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GDP 09-1031

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, identification number USA/9196/AF-96, are shown 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 in-transit inspections at the Port of Baltimore, in Baltimore, Maryland, conducted as part of the issue investigation by USEC.

The affected packages were being transported from the Russian Federation through the Port of Baltimore and continuing to PGDP. USEC believes that these ball lock pins' abnormal conditions occurred during transport from the Russian Federation to the Port of Baltimore. USEC has determined the abnormal conditions found for these pins to be corrosion issues as was reported in our previous 10 CFR 71.95 reports and possible improper installation of the ball lock pins at the point of origin in Russia. 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,

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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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KIMS50 /
KIMS5

10 CFR 71.95 - Type AF Transportation Package Report (USA/9196/AF-96)

ABSTRACT

On June 4 and 19, July 13, 15, and 28, 2009, ball lock pin abnormal conditions, identified in Enclosure 2, were found during in-transit inspections of Model UX-30 overpacks. The inspections were 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 overpacks, transportation package identification number USA/9196/AF-96, contain low enriched uranium (LEU) of Russian origin. Ten ball lock pins are used to fasten the overpack lid to its base. The cylinders contained in the identified packages from June 4 through July 15 were not affected by the condition and there was no release of radioactive material as verified during receipt inspection of the overpacks at PGDP. The overpacks from the July 28 inspection have not been received at PGDP; however, with no reportable abnormal conditions no radioactive releases are anticipated. The pin abnormal conditions for these shipments occurred either during installation of the pins at the point of origin in Russia or during some portion of the overpack shipment from Russia. Although 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)(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 and no new actions are proposed at this time. 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, USEC's procedures will be enhanced to help identify other ball lock pin failure mechanisms.

In addition to the previous actions, 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 first two shipments received in June were shipped prior to issuance of the enhanced pin inspection and installation instructions and exhibited either disengaged or missing pins. The next shipment of 80 overpacks in July did not contain any disengaged and hanging, or missing pins. Two pins were found to be partially engaged and were reinserted on the spot. The last shipment inspected on July 28 did not exhibit any reportable abnormal conditions.

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 June 4 and 19, July 13, 15 and 28, 2009, USEC personnel conducted in-transit inspections as part of its ball locking pin investigation. The USEC owned UX-30 overpack transportation packages arriving at the Port of Baltimore were inspected. During the inspections of 212 overpacks, six ball lock pins on the overpacks identified in Enclosure 2 were discovered to be missing, not fully engaged, or disengaged and hanging from its lanyard.

The 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 by USEC's transportation agent, flatracks containing the overpack/cylinder packages were loaded onto a vessel in the Port of St. Petersburg and shipped to the United States. The flatracks enter the United States through the Port of Baltimore where they are 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 these cases however, USEC, as part of its investigation of the ball-locking pin issues, inspected all the USEC packages at the Port at that time. The USEC findings for these inspections and the corrective actions applied prior to continuation of the shipments to Paducah are as identified in Enclosure 2.

INVESTIGATION RESULTS

PGDP has evaluated the ball lock pin issues identified in Enclosure 2 and has determined the following:

Item 1: No evidence remained allowing identification of a failure mechanism. A stainless pin and lanyard were installed.

Item 2: No failure mechanism was evident and the stainless steel pin was reinstalled.

Item 3: The aluminum capped pin exhibited galvanic corrosion similar to what has been identified in previous reports. The corrosion caused the cap to crack and the corrosion products caused the plunger mechanism to seize, stopping the balls from functioning properly. A replacement stainless steel pin and lanyard were installed.

Item 4: Appears to be misalignment of the overpack lid to its base during installation. A replacement pin was installed for completion of the shipment. Examination of the overpack equipment continues at PGDP.

Items 5 and 6: Pins were only partially engaged. Examination of the pins indicted they were fully functional and were reinserted prior to continuing the shipment.

It was noted during inspections of 80 packages on July 13 and 15, and 20 packages on July 28 in the Port of Baltimore that 16 of the 100 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. None of the 16 overpacks exhibited ball lock pin reportable abnormal conditions. 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.

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 the spot checking of Russian shipments at the Port of Baltimore until USEC determines additional inspections are no longer required.

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 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, 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 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	CORRECTIVE ACTION
1	ATRC-09-1362	06/4/09	UX-024	One ball locking pin missing from a corner position with the lanyard remaining	No part of the pin remained to evaluate; therefore no determination could be made as to the failure mechanism.	A replacement pin and lanyard was installed.
2	ATRC-09-1362	06/4/09	UX-076	One pin disengaged and hanging by its lanyard	The stainless steel pin was found to be functional and it was reinstalled. No failure mechanism could be determined for the existing pin.	None
3	ATRC-09-1362	06/4/09	SP-UX-0500	One pin disengaged from a corner position and hanging by its lanyard	The failed pin had an aluminum head and was not functional (locking mechanism was seized).	A replacement stainless steel pin was installed.
4	ATRC-09-1491	06/19/09	UX-038	One pin disengaged and hanging by its lanyard	An excessive amount of force was required to insert a replacement stainless steel pin in the overpack. The pin had to be pried in. This was apparently due to a misalignment of the overpack lid to its base. It appears that the Russian production facility shipped the overpack with the pin dangling.	Following receipt at PGDP the lid was removed and an inspection of the mating surfaces determined the 1-inch diameter alignment pins were bent.
5	ATRC-09-1678	07/15/09	SP UXO 201	One ball locking pin was disengaged and backed out approximately half the distance from full engagement.	The pin was determined to be functional and was reinserted.	Reinserted the pin.
6	ATRC-09-1678	07/15/09	SP-UXO-340	One ball locking pin was disengaged and backed out approximately half the distance from full engagement.	The pin was determined to be functional and was reinserted.	Reinserted the pin.

LIST OF COMMITMENTS

No new commitments are made in this correspondence.