

# NRC INSPECTION MANUAL

NMSS/FCSS

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## TEMPORARY INSTRUCTION 2600/011

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### VERIFICATION OF DISPOSITION OF POTENTIALLY DEFECTIVE 1-INCH HUNT VALVES FOR URANIUM HEXAFLUORIDE CYLINDERS

#### 2600/011-01 OBJECTIVE

This TI is intended to verify the safe disposition of certain 1-inch valves designed for use on 30-inch and 48-inch uranium hexafluoride (UF<sub>6</sub>) cylinders, as follow-up to the issuance of NRC Bulletin 2003-003, "Potentially Defective 1-inch Valves for Uranium Hexafluoride Cylinders," on August 29, 2003. The inspection activity is to be conducted in the light of the requested actions in the bulletin and any licensee-specific NRC-approved exceptions to these actions subsequently approved in follow-up correspondence with the licensee pertaining to the licensee's response to the bulletin.

#### 2600/011-02 APPLICABILITY

This TI applies to licensees and certificate holders for fixed site fuel cycle facilities and other facilities, authorized to possess and use source material and/or special nuclear material for the heating, emptying, filling of uranium hexafluoride (UF<sub>6</sub>) in 30- and 48-inch cylinders.

#### 2600/011-03 BACKGROUND

##### 03.01 QUALITY ASSURANCE PROBLEMS WITH 1-INCH HUNT VALVES

NRC has identified performance and safety concerns with certain 1-inch valves for both 32-inch and 48-inch UF<sub>6</sub> cylinders. The subject valves are manufactured by the Hunt Valve Company of Salem, Ohio (Hunt). These concerns led to issuance of the above-referenced bulletin, after inspections and subsequent investigations and testing showed identified deficiencies in Hunt's quality assurance (QA) program, and failures of multiple valve samples to meet the required specifications of ANSI Standard N14.1. Tested valves also exhibited low level valve seat leakage.

##### 03.02 ISSUANCE OF NRC BULLETIN 2003-003

NRC Bulletin 2003-03 advised addressees that they could no longer depend upon documentation provided by Hunt to assure that the subject valves meet the specifications

of the ANSI Standard N14.1. Both NRC and the Department of Transportation require use of UF<sub>6</sub> cylinders that meet ANSI Standard N14.1 for shipments of UF<sub>6</sub>; and NRC also requires UF<sub>6</sub> cylinders used at fixed sites to meet this standard. Since licensees and certificate-holders can no longer rely on the vendor, Hunt, to assure compliance with ANSI Standard N14.1, NRC Bulletin 2003-003 requires its Action Addressees to provide alternative means of assurance that the valves they use meet ANSI Standard N14.1, through their own QA programs, or replace the valves with valves from other qualified manufacturers, that are verified to meet the standard.

A complicating factor is that the valves cannot be practically hydrostatically tested to the required 400 psig while installed on a cylinder, and removing the valve destroys its usefulness for future installation. Consequently, several licensee actions, A through E, were requested in the bulletin (ADAMS Accession Number ML032330191).

Following issuance of NRC Bulletin 2003-003, responses were received from the affected licensees. Some of the responses indicated the need for exceptions to the requested actions for practical reasons. NRC considered these responses and approved them entirely, or in part, on a case by case basis. The approved exceptions are summarized in Appendix A, and need to be taken into account when performing the inspection. Most of the exceptions arise because of the long cycle time connected with the movement of cylinders between the United States and Russia as part of the Megatons to Megawatts program, wherein downblended UF<sub>6</sub> from Russia is shipped to the United States Enrichment Corporation (USEC) for later distribution to U.S. fuel manufacturers. Although USEC has agreed to desist from sending empty cylinders to Russia with Hunt valves installed, there are a number of cylinders with Hunt valves that already have been shipped to Russia and are awaiting filling, before being returned filled to USEC.

Requested Action D.2. presented licensees with a choice of whether to demonstrate that their stock of Hunt 1-inch valves complied with existing NRC regulations, NRC licenses and certificates, and DOT regulations through their own quality assurance program (rather than relying on documentation from Hunt), or planned to replace all Hunt 1-inch valves at their site within a period of 12 months. All except one licensee, USEC, opted to replace their Hunt valves. USEC, with a considerable inventory of Hunt valves, chose to demonstrate that their Hunt valves met the appropriate regulations and license conditions and use them only for installation on cylinders for storing depleted UF<sub>6</sub>. Thus, inspection relative to Requested Action D.2. of the Bulletin will differ for USEC rather than the other facilities, since USEC will continue to process filled cylinders with Hunt valves installed, while the other licensees committed to not processing such cylinders after the 12-month transition period.

In this TI, for the purposes of brevity, the terms "licensee" and "certificate-holder" are used interchangeably. Also, it is assumed that this TI is being implemented after the 12-month transition period described in Requested Action D of the bulletin has elapsed.

04.01 Determine if Hunt 1-inch valves, installed on UF<sub>6</sub> cylinders filled with natural or enriched UF<sub>6</sub>, are being stored or processed consistent with the requested actions of NRC Bulletin 2003-003 and any subsequently approved licensee-specific exceptions.

- a. Obtain information from the licensee regarding the work or storage areas where filled UF<sub>6</sub> cylinders are located at the site.
- b. Examine the valves installed on a representative sample of filled cylinders, to determine whether they include Hunt valves. Compare the results of this sampling process to the licensee's current cylinder status list to verify consistency between the two. Question the license to justify any identified discrepancies.
- c. Determine whether cylinders with Hunt valves installed are being processed, are awaiting processing, or have been recently processed beyond the end of the 12-month transition period.
- d. Of the cylinders identified in c. above, determine if the contents of the cylinders are consistent with the requested actions of NRC Bulletin 2003-003 and any subsequently approved licensee-specific exceptions. (E.g., are the cylinders ones that were delivered from Russia containing downblended Russian UF<sub>6</sub>; are the cylinders not owned by the licensee?)
- e. Examine records of UF<sub>6</sub> cylinders on site, or that previously were located on site, to determine if UF<sub>6</sub> cylinders with Hunt valves installed continue to be filled with natural or enriched UF<sub>6</sub> after the end of the 12-month transition period.
- f. Examine a sampling of any cylinders on site with Hunt valves installed to determine if any are identifiable as having been received from Russia, directly or indirectly.

04.02 Determine if appropriate procedures are in place to

- a. Ensure that filled cylinders are not shipped off-site with Hunt valves installed (except, in the case of USEC, for cylinders filled with downblended UF<sub>6</sub> from Russia), and
- b. Ensure that cylinders with Hunt valves installed are not refilled with natural or enriched UF<sub>6</sub> after the end of the 12-month transition period.

04.03 Examine licensee records to determine whether the licensee is performing, or did perform, other actions to which the licensee committed in its response to the Bulletin

- a. Determine whether the licensee refrained from shipping filled cylinders with Hunt valves installed after the end of the 12-month transition period described in the Bulletin.
- b. Determine whether the licensee replaced all 1-inch valves on UF<sub>6</sub> cylinders, in use or in storage, prior to the end of the 12-month transition period (if this action is not affected by licensee-specific exceptions).
- c. Determine whether 1-inch valves currently being installed on UF<sub>6</sub> cylinders, obtained from an alternate supplier other than Hunt Valve Company, are verified to meet the requirements of ANSI Standard N14.1.

2600/011-05            GUIDANCE

### General Guidance

NRC Bulletin 2003-003 became necessary when significant deficiencies were discovered in Hunt's QA program, and subsequent testing revealed several failures of already sold valves to meet the required ANSI Standard N14.1. The Bulletin gave wide latitude to licensees for resolving the safety issues associated with the Hunt valves in their possession. Essentially, licensees were given the choices of replacing the valves with valves of other qualified manufacturers; verifying ANSI Standard N14.1 compliance for Hunt valves in their possession, using their own QA program; or justifying continued use of Hunt valves, for specific applications at their site, based on their being able to maintain an adequate margin of safety. Licensee responses to the bulletin described the licensee's detailed plans for proceeding in each of these cases. Inspectors will be required to use judgement, in balancing risks, when inspecting under this TI. The emphasis should be on ensuring that safety has been maintained, as licensee plans for responding to the Bulletin are executed, considering that the details of such plans, and site conditions, may differ markedly between sites.

05.01 Determine if Hunt 1-inch valves, installed on UF<sub>6</sub> cylinders filled with natural or enriched UF<sub>6</sub>, are being stored or processed consistent with the requested actions of NRC Bulletin 2003-003 and subsequently approved licensee-specific exceptions.

The licensee-specific exceptions are summarized in Appendix A, but inspectors should obtain and study copies of the actual correspondence between NRC and the licensee from ADAMS before reaching the licensee's site. Hunt valves are expected to have been mostly removed from use at fuel cycle facilities after the end of the 12-month transition period described in the bulletin, and there should be no stocks of unused Hunt valves at these facilities, with the exception of the United States Enrichment Corporation (USEC). USEC was permitted to continue to install their remaining stocks of Hunt valves on cylinders with depleted uranium only, and to continue onsite use of cylinders with Hunt valves installed beyond the bulletin's transition period until emptied. Also, USEC was permitted to receive certain cylinders with Hunt valves installed for three years beyond the date of issuance of the bulletin. Consequently, certain cylinders with Hunt valves also may continue to be shipped to fuel manufacturing facilities for up to three years after issuance of the

Bulletin. These cylinders are expected to be ones that were already enroute to Russia with Hunt valves installed, before this practice was ended. In these cases, licensees are expected to process the received cylinders, but not to reuse them with the Hunt valves still installed.

As part of their Corrective Action Program (CAP), the licensee already should have determined which cylinders have Hunt Valves installed, and should have developed an appropriate corrective action plan and schedule.

Inspectors should exercise judgement regarding the number of locations and cylinders at each location that should be examined.

#### 05.02 Determine if appropriate procedures are in place.

Filled cylinders with Hunt valves installed are not to be shipped after the end of the 12-month transition period unless their contents is downblended UF<sub>6</sub> from Russia. Cylinders with Hunt valves installed are approved for continued processing beyond the 12-month transition period at USEC until emptied once. Other licensees that receive cylinders with Hunt valves installed may process them only if they contain downblended UF<sub>6</sub> from Russia.

#### 05.03 Examine licensee records to determine whether the licensee is performing, or did perform, other actions to which the licensee committed in its response to the Bulletin

All licensees did commit to refraining from shipping filled cylinders after the end of the 12-month transition period described in the Bulletin, except in the case of cylinders filled with downblended UF<sub>6</sub> from Russia. Licensee responses were mixed regarding removal of hunt valves from empty cylinders in storage. Inspectors should refer to the licensee's response correspondence in preparation for the inspection to determine specifically what commitments were made.

All licensees committed to installing 1-inch valves from an alternative supplier other than Hunt Valve Company. The licensee's quality assurance program should address how the licensee determines that the valves obtained from the alternative supplier meet the requirements of ANSI Standard N14.1. Inspectors should verify that this process has been carried out appropriately, consistent with established licensee procedures for qualifying such suppliers.

## 2600/011-06 REPORTING REQUIREMENTS

Inspection findings for all inspections conducted under this TI will be documented in routine inspection reports for core inspections.

## 2600/011-07 COMPLETION SCHEDULE

The guidance in this TI will remain effective until each site affected by NRC Bulletin 2003-003 has been inspected at least once in accordance with the TI. All affected sites are expected to have been so inspected within a period of one year from the issuance of this TI.

## 2600/011-08 EXPIRATION

The direction in this TI will remain in effect until September 30, 2005, at which time it is expected that each facility affected by NRC Bulletin 2003-003 will have been inspected.

## 2600/011-09 CONTACT

Questions regarding the technical aspects of this temporary instruction should be addressed to:

Lance Lessler  
Technical Support Group  
Division of Fuel Cycle Safety and Safeguards, NMSS  
(301) 415-8144  
E-mail: LJL@NRC.GOV

## 2600/011-10 STATISTICAL DATA REPORTING

For RITS reporting, only the portion of a routine inspection devoted to the procedures in this TI should be charged to this TI. The remainder of the time for a routine inspection should be charged in the usual manner to the inspection report number for the affected facility.

## 2600/011-11 ORIGINATING ORGANIZATION INFORMATION

11.01 Organizational Responsibility. The Technical Support Group, FCSS/NMSS, initiated this TI.

11.02 Resource Estimate. The effort required to implement the procedures in this TI are expected to vary, depending on the size of the facility, and the number of UF<sub>6</sub> cylinders at the site. The inspection effort is expected to vary between 4 hours for the fuel manufacturing facilities and single conversion facility and 8 hours for the two gaseous diffusion plants.

11.03 Training. The guidance provided in this TI generally conforms to current inspection practice, normally expected to be within the capabilities of fuel cycle facility inspectors, having undergone currently required training. No additional training is required specific to the requirements of this TI.

END

## Appendix A

### List of Approved Exceptions to Requested Actions of Bulletin 2003-003

Licensee	Exceptions
Framatome ANP, Inc. (Richland)	1. No FANP-owned UF <sub>6</sub> -filled cylinders with Hunt valves will remain onsite after the end of the 12-month transition period, but empty cylinders with Hunt valves will be permitted to be stored onsite containing only heels for a period as long as 36 months from the date of the bulletin.
	2. FANP processing of UF <sub>6</sub> cylinders with Hunt valves installed permitted to the extent that such cylinders may be included in USEC shipments under the Megatons to Megawatts program.
Global Nuclear Fuel - Americas, LLC (Wilmington)	1.....continue to process non-GNF-A-owned cylinders with Hunt valves installed, for a period not to exceed 40 months from the date of issuance of BL-2003-003. (This should include mostly cylinders containing Russian UF <sub>6</sub> received from USEC.)
Honeywell (Metropolis)	1. Plant processes and procedures have been amended to ban the use of Hunt valves on ANY UF <sub>6</sub> cylinders shipped from Metropolis Works.
USEC (Paducah)	<p>1. NRC approves USEC's proposal for installing and using Hunt 1-inch valves currently in USEC stores, on USEC-owned cylinders that will be filled with depleted UF<sub>6</sub> and then placed in storage indefinitely. NRC does not approve installing Hunt valves currently in USEC stores on cylinders for uses other than storage of depleted UF<sub>6</sub>.</p> <p>Prior to installation and usage, these valves must pass a seat leakage test in accordance with ANSI Standard N14.1 (ref. Requested Action <b>B</b> of BL-2003-003). NRC's approval is conditioned on USEC's agreement to withdraw from further use any Hunt valves that initially fail the seat leakage test.</p>



<p>USEC (continued)</p>	<p>2. NRC approves USEC's proposal for continuing to use UF<sub>6</sub> cylinders with Hunt valves already installed (as of the date of this letter), provided that the cylinders are not shipped off-site while containing more than heel quantities of UF<sub>6</sub> (ref. Requested Action <b>C</b> of BL-2003-003). Cylinders received from Russia containing downblended UF<sub>6</sub> are excepted from this shipping restriction, as described below. NRC's approval is conditioned on the following: (1) cylinders containing depleted UF<sub>6</sub> and not subjected to further processing may be stored onsite indefinitely, (2) a cylinder containing natural or enriched UF<sub>6</sub> may be used for on-site processing or storage, provided that the cylinder's 5-year hydrostatic testing date has not expired, after which time the valve must be replaced with a valve that meets ANSI Standard N14.1 and that is manufactured by a supplier currently on USEC's Approved Supplier List, consistent with the cylinder's normal wash cycle according to current procedures and requirements, and (3) cylinders with Hunt valves installed, containing natural or enriched UF<sub>6</sub>, once emptied, must not be refilled with natural or enriched UF<sub>6</sub> after the end of the 12-month transition period described in BL-2003-003, until the valve is replaced with one that meets ANSI Standard N14.1 and that is manufactured by a supplier currently on USEC's Approved Supplier List.</p>
	<p>3. NRC approves, in part, your proposal for continuing to ship cylinders with Hunt valves installed for a period of 36 months from the date of issuance of BL-2003-003, when filled with downblended Russian UF<sub>6</sub>. This applies to cylinders that are stored upon receipt and not subjected to further processing at USEC before reshipment to a fuel manufacturing facility. However, empty or nitrogen-filled cylinders not yet shipped to Russia must be shipped only with valves installed that meet ANSI Standard N14.1 and are manufactured by a supplier currently on USEC's Approved Supplier List. This condition is effective within 30 days after receipt of this letter (ref. Requested Action <b>D</b> of BL-2003-003). This condition should serve to gradually reduce the number of cylinders with Hunt valves that remain in the "Megatons to Megawatts" program.</p>
<p>Westinghouse Electric Company (Columbia)</p>	<p>1. ... continue to process non-Westinghouse-owned cylinders with Hunt valves installed, for a period not to exceed 36 months from the date of issuance of BL-2003-003. (This should include mostly cylinders containing Russian UF<sub>6</sub> received from USEC.)</p>
<p>Nuclear Fuel Services, Inc. (Erwin)</p>	<p>1. No exceptions – no processing of cylinders ongoing.</p>