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INTERNATIONAL URANIUM (USA) CORPORATION

June 30, 2006

VIA E-MAIL AND OVERNIGHT DELIVERY

Mr. Dane L. Finerfrock
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Division of Radiation Control
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Received
JUL 2006
Division of
Radiation Control

Re: Cell 4A Lining System Design Report, Response to DRC Request for Additional Information – Round 2 Interrogatory, Cell 4A Design.

Dear Mr. Finerfrock:

We are responding to your June 14, 2006 letter, requesting additional information following on the Cell 4A Lining System Design.

For ease of review, the Division of Radiation Control's ("DRC's") questions are repeated below in italics with International Uranium (USA) Corporation's ("IUSA's") responses following each question.

IUSA has previously responded to questions 2, 3, 4, 9, 11, 14, and 15.

1. *__Radiation Survey Report and Demonstration__*

IUSA has informally submitted revised cleanup and verification procedures to DRC and followed up with a teleconference on June 19, 2006, and a meeting at DRC offices on June 20th to work through the critical issues for final verification. IUSA and DRC have agreed on cleanup criteria of 5/15 pCi per gram Ra_{226} plus U_{NAT} of 30 pCi per gram in soil. IUSA will submit, under separate cover, justification for sampling frequency based on categories of low, medium and high possibilities for presence of residual contamination in the Cell 4A area.

5. *__Liner System Chemical Resistance__ – quantitative evaluation that addresses the long-term resistance of all the liner system components to the tailings cell solution, or the results of liner compatibility studies to demonstrate the long-term resistance of the liner materials.*

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Due to its excellent resistance to degradation by a wide range of chemicals, among other factors, HDPE geomembrane is the most widely used type of geomembrane. The reaction of geomembranes to chemicals has probably been studied more than any other liner degradation mechanism (Koerner et al., 1990). In accelerated chemical compatibility testing of geomembranes conducted in the laboratory and in field investigations of geomembranes that have been installed as long as several decades, polyethylene geomembranes have been found to have good resistance to a wide variety of chemicals, including aliphatic and aromatic hydrocarbons, chlorinated and oxygenated solvents, crude petroleum solvents, alcohols, organic and inorganic acids, heavy metals, and salts (Matrecon, Inc., 1988; Brady et al., 1994; Koerner, et. al., 1990; Koerner, 1999; Hsuan et al., 1991; Eith and Koerner, 1998; Koerner and Hsuan, 2002), which is why HDPE is commonly used for containing pure chemicals in laboratory bottles. Leachate containing a relatively large amount of organic solvent can lead to an increase in the rate of oxidation of an HDPE geomembrane (Koerner and Hsuan, 2002). However, this is not an issue for the White Mesa Mill, as synthetic organic chemicals are found at only trace amounts.

GCLs contain clay minerals that may react with certain chemicals. The clay minerals in GCLs are primarily montmorillonite, a mineral that has a high swelling capacity, which provides for chemical reactivity and attenuation. A number of researchers have addressed the issue of GCL compatibility with leachate and leachate constituents (Shan and Daniel, 1991; Rad et al., 1994; Ruhl and Daniel, 1997; Petrov et al., 1997; Thiel and Criley, 2005). They found that the hydraulic conductivity of a GCL is highly dependent on the hydrating liquid and the applied effective stress during permeation. GCLs that are hydrated with water and subjected to confining stress do not exhibit large increases in hydraulic conductivity when permeated with organic constituents, unless the permeating solution is a pure organic liquid with a low dielectric constant (e.g., acetone).

6. *<u>Additional GCL Data</u> – that the GCL will resist damage/degradation due to exposure to the leachate and freeze/thaw action. Include data on the hydration of the GCL and the potential impact of freeze/thaw on the GCL in the exposed portion of the liner system.*

The performance of the bentonite clay component of the GCL is derived from the ability of the bentonite to hydrate (absorb water). Bentonite clays have been shown to absorb water from adjacent soils with moisture contents as low as 1% (Daniel, et. al. 1992). Based on the construction records for the clay liner and dike construction (Appendix D of Design Report), the average dike soil moisture content was approximately 13.0% and the average clay liner soil moisture content was approximately 18.6%. As illustrated in Attachment A (Daniel 1992), a soil with a moisture content of 10% will allow the bentonite component of the GCL to reach a moisture content of approximately 140% at approximately 15 days. After