

SAFETY OF URANIUM HEXAFLUORIDE CYLINDERS AT FUEL CYCLE FACILITIES

2600/013-01 OBJECTIVE

This temporary instruction (TI) is intended to ensure the integrity of uranium hexafluoride (UF₆) cylinders used for processing and storage at NRC-regulated fuel cycle facilities.

2600/013-02 APPLICABILITY

This TI applies to licensees and certificate holders¹ for fixed site nuclear fuel cycle facilities authorized to possess and use source material and/or special nuclear material, and who utilize cylinders for the processing and storage of depleted, natural or enriched UF₆.

2600/013-03 BACKGROUND

NRC Bulletin BL-2003-003, "Potentially Defective 1-inch Valves for Uranium Hexafluoride Cylinders," addressed safety issues associated with the manufacture of certain 1-inch valves installed on UF₆ cylinders used at NRC-regulated fuel cycle facilities. Also, several NRC Information Notices addressed other problems with UF₆ cylinders, including IN-87-26, "Cracks in Stiffening Rings on 48-Inch-Diameter UF₆ Cylinders," and IN-97-24, "Failure of Packing Nuts on One-inch Uranium Hexafluoride Cylinder Valves." This experience supports the need for a more formal approach to the inspection of activities involving the use of UF₆ cylinders, to ensure that the integrity of these cylinders is maintained when in active use.

2600/013-04 INSPECTION REQUIREMENTS

04.01 The inspector should determine before the inspection, or upon arrival at the inspection site, the version of ANSI Standard N14.1 to which the licensee has committed conformance.

The majority of the time devoted to the inspection activities in this TI should be performance-based, as described in Section 04.03 below. However, if it is not

¹ The terms "licensee" and "certificate-holder" apply interchangeably in the remainder of this document.

practical to observe the licensee's operations in the use and storage of the cylinders addressed by this TI in Section 04.03, the inspector should devote more time to the independent inspection activities described in Section 04.04.

04.02 Obtain copies of the procedures used for inspecting and testing cylinders and cylinder valves, replacing cylinder valves, filling and emptying cylinders, washing cylinders, and other activities involving UF₆ cylinders onsite.

- a. Ensure that these procedures are readily available to licensee operators at the locations where the cylinders are processed. Review the procedures to ensure they are clear, understandable, and consistent with the version of ANSI Standard N14.1 to which the licensee has committed conformance.
- b. Verify that the operators have been trained and are knowledgeable of the procedures for handling, inspecting, and testing cylinders in use or storage at the facility.

04.03 Observe the licensee's use of UF₆ cylinders for in-plant processing to determine that licensee activities are in accordance with its procedures.

Determine what activities are to be performed involving UF₆ cylinders during the period of the inspection; and observe licensee activities to verify that they are in accordance with the applicable procedures.

04.04 Perform independent inspection activities to verify that applicable requirements have been met with regard to licensee use of UF₆ cylinders.

- a. Verify that the tare weight, hydro date, and other data located on a sampling of in-service cylinders is consistent with licensee records for quality control.
- b. Identify a sampling of cylinders awaiting processing, or that have been recently processed, and for any that are owned by the licensee, examine licensee records to verify that the appropriate cylinder documentation has been provided to the licensee by the manufacturer, including the "as built" drawing, radiographs, and manufacturer's data report, including certifications.
- c. Verify that appropriate surveys were conducted following the processing of UF₆ cylinders, in accordance with the requirements of ANSI Standard N14.1, to ensure the applicable radiation requirement is not exceeded due to removable contamination on the cylinders.
- d. Inspect a sampling of in-service cylinders to ensure that they do not show evidence of leaks; cracks; excessive distortion (e.g., bulges, dents, gouges); bent or broken valves or plugs; broken, cracked, or torn stiffening rings or skirts; or other conditions that may affect the safe use of the cylinder. (Appendix F of ANSI Standard N14.1 shows examples of acceptable and unacceptable damage.)
- e. For a sampling of cylinders that are empty and in a queue for filling, or that have been recently filled, verify that they are not about to be filled beyond the expiration

date that specifies when the cylinder next must be inspected and tested, or that they had not been inappropriately filled beyond that date. (Cylinders that are already filled need not be inspected and tested when the 5-year expiration date is reached, but can remain untested and uninspected until emptied.)

- f. If the cylinder is owned by the licensee, verify that the licensee has kept a record of inspections and tests of the cylinder over the period of the last five years.

04.05 Review the licensee's records of operational experience to determine if: (a) incidents that may have involved UF₆ cylinders were adequately assessed to determine root cause; (b) appropriate compensatory measures were put in place; (c) corrective actions were developed; (d) the corrective actions were implemented on a reasonable schedule in consideration of safety risk; and (e) the desired outcomes of the corrective actions were achieved.

2600/013-05 REPORTING REQUIREMENTS

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

2600/013-06 COMPLETION SCHEDULE

The guidance in this TI will remain effective for 12 months from the date of issuance, or until its content has been incorporated in whole or in part into an appropriate fuel cycle inspection procedure, as indicated in an appropriate change notice. This TI should be performed at least once before its expiration at each fuel cycle facility that utilizes UF₆ cylinders. Listed inspection tasks are expected to be performed in conjunction with Inspection Procedure 88005, "**Management Organization and Controls**." It should not be necessary for inspectors to make visits to sites for the sole purpose of performing one or more of the listed inspection tasks.

2600/013-07 EXPIRATION

The direction in this TI will remain in effect for 12 months from the date of issuance.

2600/013-08 CONTACT

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

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2600/013-09 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.

2600/013-10 ORIGINATING ORGANIZATION INFORMATION

10.01 Organizational Responsibility. The Technical Support Group, FCSS/NMSS, initiated this temporary instruction.

10.02 Resource Estimate. The resources expended to complete the inspection tasks in this TI should not exceed three hours. If it takes greater than three hours, the inspector should contact his or her supervisor to determine if some adjustments need to be made to the inspection program.

10.03 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

ATTACHMENT 1

Revision History for TI 2600/013

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	04/21/06	This TI has been issued to ensure the integrity of uranium hexafluoride (UF ₆) cylinders used for processing and storage at NRC-regulated fuel cycle facilities.	None	N/A	N/A