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Director, Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards
ATTN: Document Control Desk
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 AF Transportation Package Report (USA/9196/AF-96)

Pursuant to 10 CFR 71.95(a)(3) United States Enrichment Corporation (USEC) submits this 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 a NRC-approved Type AF transportation package. The Model UX-30 transportation package, identification number USA/9196/AF-96, was discovered to have one two-inch ball lock pin to be disengaged from its overpack and dangling by its lanyard. Ten ball lock pins per package are used to fasten the overpack lid to its base. This condition was found during an in-transit inspection at the Port of Baltimore, in Baltimore, Maryland, conducted as part of the ball lock pin issue investigation by USEC.

The affected package was being transported from the Russian Federation through the Port of Baltimore and continuing to PGDP. USEC believes that this ball lock pin's condition occurred prior to shipment, loading, or during transport from the Russian Federation to the Port of Baltimore. USEC has determined the condition found for the pin to most likely be improper engagement during installation during shipment preparation at the point of origin in Russia. The Russian Competent Authority Certification, RUS/2332/AF-96T(Rev.2) validates the DOT Competent Authority Certification USA/9196/AF-96, Revision 26 that references NRC Certificate of Compliance No. 9196, Revision 23. Discussions with the UX-30 Certificate of Compliance holder have not resulted in a determination of the impact on the effectiveness of the packaging for one or more ball lock pin losses.

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

Sincerely,

Steven R. Penrod
General Manager
Paducah Gaseous Diffusion Plant

Enclosures: As Stated

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

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

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ABSTRACT

On August 19, 2009, a ball lock pin was found disengaged and dangling by its lanyard during an in-transit inspection of Model UX-30 overpacks. The inspection was conducted by USEC personnel at the Port of Baltimore as part of the investigation of ball lock pin issues previously reported under 10 CFR 71.95. The Model UX-30 overpack, transportation package identification number USA/9196/AF-96, contained low enriched uranium (LEU) of Russian origin. Ten ball lock pins are used to fasten the overpack lid to its base. The cylinder contained in the identified package was not affected by the condition and there was no release of radioactive material as verified during receipt inspection of the overpack at PGDP. The pin abnormal condition for this shipment most likely occurred either during installation of the pin at the point of origin in Russia or during some portion of the overpack shipment from Russia. Since the shipment and the abnormal conditions originated outside the United States, USEC has chosen to conservatively report this incident under 10 CFR 71.95 (a)(3).

In a previous action associated with an earlier 10 CFR 71.95 report, USEC provided enhanced ball lock pin inspection and installation instructions to the Russian Federation in late May 2009. Since early June, USEC has checked incoming shipments from Russia at the Port of Baltimore. The shipment was made subsequent to the provision of that information; however, USEC can make no conclusion that the enhanced criteria were used by the Russians in this case. Although several aluminum head ball lock pins were replaced during this in-transit inspection as committed previously, only one pin out of three hundred sixty inspected exhibited an unexpected anomaly. Three subsequent shipments have been checked at the Port of Baltimore and no abnormal conditions were reported.

USEC believes the combined corrective actions regarding the corrosion based failures and the possible improper pin installations have made significant improvements in these recent shipments. It is USEC's intent to continue the checking of Russian shipments at the Port of Baltimore, as allowed by Port Administration and their access requirements, until USEC determines additional inspections are no longer required.

DETAILS

On August 19, 2009, USEC personnel conducted an in-transit inspection as part of its ball lock pin investigation. The USEC owned UX-30 overpack transportation packages arriving at the Port of Baltimore were inspected. During the inspection of 36 overpacks, one ball lock pin on overpack UXO187 was discovered to be disengaged and dangling by its lanyard.

The overpack was owned by USEC and was shipped bearing an empty 30B cylinder to Russia on July 10, 2008. The cylinder was filled with low enriched uranium hexafluoride (LEU), placed back in its original overpack, and shipped by rail from one of three Russian facilities to the Saint Petersburg Federal State Unitary Enterprise IZOTOP facility in St. Petersburg, Russia. The Russian Competent Authority Certification, RUS/2332/AF-96T(Rev.2) validates the DOT Competent Authority Certification, USA/9196/AF-96, Revision 26. Following routine inspections by USEC's transportation agent, flatracks containing the overpack/cylinder transportation package were loaded onto a vessel in the Port of St. Petersburg and shipped to the United States. The flatracks entered the United States through the Port of Baltimore where they were loaded onto a trailer for transport to PGDP. USEC's Baltimore transportation

agent responsible for the UF₆ shipments from Russia to USEC inspects the flat racks and packages prior to continued shipment to PGDP. The agent's inspection verifies the tamper indicating devices and the overpack integrity. In this case however, USEC, as part of its investigation of the ball lock pin issues, inspected all the USEC packages at the Port at that time. USEC found one ball lock pin disengaged and dangling by its lanyard.

INVESTIGATION RESULTS

PGDP evaluated the subject ball lock pin at the Port of Baltimore and determined no failure mechanism was evident, the ball lock pin appeared fully functional, and the stainless steel pin was reinstalled and a cable tie applied. Further examination by the plant's metallurgist of the pin and its associated overpack base alignment pin following receipt at the plant found no physical damage to indicate the pin had been forcibly removed. The head of the pin, a marine style, was bent, but this did not compromise the ability of the pin to function properly. USEC concluded the pin was either not fully engaged prior to shipment and fell out during loading, transit, and unloading, or it was not inserted prior to shipment.

Of the thirty-six transportation packages inspected on August 19 in the Port of Baltimore, twenty-eight packages inspected had been shipped from PGDP after December 16, 2008, when USEC began replacing the aluminum head ball lock pins per its December 15, 2008 commitment. UXO187 was shipped from PGDP prior to the time USEC reported its first 10 CFR 71.95 ball lock pin issue.

Three in-transit inspections conducted by USEC at the Port of Baltimore subsequent to the August 19 inspection found no reportable anomalies in seventy-two overpacks. Sixty-eight of these overpacks were shipped after USEC began implementing the ball lock pin corrective actions. USEC believes the combined corrective actions regarding the corrosion based failures and the possible improper pin installations are making significant improvements in these recent shipments.

USEC expects to continue to discover ball lock pin problems during inspections of shipping packages prior to shipment or during receipt inspections until all the aluminum capped pins have been replaced on USEC owned UX-30 overpacks and enhanced pin inspection and installation instructions are fully implemented. It is USEC's intent to continue spot checking Russian shipments at the Port of Baltimore until USEC determines additional inspections are no longer required. Based on current USEC records there are forty-one overpacks in the Russian Federation that have not been recycled through PGDP for replacement of ball lock pins with aluminum heads.

BALL LOCK PIN DESIGN INFORMATION

The UX-30 overpack is designed with ten, two-inch grip, seven-sixteenth-inch diameter single acting ball lock pins to hold the top and bottom half of the overpack 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. The aluminum capped pins in service at PGDP are labeled 800670, C7B209 and are manufactured by Jergens, and were judged by the UX-30 Certificate of Compliance holder to be an approved equal.

PGDP currently only stocks stainless steel replacement pins that comply with the original design; Avibank Part Number BLC7BC20SL6C7 that complies with part numbers 16 and 17 from CHT drawing X-20-238E.

ASSESSMENT OF SAFETY CONSEQUENCES

A review of the UX-30 Safety Analysis Report (SAR) and discussions with Energy Solutions (current 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 one or more missing ball lock pins are a significant reduction in the effectiveness of the package. However, USEC's inspection conducted prior to any shipment from PGDP will ensure that all conditions of the Certificate of Compliance are met when preparing the package for shipment.

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 SAR required inspections and are functional. However, as previously stated in our earlier reports, based on the failure modes of the aluminum capped pins and their questionable life expectancy in a salt water environment, for UX-30 overpacks owned by USEC, the two-inch aluminum capped ball lock pins are being replaced with all stainless steel pins when the packages are returned to PGDP and prior to their subsequent shipment. In addition, 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. USEC has replaced approximately forty-four percent of the pins on four hundred ninety two overpacks that have cycled through PGDP since corrective actions began. Approximately five hundred fifty aluminum capped pins have been replaced at the Port of Baltimore while in transit to PGDP. USEC's overpack inspection procedures are adequate to identify aluminum capped ball lock pins, and the procedures have been enhanced to help identify other ball lock pin failure mechanisms as previously committed. The aluminum capped ball lock pins will be replaced for the USEC fleet and should be completed by December 31, 2010, as previously committed.

SIMILAR EVENTS

USEC has filed similar 10 CFR 71.95 reports as follows:

1. USEC letter dated December 5, 2008, Serial Number GDP 08-1047
2. USEC letter dated February 13, 2009, Serial Number GDP 09-1009
3. USEC letter dated July 1, 2009, Serial Number GDP 09-1027
4. USEC letter dated July 31, 2009, Serial Number GDP 09-1031
5. USEC is aware of one similar event report filed by Global Nuclear Fuel, Americas - LLC (GNF-A). This report was filed by GNF-A on February 6, 2009.

LIST OF COMMITMENTS

No new commitments are made in this correspondence.