

Nancy Osgood

From: Boren, Mike [borenml@pgdp.usec.com]
Sent: Tuesday, August 19, 2008 3:00 PM
To: Nancy Osgood
Cc: Michael Miller; Michael Raddatz; Toelle, Steven A; Penrod, Steve; Lewis, Jim; Paine, Ed; Buckner, Mike; Shanks, Vernon; Stadler, David
Subject: FW: PTO CAR RAI no.2 response
Attachments: RAI 2 final response.pdf; Enclosure 1.pdf; Enclosure 2.pdf; Enclosure 3.pdf; Enclosure 4.pdf

Nancy, here is the response to the second PTO CAR RAI. This response includes the results of the cylinder material analysis we discussed yesterday.

If you have any further questions please let me know.

Thanks,
Mike Boren

From: Workman, Joyce
Sent: Tuesday, August 19, 2008 1:52 PM
To: Boren, Mike
Subject: RAI

USEC Response
NRC Request for Additional Information No. 2

1. A description of the age related degradation management program, i.e., the inspections, tests, corrosion mitigation programs, etc., conducted on the cylinders during the storage period.

The cylinders received periodic inspections to ensure no leakage from valves or plugs and no corrosion wastage of the cylinder wall. They were stored elevated off the ground to prevent contact with soil moisture or accumulated water. Being fissile cylinders the inspection programs were more rigorous as degradation of the cylinders is a criticality safety issue. The 25 cylinders owned by DOE have been subject to the cylinder management program described in Enclosure 1 since approximately October 2003 in accordance with an Agreed Order between the Natural Resources and Environmental Protection Cabinet of the Commonwealth of Kentucky and the US Department of Energy¹. Between the last time they were filled (thought to be in the 1972/3 timeframe) and October 1993, the cylinders were subject to the DOE inspection requirements in force at the time. The one USEC cylinder has been subject to a similar program² also in Enclosure 1. The good as-found condition of the cylinders is indicative of the proper storage over the period. The most susceptible part of the cylinder to corrosion is the head to skirt area at the 6 o'clock position. This is where rainwater can accumulate. At some time in the past, these cylinders had the heads painted, and the paint helped keep the heads in good condition. The Enclosure 2 photographs are typical examples of the actual 48A cylinders at issue.

2. A description of the preshipment inspection processes and procedures that will be used to confirm that the cylinders conform to ANSI N14.1 and 49 CFR 173.420. Specific areas of interest are:

A special inspection program was established for the subject cylinders due to the age and specific characteristics of these 48A cylinders. This inspection program includes all of the normal inspections performed to ensure compliance with ANSI N14.1 and 49 CFR 173.420 prior to shipping a fissile cylinder. Additional inspections were also included due to the age of the cylinders and certain characteristics as described in the CoC amendment request, such as lack of water capacity on the nameplate. This inspection program will ensure that no cylinder will be shipped that does not comply with ANSI-N14.1 and 49 CFR 173.420 except as noted in our certificate amendment request.

¹ The subject Order is implemented by Uranium Disposition Services, LLC by documents DUF6-UDS-PLN-011, *Cylinder Surveillance and Maintenance Plan*, and UDS-C-CYP-2402, *In-Storage Inspection of 12-inch, 30-inch, 48-inch, and CV UF6 Cylinders at Paducah*.

² PGDP Chemical Operations Group Procedure CP4-CU-CH6430, *In-Storage Fissile Cylinder Inspections*.

- Wall thickness measurement confirmation

Every cylinder is visually inspected to ensure the integrity of the cylinder wall. The acceptance criteria used are as specified in ANSI N14.1, Appendix F, "Examples of Acceptable and Unacceptable Damage to UF6 Cylinders." This inspection is performed by USEC Operations personnel. Any unacceptable condition results in the cylinder being tagged as defective, an Assessment and Tracking Report (ATR) is initiated, a more detailed inspection of the unacceptable condition is performed by QC, and the anomalous condition is evaluated by Engineering to determine final disposition.

Due to the lack of a tare weight stamp, an ASME or National Board code stamp, and a water capacity stamp on the nameplate (as described in the CoC amendment request), Operations identified that all 26 cylinders were unacceptable, in accordance with the governing procedure. This triggered the more detailed inspection process by QC, and subsequent evaluation by Engineering.

The QC inspection includes a complete visual inspection of the cylinder wall for dents, gouges, bulges, weld defects, bent or broken stiffening rings, or other conditions included in ANSI N14.1, Appendix F. Any location that indicates cylinder wall degradation by corrosion, pitting, or gouging is subject to ultrasonic wall thickness measurement. A minimum of two ultrasonic wall thickness measurements will be taken on the shell and two measurements on each head. Any cylinder wall condition that exceeds the acceptable conditions of ANSI N14.1 Appendix F, or indicates a wall thickness of less than 0.5" is unacceptable and the cylinder will be rejected for shipping.

- How do we confirm that cylinders, in fact, meet the 48A design specifications, i.e., how do we confirm that the material is what we believe it to be?

USEC does not have the receipt inspection records for these cylinders. The cylinders were purchased by DOE and were subject to the DOE quality control requirements in effect at the time of purchase. However, additional assurance of the material of construction (ASTM A-285, head and shell) was established by performing metallurgical analysis of filings from a sampling of the cylinders. USEC sampled three cylinders, two from the 1-1000 series and one from the 3001-3365 series, and verified the chemical analysis of the material was consistent with ASTM A-285 steel. In addition, hardness measurements were taken on each of the three cylinders. Hardness can be correlated to tensile strength and the measurements showed the hardness to be in the range for tensile strength of ASTM A285 Grade C. This determination is consistent with the material of construction specified in the procurement documents.

- How will we visually inspect for leakage. Specific area of interest is leakage around valve connections and plugs.

A visual inspection of each valve and plug has been completed and there is no indication of leakage from any cylinder. This inspection specifically targeted the plug and valve connections in addition to the cylinder wall. Additionally, each cylinder will be verified to have an internal pressure below 10 psia prior to shipping. This exceeds the requirement specified in ANSI N14.1 that the internal pressure be below atmosphere, and ensures that if any leakage were to occur, it would be in to and not out from the cylinder.

- Provide any available fabrication records for cylinders, e.g., QA records, nondestructive examination records, etc.

USEC has not been able to find any original fabrication or inspection records for the subject cylinders. The cylinder nameplates indicate that some of the cylinders were last recertified in 1972 and the remaining in 1973.

- Describe individual cylinder contents, particularly the assay.

Enclosure 3 includes a table containing the subject cylinder assay values.

3. Provide a copy of the DOE Job Specifications referenced in our 8/8/08 email response. The NRC has not been able to obtain them.

See Enclosure 4.