From: Miller, Debra
Sent: Wednesday, March 24, 2010 10:42 AM
To: arm.legal@gmail.com; dugan@wavecom.net; sarah@uraniumwatch.org; lteahon@crowbutte.net
Cc: Burrows, Ronald
Subject: Emailing: L. Teahon ltr.doc
Attachments: L. Teahon ltr.doc

The attached letter to L. Teahon re: Summary of March 8, 2010 Teleconference Regarding Open Issues, Crow Butte Resources, was dated and dispatched on March 24, 2010. It will be publicly available in ADAMS on April 1, 2010.

A copy of this letter should be forwarded to the attendees for Crow Butte:

Linda Gersey
Rhonda Grantham
Jim Stokey
Lee Snowhite
Joe Brister
Tom Young

Received: from HQCLSTR02.nrc.gov ([148.184.44.77]) by OWMS01.nrc.gov
([148.184.100.43]) with mapi; Wed, 24 Mar 2010 10:41:32 -0400
Content-Type: application/ms-tnef; name="winmail.dat"
Content-Transfer-Encoding: binary
From: "Miller, Debra" <Debra.Miller@nrc.gov>
To: "arm.legal@gmail.com" <arm.legal@gmail.com>, "dugan@wavecom.net"
<dugan@wavecom.net>, "sarah@uraniumwatch.org" <sarah@uraniumwatch.org>,
"lteahon@crowbutte.net" <lteahon@crowbutte.net>
CC: "Burrows, Ronald" <Ronald.Burrows@nrc.gov>
Date: Wed, 24 Mar 2010 10:41:33 -0400
Subject: Emailing: L. Teahon ltr.doc
Thread-Topic: Emailing: L. Teahon ltr.doc
Thread-Index: AcrLYBkPb0YoYJScS++TMaRNhC2GpA==
Message-ID:
<9C2386A0C0BC584684916F7A0482B6CA0E51F5D8C8@HQCLSTR02.nrc.gov>
Accept-Language: en-US
Content-Language: en-US
X-MS-Has-Attach: yes
X-MS-Exchange-Organization-SCL: -1
X-MS-TNEF-Correlator:
<9C2386A0C0BC584684916F7A0482B6CA0E51F5D8C8@HQCLSTR02.nrc.gov>
MIME-Version: 1.0

March 24, 2010

Mr. Larry Teahon
Manager of Environmental
Health and Safety
Crow Butte Resources, Inc.
86 Crow Butte Road
P.O. Box 169
Crawford, NE 69339-0169

SUBJECT: SUMMARY OF MARCH 8, 2010, TELECONFERENCE REGARDING OPEN ISSUES, CROW BUTTE RESOURCES, INC., NORTH TREND EXPANSION AREA LICENSE AMENDMENT (TAC J00523)

Dear Mr. Teahon:

On March 8, 2010, U.S. Nuclear Regulatory Commission (NRC) staff and representatives of Crow Butte Resources, Inc. (CBR) held a teleconference to discuss open issues associated with the Safety Evaluation Report (SER) for the North Trend Expansion Area (NTEA) license amendment. The purpose of this teleconference was to explain the open issues to ensure that CBR understood the information being requested by the NRC staff. The minutes of this meeting are enclosed, and contain the open issues, an expanded explanation, and a brief synopsis of any response by CBR.

Within 30 days of receipt of this letter, please either provide the information identified in the meeting summary or inform us of the date you expect to provide the information. At this point in the review process, NRC staff has presented all open issues to CBR regarding the NTEA license amendment SER. The staff previously provided written discussions of open issues on November 12, 2009. The staff is therefore curtailing any further work until CBR responds to the open issues. If you have any questions, please contact me at 301-415-6443 or, by email, at ronald.burrows@nrc.gov.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

Sincerely,

/RA/

Ronald A. Burrows, Project Manager
Uranium Recovery Licensing Branch
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No. 40-8943

Enclosure: Meeting Summary

cc: Paul Goranson, CBR
Michael Linder, NDE
Meeting Attendees

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

Sincerely,

Ronald A. Burrows, Project Manager
Uranium Recovery Licensing Branch
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No. 40-8943

Enclosure: Meeting Summary

cc: Paul Goranson, CBR
Michael Linder, NDEQ
Meeting Attendees

DISTRIBUTION: JWhitten, RIV KMcConnell DOrlando BVonTill

ML100680217

Office	DWMEP	DWMEP	DWMEP	DWMEP	DWMEP	DWMEP
Name	RBurrows	TOxenberg	TLancaster	BGarrett	SCohen	RBurrows
Date	3/10 /10	3/10 /10	3/10/10	3/23/10	3/22 /10	3/24/10

OFFICIAL RECORD COPY

MEETING SUMMARY

DATE: March 8, 2010

TIME: 10:00 a.m. – 4:00 p.m.

PLACE: U.S. Nuclear Regulatory Commission (NRC)
Two White Flint North
Room T8C1
Rockville, Maryland

PURPOSE: To discuss issues relating to Crow Butte Resources, Inc.'s (CBR's) North Trend Expansion Area (NTEA) in situ recovery (ISR) license amendment.

ATTENDEES: SEE ATTACHED ATTENDEE LIST

BACKGROUND:

The purpose of this meeting was to discuss issues relating to CBR's NTEA ISR license amendment. The meeting was publicly noticed on the NRC webpage on February 24, 2010.

DISCUSSION:

The teleconference started at 10:00 a.m. Eastern Time in Room T8C1. An opening statement was presented by Mr. Ronald A. Burrows, NRC. The meeting continued with a discussion of issues relating to CBR's NTEA ISR license amendment. Attached is a detailed summary of this discussion.

ACTIONS:

For individual actions associated with this teleconference, see the attached summary.

ATTACHMENTS:

1. Attendee List
2. Meeting Agenda
3. NRC and Crow Butte Resources, Inc.
   Detailed Discussion Summary

Enclosure

MEETING ATTENDEES

March 8, 2010

Teleconference to Discuss Issues Relating to North Trend Expansion Area ISR License Amendment

NAME	AFFLIATION	PHONE NUMBER	EMAIL
Ron Burrows	USNRC	301-415-6443	Ronald.Burrows@nrc.gov
Stephen J. Cohen	USNRC	301-415-7182	Stephen.Cohen@nrc.gov
Tom Lancaster	USNRC	301-415-6563	Thomas.Lancaster@nrc.gov
Tanya Oxenberg	USNRC	301-415-6142	Tanya.Oxenberg@nrc.gov
John Saxton	USNRC	301-415-0697	John.Saxton@nrc.gov
Linda Gersey (via phone)	USNRC		
Larry Teahon (via phone)	Cameco Resources		
Rhonda Grantham (via phone)	Cameco Resources		
Jim Stokey (via phone	Cameco Resources		
Lee Snowhite (via phone	Cameco Resources		
Joe Brister (via phone)	Cameco Resources		
Tom Young (via phone)	Cameco Resources		
Grace Dugan (via phone			
Sarah Fields (via phone)	Uranium Watch		
David Frankel (via phone)			

Attachment 1

MEETING AGENDA

Crow Butte Resources, Inc. / North Trend Expansion Area
March 8, 2010

MEETING PURPOSE: Teleconference to Discuss Issues Relating to North Trend Expansion Area ISR License Amendment.

MEETING PROCESS:

Time	Topic	Lead
10:00 a.m.	Introductions	All
	Discussion of Process and Restoration Issues (list of issues attached)	All
	Break for lunch	All
	Discussion of Radiological Issues (partial list of issues attached)	All
	Discussion of Miscellaneous Issues (list of issues attached)	All
	Additional Issues as time allows (if needed)	All
	Summary of Action Items	Moderator
	Public Comment/Questions	Moderator
4:00 p.m.	Adjourn	

Attachment 2

Process and Restoration Issues
Crow Butte Resources, Inc. / North Trend Expansion Area
March 8, 2010

Open Issues

1. Confirmation of backup disposal capacity.
2. Confirm that a minimum of six sample locations will be used to establish baseline values for a wellfield.
3. Reporting for excursion corrective actions.
4. Confirm that the liquid disposal capacity is adequate.
5. Justification for not including the complete list of parameters from NUREG-1569 in restoration plan.
6. Confirm that any proposed ACL must be approved by NRC and not through the SERP process.
7. Commit to hydraulic control from start of production to stabilization.
8. Confirm that the stabilization period will be sufficient to determine restoration success.
9. Include corrective actions during stabilization.
10. Provide techniques for statistical trend analysis of stability data.
11. Correct pore volume calculations; provide flare factors.
12. Comment on the applicability of restoration analogues to the proposed larger wellfields.
13. Document sampling procedures/analysis to establish that restoration goals are met.
14. Acknowledge that NRC will not use the restoration goal of average plus two standard deviations.

Administrative Items

1. Incorrect flow arrow direction on Figure 6.1-1.
2. Carbon dioxide in the lixiviant composition.
3. Calculation of the UCL.

Radiological Issues
Crow Butte Resources, Inc. / North Trend Expansion Area
March 8, 2010

Open Issues:

1. Justification for radon release rates from the wellfield, resin transfer and venting, and plant vent.

2. Please provide details on how radon progeny will be factored into determining compliance with 10 CFR 20.1301/1302 during operations.

3. CBR has not addressed the potential for beta exposure and surveys for beta radioactivity resulting from spills or maintenance activities.

4. CBR has not addressed the potential for beta exposure and surveys for beta radioactivity resulting from spills or maintenance activities.

5. CBR has not provided technical basis for using Class D for natural U as an inhalation class.

Confirmatory Items

1. Is the LLD of U in air 5E-11 (0.00000000005) or 8.35E-5?

2. Verify that the As Low As Is Reasonably Achievable ALARA program includes a commitment to minimize exposures to the public (e.g. ALARA goals).

Administrative Items

1. Use consistent notation (5×10^{-11} or 5E-11 (e.g. 0.00000000005) vs. $5e^{-11}$ (e.g. 8.35E-5))

2. Compliance with §20.1208 for declared pregnant women.

Miscellaneous Issues
Crow Butte Resources, Inc. / North Trend Expansion Area
March 8, 2010

Quality Assurance - Non-radiological Monitoring

Open Issues:

1. Confirm non-radiological quality assurance program.
2. Document the organizational structure and responsibilities of managerial and operational staff for the non-radiological QA/QC program.
3. Confirm specifications of personnel qualifications.
4. Document written procedures for the non-radiological monitoring program activities.
5. Document records management.
6. Document quality control program.
7. Document non-radiological data verification and validation.
8. Document QA/QC program assessments and audits.
9. Document QA/QC preventive and corrective actions.

Management Programs

Open Issues:

1. Delegation of survey responsibilities to designated personnel.
2. Weekly inspections.

Confirmatory Items:

1. Health Physics training for designated personnel.

Accidents

Open Issues:

1. Actions and equipment to stop major tank or pipe failure.
2. Procedures in the event of wildfire encroachment.

NRC and Crow Butte Resources Inc.'s Detailed Discussion Summary

Process and Restoration

I. Open Issues

1. Confirmation of backup disposal capacity.

   Background: In Section 3.1.5 of the Technical Report (TR), CBR stated that the production bleed waste stream will be managed by a combination of evaporation pond and deep disposal well injection, both of which will be constructed at the North Trend Satellite Plant. However, in Section 4.2.1.1.2 of the TR, CBR stated that pond design and specifications are currently not available and will be submitted to the NRC in a license amendment application prior to pond construction. Based on this statement, NRC staff is uncertain whether ponds or a backup disposal capacity will be operational at the initiation of the production.

   CBR stated that the exact number and capacity of the ponds will depend upon the results of the determination of the performance of the deep disposal well as far as waste water disposal rate. In addition, final pond design cannot be completed until completion of the site geotechnical assessment, which is currently not available.

   Needed: To backup deep well disposal, confirm that additional liquid disposal capacity (e.g., evaporation ponds) will be operational at the commencement of production.

   Response: We previously discussed this issue, and they understand the current license has conditions. The review of the capacity would be addressed when we get the amendment. The staff acknowledges that the response resolves this open issue.

2. Confirm that a minimum of six samples will be used to establish baseline values for a wellfield.

   Background: In Section 6.1.3.1 of the TR, CBR indicated that baseline restoration wells in a mine unit will be minimally one well per four acres. Section 5.7.8.3 of NUREG-1569 guidance states that an acceptable set should include at least one well per acre. However, for large wellfields, it may not be practical to sample one well per acre but the sampling density should be sufficient to provide an adequate statistical population. As a general guidance, at least six samples are required to achieve a specific degree of confidence and in no case should the sampling density be less than one well per four acres. The staff is uncertain about the number of samples to be collected for the baseline restoration well network for a mine unit because CBR did not provide that information directly.

Needed: CBR needs to confirm that the proposed set of samples will provide statistically significant data.

Response: CBR agreed with a minimum of six wells and will correct the application.

3. Reporting of excursion corrective actions.

   Consistent with Section 5.7.8.3 of NUREG-1569, if wells are still on excursion status when an excursion corrective action report is submitted, the report must also contain a schedule for submittal of future reports, which describe the excursion event, corrective actions taken, and results obtained. In the case of a vertical excursion, the report must contain a projected date when characterization of the extent of the vertical excursion would be completed. CBR has not provided sufficient information consistent with the above-referenced guidance.

   Needed: CBR should commit to the above-referenced reporting for excursion corrective actions consistent with NUREG-1569, Section 5.7.8.3, or provide justification for an alternate proposal.

   Response: CBR agreed to add that language in the application.

4. Confirm that the liquid disposal capacity is adequate.

   Background: CBR provided conflicting or lacking information on rates of liquid waste effluent generated during restoration and the corresponding disposal capacity. CBR estimated that the maximum bleed during operations was 1.5 percent of the proposed production capacity of 4,500 gallons per minute (gpm) yielding 67.5 gpm of fluids that may require disposal. In Section 4 of the application, CBR indicated that the brine from the treatment steps will require disposal but that the only consumptive use would be the bleed. On page 3.1-20 of the application, CBR used an average rate of 50 gpm to determine the long-term drawdown. This value is lower than the bleed during operations and likely does not include consumptive use during restoration. CBR did not provide rates attributed to restoration. Consequently, staff cannot determine whether or not the liquid disposal capacity is sufficient for waste generated during restoration treatment in accordance with guidance in NUREG-1569, Section 6.1.2.

   Needed: CBR needs to provide staff with estimates of the liquid effluent rates during restoration.

   Response: CBR agreed to provide the information.

5. Justification for not including the complete list of parameters from NUREG-1569 in restoration plan.

Background: CBR proposed a list of parameters to be included in the baseline water quality analyses based on NDEQ restoration standards. The list is fairly comprehensive but does not include all typical baseline indicators listed in NUREG-1569. Staff notes that sufficient justification is not provided for the absence of boron, chromium, alkalinity, and specific conductivity. Staff is aware that the proposed list is derived from that used at the existing facility. However, CBR did not provide a justification for the reduced list.

Needed: CBR should provide a justification for not including the selected parameters in the baseline water quality analyses.

Response: Samples for the parameters were collected at the existing site. CBR can add it to the NTEA list.

6. Acknowledge any proposed ACL must be approved by NRC and not through the SERP process.

Background: In Section 6.1.3.2, CBR included an analysis for determining the NDEQ groundwater restoration standard for a mine unit. Furthermore, CBR stated that the SERP process will be used to establish restoration standards. The staff notes that the NDEQ analysis is not a substitute for an analysis of an ACL. The analysis for an ACL must consider factors listed under Criterion 5B(6) of Appendix A, 10 CFR Part 40. Furthermore, establishment of an ACL cannot be accomplished through the SERP process, but requires consideration and approval by NRC in accordance with Criterion 5B(5)(c) of Appendix A, 10 CFR Part 40.

Needed: CBR needs to acknowledge that secondary restoration goals will be an ACL and that NRC needs to approve any ACL.

Response: The SERP reference in this section refers to initial set up wellfield and the initial limits, not for any alternate standards. The staff acknowledges that the response resolves this open issue.

7. Commit to hydraulic control from start of production to stabilization.

Background: CBR committed to maintaining a hydrologic bleed during extraction and until restoration is complete to prevent the lateral migration of lixiviant. The intent is consistent with staff's goal, but to clarify the understanding, the staff requests that CBR includes a statement that the hydraulic control will be maintained should the mine unit be placed on standby status (no production) after the first injection of lixiviant until stabilization and that the control will be sufficient to maintain an inward gradient at all times.

Needed: CBR needs to include a statement in the TR that the hydraulic control will be maintained throughout the life of the wellfield.

Response: CBR asked if that is how it's stated in the application. After re-reading the passage, the staff stated that the language should include the term "standby." CBR agreed to add the language.

8. Confirm that the stabilization period will be sufficient to determine restoration success.

   Background: CBR stated that the existing facility's Class III permit requires a minimum 6-month period for stability monitoring to demonstrate the success of restoration activities. Based on historical data, CBR noted that the 6 months may not be sufficient time to assure stability for all monitored constituents and that the monitoring may continue beyond the proposed 6 months. CBR stated that the stability monitoring will conclude when the restoration goals on a mine unit average for the monitored constituents are met and there is an absence of significant increasing trends. At the end of the stabilization process, a request will be made to NDEQ for acceptance. NDEQ would accept the restoration, extend the stabilization period or require further restoration. CBR proposed monthly sampling for 6 months for all restoration parameters at the designated restoration wells and any monitoring wells which had been on excursion status during operations.

   NUREG-1569 does not provide specific guidance on the requirements for a stability monitoring program. NUREG-1569 does state that the purpose of a stability monitoring program is to ensure that chemical species of concern do not increase in concentration subsequent to restoration and that CBR should specify the length of time that stability monitoring will be conducted, the number of wells to be monitored, the chemical indicators to be monitored, and the monitoring frequency. CBR has provided the latter information, but NUREG-1569 indicates that staff's review should evaluate the ability of the post-reclamation stability monitoring program to verify successful restoration.

   The staff's evaluation indicates that the information provided is not sufficient. While the proposed monthly sampling may provide an adequate number of samples for a statistically significant trend analysis, the proposed length of time for the stability monitoring may not be sufficient as noted by CBR. Based on staff's review of historical stability monitoring data for various ISR facilities, a minimum of four quarterly samples is required to verify a successful restoration.

   Needed: CBR needs to provide sufficient information for the staff to conclude that the stability monitoring program is sufficient to demonstrate a successful restoration.

   Response: CBR stated that it included a minimum of 6 months monitoring. Staff stated that 4 quarters is more appropriate and that justification for something less would be required. CBR acknowledged the question.

9. Include corrective actions during stabilization.

   Background: CBR did not describe how it will address corrective action at wells that are on excursion during the restoration and restoration stability monitoring period. This requirement is similar to guidance in Section 5.7.8.3 (5) of NUREG-1569 for corrective actions in the excursion monitoring operational procedures.

   Needed: CBR needs to document corrective actions for excursions during restoration and stabilization.

Response: That would not happen at a restoration unit, but would happen in operating. Staff stated that it could happen and would want some language in application to address. CBR agreed.

10. Provide techniques for statistical trend analysis of stability data.

    Background: CBR stated that restoration will be deemed complete if the restoration values for all wells are maintained during the stabilization period with no significant increasing trends. CBR did not provide a description of how stability trends will be evaluated statistically or otherwise, or describe what actions would be taken if trends are determined to be significantly increasing. NRC staff requests that CBR provide this information. In addition, the staff notes that the statistically significant analyses should not only be applicable to trend analysis, but also an analysis of hot spots should the wellfield average be used to determine that restoration has been accomplished.

    Needed: CBR needs to document statistical analyses that may be used to establish statistically significant trends.

    Response: Acknowledged the comment.

11. Correct pore volume calculations; provide flare factors.

    Background: CBR provided an estimate of the volume of water associated with the total pore volume (PV) of all wellfields within the proposed licensed area. The total reported PV is 133,268,000 gallons based on a calculated aerial extent of the wellfields of 30,636,400 square feet, thickness of 15 feet, and a porosity of 29 percent. Source or location of the information to verify the estimates was not identified in the application. In addition, the information may be in error. For example, the unit of gallons for the reported total PV is incorrect as the unit should be cubic feet (30,636,400 feet^2 x 15 feet x 0.29). In addition, CBR did not address any flare factors in the application and whether or not the proposed restoration methods are based on flare factors.

    Needed: CBR needs to correct the PV estimate, provide sources of the data, and provide an estimate of the PV for at least the first mine unit.

    Response: Acknowledged the comment.

12. Comment on the applicability of restoration analogues to the proposed larger wellfields.

    Background: Using the values listed in the application and the proposed nine mine units, the average area per mine unit is estimated at approximately 78 acres. The staff notes that the approved restoration analogue in the application was for a mine unit that was only 9.3 acres. The staff is concerned about the applicability of the restoration analogue to a much larger mine unit. In addition, the large mine units have large PVs, which has implications on the schedule and liquid waste disposal capacity (see Sections 6.1.9 and 6.1.10).

Needed: CBR needs to comment on the size of the proposed mine units and applicability of the analogue to those units.

Response: Acknowledged the comment.

13. Document sampling procedures/analysis to establish that restoration goals are met.

Background: CBR reported that monitoring will be performed daily, weekly, and monthly at selected wells to track the restoration progress. CBR proposes to sample all monitoring wells at the end of the active restoration phase for parameters listed in Table 6.1-1 of the application. CBR did not provide a description of the monitoring procedures to be used during restoration, including sampling density, parameters, and frequency to substantiate that restoration progress. NUREG-1569 guidance suggests that CBR may reduce the parameter list and monitoring wells to monitor restoration progress. However, without any information on the proposed plan, the staff cannot fully evaluate whether or not the program is adequate.

Needed: CBR needs to document the monitoring program during restoration.

Response: Acknowledged the comment.

14. Acknowledge that NRC staff will not use the restoration goal of average plus two standard deviations.

Background: In Section 6.1.3.2, CBR indicated that the restoration goal for a specific parameter is the mine unit baseline average plus two standard deviations if the baseline concentration exceeds the applicable MCL. Section 6.1.3 of NUREG-1569 indicates that CBR has the option of determining numeric restoration limits for each parameter on a well-by-well basis or as a statistical average applied over the entire wellfield. The staff is aware that the plus two standard deviations have been used to establish restoration goals for the wellfields at the existing facility. Based on data for the existing facility, the parameters which this policy affects typically are sulfate, uranium, and radium. In addition to the noted discrepancy with NUREG-1569, staff's concern about this policy is twofold. First, what is the effect should the MCL be modified during the active life of the wellfield (e.g., uranium)? Second, the mean and standard deviation values for a parameter may suggest that the sample population was not normally distributed.

Needed: CBR will have to note that NRC's review of the restoration report will be based on the mean value using the wellfield average. CBR will have to justify any additional site-specific statistical analysis to support any restoration.

Response: Stated that the language is in the license in10.3C. The open issue has been resolved and will be deleted.

II. Confirmatory Items

No confirmatory items for this issue.

III. Administrative Items

1. Incorrect flow arrow direction on Figure 6.1-1.

   Background: CBR included a flow diagram for the restoration process in Figure 6.1-1. A flow arrow on that figure depicts restoration fluid flow into the Raw Water Tank. Based on the anticipated operations, the arrow should be towards the injection stream.

   Needed: CBR needs to revise the flow diagram.

   Response: CBR stated that the tank is the make-up water tank. CBR stated it would correct that arrow.

2. Carbon dioxide in the lixiviant composition.

   Background: CBR has included carbon dioxide in the description of the lixiviant composition within the TR. Section 3.2.1 of the TR states "sodium bicarbonate and/or gaseous carbon dioxide are added to the lixiviant as the fluid leaves the satellite plant for the wellfields." Additionally, Section 3.2.2.1 states "process-related chemicals stored in bulk at the North Trend Satellite Plant will include carbon dioxide, oxygen, and or hydrogen peroxide." License Condition 10.1 states, "the licensee shall use a lixiviant composed of native groundwater, with added sodium carbonate / bicarbonate and oxygen or hydrogen peroxide, as described in the approved license application." The TR and License Condition 10.1 are not in agreement concerning the presence or absence of carbon dioxide in the lixiviant composition.

   Needed: CBR should clarify the presence or absence of carbon dioxide in the lixiviant composition.

   Response: CBR stated that it wanted the flexibility to use CO_2. Staff pointed out that License Condition 10.1 will need to be amended.

3. Calculation of the UCL.

   Background: In Section 5.7.8.2 in the TR, CBR stated that for excursion indicators with a baseline average below 50 mg/l, the UCL may be determined by adding five standard deviations or 15 mg/l to the baseline average for the indicator. License Condition 10.4 C states that for those indicator parameters with baseline concentrations that average 50 mg/L or less, the UCL for that parameter may be calculated as equal to 20 percent above the maximum baseline concentration, the baseline average plus five standard deviations, or the baseline average plus 15 mg/L. The statements in the application and the license do not agree.

   Needed: CBR should clarify the above-referenced disagreement between the application and license condition 10.4 C.

   Response: Asked for page 5-56 or 5-47. CBR would review this comment.

Radiological

I. Open Issues

1. Justification for radon release rates from the wellfield, resin transfer and venting, and plant vent.

   Background: In CBR's submittal dated November 20, 2009, *Missing Attachments to the North Trend License Amendment,* the following assumptions are made regarding calculations for radon released to the environment:

   - Resin transfer and venting, 10% released
   - Wellfield, 25% released
   - Plant vent, 10% released

   These assumptions are found in Tables 4.12.2(A)-4 and 7-3(A)-4, *Calculation of Annual Radon Emissions Crow Butte Project – North Trend Satellite Area.*

   Needed: Please provide more details on the origin of these assumptions.

   Response: Acknowledged the comment.

2. Please provide details on how radon progeny will be factored into determining compliance with 10 CFR 20.1301/1302 during operations.

   Background:

   In Section 5.7.7 of the TR, CBR describes its radon air sampling program. However, there is no discussion of how radon progeny will be factored into analyzing potential public doses. This open issue is related to the open issue on the LLD for environmental radon measurements transmitted to CBR in NRC's letter dated November 12, 2009 (ML093060326) providing meeting minutes for the October 5, 2009, public meeting (issue 2 on page 13 of the letter).

   The concentration values given in 10 CFR 20, Appendix B, Table 2, are based on radionuclide concentrations inhaled or ingested. NRC staff has determined that the correct evaluation of radon-222 exposures to the public must include the dose from radon-222 and an assessment of radon progeny. The radon progeny, if present, will be the principal contributor to radiation dose in most practical radon exposure situations and need to be considered in any dose assessment.

   Needed: Details on how radon progeny will be factored into determining compliance with 10 CFR 20.1301/1302 during operations.

   Response: Acknowledged the comment.

3. CBR has not addressed the potential for beta exposure and surveys for beta radioactivity resulting from spills or maintenance activities.

Background: The description in Section 5.7.2.1 has not adequately addressed surveys following spills or maintenance. CBR has not addressed the potential for exposure to beta radiation from the residual radioactivity that contains uranium and short-lived progeny that is in secular equilibrium with uranium. Alpha surveys will not detect the presence of the short-lived progeny because Th-234 and Pa-234m are beta-gamma emitters.

Needed: Provide justification for not conducting beta surveys.

Response: Reg Guide 8.30 allows you to do a substitution. What's missing is an evaluation of spills and maintenance. CBR acknowledged the comment.

4. CBR has not addressed the potential for beta exposure and surveys for beta radioactivity resulting from spills or maintenance activities.

   Note: This is a repeat of open issue #3 above. No further action necessary.

   Needed: Response to open issue #3 above.

   Response: No additional action.

5. CBR has not provided sufficient technical basis for using Class D for natural U as an inhalation class.

   Background: Sections 4.1.2.1, 5.7.3.1, and 5.7.4.1 state the DAC for soluble natural U is 5×10^{-10} μCi/ml in accordance with 10 CFR 20, Appendix B.

   Needed: Provide justification for inhalation classification.

   Response: CBR performed a lung study that it will submit. It is a sample that was collected from a drum. CBR's lung study demonstrates that the uranium is 95% D class, and it wasn't planning on a split classification.

II. Confirmatory Items

1. Is the LLD of U in air 5E-11 (0.00000000005) or 8.35E-5?

   Background: Section 5.3.7.1 states the air sample volume collected will be adequate to achieve the LLD for U in air is $5e^{-11}$ μCi/ml, which is 10% of the DAC. The DAC for class D natural U is 5×10^{-11} μCi/ml. The value of $5e^{-11}$ is 8.35E-5 (0.0000835).

   Needed: Provide the correct value of the LLD, 5E-11 (0.00000000005) or 8.35E-5.

   Response: CBR acknowledged comment and stated that it will make the correction. CBR stated that it cannot meet the LLD, but it will submit information related to CBR's detection capabilities. The staff will evaluate what it states.

2. Verify that the ALARA program includes a commitment to minimize exposures to the public (e.g. ALARA goals).

Note: This issue is incorporated as an open issue after the agenda items. No further action required for this confirmatory item.

III. Administrative Items

1. Use consistent notation (5×10^{-11} or 5E-11 (e.g. 0.00000000005) vs. $5e^{-11}$ (e.g. 8.35E-5)).

   Background: First line of page 5-40 has inconsistent notation for 10% of the DAC value, "$5e^{-11}$." In subsequent paragraphs, the notation is in another form (e.g. $5x10^{-10}$).

   Needed: Consistent notation.

   Response: No response needed.

2. Compliance with §20.1208 for declared pregnant women.

   Background: In the last paragraph of Section 5.7.2.2, Cumulative Exposure, CBR states all CBR employees, such as adult or declared pregnant employee, will be monitored in accordance with §20.1201(a). Exposure limits for declared pregnant women is addressed in §20.1208.

   Needed: Provide the correct citation in the TR.

   Response: Acknowledged the comment.

Miscellaneous

I. Open Issues

Quality Assurance: Non-Radiological Monitoring

1. Confirm non-radiological quality assurance program.

   Background: It follows from UMTRCA Section 205 (a), that a quality assurance (QA) program should be provided for ISR monitoring programs that generate data used to assess non-radiological hazards. It also follows that the quality assurance plan for non-radiological monitoring activities will have the same basic requirements as the radiological QA program. Regulatory Guide 3.46 entitled, "Standard Format and Content of License Applications for In Situ Uranium Solution Mining," indicates that a description of the quality assurance programs for all radiological and non-radiological in-plant, effluent, and environmental monitoring programs that include groundwater monitoring should be provided.

   In Section 5.7.9 of the TR, CBR stated that a quality assurance program is in place at the main facility for all relevant operational monitoring and analytical procedures. NRC staff is uncertain if this statement refers to both the radiological and non-radiological monitoring programs. Staff also notes that CBR's statement did not include non-radiological pre- and post-operational monitoring activities.

Needed: CBR should confirm that a non-radiological QA program exists for monitoring activities that generate non-radiological data.

Response: Acknowledged the comment.

2. Document the organizational structure and responsibilities of managerial and operational staff for the non-radiological QA/QC program.

   Background: In Section 5.7.9 of the TR, CBR stated that a quality assurance program is in place that includes the formal delineation of organizational structure and management responsibilities. Responsibility for both review/approval of written procedures and monitoring data/reports is provided. NRC staff notes that management responsibilities and the responsibility for both review/approval of written procedures and monitoring data/reports do not appear to be provided for the non-radiological QA program.

   Needed: CBR should describe the management responsibilities for the non-radiological QA/QC program.

   Response: Acknowledged the comment.

3. Confirm specifications of personnel qualifications.

   Background: In Section 5.7.9 of the TR, CBR stated that a quality assurance program is in place that includes minimum qualifications and training programs for individuals performing radiological monitoring and those individuals associated with the QA program. NRC staff notes that details of the specifications of personnel qualifications for the non-radiological QA program were not provided in the TR.

   Needed: CBR should describe personnel training, qualifications, and maintenance of proficiency in the principles and techniques of non-radiological monitoring activities and QA/QC support functions.

   Response: Acknowledged the comment.

4. Document written procedures for the non-radiological monitoring program activities.

   Background: The TR did not adequately describe written procedures for all activities that generate non-radiological data, such sample collection, sample management and chain of custody, sample preparation and analysis, data reduction and recording, and data assessment and reporting. A description of written procedures is also needed for addressing support functions, such as the preparation of quality control samples, corrective actions, audits, and records.

   Needed: CBR should describe written procedures for the non-radiological QA/QC program.

   Response: Acknowledged the comment.

5. Document records management.

Background: In Section 5.2.1 of the TR, CBR described its environment, health and safety management system and record keeping and retention. Records containing information pertinent to decommissioning and reclamation such as descriptions of spills, excursions, contamination events, etc., as well as information related to site and aquifer characterization will be maintained on site until license termination. Section 5.2.1 also stated that the EHSMS Program Volume II, *Management Procedures,* provides specific instructions for the proper maintenance, control, and retention of records associated with implementation of the program. NRC staff notes that a description of the non-radiological monitoring records management is not provided in the report.

Needed: CBR should describe the proposed system that produces records which document environmental monitoring activities. CBR should also describe how records are maintained and establish a retention time(s) for the records.

Response: Acknowledged the comment.

6. Document quality control program.

Background: In Section 5.7.9 of the TR, CBR indicated that quality control (QC) exists for laboratory methods. Procedures cover statistical data evaluation, instrument calibration, duplicate sample programs, and spike sample programs. Outside laboratory QA/QC programs are included.

CBR has not adequately described the quality control program for non-radiological data (e.g., data quality objectives, field and laboratory QA/QC practices, proper maintenance, calibration, and use of equipment, and proper sample handling, custody, and shipping of samples).

Needed: CBR should adequately describe the quality control program for the non-radiological monitoring program.

Response: Acknowledged the comment.

7. Document non-radiological data verification and validation.

Background: In Section 5.7.9 of the TR, CBR stated that the QA program provides assurance to both regulatory agencies and the public that the monitoring results are valid.

CBR has not adequately described the procedures and qualified individuals for the routine verification and validation of non-radiological data to ensure data quality is sufficient to meet data needs. NRC staff notes that a description of the non-radiological monitoring records management is not provided in the report.

Needed: CBR should adequately describe the procedure and qualified individuals for the routine data verification and validation.

Response: Acknowledged the comment.

8. Document QA/QC program assessments and audits.

   Background: In Section 5.7.9 of the TR, CBR stated that the QA program addresses provisions for periodic management audits to verify that the QA program is effectively implemented and to verify compliance with applicable rules, regulations, and license requirements. The NRC staff notes that a description of the QA/QC program assessments and audits for the non-radiological QA program was not provided.

   Needed: CBR should describe the assessment and auditing of the QA/QC program practices and procedures.

   Response: Acknowledged the comment.

9. Document QA/QC preventive and corrective actions.

   Background: In Section 5.7.9 of the TR, CBR stated that a quality assurance program is in place at the main facility for all relevant operational monitoring and analytical procedures. The objective of the program is to identify any deficiencies in the sampling techniques and measurement processes so that corrective action can be taken and to obtain a level of confidence in the results of the monitoring programs. CBR has not discussed or demonstrated a corrective action program at the site that integrates components of the Quality Assurance program.

   Needed: CBR should describe the components of a QA program that include identifying areas for improvement, defining performance or programmatic deficiencies, and initiating appropriate corrective or preventive actions.

   Response: Acknowledged the comment.

Management Programs

1. Delegation of survey responsibilities to designated personnel.

   Background: Regulatory Guide 8.31, Section 2.6, states that the RSO and radiation safety office personnel are responsible for performing routine and special radiation surveys, and License Condition 9.12 requires that CBR conform to Regulatory Guide 8.31. However, in Sections 5.1.8 and 5.7.6 of the application, CBR stated that health physics technician may delegate radiation survey requirements to trained personnel.

   Needed: Please demonstrate how delegating survey responsibilities conforms with Regulatory Guide 8.31, as required by License Condition 9.12.

   Response: Acknowledged the comment.

2. Weekly inspections.

   Background: License Condition 9.12 requires CBR to comply with Regulatory Guide 8.31, and Section 2.3.1 of this regulatory guide states that the RSO and facility foreman

should conduct weekly inspections. CBR stated that the General Manager and the Lead Operator would perform these inspections in the absence of the RSO and Operations Superintendent. This statement does not appear to comply with Regulatory Guide 8.31.

Needed: Please explain how CBR will comply with Regulatory Guide 8.31 regarding the personnel to conduct the weekly inspections.

Response: Acknowledged the comment.

Accidents

1. Actions and equipment to stop major tank or pipe failure.

   Background: CBR specified that tank failures will likely occur as small leaks, the repair of which would occur by emptying the tank and patching the leak. However, CBR did not explain the actions and equipment used to stop a major pipe or tank rupture in the plant.

   Needed: CBR should provide the staff information regarding the manner in which major piping/tank ruptures will be stopped and also the capacity of the sumps/bermed areas. As an alternative, the NRC staff will include a license condition requiring that this information be provided and approved before operations start.

   Response: The staff stated that this could become a license condition for pre-operational activities. CBR stated that much of this will be determined after final design.

2. Procedures in the event of wildfire encroachment.

   Background: On July 31, 2006, CBR notified the NRC Emergency Operations Center and the NRC project manager of the potential evacuation of the main facility due to encroaching wildfires. Although the fires did not approach close enough to warrant an evacuation, the potential for wildfires exists.

   Needed: CBR should describe the procedures to be followed in the event of an evacuation, and should describe the potential radiological health effects.

   Response: Acknowledged the comment.

II. Confirmatory Items

Management Programs

1. Health Physics training for designated personnel.

   Background: CBR identified the Lead Operator as the "designated person" who will perform daily inspections in the occasional absence of the RSO or Health Physics Technician. License Condition 9.12 will be amended to require that any designated person will have health physics training, and such training program will be specified by CBR and submitted to the staff prior to starting operations at the North Trend facility.

Furthermore, License Condition 9.12 will be modified to state that the Lead Operator may perform daily inspections no more than 2 days per week, and those reports will be reviewed by health physics staff within 48 hours completing the report. CBR will also have a health physics staff member available by telephone while the Lead Operator is performing the daily inspections.

Needed: Concurrence with the license condition.

Response: Acknowledged the comment. CBR questioned the staff regarding 3-day weekends. CBR also stated that the staff should take into account the experience of CBR's personnel. The staff stated that it was considering CBR's experience. The staff and CBR could discuss this issue at a later date.

III. Administrative Items

No administrative items for miscellaneous issues.

END OF AGENDA ITEMS – BEGIN ADDITIONAL ISSUES

Radiological

I. Open Issues

1. CBR has not adequately addressed the RAI 5.7.2, 3(a).

   Background: In the letter dated November 10, 2008, the NRC staff requested an analysis of public doses for visitors for compliance with 10 CFR 20.1302 (b) and 10 CFR 20.1301 (b). CBR estimated the highest total effective dose equivalent for a downwind receptor near the NTEA as 5.8 mrem/year based on an occupancy factor of 100% (8,760 hours/year). CBR stated that a visitor onsite for 2,000 hours per year would receive an annual dose of 1.2 mrem/year, much less than the 100 mrem public dose limit. CBR has not explained if the downwind point is arbitrary. In terms of public dose, it is not clear that CBR determined who or what group receives the highest exposure consistent with NUREG-1736.

   Needed: Provide a more detailed explanation that CBR has met the requirements in 10 CFR 20.1301(b) and 1302(b).

   Response: Acknowledged the comment.

2. Identify survey instrumentation available to measure gamma dose rates in excess of 5 millirem per hour.

   Background: In section 5.7.2.1, CBR indicated that the external gamma survey meters will have a detection range "Lowest range not to exceed 100 microRoentgens per hour (μR/hr) fullscale with the highest range to read at least 5 milliRoentgens per hour (mR per hour) full scale". It is not clear if CBR will have sufficient instrumentation to measure gamma dose rates in excess of 5 mrem per hour sufficient for expected dose rates during operations.

   Needed: Provide survey instrumentation sufficient to measure expected gamma dose rates during operations.

   Response: Acknowledged the comment.

3. Recordkeeping and reporting requirements.

   CBR must provide a description of the records and reporting criteria in Sections 5.7.2, 5.7.3, 5.7.5, and 5.7.6. to meet the requirements of 10 CFR 20, Subpart L, which specifies record keeping requirements and 10 CFR 20, Subpart M which defines reporting requirements.

   Needed: A description of how CBR will incorporate the record and reporting requirements specified in 10 CFR 20, Subpart L, and Subpart M.

   Response: Acknowledged the comment.

4. CBR has not sufficiently demonstrated that the requirements for mixed radionuclides in Section 20.1204(e), (f) and (g) are met.

   Background: In Section 5.7.3.1 of the TR, CBR indicated that measurement of airborne uranium will be performed by gross alpha counting of the glass fiber air filters for uranium air particulates using an alpha scaler. CBR also stated that Ra-226 may be present in a lesser amount and that the DAC for Ra-226 is 3×10^{-10} μCi/ml. Gross alpha counting of the air filters will not be able to differentiate specific radionuclides. CBR has not described how the inhalation of mixed radionuclides will be calculated in exposure doses.

   Needed: Demonstration of how CBR will meet regulatory requirements for monitoring and inhalation exposure to mixed radionuclides in Sections 5.7.3.1 and 5.7.4. This includes an analysis of all uranium alpha- and beta-emitting daughters.

   Response: Acknowledged the comment.

5. Specify method for determining the lower limit of detection (LLD) for the alpha scaler used to measure air samples in Section 5.7.3 in the TR.

   Background: CBR stated that LLD will be able to detect 10% of DAC, but does not describe method used to determine LLD.

   Needed: Provide method.

   Response: Acknowledged the comment.

6. Justification that urinalysis is acceptable for bioassay in Section 5.7.5.

   Background: CBR has not sufficiently justified using inhalation class D for the uranium in its facility. Regulatory Guide 8.22 recommends in vivo lung counts for exposures to Class W or Y materials.

   Needed: Provide justification for bioassay type.

   Response: Acknowledged the comment.

7. CBR has not provided a description of how bioassay results will be used to confirm results derived from its airborne radiation monitoring program and used in exposure calculations. In addition, CBR does not describe actions to be taken in the event action levels are exceeded in Section 5.7.5.

   Background: There is no discussion on CBR's methods for evaluating bioassay data that result in calculated intakes in Section 5.7.4 or 5.7.5. CBR stated that action levels are established based on Table 1 in RG 8.22, but does not describe CBR's actions in the event that a positive bioassay (urinalysis) result is confirmed, such as determining whether internal exposure for an individual should be determined based on bioassay results or monitoring data. Exposure calculations discuss inhalation based on air monitoring results in 5.7.4.

   Needed: Provide a technical basis for how the uptake will be converted to a dose and assigned to the individual in accordance with 10 CFR 20 Subpart C, which include the limit specified in Section 20.1201(e).

   Response: Acknowledged the comment.

8. CBR has not provided sufficient information on releasing items to unrestricted areas during operations in Section 5.7.6.

   Background: CBR should clarify what beta-gamma surface contamination limits will be used for releasing items for unrestricted use consistent with License Condition 9.8 of License SUA-1534. License Condition 9.8 requires CBR to comply with Enclosure 2 of Policy and Guidance Directive FC 83-23 (the Guidelines), or an NRC-approved suitable alternative procedure for releasing equipment, materials, or packages from the restricted

area. According to the Guidelines, the limit for beta-gamma-emitting radionuclides should be applied independently from alpha-emitting radionuclides.

In addition, CBR has not provided information on how its ALARA program will be implemented with respect to license condition 9.8 in License SUA-1534. The guidelines state, "The licensee shall make a reasonable effort to eliminate residual contamination."

Needed: Description of how requirements in license condition will be met for releasing potentially contaminated items for unrestricted use.

Response: Acknowledged the comment.

9. Beta-gamma surface contamination limits for releasing items for unrestricted use during facility decommissioning.

   Background: Regarding facility decommissioning, CBR must clarify what beta-gamma surface contamination limits will be used for releasing items for unrestricted use pursuant to License Condition 9.8 of License SUA-1534. License Condition 9.8 requires CBR to comply with Enclosure 2 of Policy and Guidance Directive FC 83-23 (the Guidelines), or an NRC-approved suitable alternative procedure for releasing equipment, materials, or packages from the restricted area.

   Section 6.3.2.1 of the TR indicates that separate beta-gamma surface contamination limits will not be applied for releasing items for unrestricted use. According to the Guidelines, the limit for beta-gamma-emitting radionuclides should be applied independently from alpha-emitting radionuclides.

   Needed: Description of how requirements will be met.

   Response: Acknowledged the comment.

10. CBR did not address personnel or surface contamination monitoring for beta-gamma-emitting radionuclides.

    Background: CBR stated in Section 5.7.6 that personnel leaving the restricted area will be required to perform gross alpha contamination monitoring. Any gross alpha contamination on the skin or clothing will be considered removable and is subject to a limit of 1000 dpm/100 cm^2, which is consistent with Table 2 of Regulatory Guide 8.30 for removable natural uranium contamination. However, CBR did not address the potential for personnel contaminated with beta-gamma-emitting radionuclides, taking into account the full scope of operations including spills and maintenance. In addition, monitoring for the presence of beta-gamma-emitting radionuclides is not addressed.

    10 CFR 20.1501 requires, among other things, that surveys be made to evaluate potential radiological hazards.

Needed: Description of how the CBR's personnel and surface contamination monitoring program will comply with relevant regulatory requirements regarding the potential for the presence of beta-gamma-emitting radionuclides.

Response: Acknowledged the comment.

11. No description of the quality of samples or error and precision requirements in Section 5.7.9.

Background: NUREG-1569 acceptance criteria states the quality assurance plan should be consistent with guidance provided in RG 4.14 Sections 3 and 6, and RG 4.15. Section 3, Quality of Samples, and Section 6, Precision and Accuracy of Results, describe objectives to be met to ensure the quality of effluent and environmental monitoring samples. RG 4.15 describes quality assurance throughout a sampling and analysis program. CBR described calibration and instrument standards in Section 3.3 and quality control of bioassay analysis in Section 5.7.5. However, no discussion of error is discussed.

Needed: Description of how CBR's quality assurance program is consistent with recommendations in RG 4.15 and Sections 3 and 6 of RG 4.14 regarding samples related to the radiological monitoring program.

Response: Acknowledged the comment.

12. Demonstrate that calculations converting gross alpha measurements of air samples to U concentrations are acceptable to use in exposure calculations in Section 5.7.4.

Background: In Sections 5.7.3.1 and 5.7.3.2 of the TR, CBR states that air samples analyzed for alpha activity will be used to determine airborne uranium and radon progeny exposure, respectively. CBR does not explain how the gross alpha counts are used to differentiate the type of exposure. CBR did not include information on the efficiency of the detector, the probe used, or if the lower limit of detection meets NRC criteria to demonstrate how the gross alpha counts are converted to U or Rn progeny concentrations to use in the exposure calculations.

Needed: A description of detailed calculations converting gross alpha counts to U or Rn progeny concentrations in Section 5.7.4.

Response: Acknowledged the comment.

13. CBR has not demonstrated how gamma exposure readings will correlate to uranium and Ra-226 that may be present in soils at NTEA.

Background: CBR states that 17,900 cpm as determined with a Ludlum Model 44-190/2221 NaI detection system or equivalent held at 18 inches above ground surface will be used as an action level for gamma radiation. CBR states that this action level was based on an evaluation between gamma count rates and Ra-226 concentrations at the main plant area.

Needed: CBR should provide technical justification for using correlation data derived from an unrelated land area and applying this data to NTEA.

Response: Acknowledged the comment.

14. 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.

    Background: 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.

    Needed: 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.

    Response: Acknowledged the comment.

15. More details needed on CBR's ALARA program.

    Background:

    ALARA requirements relevant to ISR facilities are codified in 10 CFR 20.1101 and 10 CFR 40, Appendix A, Criterion 8.

    License Condition 9.12 of SUA-1534 requires CBR to follow the guidance in Regulatory Guide 8.31, *Information Relevant to Ensuring that Occupational Radiation Exposure at Uranium Recovery Facilities Will Be As Low As Is Reasonably Achievable*. Regulatory Guide 8.31 specifically recommends that the annual radiation protection and ALARA audit should address trends in personnel exposure and recommendations on ways to further reduce personnel exposure from uranium and its daughters.

    Further, Regulatory Guide 8.10, *Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable*, recommends that the RSO and radiation protection staff know the origins of radiation exposures and that they look for ways to reduce exposure.

Section 5.3 of the CBR's TR describes its management and inspection program. This program includes an annual ALARA audit. However, it is not clear how the CBR's ALARA program is consistent with the principles recommended in Regulatory

Guides 8.31 and 8.10. Although CBR does apply good ALARA practices in its occupational airborne monitoring program described in Section 5.7.3 of its TR (e.g., setting action levels at 25% of the DAC), there are other areas of its radiation protection program that do not address ALARA principles.

Specific examples that NRC staff is requesting clarification on include the following:

- Reliance in Section 5.7.6 of the TR on maximum limits for personnel monitoring.
- No discussion in Section 5.7.6 of the TR on reducing surface contamination from items to be release for unrestricted use. CBR appears to rely on maximum release limits here as well.
- Lack of demonstration that CBR accounts for all sources (e.g., effluents from the facility, wellfield and header houses) of occupational exposure.
- No ALARA goals stated in the TR.
- CBR has not demonstrated that it has a 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.

Needed: A detailed description of CBR's ALARA program that addresses the points above and how the program is consistent with recommendations in Regulatory Guides 8.31 and 8.10.

Response: Acknowledged the comment.

II. Confirmatory Items

There are no confirmatory items in this section.

III. Administrative Items

1. Inconsistent statement that there will be no airborne particulate effluent from the NT satellite plant in Section 5.7.1.1

   Background: This statement conflicts with changes to Section 4.1 provided in the response to RAIs dated February 27, 2009.

   Needed: Address inconsistencies in statements.

   Response: Acknowledged the comment.

2. CBR should verify that procedures will be used.

   Background: Throughout Section 5.7.2, CBR uses the word "would" instead of "will." Needed: Correct verb use to demonstrate intent to meet regulatory requirements.

   Response: Acknowledged the comment.

3. Response to RAI 5.7.4.1(4)

   Background: In reviewing CBR's February 28, 2009, response to NRC's November 17, 2008, request for additional information, it appears that there is a misunderstanding of RAI 5.7.4.1(4). The TR did not provide a definition of the "i" annotation in the exposure equation. NRC is asking for a clarification of what "i" indicates, not that there was an incorrect definition. Based on the equation and the definition of "n" in the equation, the term "i" appears to annotate an individual exposure period.

   Needed: Updated TR with proper mathematical notation.

   Response: Acknowledged the comment.

4. There is a discrepancy in 6.3.2.1 regarding "NRC-licensed facility."

   Background: 6.3.3 and License Condition 9.7 include Agreement State-licensed facility.

   Needed: Consistent notation.

   Response: Acknowledged the comment.

5. Verification of Soil Cleanup.

   Background: In Section 6.4.3 of the TR, CBR committed to following statistical clean-up criteria described in NUREG/CR-5849. This reference has been superseded with NUREG-1575, MARSSIM, has been adopted by the EPA, DOE, NRC, and several other Federal agencies as an improved method to clean-up soils and buildings.

   Needed: Updated methodology for proving 95-percent confidence that the survey units meet the cleanup guidelines.

   Response: Acknowledged the comment.

Miscellaneous

I. Open Issues

There are no open issues in this category.

II. Confirmatory Items

Spill Prevention

Background: Contamination from spills would be isolated from surface water due to the construction of berms around the wellfields (Section 7.2.6.2, CBR, 2007). Furthermore, CBR will prepare and implement a Spill Prevention, Control, and Countermeasures (SPCC) plan to remediate soil contamination by spills. CBR also cites Section VIII of its Emergency Manual for spill response procedures, as well. However, it is not clear what is included in the term "surface water features.

Needed: CBR should clarify that the berms would prevent surface spills from entering all surface water bodies and drainages that connect to surface water bodies and that the berms serve to eliminate public dose and contaminant pathways to surface water.

Response: Acknowledged the comment.

III. Administrative Items

There are no administrative items in this category.

CBR asked about if there are any remaining issues. NRC staff responded that there would be no further open issues.

List of Acronyms Used During This Discussion:

ALARA – As Low As Is Reasonably Achievable
SERP – Safety and Environmental Review Panel
TR – Technical Report
NDEQ – Nebraska Department of Environmental Quality
ACL – Alternate Concentration Limit
MCL – Maximum Contaminant Level
UCL – Upper Control Limit
LLD – Lower Limit of Detection
QA – Quality Assurance
QC – Quality Control
RSO – Radiation Safety Officer
NTEA – North Trend Expansion Area
RAI – Request for Additional Information
MARSSIM – Multi-Agency Radiation Safety and Site Investigation Manual
EPA – Environmental Protection Agency
DOE – Department of Energy
NRC – Nuclear Regulatory Commission
CPM – counts per minute
DAC – Derive air concentration
ISR – In-Situ Recovery