UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, DC 20555-0001

May 12, 2016

NRC INFORMATION NOTICE 2016-06: URANIUM HEXAFLUORIDE CYLINDERS WITH POTENTIALLY DEFECTIVE 1-INCH VALVES

ADDRESSEES

All licensees authorized to possess and use source material or special nuclear material for the heating, emptying, filling, or shipping of uranium hexafluoride (UF_6) in 30- and 48-inch cylinders.

All holders of, and applicants for, a specific source material license under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 40, "Domestic Licensing of Source Material."

All holders of, and applicants for, a fuel cycle facility license under 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material."

Registered users of certificates of compliance for enriched (fissile) UF_6 packages under 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

Holders of Certificates of Compliance for enriched (fissile) UF_6 packages under 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

All State Radiation Control Program Directors.

U.S. Department of Transportation (DOT).

U.S. Department of Energy.

PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to remind addressees, including more recent NRC licensees, of performance and safety concerns regarding UF_6 cylinders with 1-inch valves manufactured by the Hunt Valve Company of Salem, OH. The NRC expects the recipients to review the information within this IN and consider actions, as appropriate, for cylinders in their possession or that they expect to receive. However, suggestions contained in this IN are not NRC requirements; therefore, no specific action or written response is required.

DESCRIPTION OF CIRCUMSTANCES

This section describes events involving transportation of cylinders fitted with Hunt valves that have occurred within the past 5 years:

- During 2014, as part of the shutdown of the Paducah Gaseous Diffusion Plant operated by the former United States Enrichment Corporation (USEC)[1], four 48G cylinders containing natural UF_6 were shipped to Honeywell. These cylinders were fitted with Hunt valves. Two of the cylinders were received and inspected by Honeywell and discovered to have Hunt valves installed. The other two cylinders were returned to USEC Paducah before they were received.

- During late 2012 through early 2013, to support the Mixed Oxide Fuel Facility (MOX) project, MOX shipped eight 48G cylinders containing depleted UF_6 to AREVA. Six of these cylinders were fitted with Hunt valves. Although shipment of depleted UF_6 is not within the NRC's purview, the NRC is concerned about the transportation of cylinders containing Hunt valves because these cylinders may be used in NRC-regulated activities.

- During 2011, to support the Chinese AP1000 project, the China Nuclear Energy Industry Corporation sent five 30B cylinders containing enriched UF_6 cylinders to Westinghouse Electric Company, Columbia Fuel Fabrication Facility (Westinghouse). These cylinders were fitted with Hunt valves. Westinghouse changed out the Hunt valves with acceptable cylinder valves.

BACKGROUND

Several provisions of the NRC's regulations, license conditions, and certificates of compliance address the adequacy of equipment, facilities, and procedures to protect health and minimize danger to life or property. These include regulations in 10 CFR 70.23(a)(3) and (a)(4); 10 CFR 71.43, "General Standards for All Packages"; and 10 CFR 71.85, "Preliminary Determinations." These provisions also address the packaging and transportation of radioactive material. The manufacture, testing, and use of UF_6 cylinder valves consistent with the provisions of the American National Standards Institute (ANSI) N14.1 standard, "Uranium Hexafluoride—Packaging for Transport," provides an adequate level of assurance that the health and safety of the public and workers are protected, both for onsite operations and during transportation. The NRC has specified the use of the ANSI N14.1 standard through the NRC certificates of compliance for fissile UF_6 transportation packages. The 10 CFR Part 71, "Packaging and Transportation of Radioactive Material," regulation applies to any licensee authorized by a specific or general license to receive, possess, use, or transfer licensed material. The regulations in 10 CFR 71.5, "Transportation of Licensed Material," invoke DOT requirements under 10 CFR Parts 107, 171 through 180, and 390 through 397.

The DOT requirements at 49 CFR 173.420, "Uranium Hexafluoride (Fissile, Fissile Excepted, and Non-Fissile) require, in part, that packages containing UF_6 be designed, fabricated, and inspected in accordance with the ANSI N14.1 standard in effect at the time the packaging was manufactured. Material used to manufacture cylinder valves must meet the material stress-relief specifications stated in ANSI N14.1.

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[1] The NRC terminated USEC's certificate of compliance for the Portsmouth Gaseous Diffusion Plant on October 12, 2011, and the certificate of compliance for the Paducah Gaseous Diffusion Plant on February 2, 2015, per USEC's requests, after USEC decided to end NRC-regulated activities at those sites.

In addition, Section 5.4.6, One-inch Valves-Defect of USEC-651, "The UF_6 Manual, Good Handling Practices for Uranium Hexafluoride," provides a listing of various manufacturers whose valves are considered unacceptable for use. The section further states that Hunt valves are not acceptable for shipment of cylinders that contain greater than a heel quantity of UF_6. The intent is that the valve will be replaced before re-filling.

NRC has previously identified performance and safety concerns with 1-inch valves for UF_6 cylinders manufactured by Hunt. These safety concerns have been previously documented in the following:

- NRC Inspection Report 99902011-2001-201, issued October 25, 2001, identified a number of significant deficiencies with Hunt's compliance with quality assurance requirements.

- NRC IN 2002-31, "Potentially Defective UF_6 Cylinder Valves (1-Inch)," issued on October 31, 2002, discussed safety concerns related to UF_6 cylinder valves manufactured by Hunt. Those safety concerns involved: (1) cracked packing nuts, and (2) the loss of material traceability and failure to conduct hardness testing, for a series of heat codes, for valve stems purchased by USEC.

- NRC IN 2002-31, Supplement 1, "Potentially Defective UF_6 Cylinder Valves (1-Inch)," issued on March 24, 2003, discussed additional safety concerns related to UF_6 cylinder valves manufactured by Hunt. USEC conducted a testing program, on a sample of valves, to demonstrate that the 1-inch UF_6 Hunt valves would be able to perform their intended safety function. Because of those tests, several 1-inch valves manufactured by Hunt for UF_6 cylinders failed the pressurized seat leakage acceptance criteria of the ANSI N14.1 standard. All failed valves were from Hunt valve Vendor Lot 200027-85.

- NRC Bulletin 2003-03, "Potentially Defective 1-Inch Valves for Uranium Hexafluoride Cylinders," was issued on August 29, 2003.

- NRC Inspection Report 70-1113/2005-001, issued March 11, 2005, identified a notice of deviation for the failure to replace all Hunt valves on the cylinders owned by the licensee.

DISCUSSION

In 2003, the NRC issued Bulletin 2003-03 for the following reasons:

- To advise addressees of the performance and safety concerns with 1-inch valves for UF_6 cylinders manufactured by Hunt.

- To request that action addressees take specific actions intended to identify potentially defective Hunt valves under their control.

- To ensure cylinders with Hunt valves already installed were safely used and transported during a transition period.

- To ensure that only valves verified to be compliant with NRC regulations, NRC licenses and certificates, and DOT regulations were in use by the end of a transition period.

All action addressees were required to provide the NRC with a written response to the bulletin, detailing their plans to address their stock of Hunt valves and cylinders with Hunt valves.

In accordance with the bulletin's instructions, licensees submitted their plans, which were approved by the NRC as detailed in the following table.

Table 1: Agencywide Documents Access and Management System (ADAMS) Accession Numbers for Licensee Responses to Bulletin 2003-03 and NRC Approvals

Licensee	Docket	ADAMS Accession Nos. for Licensee Responses	ADAMS Accession Nos. for NRC Approvals
Framatome ANP, Inc. (Richland)	07001257	ML032810214	ML040850633
Global Nuclear Fuel - Americas, LLC (Wilmington)	07000113	ML032720331 ML15272A386	ML032810007 ML041030378
Honeywell (Metropolis)	04003392	ML032751379 ML041890276	ML041030416
USEC (Paducah, Portsmouth)	07007001 07007002	ML032880118 ML041560120 ML051230301	ML040770043 ML041910540 ML051370588
Westinghouse Electric Company (Columbia)	07001151	ML032810122	ML041040537
Nuclear Fuel Services, Inc. (Erwin)	07000143	ML032720710	No NRC response—possessed no Hunt valves

In general, most licensees had a limited number of Hunt valves installed or in inventory, with the exception of USEC. Most of the approved plans in response to NRC Bulletin 2003-03 allowed use of the valves for purposes of storage, but required replacement of the valves before transportation. The events and circumstances previously highlighted in this IN demonstrate that some users of UF_6 cylinders may lack awareness of the issue. Users of UF_6 cylinders should consider the information outlined in the Background section of this IN with respect to cylinders they possess or may receive.

CONTACT

This IN requires no specific action or written response. Please direct any questions about this matter to the technical contact listed below.

/RA/

Daniel S. Collins, Director
Division of Material, Safety, State, Tribal
and Rulemaking Programs
Office of Nuclear Material Safety
and Safeguards

Technical Contact: John Vera, NMSS/DSFM
301-415-5790
Email: john.vera@nrc.gov

Note: NRC generic communications may be found on the NRC public Web site, http://www.nrc.gov, under Electronic Reading Room/Document Collections.

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ADAMS Accession No.: ML15303A504

*concurred via email

OFFICE	NMSS/DSFM/SFLB	NMSS/FCSE/ECB	* NMSS/MSTR	RII/DFFI/PB1	NMSS/FCSE/ECB
NAME	JVera	OSiurano	AMcIntosh	OLopez-Santiago	TGrice
DATE	09/29/2015	11/09/2015	09/30/2015	11/03/2015	11/09/2015
OFFICE	NMSS/DSFM/SFLB	*TECH EDITOR	NMSS/DSFM	NMSS/FCSE	NMSS/MSTR
NAME	MSampson	JDougherty	MLombard	CErlanger	DCollins
DATE	10/16/2015	3/14/2016	3/31/2016	3/28/2016	5/12/16

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