



December 15, 2005  
GDP 05-1047

Mr. E. William Brach  
Director, Spent Fuel Project Office  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

**Paducah Gaseous Diffusion Plant (PGDP)  
Docket No. 70-7001, Certificate No. GDP-1  
Packaging and Transportation of Radioactive Material - 10 CFR 71.95 Report**

Dear Mr. Brach

Pursuant to 10 CFR 71.95(c), USEC provides the enclosed written notification of the discovery of an instance in which the conditions of approval in the Certificate of Compliance for a Model UX-30 shipping package were not followed during a shipment. The instance involves shipment of a Model 30B UF<sub>6</sub> cylinder containing Russian enriched down-blended uranium hexafluoride to Global Nuclear Fuels – Americas (GNF), where the cylinder's cylinder valve was believed to have not been in the fully closed position during shipment. Enclosure 1 provides the required information.

There are no new commitments in this correspondence. Should you require additional information regarding this event, please contact Stephen R. Cowne at (270) 441-6796.

Sincerely,

Steven R. Penrod  
General Manager  
Paducah Gaseous Diffusion Plant

Enclosure: As Stated

cc: NRC Region II Office  
NRC Senior Resident Inspector – PGDP  
P. Paquin, General Manager, Licensing and Engineering, Duratek

United States Enrichment Corporation  
Paducah Gaseous Diffusion Plant  
P.O. Box 1410, Paducah, KY 42002

NMESO1

10 CFR 71.95 REPORT  
CYLINDER LU2487 SHIPMENT TO  
GLOBAL NUCLEAR FUELS-AMERICAS

**Abstract:** Global Nuclear Fuels-Americas, Nuclear Energy Production (GNF), reported that while performing the initial leak check of its cylinder valve following loading of a Model 30B uranium hexafluoride cylinder into an autoclave, a rapid pressure decrease was noted by an operator. The operator's investigation noted the valve was slightly open. The valve was closed, and successfully leak rate tested. The cylinder's contents were evacuated into the GNF fuel fabrication process.

**Narrative Description:** On June 17, 2005, the Ural Electrochemical Integrated Plant (UEIP) in Russia filled a 30B 2½-ton cylinder (LU2487) in connection with the "Megatons to Megawatts" program. The cylinder was filled in accordance with ASTM C996-96. Specifically the absolute pressure in the cylinder at the time of filling was certified to be less than 517 kPa at 93°C (75 psia at 200° F). Under the "Megatons to Megawatts" program, USEC retains witnesses in Russia to observe and document the filling of cylinders. A seal is applied to the cylinder valve on each full cylinder; the witness documents the seal number and provides that number to USEC. The full cylinder was shipped to the United States Enrichment Corporation's Paducah facility (USEC) and received on August 12, 2005. The Russian plants each provide certificates of quantity and quality which attests to the fact that the cylinders filled were in accordance with the required specification. These certificates are provided to USEC well in advance of the cylinders being received. The seal number is verified at the time the cylinder is received at USEC. On August 12, the seal was confirmed to be the one applied in Russia after the cylinder was filled. The cylinder contained 2236.3 kg of uranium hexafluoride of 4.951 weight percent <sup>235</sup>U.

The cylinder was stored at the Paducah facility until October 11, 2005, when it was shipped to GNF in a UX-30 protective package in accordance with NRC Certificate 9196 (USA/9196/AF-85). USEC does not sample the contents of the 30-inch cylinders received from Russia nor does it operate the cylinder valve for any other purpose, although we do have the right to do so. Separate 1S size sample cylinders for sampling are provided with a material sample identical to that of its companion 30-inch cylinder. The 30-inch cylinder is stored in an outside cylinder storage yard until the cylinder is needed for shipment to a fuel fabricator. Therefore, when LU2487 was shipped to GNF on October 11, the contents and condition of the cylinder were the same as that certified and witnessed in Russia.

On November 16, 2005, a GNF operator checked the cylinder valve and placed the cylinder in an autoclave for a leak check. A pigtail was attached to the valve and pressurized to about 40 psig. The operator noticed an immediate drop in pressure in the pigtail and investigated the valve. The operator was able to turn the valve stem in the

closed direction approximately ½ turn. The operator reinitiated the leak check and the pigtail held pressure. The valve was then opened and it was determined that the cylinder was less than atmospheric pressure. GNF eventually fed the cylinder contents to the process and returned the empty cylinder to USEC on December 2, 2005.

**Evaluation:** On December 5, 2005, USEC asked the UEIP plant to provide a description of the procedure used in checking the filled cylinders for air tightness. The UEIP plant provided a statement that after the cylinder has been filled at a temperature of 93° C, the cylinder valve is closed. The pressure inside the cylinder at that time is at least 350 kPa. The pigtail is evacuated to 133 Pa and that vacuum is held for 15 minutes and the valve is checked for leaks. The valve is considered to be leak tight if there is no increase of pressure during that hold time. The UEIP contact reviewed the working control notes for LU2487 and reported that there were no deviations from the established technical process. The UEIP contact also commented that the valve was leak tight and could not have changed by itself. It would have been necessary to use a wrench to open the valve.

GNF surmises that the valve was partially open during shipment in the UX-30 package. This would be contrary to the NRC certificate which requires a leak rate of the closed valve following filling. However, the UEIP contact also indicated their review of the working control notes for the subject cylinder included notes on air tightness control and the tightness of the valve tests, and there was no deviation from the established technical process.

Contamination swipes of the cylinder were taken upon receipt from Russia, prior to shipment to GNF, after receipt by GNF, and when the cylinder was returned to PGDP on December 2, 2005. The results of each analysis were within the limitations allowed by the Department of Transportation (DOT). There was no loss of containment or spread of contamination during the shipment or handling of the cylinder. There was no personnel exposure as a result of the instance.

USEC believes a root cause can not be determined from an examination of the valve on the returned cylinder. This is based on GNF having turned the valve closed ½ turn and obtaining a good leak check, and their finding the cylinder was still below atmospheric pressure.

USEC has reviewed the circumstances of this issue with the NRC's Senior Resident Inspector for PGDP, who in turn discussed the issue with NRC Region II management, and the DOT regulatory authority. NRC staff raised questions regarding USEC's procedure and practice with respect to handling of the 30B cylinder received from Russia and USEC's requirements as the shipper when the cylinder is delivered to the fuel fabrication facilities. These questions were explored with the DOT regulatory authority and these practices were found consistent with the DOT regulatory requirements. Specifically, USEC can use the certified process knowledge provided by Russia to verify these cylinders to be below atmospheric pressure as required by 49 CFR 173.420(a)(6), which was done in this case.

**Conclusion:** Based on the evidence provided to date by UEIP and GNF, USEC has not been able to determine a root cause for this issue. It appears however there is no reason to believe an equipment defect caused the leakage because GNF was able to obtain a good leak check following their closure of the valve. At the present time, approximately 6000 cylinders of down-blended Russian material have been processed by fuel fabrication facilities with no similar leakage issues reported.