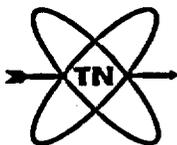


***Safety Analysis Report  
for the  
NCI-21PF-1 Protective Shipping Package***



**Submitted by:  
Nuclear Containers, Inc.  
125 Iodent Way, Suite B  
Elizabethton, Tennessee 37643**

**Revision 4  
August, 1997**



**Prepared by:  
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LIST OF CHANGES

CHANGES INCLUDED IN REVISION 4

SAR Page Number	DESCRIPTION OF CHANGE	REVISION BASIS
Cover Pages	Corrected revision number and date of submittal to Revision 4, August 1997	Editorial
7-2, 7-3, 8-2	Corrected footers to indicate Rev. 4, 08/97	Editorial
7-2, 7-3	Added "approximately" to reference of "cylinder valve in the 12 o'clock position."	Editorial
8-2, Section 8.1.3 8-6, Section 8.2.3	Added in record retention requirement.	Response to NRC
8-2, Section 8.1.3.1	Added in accuracy requirement on VPD fit-up test. Also added "approximately" to step (a)	Response to NRC
Drawing VPD-0001	Added "approximately" to step 1.	Editorial
Drawing VPD-0003	Added tolerances to Section D view. Removed duplicate dimension from Section C view.	Response to NRC

"REVISION BASIS" Descriptions:

Editorial - Format correction.  
 Response to NRC - Pages revised in response to NRC request for additional information during telephone conversation on August 6, 1997:

***Safety Analysis Report***  
***for the***  
***NCI-21PF-1 Protective Shipping Package***

Revision 4  
August, 1997

Submitted by:  
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Elizabethton, Tennessee 37643

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**7.1.3.2 Valve protection device:**

- a. Verify that the spider is sound with no broken welds.
- b. Verify that the spider clamps operate properly and verify that the bolts located on the tips are locked in place.
- c. Verify that the neoprene bolt protectors are in place and not deteriorated (replace if damaged).

**7.1.4 Procedure for Loading the NCI-21PF-1 Overpack**

**7.1.4.1 Complete the inspection report verifying that the following overpack components are free from damage and are in working order:**

- a. Inner and outer shells
- b. Cylinder support pads
- c. Gasket and gasket surfaces; verify that gaskets have been replaced within past 3 years.
- d. Vent seals/plugs.
- e. Tie-down and lifting/stacking supports.
- f. Lifting U-bolts.
- g. Toggle closures and toggle handle ball-lock-pins.
- h. Security seal lugs.

**7.1.4.2 Remove the temporary valve protector cover, if present.**

**7.1.4.3 The cylinder (horizontal) shall be oriented with the valve approximately in the twelve o'clock position.**

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**7.1.4.4 One secondary aluminum insert shall be placed into the cylinder skirt.**

**7.1.4.5 The next secondary aluminum insert shall be placed into the cylinder skirt.**

**7.1.4.6 Once the two pieces have been placed inside of the cylinder skirt, a two to three inch space should exist between the two pieces. A steel spacer shall be placed between the two pieces. (See Appendix 1.3 for illustration)**

**7.1.4.7 The aluminum (primary) insert shall be placed over the valve.**

**7.1.4.8 Install the metal spider of the valve protection device among the inserts. Verify that the bridge of valve location insert covers the cylinder valve.**

**7.1.4.9 Clamp the metal spider of the valve protection device in place. (See Appendix 1.3 for illustration)**

- 7.1.4.10 Carefully load the UF<sub>6</sub> cylinder into bottom half of the overpack with the cylinder valve positioned up (approximately 12:00 o'clock position).
- 7.1.4.11 Carefully place lid on overpack.
- 7.1.4.12 Engage all toggle clamps, then close all toggle clamps alternating first corner-to-corner (4 closures) followed by side-to-side (6 closures).
- 7.1.4.13 Secure the handles with the ball-lock-pins.
- 7.1.4.14 Install security seals and record their numbers.
- 7.1.4.15 Complete inspection report.
- 7.1.4.16 Complete radiation survey and assign Transport Index.
- 7.1.4.17 Remove old labels and re-label per applicable regulations.

**7.2 PROCEDURES FOR UNLOADING PACKAGE**

- 7.2.1 Complete receiving report.
- 7.2.2 Remove and record the overpack seal.
- 7.2.3 Remove the ball-lock-pins and open all toggles before disengaging from upper brackets.
- 7.2.4 Remove the lid of the overpack.
- 7.2.5 Remove the 30B cylinder from the overpack.
- 7.2.6 Unclamp the metal spider of the valve protection device.
- 7.2.7 Remove the metal spider from among the inserts.
- 7.2.8 Remove the metal spacer from among the inserts.
- 7.2.9 Carefully remove the main valve location (primary) insert from the cylinder skirt.
- 7.2.10 Remove the secondary location inserts from the cylinder skirt.
- 7.2.11 Clean any loose debris from NCI-21PF-1 overpack interior and valve protection device.
- 7.2.12 Close the overpack prior to storage.

### 8.1.2 Acceptance Tests for the Valve Protection Device

Each completed valve protection device shall be inspected to document compliance with the following drawing requirements:

- (a) As-built dimensions.
- (b) Clamp adjustments
- (c) Actual weights of steel spider, steel space, primary insert and each secondary insert.
- (d) Final weight of entire valve protection device.
- (e) Proper permanent marking of each component per drawing VPD-0002.

### 8.1.3 Acceptance Tests for the 30B Cylinder

Acceptance tests for the 30B cylinder shall be in accordance with ANSI N14.1. In addition, the fitup of the Valve Protection Device to the cylinder shall be performed and recorded as specified below. Reports, certifications, and records (including the Valve Protection Device Fit-Up Test) of the 30B cylinder shall be in accordance with ANSI N14.1.

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#### 8.1.3.1 Valve Protection Device Fit-Up Test

Prior to first use of each cylinder-valve combination with a valve protection device, a fit up test will be performed to verify that the valve protection device fits properly in the cylinder. This fit up test will verify the clearances in two locations:

- g, clearance between the valve and the underside of the bridge; and
- Gap, clearance between the underside of the valve protection device and the cylinder head.

The (g - Gap) value as specified on Figure 2.7-8 shall be at least 3/16" (5 mm). "g" and "Gap" measurements shall be measured using calibrated equipment with an accuracy of at least  $\pm 0.005$  inch.

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The acceptance test will consist of the following steps:

- (a) The cylinder (horizontal) shall be oriented with the valve in approximately the twelve o'clock position.
- (b) One secondary aluminum insert shall be placed into the cylinder skirt.
- (c) The next secondary aluminum insert shall be placed into the cylinder skirt.

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### **8.2.2 Maintenance Programs for the Valve Protection Device**

In addition to routine operational inspections, the valve protection device shall be inspected every five years to verify compliance with original design criteria. As a minimum this maintenance and inspection shall include:

- (a) Perform all routine inspections outlined in Chapter 7.
- (b) Perform full visual inspection of all welds for the presence of cracks. Any questionable condition of a weld shall be subject to further examination to assure that no cracks are present. Weld defects shall be repaired.
- (c) All repairs shall be performed by competent sources. All repairs that require welding shall be made by welders who are qualified in accordance with Section IX of the ANSI/ASME Boiler and Pressure Vessel Code or Section 5 of ANSI/AWS D1.1. The repair shop shall provide certification of weld procedures and welder qualifications.
- (d) Perform full visual inspection of painted surfaces; any discontinuity in paint coverage shall be corrected.

### **8.2.3 Maintenance Program for the 30B Cylinder**

Maintenance of the 30B Cylinders shall be performed in accordance with ANSI N14.1.

The valve protection device fit up test (Section 8.1.3) shall be performed on the same schedule as the Periodic Inspections and Tests requirements of ANSI N14.1. Results of the valve protection device fit up test shall be maintained with cylinder documentation in accordance with ANSI N14.1.

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**FIGURE WITHHELD UNDER 10 CFR 2.390**

**FIGURE WITHHELD UNDER 10 CFR 2.390**