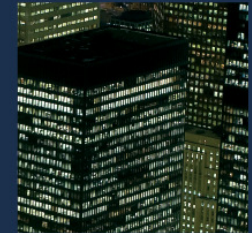


NRC License Renewal in the 21st Century

Josh Leftwich,
Director of Radiation Safety and Licensing,
Cameco Resources

Double



Safe, clean, reliable.
Doubling uranium production by 2018.



Introduction

- **Background**

- Initially licensed in 1989 renewed in 1997
- License Renewal Application was submitted in November 2007
 - ◆ Entire 550pg document was submitted as a renewal
- Received first round of NRC comments - January 2009
- Cameco Responds to the NRC comments - May 2009
- NRC identifies open issues when drafting the Safety Evaluation Report - June 2010
- Cameco Responds to open issues - September 2010
- Issues still being reviewed, with plan to NRC forth coming



NRC Comments

- **Subject of First round of Comments/RAIs**
 - Meteorological Data
 - Updated Baseline information
 - Management Controls
 - Radiation Protection Program
 - ◆ Justification for 100% Class D solubility for yellowcake
 - ◆ Justification for gross alpha counting for internal dose
 - ◆ Contamination control
 - ◆ Airborne Effluent Monitoring



NRC Open Issues

**NRC identifies “open issues” in drafting Safety Evaluation Report
June 2010**

- **Radiation protection**
- **Contamination control**
- **Airborne Effluent**

► NRC Open Issues

- **Radiation Protection - Airborne Contamination**

“.....it did not provide sufficient information to justify the use of 100 percent Class D yellowcake. Please provide technical justification for assuming 100 percent Class D inhalation class for the yellowcake produced at the Crow Butte Project. In addition, if the proposed inhalation class changes, provide an appropriate revised lower limit of detection for measuring uranium in air.”

- **Cameco Response**

- should be assigned as 100% Class D
- the yellowcake is considered soluble and meets the definition of “low fired yellowcake”. The definition of “low fired yellowcake” used in Regulatory Guide 8.22 is defined in NUREG 0874
- no mixed DAC

► NRC Open Issues

- **Radiation Protection - Airborne Contamination**

“....it did not provide sufficient information to justify the use of gross alpha counting for determining occupational internal dose from sources other than radon and its daughters. This method does not account for potential radiation from other alpha emitters, as well as the potential for the presence of beta-gamma emitting daughters. Please provide technical justification for relying on gross alpha counting alone for determining occupational internal dose from sources other than radon and its daughters.”

- **Cameco Response**

- Sampling from Smith-Ranch Highland facility showed that for almost all progeny measurements, results were in fact at or below the reported minimum limit of detection (MDC) by the laboratory.
- Isotopic analysis of yellowcake from the Smith-Ranch and Crow Butte Highland facility showed the yellow cake is >99.9% uranium. that for almost all progeny measurements, results were in fact at or below the reported minimum limit of detection (MDC) by the laboratory.



► NRC Open Issues

- **Cameco Response cont'd**

- To address the beta emitter in-growth, the short-lived beta emitters Th-234 and Pa-234 from the freshly extracted uranium product takes approximately 4 months to reach equilibrium.
 - ◆ Accordingly, very little, if any Th-234 or Pa-234 would be expected to be present in the active processing areas at the Crow Butte Facility.
 - ◆ DACs for these two nuclides are several orders of magnitude higher than for U natural. Controlling to the DAC for U natural ensures any contribution in the mixture from these two beta emitters will meet the 10% exclusion allowance in 10 CFR §20.1204(g).



► NRC Open Issues

- **Contamination control**

“Please address how the potential for the presence of beta-gamma emitters are addressed in CBR’s contamination control program”.

- **Cameco Response**

–Regulatory Guide 8.30 recommends that beta surveys of operations that involve direct handling of large quantities of aged yellowcake be performed to ensure that extremity and skin exposures are within limits.

–No mechanisms by which the beta emitters Thorium-234 or Proactinium-234 can be separated from their alpha emitting uranium parents. For that reason there cannot be contamination in the absence of detectable alpha.



▶ NRC Open Issues

- **Contamination Control cont'd**

“Please address how the potential for the presence of beta-gamma emitters are addressed in CBR’s program for releasing items for unrestricted use”.

- **Cameco Response**

–All equipment and materials released from the Restricted Area are surveyed for alpha contamination and for beta gamma contamination. The release limits for beta gamma contamination are 0.2 mrad average and 1.0 mrad maximum at 1 cm as required by “Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material” dated May 1987 (License Condition 9.8). A Ludlum Model 3 survey meter with a Ludlum 44-38 probe (or equivalent) will be used



▶ NRC Open Issues

- Airborne Effluent

“Please specify radiological monitoring that CBR will perform during operations to confirm its licensing basis and the validity of calculations used for estimating public and occupational exposures for all aspects of its operations. Although calculations are allowed in meeting the requirements of 10 CFR 1301/1302, the NRC staff expects that CBR will perform monitoring to such an extent as to be able to confirm its licensing basis and the validity of calculations used for estimating effluent concentrations and calculating dose for compliance with 20.1301/1302. This concept applies to point sources as well as diffuse sources such as radon released in the wellfield. Compliance with 10 CFR 20.1501 in regards to occupational dose should be approached in the same manner. Monitoring proposed by CBR does not appear to take into account all sources of potential exposure to workers and members of the public. Examples include effluent discharged from the facility, header houses, and wellfields. More specifically, it is not clear that occupational exposures due to radon and its progeny are considered for all aspects of its operations throughout the permit area. Please provide a more detailed description of CBR’s radiological monitoring program that can be used to confirm its licensing basis and the validity of calculations used for estimating public and occupational exposures for all aspects of its operations.”

► NRC Open Issues

- **Airborne Effluent, Public Dose – Cameco Response**
 - Mildos Simulation gave a maximum exposure of nearest receptor (public) the value of TEDE of 31.7 mrem/year, the actual value of TEDE of 17.00 mrem/year
 - Similar to the MILDOS Area simulation, the monitoring and resulting Dose to Public TEDE includes the dose from uranium, radium-226, lead-210, radon-222 and gamma from the diverse, albeit limited sources in and around the plant, and provides consideration of radon and its progeny .

▶ Open Issues cont'd

- **Airborne Effluent, Occupational Dose – Cameco Response**
 - The MILDOS Area simulation considers radon and its progeny. reveals a cluster of receptors located in wellfield but with minimal influence from plant emissions. Taking the worst-case of these TEDEs, and multiplying by 2000 hours/8760 hours, gives 1.7 mrem/year worker exposure from wellfield sources. It should be noted that this value includes exposure from vegetation and meat consumption that would not occur for a worker.
 - Taking the worst-case of these TEDEs, and multiplying by 2000 hours/8760 hours, gives 7.2 mrem/year worker exposure from wellfield and plant sources.

▶ Open Issues cont'd

- **Airborne Effluent, Occupational Dose**

“..it did not provide sufficient information to demonstrate compliance with 10 CFR 20.1301(b) and 10 CFR 20.1302(b). CBR appeared to use arbitrary downwind receptor points for its calculations. In terms of public dose, it is not clear that CBR determined who or what group receives the highest exposure consistent with NUREG-1736. Please provide an analysis of public dose consistent with open issue G(1) above and NUREG-1736.”

- **Cameco Response**

–CBR compliance with 10 CFR 20.1301(b) and 10 CFR 20.1302(b) have been routinely evaluated by NRC through review and issuance of the current license and review of the Semiannual Radiological Effluent and Environmental Monitoring Reports. Similarly, the downwind receptor points were reviewed and approved by the NRC and determined appropriate

► **Where are we today?**

- **Responses to “open issues” still not satisfactory**
- **Still have “Open issues” that are a concern with NRC**
- **NRC intent to begin preparing SER and draft license first quarter 2011**
- **Told that remaining open issues will appear and be resolved as new license conditions**



Conclusion

- **Proposed to perform the testing under its existing programs that will address NRC's data requests**
- **Cameco believes that the responses to the issues have been adequately addressed**
- **Historic performance of the operations have not demonstrated any new risks that would drive these concerns.**

