USEC
A Global Energy Company

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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)(1) United States Enrichment Corporation (USEC) submits this report for discovery of abnormal conditions involving NRC-approved Type AF packages. These Model UX-30 transportation packages, transportation package identification number USA/9196/AF-96, are identified in the table in Enclosure 2 along with the abnormal condition and date identified. Ten ball lock pins per package are used to fasten the overpack lid to its base. These abnormal conditions were found during receipt inspection at PGDP, or for the highlighted items in Enclosure 2, during an in-transit inspection conducted as part of the issue investigation by USEC personnel at the carrier's off-site staging area near the PGDP plant site.

The packages had been transported from the Russian Federation through the Port of Baltimore and then to PGDP. USEC believes that these ball lock pins' abnormal conditions occurred during transport from the Russian Federation to Paducah, Kentucky. USEC has determined the abnormal conditions found for these pins to be primarily the same issues as for those pins reported in our previous 10 CFR 71.95 reports and noted in Enclosure 2. Further discussions with the UX-30 Certificate of Compliance holder did not result 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,

James D [illegible] for SR Penrod

Steven R. Penrod
General Manager
Paducah Gaseous Diffusion Plant

Enclosures: As Stated

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

NMSS01

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ABSTRACT

On the dates noted in Enclosure 2, during receipt inspection at PGDP (Items 1-7), or for the highlighted items, during an in-transit inspection conducted as part of the investigation by USEC personnel at the carrier's off-site staging area near the PGDP plant site (Items 8 and 9), Model UX-30 overpacks, transportation package identification number USA/9196/AF-96, containing low enriched uranium (LEU) of Russian origin were found to have ball lock pin abnormal conditions identified in Enclosure 2. Ten ball lock pins are used to fasten the overpack lid to its base. The cylinders contained in these packages were not affected by the condition and there was no release of radioactive material. However, since USEC is the owner of the packages in question (user but not certificate holder), and the pin abnormal conditions may have occurred during some portion of the domestic leg of the shipment, USEC has chosen to conservatively report this incident under 10CFR71.95 (a)(1).

The corrective actions described in our previous 10 CFR 71.95 reports associated with ball lock pins on UX-30 overpacks are sufficient to resolve the corrosion based issues. As noted previously, USEC intends to replace any two-inch aluminum capped ball lock pins with all stainless steel ball lock pins in USEC owned UX-30 overpacks prior to their next shipment from PGDP. Additionally, any other ball lock pin found to be defective or not functioning properly will be replaced before shipping off site.

DETAILS

On May 5 and May 7, 2009, the UX-30 overpack transportation packages, each with a 30B UF_6 cylinder containing fissile UF_6, identified in Enclosure 2 were inspected at PGDP following receipt. During receipt inspection, eight ball lock pins on the overpacks identified in Enclosure 2 (Items 1-7) that secure the overpack lid to its base were discovered to either have a shank missing, disengaged and dangling from its lanyard, or not fully engaged. On May 18, 2009, inspections were conducted off-site by USEC personnel for all USEC overpacks at USEC's carrier's off-site staging area. During these inspections the two UX-30 overpack transportation packages identified in Enclosure 2 (Items 8 and 9) were discovered to have a ball lock pin disengaged and dangling.

The identified overpacks, all owned by USEC and bearing an empty 30B cylinder were shipped to Russia at various times. The cylinders were 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. Following routine inspections, the flatracks were loaded onto a vessel in the Port of St. Petersburg and shipped back to the United States. The flatracks entered the United States through the Port of Baltimore and were loaded onto a trailer for transport to PGDP. The transportation agent responsible for the UF_6 shipments from Russia to USEC inspected the flat racks and packages, including the packages identified as Items 1 through 9 in Enclosure 2, upon

receipt prior to shipment and identified no damaged or failed components prior to shipping. No anomalies were reported from this cursory inspection of the ball lock pins prior to their departure from Baltimore for the shipment's return to Paducah.

As part of its investigation of the ball lock pin issue, USEC chose to inspect some of the UX-30 overpacks while they were in transit from Russia to PGDP. This inspection conducted at the carrier's off-site staging facility near Paducah included the overpacks identified in Enclosure 2, Items 8 and 9, and identified the conditions noted. These issues were corrected prior to continued transit.

INVESTIGATION RESULTS

PGDP has inspected the ball lock pin issues identified in Enclosure 2 and has determined the abnormal condition to be similar to that described in USEC's previous reports. The aluminum capped pins are exhibiting galvanic corrosion that causes the aluminum cap to crack and become detached from the stainless steel shank, or the corrosion products cause the plunger mechanism to seize, stopping the balls from functioning properly. For the stainless steel pins, the harsh saltwater environment during shipping from Russia can result in corrosion or grime buildup that can eventually result in a pin seizing. There is also some evidence that some pins may be exhibiting damage resulting from overpack handling at the shipper or during transit. Due to what was identified on receipt, there could potentially be installation questions about the pins in Items 4 and 6, but this is difficult to determine on a receipt inspection.

USEC has a fleet of approximately 530 overpacks. Since USEC's December 5, 2008, 10 CFR 71.95 report on ball lock pin issues, USEC has inspected approximately 300 overpacks containing 3000 of the two-inch ball lock pins. USEC has replaced approximately 1,125 ball lock pins.

Ball lock pin problems will continue to be discovered 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 as previously committed. Other abnormal conditions with stainless steel pins will continue to be found during required inspections and they will be replaced as necessary prior to shipment from PGDP.

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 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 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 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 is currently replacing approximately 1 out of 3 pins. USEC's overpack inspection procedures are adequate to identify aluminum capped ball lock pins, but the procedures will be enhanced to help identify other ball lock pin failure mechanisms by August 31, 2009. These 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 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.

ABNORMAL CONDITIONS DISCOVERED

Item No.	ATRC Number	Discovery Date	USEC Package Number	ISSUE DESCRIPTION	INVESTIGATION FINDING
1	ATRC-09-1047	05/05/2009	SP-UX-0447	One aluminum head pin with shank missing dangling from lanyard	Aluminum corrosion mechanism previously described
2	ATRC-09-1047	05/05/2009	UX0129	Two stainless steel pins disengaged and dangling from lanyard	One pin apparently forcibly pulled from overpack. One pin not recovered
3	ATRC-09-1047	05/05/2009	SP-UX-0383	One stainless steel pin disengaged and dangling from lanyard	Stuck button/debris in ball mechanism
4	ATRC-09-1047	05/05/2009	SP-UX-0344	One ball lock pin not fully engaged	Pin was not evaluated for damage, it is believed to be an installation error
5	ATRC-09-1082	05/07/2009	UX0148	One stainless steel pin disengaged and dangling from lanyard	Failure mechanism not determined
6	ATRC-09-1082	05/07/2009	UX0148	One stainless steel pin not fully engaged	Pin was wedged in overpack and could not be removed by hand.
7	ATRC-09-1082	05/07/2009	SP-UX-0446	One aluminum head pin not fully engaged	Aluminum corrosion mechanism previously described
8[1]	ATRC-09-1202	05/18/2009	UX-059	One stainless steel pin disengaged and dangling from lanyard	Plunger seized in a partially retracted position, but could be freed
9	ATRC-09-1202	05/18/2009	UX-043	One stainless steel pin disengaged and dangling from lanyard	Plunger seized in a partially retracted position, but could not be freed

[1] The items 8 and 9 were found during USEC inspections at the overpack carrier's staging area off site from PGDP. Items 1 through 7 were found during receipt inspection at PGDP.

LIST OF COMMITMENTS

USEC's overpack inspection procedures are adequate to identify aluminum capped ball lock pins, but the procedures will be enhanced to help identify other ball lock pin failure mechanisms by August 31, 2009.