USEC
A Global Energy Company

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GDP 12-1039

ATTN: Document Control Desk
Mr. Mark D. Lombard, Director
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Paducah Gaseous Diffusion Plant (PGDP)
Docket No. 70-7001, Certificate No. GDP-1
10 CFR 71.95 - Type B Transportation Package Report (USA/9196/B(U)F-96)

Pursuant to 10 CFR 71.95(a)(3), the United States Enrichment Corporation (USEC) submits herein a report for discovery of an instance in which the conditions of approval in the Certificate of Compliance were not observed in making a shipment involving an NRC-approved Type B uranium hexafluoride transportation package that did not conform with Condition 6 of the Certificate. USEC's transportation agent discovered during an in transit inspection of an incoming international shipment at the Port of Baltimore, a Model UX-30 transportation package (SPUX0308), transportation package identification number USA/9196/B(U)F-96, with one of the ten ball lock pins used to fasten the overpack lid to its base disengaged and dangling from its lanyard. Certificate Condition 6 requires in part that the package be inspected and maintained in accordance with ANSI N14.1-2001.

This nonconformance with a Certificate condition was determined not to be an element attributed to a package design issue; therefore, USEC determined discussions were not necessary with the UX-30 Certificate of Compliance holder.

Enclosure 1 provides the required details of this report and Enclosure 2 provides a list of commitments.

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

NMSS01

Any questions regarding this report should be directed to Vernon J. Shanks, Regulatory Affairs Manager at (270) 441-6039.

Sincerely,

Michael A Buckner

Michael A. Buckner, Acting General Manager
Paducah Gaseous Diffusion Plant

Enclosures: As Stated

cc: NRC Region II
NRC Resident Inspector - PGDP
NRC Project Manager – PGDP

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ABSTRACT

During an October 17, 2012, in-transit inspection at the Port of Baltimore of a shipment of UX-30 overpacks containing low enriched uranium hexafluoride (LEU) of Russian origin, one overpack, a Model UX-30 transportation package (USA/9196/B(U)F-96), was found to have one of the ten ball lock pins that are used to fasten the overpack lid to its base disengaged and dangling from its lanyard. The package contained one full type 30B cylinder of less than five percent assay. The cylinder was not affected by this condition and there was no release of radioactive material. However, since USEC is the owner of the package in question (user but not certificate holder), and the pin failure apparently originated outside the United States, USEC has chosen to conservatively report this incident under 10CFR71.95(a)(3).

USEC assumes the pin may have been improperly installed and/or became dislodged during package handling operations prior to return to the Port of Baltimore. USEC has previously provided the Russian Federation guidance for installation of ball lock pins and has determined that guidance to be adequate. The corrective actions described in our previous 10 CFR 71.95 reports are believed to be sufficient, and no further action is needed at this time.

DETAILS

On October 17, 2012, a shipment of ISO flatracks each containing four UX-30 overpack transportation packages each containing a 30B UF_6 cylinder containing fissile UF_6, was inspected in-transit by USEC's transportation agent at the Port of Baltimore. During that inspection, one of the ten ball lock pins that secure the SPUX0380 overpack lid to its base was discovered to be disengaged and dangling from its lanyard.

Overpack SPUX0380 departed the Paducah site on January 17, 2012, containing an empty 30B cylinder to be delivered to the Russian Federation. The cylinder was filled in Russia with LEU at less than five percent assay, placed back in overpack SPUX0380 and returned to Paducah on October 30, 2012. The Russian Competent Authority Certification, RUS/2332/B(U)F-96T (Rev. 5) validates the DOT Competent Authority Certification, USA/9196/B(U)F-96, Revision 29, requiring Russia to implement the operating procedures referenced in the UX-30 SAR. The overpack was shipped in the Russian Federation by rail from the Ural Electrochemical Integrated Plant to the Saint Petersburg Federal State Unitary Enterprise IZOTOP facility in St. Petersburg, Russia. Following routine inspections, the overpack was loaded onto a vessel in the Port of St. Petersburg. The overpack entered the United States through the Port of Baltimore and was inspected on October 17, 2012 by USEC's transportation agent responsible for the UF_6 shipments from Russia to USEC. The transportation agent inspects each package and verifies the tamper indicating devices and the overpack integrity. One ball lock pin was found to be disengaged and dangling from its lanyard prior to departure from Baltimore for the shipment's return to Paducah. It is suspected the pin became disengaged during transport from the Russian

Federation to the Port of Baltimore. The pins plunger was stuck in the depressed position that frees the balls preventing engagement. The transportation agent replaced the failed ball lock pin for its return to Paducah.

INVESTIGATION RESULTS

PGDP has examined the failed pin and found the pin's plunger to be stuck in the depressed position preventing the ball mechanism from engaging the overpack indexing pin. Further examination found the pin to be bent at the ball engagement end, and the end of the pin to be crushed. Impact marks were also found on the head of the pin and axial scrapes and radial marks below the ball engagement position. No evidence of corrosion was found on the pin and it appeared to be of all stainless steel construction. From this evidence it appears the ball lock pin may have been struck on the head forcing it into the indexing pin resulting in the pin being damaged. There was no apparent tool marks on the ball lock pin suggesting an attempt to extract a stuck pin. Examination of the affected indexing pin found it to be not properly aligned. That is, not perpendicular to its mounting surface. The force sufficient to bend the ball lock pin would have also been sufficient to bend or straighten the indexing pin. When the new pin installed at the Port of Baltimore was removed from the overpack, it was found tight but not stuck.

A review of the USEC inspection record for the overpack before shipment to the Russian Federation found no evidence of any issue with the overpack that would compromise the ability of the ball lock pin to be properly seated in the indexing pin.

From the evidence found, USEC suspects that the indexing pin may have been bent during overpack handling or misaligned in some other manner. A misaligned indexing pin could have resulted in the inability to easily insert the ball lock pin. The crushed end and impact marks appear to indicate the ball lock pin was forcibly inserted and during overpack handling during shipping became dislodged because the pin's balls would not engage.

BALL LOCK PIN DESIGN INFORMATION

The UX-30 overpack is designed with ten, 2" grip, 7/16" diameter single acting ball lock pins to hold the top and bottom half together during transport. UX-30 overpacks are currently manufactured by Columbiana Hi Tech (CHT). CHT Drawing X-20-238E, "Fabrication and Assembly UX-30 Overpacks," states the ball lock pins are Avibank 7M2.00, Carr Lane, or approved equal.

PGDP currently stocks all stainless steel replacement pins; Avibank Part Number BLC7BC20SL6C*[1] that complies with part numbers 16 and 17 from CHT drawing X-20-238E. This pin in question was stamped with "AVK PUSH BLC7BC20SL6C8, indicating stainless steel construction and 7/16" diameter by 2" length.

[1] The asterisk represents a number indicative of the size hole placed in the ball lock pin cap for the purpose of attachment of the lanyard to the pin.

ASSESSMENT OF SAFETY CONSEQUENCES

A review of the UX-30 Safety Analysis Report (SAR) and previous discussions with Energy Solutions (former UX-30 certificate holder) indicate the package was accepted on performance based testing conducted by Vectra (original equipment designer/manufacturer). No evaluations were performed in the Safety Analysis Report with less than the full complement of pins with full insertion. The package is placed on transport saddles that have metal straps that are clamped over the package. These devices provide a secondary clamping mechanism to hold the overpack halves together, but these devices are not credited in the Safety Analysis Report. Based on this review USEC is unable to quantify whether a single missing ball lock pin is a significant reduction in the effectiveness of the package. However, the user inspection conducted prior to any shipment provides reasonable assurance that the packages will be shipped in a safe condition. Radiological surveys following receipt revealed less than minimum detectable activity; therefore, the package met its intended safety function.

CORRECTIVE ACTIONS

USEC inspects each UX-30 package prior to shipment according to Chapter 7 of the UX-30 SAR. If an inspection indicates that a ball lock pin is not functional then the ball lock pin is replaced. The pins are acceptable for use if the pins pass the UX-30 required inspections and are functional. As has been indicated in earlier 10 CFR 71.95 reports, USEC is aggressively replacing any stainless steel pins that show any signs of deterioration that could lead to failure. For example, if a pin locking mechanism is tight or binding, if the pin shank shows any detrimental grit or grime, or if the pin head is damaged such that the locking mechanism could be compromised, the pin will be replaced. The pin in this event was replaced by USEC's transportation agent. Deficient pins will be replaced as described in accordance with current procedure practice. USEC has previously provided the Russian Federation guidance for installation of ball lock pins and has determined that guidance to be adequate. The corrective actions described in our previous 10 CFR 71.95 reports are sufficient to resolve any pin engagement issue prior to shipping from Paducah.

Each overpack in the Russian program is subject to the annual inspection required by the Certificate prior to shipping back to Russia. USEC procedures require the shell alignment to be verified adequate prior to shipping. Existing procedures are sufficient to identify problems of this nature. SPUX0380 will be inspected in accordance with normal procedures prior to shipping again. Work Order 1217367-01 was initiated to provide maintenance support for this inspection to correct any identified issues, if appropriate.

SIMILAR EVENTS

USEC has made several previous 10 CFR 71.95 reports that included issues with disengaged and dangling ball lock pins. In those cases where no specific failure mechanism could be determined, it was presumed that improper insertion at the origin of the shipment contributed to the failure. In other cases corrosion of the pin led to its failure. In this case, an undiscovered misalignment of an indexing pin may have contributed to the originator of the shipment forcefully inserting the ball lock pin in a manner that damaged the ball lock pin resulting in a failure to engage, or the pin was damaged during package handling. There have been no previous similar events of this nature reported by USEC.

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LIST OF COMMITMENTS

No new commitments.