailed acceptance is not received and no NCR has been initiated, Accounting will contact you to inform you that the invoice will be processed and the supplier will be paid. You are still required to inspect the item (s) and document the results in an email to Receiving, PQA, & Accounting, however, one of your most effective avenues of resolution for defective items will have been eliminated.

6/30/2008