



# NUCLEAR CONTAINERS, INC.

Chemical & Nuclear - Engineering and Equipment Fabrication

125 Iodent Way, Suite B - Elizabethton, Tennessee 37643

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November 19, 1996

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

**RE: Reply to a Notice of Nonconformance (Docket No. 71-0179)**

Dear Sir/Madam:

Nuclear Containers, Inc. (NCI) respectfully responds to this notice of nonconformance of 10 CFR Part 71.85, "Preliminary determinations." The nonconformance occurred because NCI failed to follow up with the submittal of the substituted phenolic resin in the U.S.A.E.C. Material and Equipment Specification SP-9 after testing had been performed. In 1986, Schenectady Chemical Company's phenolic resin HRJ-2590 was recommended by Union Carbide Corporation (UCC) as a replacement for UCC's BRL-2760, which had been discontinued. Samples of the HRJ-2590 phenolic resin were obtained and subsequently tested by both Nuclear Containers, Inc. and Martin Marietta Energy System's K-25 Plant. The nonconformance occurred at this point, because NCI assumed that K-25 would then submit the test results to the U.S. Department of Energy as a revision to SP-9, which was the way the previous supplement had been handled. We did not follow up on this submittal.

In 1991, corrosion in the form of pitting was found on some containers. At first, NCI believed the corrosion was due to road salts. However, later that year, British Nuclear Fuel, Ltd. reported to us that they believed the pitting was due to a high chloride content in the phenolic foam insulation. At this point, NCI pursued this problem through testing and conversations with Schenectady Chemical Company, and it was discovered that hydrochloric acid was used in the neutralization of the phenolic resin. Since oxalic acid was already a component of the foam, it was suggested as a replacement in the neutralization process and subsequently tested. Therefore, in November 1991, Schenectady Chemical Company's HRJ-2590 phenolic resin was substituted with HRJ-11825, under the stipulation that this resin would contain less than 200 ppm chlorides. To the best of my knowledge, pitting has not been found in any of the Model No. NCI-21PF-1 transportation packagings containing the HRJ-11825 phenolic resin foam to this date.

Since 1991, several tests have been performed on the low chloride foam NCI-21PF-1 packages. These include the hypothetical accident conditions (HAC) testing performed by NCI and submitted to the U.S. Nuclear Regulatory Commission (NRC) on June 9, 1995 and the HAC testing performed by Southwest Research Institute in San Antonio, Texas during October and

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November 1996. Following the HAC testing in 1995, accelerated corrosion testing was performed by Law Engineering Industrial Services in Charlotte, North Carolina. The corrosion tests were conducted in order to determine that the 200 ppm chloride content required in the HRJ-11825 phenolic resin was sufficiently low, so that it would not affect the ability of the package to withstand the HAC testing.

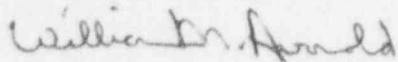
Another corrective step taken along with the 1995 HAC testing, was the development and implementation of a new foam specification, which was also submitted to the NRC. This specification included all of the materials currently used in the phenolic foam insulation along with physical and chemical properties of the foam.

The corrective actions taken by NCI in order to avoid further noncompliances was to reinstruct all NCI personnel, as required, to report any deviations from package design during fabrication before application of a model number and any package deformities in accordance with 10 CFR Part 71.85 and 10 CFR Part 21, respectively.

This corrective action has already been completed. Since the NRC inspection in October 1994, there were two instances in which this action was utilized. First, the use of a damaged 30B cylinder skirt during HAC testing in 1995 was reported in the June 9, 1995 safety analysis test report to the NRC. NCI also reported corrosion found in a Model No. UX-30 transportation packaging, which was tested by NCI, to the NRC in a letter dated October 26, 1995.

If you have any questions or need any further information, please contact me at (800)221-2465.

Very truly yours,



William M. Arnold  
Operations Manager

WMA/hl

cc: Susan F. Shankman, Chief, Transportation Safety and Inspection Branch, NMSS



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

October 17, 1996

EA No. 94-234

Mr. William R. Housholder, President  
Nuclear Containers, Inc.  
125 Iodent way, Suite B  
Elizabethton, TN 37643

SUBJECT: NRC INSPECTION REPORT NO. 71-0179/94-211  
NRC INVESTIGATION NO. 2-95-011  
NOTICE OF NONCONFORMANCE

Dear Mr. Housholder:

This refers to (1) the special inspection conducted at Nuclear Containers, Inc. (NCI), in Elizabethton, Tennessee, by Mr. D. Reid, Dr. J. Jankovich and Ms. N. Osgood of this office on October 3-4, 1994, and (2) the NRC investigation conducted at NCI on May 12, 1995. Mr. J. Albright of the Department of Transportation participated as an observer to the NRC inspection.

The purpose of the inspection was to determine when corrosion of the Model No. NCI-21PF-1 packagings was first identified by NCI; to ascertain which packagings are affected; and to verify whether the affected packagings meet the conditions specified in Certificate of Compliance (COC) No. 9234. The purpose of the investigation was to determine if NCI intentionally violated any NRC regulations.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of representative records, interviews with personnel, and observation of activities performed at your facility. At the conclusion of the inspection, preliminary findings were discussed with you and your staff.

Based on the results of this inspection and investigation, and on information provided to the Commission before the inspection, a nonconformance was identified regarding the requirements of 10 CFR Part 71. Specifically, NCI did not fabricate certain Model No. NCI-21PF-1 transportation packagings in accordance with the provisions of the COC. The specific finding and reference to the pertinent requirement is identified in the enclosed inspection report and Notice of Nonconformance (Notice). The Office of Investigation has concluded that NCI did not intentionally violate any NRC regulations (see enclosed synopsis of Case No. 2-95-011).

The NRC is concerned about your failure to fabricate packagings in accordance with your COC because defects in the stainless steel shell caused by corrosion could reduce the effectiveness of the packaging under accident conditions. In addition, we are particularly concerned that you did not notify the NRC of the corrosion problems.

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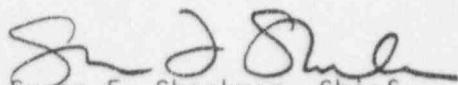
Mr. William R. Housholder

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Please provide us within 30 days from the date of this letter a written statement in accordance with the instructions specified in the enclosed Notice. In addition, given your lack of notification to NRC regarding the corrosion problems, you should also document in your response to this letter the specific actions you plan to take to ensure that proper notification is made under similar circumstances in the future.

In accordance with 10 CFR 2.790 of NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be placed in the NRC Public Document Room (PDR). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. However, if you find it necessary to include such information, you should clearly indicate the specific information that you desire not to be placed in the PDR, and provide the legal basis to support your request for withholding the information from the public.

Sincerely,



Susan F. Shankman, Chief  
Transportation Safety  
and Inspection Branch  
Spent Fuel Project Office, NMSS

Enclosures:

1. Inspection Report 71-0179/94-211
2. Notice of Nonconformance
3. Synopsis of OI Case No. 2-95-011

Docket Nos. 71-0179, 71-9234

cc: J. O'Steen, Department of Transportation  
J. Albright, Department of Transportation



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SPENT FUEL PROJECT OFFICE SAFETY INSPECTION

ORGANIZATION: Nuclear Containers, Inc.

ADDRESS: 125 Iodent Way, Suite B  
Elizabethton, Tennessee 37643

CONTACT: Mr. William R. Housholder, President

ACTIVITY: Design and fabrication of radioactive material  
transportation packaging.

INSPECTION REPORT NO.: 94-211

INSPECTION LOCATION:

Elizabethton, TN

INSPECTION DATE:

October 3-4, 1994

ON-SITE INSPECTION  
HOURS:  
24

INSPECTION TEAM: Dennis G. Reid, Team Leader  
John P. Jankovich, Inspector  
Nancy L. Osgood, Technical Advisor

INSPECTION BASES AND SCOPE:

- A. BASES: 10 CFR Parts 71 and 21, and Certificate of  
Compliance No. 9234.
- B. SCOPE: Assess the extent of corrosion pitting of the Model  
No. NCI-21PF-1 transportation packagings.  
Determine that Model No. NCI-21PF-1 packagings are  
fabricated in accordance with the Certificate of  
Compliance issued by the Commission.

Enclosure 1

960025002 (AP)

## 1. SUMMARY

A U.S. Nuclear Regulatory Commission inspection team conducted a special announced inspection of Nuclear Containers, Inc. (NCI), in Elizabethton, Tennessee, on October 3-4, 1994.

The inspection team reviewed NCI's fabrication activities to assess corrosion pitting that had occurred in the Model No. NCI-21PF-1 packagings used to transport uranium hexafluoride (UF<sub>6</sub>) cylinders and to determine whether the packagings have been manufactured in accordance with the conditions specified in Certificate of Compliance (COC) No. 9234 issued by NRC. Inspection findings are based on data collected through review of selected documents and records, and interviews with personnel.

The inspection team identified a nonconformance with the requirements of 10 CFR 71.85 regarding the application of model numbers to transportation packagings that were not fabricated in accordance with the COC.



## 2. BACKGROUND

The NRC conducted a special announced inspection of NCI in Elizabethton, Tennessee, on October 3-4, 1994. The inspection team examined records of fabrication activities to determine whether procedures had been established, documented, and executed to fabricate the Model No. NCI-21PF-1 packagings in accordance with the design approved by NRC in COC No. 9234.

The Model No. NCI-21PF-1 packaging was developed to provide a fire and shock resistant means of transporting UF6 cylinders. The design consists of fire resistant phenolic foam contained within a stainless steel shell with wooden internal framework. The inspection team focused primarily on the evolution of the phenolic foam, including related qualification testing, procedures and controls. Certain NCI-21PF-1 packagings were fabricated with a foam that was high in chlorides. These packagings have exhibited varying degrees of corrosion pitting in the stainless steel shells. A description of the corrosion problems in these packagings is given in NRC Bulletin No. 94-02, issued November 14, 1994.

The objective of the inspection was to assess the extent of corrosion pitting of the Model No. NCI-21PF-1 packagings used as overpacks to transport UF6 cylinders, and to augment data collected during a meeting that was held with Mr. Mike Arnold of NCI at NRC in Rockville, on September 12, 1994, and from NCI letters dated August 26, 1994 and September 6, 1994.

In order to provide a referencable background for the issues discussed in the inspection report, Table 1 summarizes the revisions that were made to the design of Model No. NCI-21PF-1 packaging and to COC No. 9234.

Table 1

## SUMMARY OF REVISIONS TO CERTIFICATE OF COMPLIANCE NO. 9234

COC Rev./Date	Comments	NCI Drawings Rev./Date
		Rev. 1 July 1, 1988
		Rev. 2 Nov. 15, 1988
Rev. 0 Dec. 27, 1988	Referenced NCI Drawing. No. DED-206-B, Sheets 1 through 10, Rev. 2.	
		Rev. 3 Mar. 1, 1989 Not submitted to NRC.
		Rev. 4 Sep. 29, 1989 Not submitted to NRC.
Rev. 1 Jun. 11, 1991	Referenced NCI Drawing. No. DED-206-B, Sheets 1 through 10, Rev. 2. Amended based on NCI application dated 4-9-91, to include Model 30A cylinders.	
Rev. 2 Nov. 19, 1992	Referenced NCI Drawing. No. DED-206-B, Sheets 1 through 10, Rev. 2. Amended without application from NCI to include foam inspection every 5 years.	
		Rev. 5 Mar. 8, 1993 Submitted to NRC 9-10-93.
Rev. 3 Dec. 22, 1993	Referenced NCI Drawing. No. DED-206-B, Sheets 1 through 11, Rev. 5. Amended based on NCI application dated 8-24-89, & supplement dated 1-11-93, to authorize recycled UF6 (Type B package), and renewed for five year period based on NCI application dated 9-10-93.	
Rev. 4 Jul. 26, 1994	Referenced NCI Drawing. No. DED-206-B, Sheets 1 through 11, Rev. 5.	



### 3. INSPECTION FINDINGS

A nonconformance was identified regarding 10 CFR 71.85, "Preliminary determinations." This section requires the licensee to determine that the packagings have been fabricated in accordance with the design approved by the Commission, before applying the model numbers. The inspection team identified the following instances where NCI fabricated and applied the model number to Model No. NCI-21PF-1 transportation packagings that were not in compliance with COC No. 9234.

Specifically, packaging drawings referenced in COC No. 9234, Revision 0, dated December 27, 1988, called out the foam formulation specified in "U.S. Atomic Energy Commission Material and Equipment Specification SP-9, Fire Resistant Phenolic Foam" (Specification SP-9), dated March 28, 1968. Further revisions of the drawings still specified the same foam. However, in 1986, before NRC approval of the COC, NCI changed the formulation from Specification SP-9 requirements, to include a high chloride resin, and changed it once more in 1991 to a lower chloride resin. NCI's failure to inform NRC of the formulation change that occurred in 1986, and for NCI to have instituted an unauthorized change in 1991, is a nonconformance with the provisions of the COC.

### 4. Persons Contacted

An entrance meeting was held on October 3, 1994, to present the objectives of the NRC inspection. On October 4, 1994, an exit meeting was held to present the preliminary findings of the inspection. The individuals from NCI who were present at the entrance and exit meetings were W. Housholder, President; W. Arnold, Operations Manager; and S. Brewer, Production Manager.

### 5. Documents Reviewed

#### 5.1 Logs, Files & Reports

NCI letter dated November 9, 1993, to Mr. Charles J. Haughney, NRC.

NCI letter dated November 5, 1993, to Urenco (Capenhurst) Ltd.

Repair Job Data packages for Job Nos. 94-472, 94-476.

Repair Job Log for Job Nos. 91-410 through 94-487.

#### 5.2 Procedures, Purchase Orders and Invoices

Procedure SUP 6.4, "Painting Controls," Revision 0, dated May 25, 1993; and Revision 1, dated June 14, 1994.

Purchase Order Nos. 4140-PRELIM, dated November 20, 1991; 4140, dated November 20, 1991; and 4296, dated August 28, 1992.

Document package for NCI Job No. 94-472 (Mitsui Contract No. 131834).



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

NOTICE OF NONCONFORMANCE

Nuclear Containers, Inc.  
Elizabethton, TN

Docket No. 71-0179

Based on the results of an NRC inspection performed on October 3-4, 1994, it appears that certain of your activities were not performed in accordance with NRC requirements:

10 Part 71.85, "Preliminary determinations," requires the licensee to determine that the packagings have been fabricated in accordance with the design approved by the Commission, before applying the model numbers.

Contrary to the above, Nuclear Containers, Inc. (NCI), fabricated and applied the model number to Model No. NCI-21PF-1 transportation packagings that were not in compliance with Certificate of Compliance (COC) No. 9234. Specifically, packaging drawings referenced in COC No. 9234, Revision 0, dated December 27, 1988, called out the foam formulation specified in "U.S. Atomic Energy Commission Material and Equipment Specification SP-9, Fire Resistant Phenolic Foam" (Specification SP-9), dated March 28, 1968. Further revisions of the drawings still specified the same foam. However, in 1986, before NRC approval of the COC, NCI changed the formulation from Specification SP-9 requirements, to include a high chloride resin, and changed it once more in 1991 to a lower chloride resin.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Chief, Transportation Safety and Inspection Branch, Office of Nuclear Material Safety and Safeguards within 30 days of the date of the letter transmitting this Notice of Nonconformance.

This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each nonconformance: (1) the reason for the nonconformance, or if contested, the basis for disputing the nonconformance, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further noncompliances, and (4) the date when your corrective action will be completed. Where good cause is shown, consideration will be given to extending the response time.

Dated at Rockville, MD

This 17th Day of October, 1996

Enclosure 2

9609250044 IP

Office of Investigations  
Case No. 2-95-011  
Synopsis

The U.S. Nuclear Regulatory Commission, Region II, Office of Investigations (OI), initiated this investigation on May 12, 1995, to determine whether Nuclear Containers, Inc. (NCI), failed to notify NRC of design changes and potential corrosion problems involving casks utilized for shipping radioactive materials. Investigation included interviews of NCI officials and review of: technical specifications and drawings, an NRC inspection report, NCI and NRC documentation, and safety analysis and engineering reports.

Based on evidence developed and reviewed during this investigation, OI determined that NCI manufactured Model No. NCI-21PF-1 packagings under Certificate of Compliance No. 9234, utilizing phenolic resin other than that specified in USAEC Specification SP-9 (BRL-2760). Further, OI determined that NCI did not properly report the substitution of phenolic resin or the resultant corrosion problems to the NRC. However, evidence did not suggest that NCI intended to produce an inferior product or intentionally violate any NRC regulations.