

September 3, 2014

Mr. Andrew Persinko, Deputy Director
Document Control Desk
Decommissioning & Uranium Recovery Licensing Directorate
Division of Waste Management & Environmental Protection
Office of Federal & State Materials & Environmental Management Programs
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Mail Stop T7-E18
Rockville, Maryland 20852-2738

Re: License Amendment Request – Re-drying Honeymoon Dried Yellowcake – Response to NRC
information request of August 29, 2014.
Uranium One USA, Inc.
Materials License No. SUA-1341
Docket No. 40-8502 – TAC No. J00721

Dear Mr. Persinko:

Please find attached information and commitments by Uranium One USA, Inc. to address two additional items (emailed from R. Linton to J. Winter on August 29, 2014) identified during management concurrence for the License Amendment request to SUA – 1341 to re-dry the Honeymoon yellowcake at the Irigaray facility. Uranium One believes the attached information and commitments addresses these items and requests a quick review of the information and final approval of the License Amendment. If you have any questions regarding this information please do not hesitate to contact me at 307-233-6331 or via email at jon.winter@uranium1.com.

Sincerely,



Jon Winter
Director, Health, Safety and Environment
Uranium One Americas

Enclosures: Response to August 29, 2014 email from R. Linton to J. Winter.
Page replacement (1) for the 2013 License Renewal Application, page 5-31a

cc: Ron Linton w/enclosures
Donna Wichers w/enclosures

Uranium One response to R. Linton email of August 29, 2014

NRC Question

1. U1 has proposed the classification of redried Honeymoon YC as translocation (i.e., "solubility") class Y (refer to the June 28, 2014 RAI-4(a) response) for radiation protection purposes. Class Y classification is conservative for the purpose stated. However, Uranium One has not addressed 10 CFR 20.1201(e) for soluble uranium limits.

Uranium One should commit to comply with the requirements in 10 CFR 20.1201(e).

Uranium One response:

In addition to the commitment to use the Classifications identified in the revised table 5.6 of the License Renewal Application (June RAI responses replacement pages), Uranium One will also commit to limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity as per 10 CFR 20.1201(e). An additional line stating the above commitment has been added to the License Renewal Application page 5-31a and is attached as a page replacement.

NRC Question

2. Uranium One has reported that the Honeymoon yellowcake contains organic material that needs to be reduced/removed prior to shipping to a conversion facility. Yellowcake drums will be opened and handled at the drum tipping station in an enclosed area. Uranium One has not supplied an analysis on the possibility of accumulation of organic vapors at the drum tipping station and potential health and safety impacts, including respiratory or combustion concerns. Since the possibility of organic vapors were not discussed, the NRC staff cannot make a determination about this concern.

Uranium One should provide an analysis of effects, if any, from organic vapors that may emanate from organic material contained within the Honeymoon dried yellowcake in the drum tipping location. This analysis should discuss mitigation measures Uranium One may/will use to address the potential health and safety effects from organics in the yellowcake.

Uranium One response:

A great deal of effort has been expended to insure that the exposures and hazards to our employees is minimized or eliminated during the process of re-drying the Honeymoon yellowcake. The equipment to transfer the yellowcake from the drums to the dryer was specifically designed to operate as close to completely dust free as possible. In addition to the unique specification of this equipment, the drum tripper work area has been enclosed to avoid any potential yellowcake coming in contact with other workers in the area. The employees working in the enclosure room will be equipped with the same level of protection (Personal Protective Equipment [PPE] including full-face respirator or positive air pressure hood respirator [PAPR], tyvek suits, rubber gloves and boots) as when working in the drypack yellowcake drumming room. The enclosure room will operate under a negative draw created by a HEPA filtration system with the capability of providing roughly 1.3 air exchange's per minute (78 air exchanges per hour).

The NRC has not allowed Uranium One to conduct limited scale testing of the newly installed equipment to re-dry the Honeymoon yellowcake prior to the issuance of a License Amendment, so a specific analysis of the potential for accumulation of any organic vapors that may emanate from the previously dried yellowcake cannot be completed. However, Uranium One acknowledges NRC's concerns and offers the following information on the potential effects from organic vapors and the protective measures that will be taken during processing of the Honeymoon yellowcake.

Organic Analysis

As previously described in Uranium One's March 27, 2014 submittal to NRC (Supplemental Data for Technical and Impact Analysis for License Amendment Request, Re-drying Honeymoon Dried Yellowcake), the solvent extraction process used at Honeymoon has been utilized extensively throughout the mining industry for uranium and copper production for more than 30 years. The extractant organics included DEHPA (di-2-ethyl-hexyl-phosphoric acid), Alamine-336, TBP (tri-butyl-phosphonate) and Iso-Decanol dissolved in a high flash-point low molecular weight kerosene (solvent). The three main phases of the Honeymoon process were: solvent extraction, solvent stripping and precipitation/drying. The solvent stripping or scrubbing circuit is intended to remove the majority of the extractant and solvents present in the uranium loaded solution, but a residual amount of solvent and extractant can carry through to the uranium precipitation and drying circuit. This is what occurred with the Honeymoon yellowcake.

Gas chromatography/mass spectrometry analysis of the Honeymoon product was performed by Cameco in 2014. The results identified low mass organics such as hexanol and hexanone that were decomposition products of the organics used in the Honeymoon process. Heavy mass organics such as TBP were also noted. Later in 2014, InterMountain Laboratories (IML) conducted a carbon fingerprint analysis on a sample of Honeymoon yellowcake. The IML results showed that the organic compounds mostly fall within the diesel range organics window of C10 to C32. Compounds that fall within the C8 to C10 window were also observed.

In summary, based on the available information, Uranium One does not anticipate that organic vapors from the Honeymoon yellowcake will be problematic inside the enclosure where the drums will be opened. The nature of the small amount of residual organic in the Honeymoon yellowcake is typical of uranium solvent extraction operations, but occurs at much lower concentrations than used in the milling process. NRC is very aware of conventional solvent extraction processes at uranium mills and the results of monitoring programs for employee safety at those operations. For example, specialized PPE for organic vapors is not required for employees within the solvent extraction plants where vats are open to the atmosphere. Respiratory and splash protection is used only when working directly on the vats. LEL levels may be taken weekly, but explosive gases have never been problematic. Employees may wear organic vapor badges (colorimetric readings) on a periodic basis primarily to validate concentrations are not near TLVs. Four to five badges may be worn by certain employees during a given quarter. Proper ventilation within the solvent extraction plant (typically 6 to 10 air exchanges per hour) is the primary method used to control organic vapors.

Mitigation Measures to be Taken

Although Uranium One does not anticipate organic vapors to be problematic when opening the drums of Honeymoon yellowcake inside the enclosure, the following protective measures will be taken to ensure employee safety:

- Respirators - As stated above, all employees that work in the enclosure room will be required to utilize either a full face respirator or a PAPR along with other PPE. The respirators are equipped with P100 filter cartridges that remove 99.97% of all air particulates, and are approved for use in environments containing organic vapors and/or acid fumes. The P100 cartridges are equipped with activated carbon or other sorbent materials which, due to their large surface areas, allow organic gases to become absorbed thus protecting the employee from these potential hazards.
- Enhanced Ventilation– As previously discussed, the enclosure room where the yellowcake is transferred from the drums to the conveyance system is equipped with a ventilation system that creates a negative draw on the enclosure. The system is capable of removing roughly 1.3 air exchanges per minute within the enclosure, or 78 air exchanges per hour. This, in itself, will insure that there is no accumulation or buildup of organic gases or vapors within the enclosure, should they be released from the drums of yellowcake. Additionally, the ventilation system is equipped with a HEPA filter that is 99.97% effective at removing fine particulates such as yellowcake dust, which is the targeted constituent within this area. The HEPA filter itself does not filter out gases or vapors, but Uranium One will add an activated charcoal filter on the unit prior to the HEPA filter. The activated filter is efficient at absorbing a number of different organic gases. This will insure that air exiting the enclosure will have particulates and organic gas (if present) absorbed prior to entering the outside air.
- Gas Monitoring – As a further response to the NRC concern for the accumulation of organic vapors and potential combustion, Uranium One will monitor combustible gases (Lower Explosive Limit [LEL]) within the enclosure. This will be accomplished by placing a multi-gas monitor probe within the enclosure with the monitor and visual readout placed outside the enclosure such that the operator can check the LEL reading prior to entering the enclosure.

In addition to combustible gases, the multi-gas monitor also measures the concentrations of other gases including oxygen (O₂), hydrogen sulfide (H₂S) and carbon monoxide (CO). Hydrogen sulfide gas will not be present in the yellowcake. As CO is a byproduct of organic degeneration, Uranium One will place a CO detector within the enclosure at a location where operators may visually observe CO concentrations. We do not expect CO to be an issue but monitoring will insure employee safety.

If a buildup of any gas that could be harmful to human health is observed, including combustible gases, the enclosure will be opened to the plant atmosphere to allow more air to enter, circulate and dilute the levels of that gas. Employees will not re-enter the enclosure until gas levels are normal.

occurring prior to conception. The intake for the declared pregnant woman will be determined as discussed in Sections 5.7.4.1 and 5.7.4.2.

Honeymoon Yellowcake Solubility Classifications – The Honeymoon dryer was operated at 150°C (302°F), so that the batch or charge reached a maximum temperature of 90°C (194°F). The color of the Honeymoon material is yellow which is consistent with a low fired product. Regulatory Guide 8.30 Section 2.2 states in part: "For compliance purposes, yellowcake dried at 400°C (753°F) and above should be classified as insoluble". Operating temperatures of the Honeymoon Dryer are consistent with other rotary dryer operations that classify their yellowcake as Class D or soluble material.

Material feed into the drum tipping station will be classified as Class D or soluble for occupational exposure purposes. This is consistent with the classification at Irigaray for all process areas prior to the dryer.

Because Uranium One does not propose to run solubility classification testing on the Honeymoon yellowcake a conservative approach has been taken to classify all emissions once the material is feed into the dryer as Class Y or insoluble for the Drum Packaging Room, Furnace Areas, YC Control Room Area and YC Stack Discharge Emissions as depicted in Table 3.6.

The current classification for Willow Creek produced yellowcake is 85% Class D and 15% Class W which is based on solubility testing conducted at a drying temperature of 538°C (1000°F) and 649°C (1200°F) respectively.

In addition to the commitment to use the Classifications identified in Table 5.6, Uranium One will also commit to limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity as per 10 CFR 20.1201(e).