



**Department of Energy**  
Washington, DC 20585

**MAR 25 2008**

Attn: Document Control Desk  
Director, Spent Fuel Project Office  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

In a letter dated November 19, 2007 (under Docket 71-9315 and TAC No. L24141), the NRC acknowledged that an amendment review for the ES-3100 Certificate of Compliance (CoC) has been scheduled. In a letter dated March 11, 2008, the Department of Energy (DOE) submitted a suggested mark-up of the ES-3100 CoC corresponding to the technical items listed in that amendment. It is now requested that one additional item be considered during the course of this amendment and that (if approved) the CoC Revision 8 also reflect this item.

The item concerns the text of CoC Section 5.(b)(1)(ii). In the last sentence, there is a phrase, "or come in contact with water." This phrase implies that incidental contact of uranium metal with water will increase the likelihood of pyrophoricity. The SER for Revision 5 of the CoC provides this language and references the Safety Analysis Report (SAR) as the basis. However, the SAR states on page 7-4, item (b)(iv), that metal with visible moisture should not be shipped. DOE acknowledges that metal which has been stored in water, or metal with visible moisture, should not be packaged and shipped in the ES-3100 container; however, brief contact with water and then being dried before shipping should be allowed. Additionally, DOE believes there is no difference between metal that had incidental contact with water and metal that did not have incidental contact with water, from the standpoint of pyrophoric tendencies.

In a conversation between Tom Thornton and the Y-12 National Security Complex pyrophoric analyst on March 18, 2008, the issue of incidental contact with water was discussed. Both the analyst and Mr. Thornton were in agreement that incidental contact with water is not a problem as long as the metal is dried before it is packaged. They agreed that uranium metal can have incidental contact with water, be dried, and then be packaged for shipment under the requirements for pyrophoric metal in the CoC.

On the basis of this information and experience at Y-12 as discussed below, DOE requests that the words "or come in contact with" in the last sentence of Section 5(b)(1)(ii) of the CoC, be replaced by "or is visibly wet at the time of packaging."

1105501



The resultant sentence would be, "Uranium metal or alloy which has been stored in water or is visibly wet at the time of packaging is not authorized to be shipped in this package."

Through years of experience with handling and machining uranium at Y-12, the incidental, short-duration, contact with water has not indicated any increase in the pyrophoric nature of small pieces of uranium metal (by the generation of surface hydrides). Several frequent operations at Y-12 put uranium metal in contact with water for short periods of time with no observation of hydride formation. When bulk uranium is machined to obtain a sample, water is used as a coolant. Bulk uranium also comes in contact with water during cleaning and pickling operations. In all cases, the incidental contact with water is typically on the order of a few minutes, and the uranium is dried or air dries immediately afterwards and before the metal is packaged.

In the case of sample machining, a piece of bulk uranium metal is placed inside a drill-press enclosure. The drill press uses a drill bit to cut the sample, while a recirculating water system cools the drill bit and metal. Typically, it requires only one drill hole to obtain the requisite amount of sample material in the form of a course machine turning or two. The piece of bulk uranium metal and the sample material are then re-weighed. It should be noted that excess water on the metal at this point would cause weighing errors, so operators make sure no moisture lingers on any surfaces immediately after machining.

The samples are then either cleaned and dried or pickled to remove any surface oxidation. For cleaning, the machine turnings are placed in a wire basket and submerged in a container of water, removed, submerged in a container of solvent and then placed on a shelf in a drying hood. The sample material, along with the bulk metal, is then packaged in a convenience can and backfilled with argon gas.

For pickling, the bulk metal and associated sample material in the form of one or more course machine turnings are pickled as a batch. The batch is loaded into a mesh bottom basket, submerged in warm nitric acid for a few minutes, rinsed in water, and then placed in a heated tray to dry. The dry material is re-weighed. The bulk metal and sample are dry when they are packaged in the convenience cans and backfilled with argon for shipment.

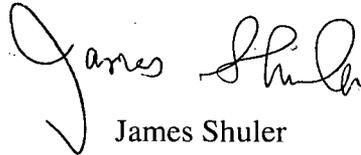
In these operations, the contact with water is brief and the metal is dry when being packaged for shipment. The brief contact does not cause hydride formation or increase the tendency for pyrophoricity. On this basis, DOE believes that uranium should be treated as any other pyrophoric item in the ES-3100 package [as defined in the CoC Section 5(b)(1)(ii)].

The original of this letter, is being sent to the Document Control Desk. In addition, one copy of this letter is being delivered to Kimberly J. Hardin, Project

Manager, Licensing Branch, Division of Spent Fuel Storage and Transportation,  
Office of Nuclear Material Safety and Safeguards.

If you have any questions, please contact me at (301) 903-5513.

Sincerely,

A handwritten signature in cursive script that reads "James Shuler". The signature is written in black ink and is positioned to the left of the typed name.

James Shuler  
Manager, Packaging Certification Program  
Office of Packaging and Transportation  
Office of Environmental Management

Enclosure

cc:

Kimberly J. Hardin, NRC  
Ken Sanders, NNSA NA-26  
Dana Willaford, DOE ORO  
Jeff Arbital, B&W Y-12  
Steve Sanders, B&W Y-12  
Walter North, B&W Y-12