November 12, 2009

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: MINUTES FROM OCTOBER 5, 2009, TELECONFERENCE REGARDING OPEN ISSUES, CROW BUTTE RESOURCES, INC., NORTH TREND EXPANSION AREA LICENSE AMENDMENT (TAC J00523)

Dear Mr. Teahon:

On October 5, 2009, 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 for the North Trend Expansion Area 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.

Please respond to these open issues or provide a schedule for responding within 30 days of the date of this letter. 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: Stephen Collings, CBR
Michael Linder, NDEQ

November 12, 2009

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DISTRIBUTION: JWhitten, RIV KMcConnell DOrlando BVonTill

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Office	DWMEP	DWMEP	DWMEP	DWMEP	DWMEP
Name	RBurrows	TLancaster	BGarrett	SCohen	RBurrows
Date	11/5/09	11/10/09	11/12/09	11/12/09	11/12/09

OFFICIAL RECORD COPY

MEETING SUMMARY

DATE: October 5, 2009

TIME: 10:00 a.m. – 4:00 p.m.

PLACE: U.S. Nuclear Regulatory Commission (NRC)
Two White Flint North
Room T10C4
Rockville, Maryland

PURPOSE: To discuss meteorological, radiological and hydrogeological 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 meteorological, radiological and hydrogeological issues relating to CBR's NTEA ISR license amendment. The meeting was publicly noticed on the NRC webpage on September 24, 2009.

DISCUSSION:

The teleconference started at 10:00 a.m. Eastern Time in Room T10-C4. An opening statement was presented by Mr. Ronald A. Burrows, NRC. The meeting continued with a discussion of meteorological, radiological and hydrogeological 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 AGENDA
Crow Butte Resources, Inc. / North Trend Expansion Area
October 5, 2009

MEETING PURPOSE: Teleconference to Discuss Meteorological, Radiological and Hydrogeological Issues Relating to North Trend Expansion Area ISR License Amendment.

MEETING PROCESS:

Time	Topic	Lead
10:00 a.m.	Introductions	All
	Discussion of Meteorological Issues (list of issues attached)	All
	Discussion of Radiological Issues (list of issues attached)	All
	Discussion of Hydrogeological Issues (list of issues attached)	All
	Break for lunch	All
	Discussion of Other Issues (time permitting)	All
	Summary of Action Items	Moderator
	Public Comment/Questions	Moderator
4:00 p.m.	Adjourn	

Attachment 2

Meteorological Issues
Crow Butte Resources, Inc. / North Trend Expansion Area
October 5, 2009

1. Justification of why Crow Butte data is representative of North Trend Expansion Area.

2. No concurrent data from National Weather Service station to demonstrate data represents long-tern trends.

3. No information related to siting of meteorological instruments.

4. “Humidity” and “Winds” section numbers mislabeled.

5. No discussion on method used to calculate atmospheric stability or what type of instrumentation was used.

6. No data on mixing layer height.

7. In the notes to Table 2.5-13 (all stabilities), it reads “Percent occurrence for A stability class = 100 percent”. It appears that “A” should read “All”.

8. Lack of description of the types and specifications for the meteorological instruments used to collect relevant data.

9. Lack of data on system calibration and maintenance.

10. No recovery rates provided for meteorological data.

Radiological Issues
Crow Butte Resources, Inc. / North Trend Expansion Area
October 5, 2009

1. Justification for AM-6 as background control location.
2. Criteria for placement of pre-operational radon monitors.
3. No table number assigned to table on page 2.9-11 (mean radon concentration).
4. Justification for a lack of pre-operational airborne particulate monitoring program.
5. Insufficient justification for not sampling for airborne Th-230.
6. Justification for not monitoring radon flux.
7. Proposed vegetation sampling program not consistent with Regulatory Guide (RG) 4.14.
8. Crop sampling not addressed.
9. Livestock sampling not addressed.
10. Fish sampling not addressed.
11. Justification for using exposure rate correlation data developed from currently licensed facility for North Trend Expansion Area direct radiation readings.
12. Where does seventh data point from Table 2.9-12 of TR come from?
13. Justification for using exposure rate correlation data developed from currently licensed facility for North Trend Expansion Area compass direct radiation readings.
14. Justification for location of soil sampling at air monitoring stations – see item #2 above.
15. Text of description of proposed surface soil sampling program does not comport with Figure 2.9-4 of the TR.
16. Insufficient justification for not sampling for Th-230 in soil at airborne monitoring stations.
17. Sediment sampling from White River not consistent with RG 4.14.
18. No sediment sampling evaluation for Spring and Unnamed Creeks and Hall Canal.
19. It is stated in the TR that that W-2 in Figure 2.7-1 is upstream of the site boundary. It appears to be downstream.

20. Surface water sampled for 5 quarters instead of at least 12 months. Only three quarters had the complete suite of radionuclides analyzed consistent with RG 4.14.

21. Missing radionuclide constituents from some quarterly samples.

22. The note to Table 2.9-6 indicated “groundwater”. It appears that this should indicate “surface water”.

23. Surface water results do not delineate between suspended and dissolved radionuclides.

24. No surface water sampling evaluation for Spring and Unnamed Creeks and Hall Canal.

25. Analytical results for surface soil sampling not included in TR (Confirmatory).

26. Analytical results for subsurface soil sampling not included in TR (Confirmatory).

27. Insufficient justification for not monitoring radon effluent.

28. Insufficient justification for not having an operational environmental air particulate monitoring program.

Hydrogeological Issues
Crow Butte Resources, Inc. / North Trend Expansion Area
October 5, 2009

1. Mineralogical information for the Basal Chadron Formation within North Trend.

2. Recent stream flow data and comparative assessment to past data.

3. Safety considerations and measures for potential flood impacts in Section 34.

4. Water supply wells in Table 2.2-12 were not all found in Figure 2.2-4 (e.g., # 55, 60, 61, 65, 98, 219, and 5,000 series wells).

5. Extend the Basal Chadron potentiometric surface map to include water supply wells close to the project area, where feasible.

6. Extend the Brule potentiometric surface map(s) to include representative water supply wells within and close to the project area, where feasible.

7. Considerations for the use of PVC well screens at certain locations.

8. Justification and formal request for the three-year alternate restoration schedule.

9. Further assess the cause of the Basal Chadron's increased hydraulic gradient that is parallel to the monocline fold axis.

10. The revised Figure 3.2-1 is missing.

11. Short-term stability analysis, construction, drawings, and associated monitoring wells for evaporation ponds in compliance with 10 CFR 41 (h) and 10 CFR 40 Appendix A.

12. Justification for baseline water quality indicators.

13. Justification for one overlying monitoring well per five acres and one baseline restoration well per four acres.

14. Penetration of screened interval of monitoring and production wells.

15. Consistent with NUREG 1569, the NRC must be notified in writing within seven days from the time an excursion is verified.

16. Commitment to current federal drinking water standards for restoration (e.g., 0.03 mg/ L for uranium).

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

Open Issues

I. Meteorology

1. Justification of why Crow Butte data is representative of North Trend Expansion Area.

   Background: Section 2.5 of the Technical Report (TR) describe meteorological data collected from an onsite monitoring station "near the Crow Butte facility." In Section 2.5.5 of the TR (Winds), the applicant discusses why the Crow Butte data should be considered valid.

   Needed: We are looking for an analysis of why the Crow Butte data, in particular the wind data, is representative of the North Trend Expansion Area, not why it was the best data from the options presented. It would be helpful to include the location of the Crow Butte onsite monitoring station.

   Response: They will address the issue.

2. No concurrent data from National Weather Service station to demonstrate data represents long-tern trends.

   Background: RG 3.63 recommends comparing a concurrent period of meteorological data from a National Weather Service (NWS) station with the long-term meteorological data from that NWS station. The NWS station selected for this comparison should be in a similar geographical and topographical location and be reasonably close (preferably within 50 miles of the site).

   For this comparison, the applicant chose two NWS stations. These stations are located in Scottsbluff, Nebraska, which is 60.9 miles south of the North Trend Expansion Area and Rapid City, South Dakota, which is 98.2 miles north of the North Trend Expansion Area. While the applicant provided information from both of these NWS stations, it did not evaluate which station is most representative of the North Trend Expansion Area.

   Needed: The applicant should determine if the period of meteorological data collection is representative of long-term meteorological conditions in the site vicinity, including a justification for the selection of the NWS station.

   Response: Gave yearly averages. RG 3.63 goes into the manner in which to discuss the representativeness of data.

3. No information related to siting of meteorological instruments.

   Background: RG 3.63 provides recommendations on the siting of meteorological instruments. The applicant did not furnish any information of this type for its meteorological instruments used to collect onsite data.

Needed: The applicant should provide this information.

Response: That's AM station 5, they have that. Look at RG 3.63 to make sure we get the info we need.

4. No discussion on method used to calculate atmospheric stability or what type of instrumentation was used.

   Background: Referring to RG 3.63, the applicant did not discuss which method was used to calculate atmospheric stability and what type of instrumentation was used in the calculations.

   Needed: Applicant should address this issue.

   Response: Stability class was submitted in the application. Based on a calculation. Took the data from the 1982 – 1984 met data. They'll look into that. NRC did not see how the stability class was calculated.

5. No data on mixing layer height.

   Background: The applicant did not provide information related to annual average mixing layer height which is used in MILDOS calculations.

   Needed: Applicant should address this issue.

   Response: They looked into that. North Platte is the closest area for mixing height which is 250 miles away. NRC – If you have problems with showing representativeness you can use something conservative.

6. Lack of description of the types and specifications for the meteorological instruments used to collect relevant data.

   Background: RG 3.63 provides recommendations regarding meteorological system accuracy and instrumentation specifications. The applicant did not provide a complete description of the types (e.g., wind instrumentation) and specifications for the meteorological instruments used to collect relevant data.

   Response: They're digging through the archives.

   Needed: Applicant should address this issue.

8. Lack of data on system calibration and maintenance.

   Background: RG 3.63 provides recommendations on meteorological system calibration and maintenance. The applicant did not provide any data on systems calibration or maintenance.

   Needed: Applicant should address this issue.

Response: They're digging through the archives.

9. No recovery rates provided for meteorological data.

   Background: RG 3.63 provides recommendations on meteorological data recovery. The applicant did not provide this data.

   Needed: Applicant should address this issue.

   Response: They're digging through the archives.

II. Radiological Issues

1. Justification for AM-6 as background control location.

   Background: Figure 2.6-1 describes the preoperational and operational air monitoring locations. The applicant stated that monitoring location AM-6 represents the background control location for the North Trend Expansion Area, as well as the current licensed operation.

   RG 4.14 provides guidance for selecting control sampling sites. In general, this location should be in the least prevalent wind direction and unaffected by milling operations. Based on wind data presented by the applicant (see Section 2.5 of the TR) and no additional discussion by the applicant, it is not clear why AM-6 was chosen as the background control location for the North Trend Expansion Area.

   The least prevalent wind direction appears to be towards the west. While this wind pattern would appear to make AM-6 suitable as a background location for current operations, a more westerly monitoring location would seem to be more appropriate. Table 7.3-1 of the TR appears to confirm this as westerly receptor points generally result in lower estimated doses.

   Needed: A discussion which provides justification for selecting AM-6 as the background control location for the North Trend Expansion Area which addresses RG 4.14 guidance criteria.

   Response: RG 4.14, site should be unaffected by mining and milling. They say it is. That is the site that they've had since 1982. They'll address it.

2. Criteria for placement of pre-operational radon monitors.

   Background: In Section 2.9.2.1 of the TR, the applicant described the positioning of the air monitoring locations for the North Trend Expansion Area, AM-9 through AM-14 (see Figure 2.9-2 of the TR). It appears that the nearest residents and the locations of the proposed license boundaries were taken into consideration. However, referring to Figure 2.5-6 and Table 7.3-1 of the TR, the applicant did not appear to take into account the three different downwind sectors with the highest predicted radionuclide airborne concentrations during milling operations as recommended by RG 4.14.

Needed: The applicant should provide justification for placement of preoperational radon monitors which address RG 4.14 recommendations or sufficient justification for an alternate proposal.

Response: The five locations that were picked were from RG 4.14 and were selected from the prevailing wind directions. 2004 added two more stations. If we were to put three stations in the three predominant downward sectors, they would be right next to each other. We didn't set them side-by-side.

NRC – may want to look at Tables 1 and 2.

3. Justification for a lack of pre-operational airborne particulate monitoring program.

Background: In Section 2.9.2.3 of the TR, the applicant described its preoperational air particulate monitoring program. According to the applicant, since all drying and packaging operations will be performed at the current Central Plant Facility, there are no operations that could cause a release of airborne particulate radionuclides. However, air particulate samples were taken at air monitoring location AM-10. These results, and those of the control location (AM-6), are presented in Table 2.9-3.

In evaluating the applicant's preoperational air particulate monitoring program, NRC staff notes that other source terms that could lead to a release of airborne particulate radionuclides exist. These include ongoing radon releases leading to particulate radon daughter (e.g., Pb-210) production and pregnant lixiviant field spills.

Needed: An analysis of airborne radionuclide particulate source terms and an evaluation of a preoperational air particulate monitoring program consistent with RG 4.14.

Response: Started out on the premise that it wasn't a mill. Would be useful to add a air monitoring station. Had discussions with staff in 2004.

4. Insufficient justification for not sampling for airborne Th-230.

Background: In selecting which radionuclides to include in its preoperational air particulate monitoring program, the applicant stated that Th-230 was not selected for analysis as recommended in RG 4.14 based on the current NRC-approved Crow Butte operational air particulate monitoring program and because Th-230 is not typically released through the in situ leach process and is not a radionuclide of concern.

In evaluating these reasons, NRC staff notes that the decision to end Th-230 monitoring was made only after evaluating the measurement of Th-230 levels in the environment following seven years of commercial operation at the currently licensed facility (ML071520242). Further, the applicant has not demonstrated that conditions at the North Trend Expansion Area would lead to identical results obtained at its currently licensed facility. Lastly, the applicant did not provide data to substantiate that Th-230 is "not a radionuclide of concern."

Needed: Either provide a preoperational air particulate monitoring program consistent with RG 4.14 or sufficient justification for not including Th-230.

Response: They will address this issue.

5. Justification for not monitoring radon flux.

Background: This issue has been resolved. According to Section 3.11.2 of the Environmental Report, the applicant will have no tailings impoundments on site. No radon flux monitoring required.

Needed: No further action required.

6. Proposed vegetation sampling program not consistent with RG 4.14.

Background: The applicant has committed to perform vegetation sampling during the 2009 growing season. Proposed sample locations are presented in Figure 2.9-4 of the TR. According to the applicant, the sampling protocol in RG 4.14 is based on air particulates from the processing facility and since few particulates will be generated this approach does not appear to be meaningful. Instead, the applicant proposed locations that are representative of wellfield locations and that could be potentially impacted due to spills during cleanup operations.

NRC staff notes that the sampling protocol in RG 4.14 includes radon daughters that are generated from radon in the wellfield and that radon releases can lead to radionuclide foliar deposition and uptake by vegetation of these radon daughter products.

Staff also does not agree with the applicant regarding the definition of milling operations as stated in the applicant's February 27, 2009 response to NRC staff's November 17, 2008 request for additional information. As defined in 10 CFR 40.4, uranium milling "means any activity that result in the production of byproduct material…."

Needed: The applicant should evaluate all of its activities and then propose a vegetation sampling protocol based on this evaluation that is consistent with the recommendations in RG 4.14 or justification for an alternate proposal.

Response: They already did the sampling and we'll review when we receive the information.

7. Crop sampling not addressed.

Background: The applicant did not address preoperational crop samples. As indicated in Section 2.2.2.2 of the TR, the primary land use in the North Trend Expansion Area is cropland.

Needed: The applicant should evaluate preoperational crop sampling consistent with the recommendations in RG 4.14 or provide justification for an alternate proposal.

Response: Reason for 8 and 9 is the definition of the mill. The current site was licensed without livestock samples.

8. Livestock sampling not addressed.

   Background: In Section 2.2.2.2 of the TR, the applicant stated that within the North Trend Expansion Area and the surrounding 2.25-mile review area the primary land use is raising livestock.

   The applicant did not address preoperational livestock samples.

   Needed: The applicant should evaluate preoperational livestock sampling consistent with the recommendations in RG 4.14 or provide justification for an alternate proposal.

   Response: See response to previous issue.

9. Fish sampling not addressed.

   Background: In Section 7.2.7.10 of the TR, the applicant identified portions of Spring Creek and the White River, both of which cross the proposed site boundary, as suitable habitats for fish. The applicant did not address preoperational fish samples.

   Needed: The applicant should evaluate preoperational fish sampling consistent with the recommendations in RG 4.14 or provide justification for an alternate proposal.

   Response: Spring Creek is dry, and they would have done that in the White River. The staff stated that If the samples from the original application were in the white river, then they would still be valid.

10. Justification for using exposure rate correlation data developed from currently licensed facility for North Trend Expansion Area direct radiation readings.

    Background: As described in Section 2.9.8.2 of the TR, the applicant performed direct gamma radiation measurements at the proposed satellite processing area in May 2004 using a Ludlum Model 44-10 sodium iodide detector and associated electronics. A total of 422 measurements were collected and are presented in Figure 2.9-6 of the TR. In addition, exposure rate measurement were collected at each satellite processing area soil sample location described in Section 2.9.8.2 of the TR using a Ludlum Model 19 μR meter. Summary data for the gamma direct gamma radiation measurements are presented in Table 2.9-12 of the TR.

    NRC staff notes that the gamma exposure rate values in Table 2.9-12 were derived using the exposure rate vs. count rate correlation data derived from the currently licensed facility (see note to Table 2.9-12). The applicant has not provided justification for applying a correlation derived from another land area and applying it to the North Trend Expansion Area. Moreover, in its February 27, 2009 response to NRC staff's November 17, 2008 request for additional information, the applicant stated that it is unlikely that a meaningful correlation exists for this site.

Needed: The applicant should provide a technical justification for using correlation data from an unrelated land area or provide preoperational gamma measurements consistent with RG 4.14.

Response: They will address this issue.

11. Justification for using exposure rate correlation data developed from currently licensed facility for North Trend Expansion Area compass direct radiation readings.

Background: As described in Section 2.9.8.2 of the TR, the applicant has proposed performing preoperational gamma radiation measurements at 150-meter intervals in each of eight compass directions from the center point of the North Satellite Facility out to a distance of 1,500 meters from the center of the milling area (see Figure 2.6-2) prior to construction, and repeated for areas disturbed by site preparation or construction. The applicant stated that these surveys will be performed in the same manner as described for the proposed satellite processing area using the correlation information (i.e., count rate correlated with exposure rate) developed for the currently licensed facility.

As previously discussed, the applicant has not provided justification for applying a correlation derived from another land area and applying it to the North Trend Expansion Area. Moreover, in its February 27, 2009 response to NRC staff's November 17, 2008 request for additional information, the applicant stated that it is unlikely that a meaningful correlation exists for this site.

Needed: The applicant should provide a technical justification for using correlation data from an unrelated land area or provide preoperational gamma measurements consistent with RG 4.14.

Response: They will address this issue.

12. Justification for location of soil sampling at air monitoring stations – see item #2 above.

Background: As described in Section 2.9.6 of the TR, in 2006, soil samples were obtained from each of the air monitoring locations (AM-9 through AM-14) and analyzed for natural uranium, radium-226, and lead-210.

However, as previously discussed, the applicant has not provided sufficient justification to ensure that the locations of the air monitoring stations are consistent with RG 4.14.

Needed: The applicant should provide justification for placement of air monitoring stations which address RG 4.14 recommendations.

Response: Understood the issue.

13. Insufficient justification for not sampling for Th-230 in soil at airborne monitoring stations.

Background: RG 4.14 recommends analyzing surface soil samples at air monitoring stations for Th-230. As indicated on open issue #14, the applicant did not analyze for this radionuclide nor did it provide justification for not doing so.

As discussed for preoperational air sampling, the decision to end Th-230 monitoring was made only after evaluating the measurement of Th-230 levels in the environment following seven years of commercial operation at the currently licensed facility (ML071520242). Additionally, the decision was only applied to airborne particulates and stream sediment samples. Further, the applicant has not demonstrated that conditions at the North Trend Expansion Area would lead to identical results obtained at its currently licensed facility. Lastly, the applicant did not provide data to substantiate that Th-230 is "not a radionuclide of concern."

Needed: Either provide a preoperational soil monitoring program consistent with RG 4.14 or sufficient justification for not including Th-230.

Response: Th-230 appears to be the issue and probably follows through with 17.

14. Preoperational sediment sampling from White River not consistent with RG 4.14.

Background: RG 4.14 recommends sampling for sediments twice, once following spring runoff and late summer, preferably following an extended period of low flow. In addition, it recommends that several samples should be collected and composited for a representative sample and analyzed for natural uranium, Ra-226, Th-230, and Pb-210.

In evaluating the applicant's preoperational sediment sampling program, NRC staff notes that the following aspects are not consistent with RG 4.14:

1) The sediment samples were taken in November and December of 2004 and 2006 respectively,

2) There was no discussion on sediment sampling techniques (e.g., how many samples obtained at each location), and

3) Th-230 was not included in the applicant's analysis.

The applicant stated that analysis of Th-230 in sediments was discontinued in 1998 with the concurrence of the NRC. As was previously discussed in open issue #5, the decision to end Th-230 monitoring was made only after evaluating the measurement of Th-230 levels in the environment following seven years of commercial operation at the currently licensed facility (ML071520242). Further, the applicant has not demonstrated that conditions at the North Trend Expansion Area would lead to identical results obtained at its currently licensed facility.

Needed: Provide a preoperational sediment monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Understood the issue

15. No preoperational sediment sampling evaluation for Spring and Unnamed Creeks and Hall Canal.

Background: RG 4.14 recommends sampling from drainage systems that cross the site boundary and that may be impacted from contaminated areas.

In Section 2.7.1 of the TR, the applicant identified two ephemeral creeks (Spring and Unnamed) and a historic canal (Hall Canal) that pass through the proposed North Trend Expansion Area (see Figure 2.7-1 of the TR). The applicant did not analyze these drainage systems for potential impacts from their operations.

Needed: Provide a preoperational sediment monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: They are dry. They have not had water in them for years. The staff stated that if they can possibly be impacted by operations sediment samples should be collected to ensure that any future remediation is completed properly.

16. Preoperational surface water sampled for five quarters instead of at least 12 months. Only three quarters had the complete suite of radionuclides analyzed consistent with RG 4.14.

Background: RG 4.14 recommends sampling at least monthly from streams that cross the site boundary.

In Section 2.9.4 of the TR, the applicant stated that surface water was sampled from W-1 and W-2 on a quarterly basis during 2004 and 2005 for a total of five quarters. In a note to Table 2.9-6 of the TR, some of the quarterly samples were not analyzed for Th-230, Pb-210 and Po-210 due to a chain of custody error. Therefore, only 3 quarters of complete data are available versus 12 months recommended by RG 4.14. It is not clear how many samples were actually taken as the applicant discusses nine quarterly sampling periods while only five are shown on Table 2.9-6 of the TR.

Based on sample results, it is the opinion of the applicant that the results presented in Table 2.9-6 of the TR appear to be representative of the White River at W-1 and W-2.

This opinion is not sufficient justification to demonstrate consistency with RG 4.14.

Needed: 1) Clarification on the number of surface water samples evaluated; and 2) provide a preoperational surface water monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Applicant plans to address the concern.

17. Missing radionuclide constituents from some quarterly samples.

Background: As discussed in open issue #20, some of the quarterly samples were not analyzed for Th-230, Pb-210 and Po-210 due to a chain of custody error. This is inconsistent with RG 4.14.

Also discussed in open issue #20, it is the opinion of the applicant that the results presented in Table 2.9-6 of the TR appear to be representative of the White River at W-1 and W-2.

This opinion is not sufficient justification to demonstrate consistency with RG 4.14.

Needed: Provide a preoperational surface water monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Will fix when applicant fixes #20.

18. Preoperational surface water results do not delineate between suspended and dissolved radionuclides.

Background: Staff also notes that the applicant did not delineate between suspended and dissolved radionuclides as recommended by RG 4.14.

Needed: Provide a preoperational surface water monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: They will address this issue.

19. No preoperational surface water sampling evaluation for Spring and Unnamed Creeks and Hall Canal.

Background: RG 4.14 also recommends sampling from drainage systems that cross the site boundary and that may be impacted from contaminated areas. Any stream beds that are dry part of the year should be sampled when water is flowing.

As discussed in open issue #18, the applicant identified two ephemeral creeks (Spring and Unnamed) and a historic canal (Hall Canal) that pass through the proposed North Trend Expansion Area (see Figure 2.6-4). The sources of water include runoff flow and occasional springs.

The applicant did not evaluate these drainage systems for surface water sampling.

Needed: Provide a preoperational surface water monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: They will address this issue.

20. Analytical results for preoperational surface soil sampling not included in TR (Confirmatory).

Background: In Section 2.9.6 of the TR, the applicant has proposed collecting soil samples to a depth of 5 cm at 300 meter intervals to a distance of 1500 meters, where feasible, in eight meteorological sectors from the center of the proposed North Trend Satellite Facility (see Figure 2.6-2).

Samples will be analyzed for Ra-226 and 10 percent of the samples for natural uranium, Th-230, and Pb-210. However, the analytical results for surface soil sampling are not incorporated into the TR.

Needed: The applicant should incorporate the analytical results for surface soil sampling into the TR.

Response: Understood.

21. Analytical results for preoperational subsurface soil sampling not included in TR (Confirmatory).

Background: The applicant has also proposed collecting five subsurface soil samples at a center reference location (North Trend Satellite Facility) and at distances of 750 meters in each of four directions from the center point. All samples will be analyzed for Ra-226 and ones set of samples for natural uranium, Th-230, and Pb-210.

However, the analytical results for subsurface soil sampling are not incorporated into the TR.

Needed: The applicant should incorporate the analytical results for surface soil sampling into the TR.

Response: pre-construction issue. Can we include that as a license condition?

22. Insufficient justification for not monitoring radon effluent.

Background: The applicant discussed radon effluents in Section 5.7.7 of the TR. Based on the expected inconsistent radon flow rate and its interpretation of RG 8.37 regarding the practicality of monitoring for airborne radioactive effluents, the applicant decided not to perform any radon effluent monitoring.

NRC staff evaluated the applicant's rationale for not monitoring radon effluent and does not agree with it for the following reasons:

1) The applicant has not presented data on technologies evaluated and its potential application to its operations for NRC staff to make a complete determination on practicality;

2) RG 8.37 recommends that unmonitored effluents should not exceed 30 percent of the total estimated effluent releases;

3) RG 4.14 recommends operational sampling for Pb-210 on a semiannual basis under "other" stacks; and

4) It is not clear if the applicant has made an effort to identify the member of the public likely to receive the highest dose from licensed operations in accordance with 10 CFR 20.1301 which includes the entire Permit Area.

Needed: Applicant should propose an effluent monitoring program for gaseous effluents that addresses the requirements in 10 CFR 1302(a), 10 CFR 40, Appendix A, Criterion 7 and 8, and 10 CFR 40.65 and is consistent with RGs 4.14 and 8.37.

Response: They will address this issue.

23. Insufficient justification for not having an operational environmental air particulate monitoring program.

Background: In Section 2.9.2.3 of the TR, the applicant stated that it does not propose to perform any operational air particulate monitoring due to the absence of proposed operations that could be a source of airborne radioactive particulates.

NRC staff notes, however, that pregnant lixiviant field spills and transportation accidents have been shown (NUREG/CR-6733) to have the ability to result in a significant release of licensed material. In addition, radon daughters from operations can accumulate in soil, vegetation, and surface waters from airborne deposition.

Needed: The applicant should provide an operational environmental air particulate monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: They will address this issue.

END OF AGENDA ISSUES

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1. Criteria for placement of operational environmental radon monitor (See #2 above).

Background: In Section 2.9.2.1 of the TR, the applicant described the positioning of the air monitoring locations for the North Trend Expansion Area, AM-9 through AM-14 (see Figure 2.9-2 of the TR). It appears that the nearest residents and the locations of the proposed license boundaries were taken into consideration. However, referring to Figure 2.5-6 and Table 7.3-1 of the TR, the applicant did not appear to take into account the three different downwind sectors with the highest predicted radionuclide airborne concentrations during milling operations as recommended by RG 4.14.

Needed: The applicant should provide justification for placement of preoperational radon monitors which address RG 4.14 recommendations or sufficient justification for an alternate proposal.

Response: Understood. The monitors won't be placed very far apart.

2. No LLD specified for operational environmental radon measurements.

Background: Monitoring will be performed using Track-Etch radon cups on a semiannual basis. The applicant referred to "the required lower limit of detection (LLD)" but did not specify the value of the LLD. RG 4.14 recommends that the LLD for Rn-222 should be 2×10^{-10} μCi/ml.

Needed: The applicant should specify an LLD for radon measurements that is consistent with RG 4.14 or provide sufficient justification for an alternate value.

Response: They will address this issue.

3. No justification for not performing operational environmental soil sampling.

Background: RG 4.14, Table 2, suggests that soil sampling be conducted in five or more locations that are the same as for air particulate sampling. It suggests collecting annual grab samples and analyzing for natural uranium, Ra-226, and Pb-210.

The applicant did not propose to perform routine soil sampling during operations. Instead, the applicant stated that surface soil samples will be taken at the monitoring locations (AM-9 through AM-14, see Figure 5.7.7-2) following conclusion of operations and will be compared to the results of the preoperational monitoring program.

NRC staff notes that pregnant lixiviant field spills and transportation accidents have been shown to have the ability to result in a significant release of licensed material. In addition, radon daughters from operations can accumulate in soil, vegetation, and surface waters from airborne deposition.

Needed: The applicant should provide an operational soil monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Understood.

4. No justification for not analyzing White River sediments for Th-230.

Background: RG 4.14, Table 2, suggests that sediment sampling be conducted as an annual grab sample from each water body identified for surface water sampling. The sediment samples should be analyzed for natural uranium, Th-230, Ra-226, and Pb-210.

The applicant stated that upstream and downstream sediment samples from the White River will be collected annually and analyzed for natural uranium, Ra-226 and Pb-210. The applicant did not provide justification for not including Th-230 in its analysis of sediment.

As discussed in open issues #17, the decision to end Th-230 monitoring in sediments at the main facility was made only after evaluating the measurement of Th-230 levels in the environment following seven years of commercial operation at the currently licensed facility (ML071520242). Further, the applicant has not demonstrated that conditions at the North Trend Expansion Area would lead to identical results obtained at its currently licensed facility.

Needed: Provide an operational sediment monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Understood. They will fix any place where there is Th-230.

5. No operational sediment sampling evaluation for Spring and Unnamed Creeks and Hall Canal.

Background: RG 4.14 recommends sampling from drainage systems that cross the site boundary and that may be impacted from contaminated areas.

In Section 2.7.1 of the TR, the applicant identified two ephemeral creeks (Spring and Unnamed) and a historic canal (Hall Canal) that pass through the proposed North Trend Expansion Area (see Figure 2.7-1 of the TR).

The applicant did not analyze these drainage systems for potential impacts from their operations.

Needed: Provide an operational sediment monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Understood.

6. Insufficient justification for not having an operational vegetation sampling program.

Background: Where a significant pathway to man is identified, RG 4.14 suggests analyzing three of each type of crop, livestock, etc., raised within 3 km of the mill site.

The applicant did not propose to perform any vegetation, food or fish sampling during operations.

In Section 5.7.7 of the TR, the applicant stated that the vegetation pathway was evaluated and discussed in Section 7.3 of the TR. NRC staff notes that while the applicant discusses source terms and dose pathways in general, there is no comparison of the expected dose associated with the vegetation pathway to that of the “important” exposure pathways recommended in RG 4.14.

Needed: Provide an operational vegetation sampling program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Understood.

7. No justification for not having an operational crop sampling program.

Background: In Section 2.2.2.2 of the TR the applicant stated that the primary land use in the North Trend Expansion Area is cropland, primarily for the production of wheat with a small amount of land being used for the production of alfalfa.

Needed: The applicant should provide an operational crop sampling program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Understood.

8. No justification for not having an operational livestock sampling program.

Background: In Section 2.2.2.2 of the TR, the applicant identified that raising livestock is the primary land use within the North Trend Expansion Area and the surrounding 2.25-mile review area.

Needed: The applicant should provide an operational livestock sampling program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Understood.

9. No justification for not having an operational fish sampling program.

Background: In Section 7.2.7.10 of the TR, the applicant identified portions of Spring Creek and the White River, both of which cross the proposed site boundary, as suitable habitats for fish. NRC staff notes that fish sampling for the current licensed facility (ML080940310) did not appear to address either of these areas.

Needed: The applicant should provide an operational fish sampling program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Understood.

10. Insufficient justification for placement of operational direct radiation monitoring devices.

Background: RG 4.14, Table 2, suggest five or more passive integrating radiation devices at the same locations as air particulate sampling. The passive integrating radiation devices should be changed out on a quarterly basis and measured for gamma exposure rate.

The applicant proposed to monitor environmental gamma radiation levels continuously at the air monitoring stations (AM-9 through AM-14) with dosimeters that will be exchanged on a quarterly basis.

As noted in Section 2.6.1 of this SER, the applicant did not appear to take into account the three different downwind sectors with the highest predicted radionuclide airborne

concentrations during milling operations as recommended by RG 4.14 when determining air sampling locations.

Needed: The applicant should provide an operational direct radiation monitoring program consistent with RG 4.14 or sufficient justification for an alternate program.

Response: Understood.

HYDROGEOLOGIC ISSUES

1. Recent stream flow data and comparative assessment to past data.

   Background: In Section 2.7.1.2 of the TR, the applicant assessed stream flow in the White River, using various published data from 1992 through 2004. The applicant should assess more recent stream flow data and assess whether or not the recent data is comparable to past data. In this manner, a trend in stream flow may be identified. NRC staff noted that the USGS has published recent provisional stream flow data on its website.

   Needed: Recent stream flow data and comparative assessment to past data.

   Response: Understood.

2. Safety considerations and measures for potential flood impacts in Section 34.

   Background: In Section 2.7.1.4 of the TR, the applicant states, "the portion of the proposed North Trend Expansion Area where the greatest flooding potential related to the White River exists is the southeast part of Section 34. The White River elevation in that area varies from 3,645 feet AMSL on the western portion of the southern permit boundary, to 3,622 feet AMSL to the northeast. Because of lower elevation and proximity to the White River, final wellfield layout in Section 34 may necessitate consideration of potential flood impacts (e.g., below a surface elevation of 3,657 feet on the west, and 3,634 feet to the northeast)."

   Needed: Noting potential flood impacts in Section 34, what are the applicant's considerations for the final wellfield layout in that section? Other than the operational controls, use of dikes and berms, and daily wellfield inspections, what other design features and/or mitigation measures may be considered?

   Response: The only other issue is how the well is constructed. When the wells are installed the heads are not sticking above ground. Understood.

3. Justification and formal request for the 3-year alternate restoration schedule.

   Background: In Section 3.1.3 of the TR, the applicant provides a production and restoration schedule. Considering the applicant's current experience with wellfield restoration, NRC staff noted that the restoration timeline appears too short. Also, as specified in 10 CFR 40.42, the applicant's restoration schedule is considered to be an "Alternate Restoration Schedule." In accordance with these regulations, the applicant

must formally request an alternate restoration schedule in its application and deviations from this schedule require a license amendment.

Needed: Provide all requested information.

Response: Intent was to have a 3-year review. However, they can take that back to the regulations, as the regulations are written. Removed from the application.

4. Further assess the cause of the Basal Chadron's increased hydraulic gradient parallel to the monocline fold axis.

Background: On replacement page 3.1-20 of the Responses to NRC's Request for Additional Information dated February 28, 2009, the applicant states: "Recent water levels collected from the Basal Chadron Sandstone indicate that steep folding of the Basal Chadron Sandstone associated with development of the monocline structure south of the North Trend Area does not appear to affect the overall hydraulic gradient direction. However, there is a noticeable increase in hydraulic gradient parallel to the fold axis along the length of the structure. This has been interpreted as a decrease in transmissivity. Reduced transmissivity was likely the result of structural thinning of Basal Chadron Sandstone along the northern limb of the monocline. Other explanations for the steepened gradient in the vicinity of the fold include possible heterogeneity within the Basal Chadron Sandstone, any spatial variation of leakage through the upper confining layers (though the rate of leakage required to produce the observed change in gradient would be minimal) and pressure-induced permeability reductions due to compressional stresses associated with folding."

Needed: This issue has been resolved internally with NRC staff. No other action required.

5. Short-term stability analysis, construction, drawings, and associated monitoring wells for evaporation ponds.

Background: Short-term stability analysis, construction, drawings, and associated monitoring wells for evaporation ponds in compliance with 10 CFR 41 (h) and 10 CFR 40 Appendix A. NRC staff noted that licensed and operational ponds at the start of production are one option that could be used to maintain groundwater bleed in the event deep well disposal fails in the short-term.

Needed: As stated.

Response: They have a pond design.

6. Justification for baseline indicators, silver, gross alpha and gross beta.

   Background: Within Section 2.7.3 of the TR, the applicant's list of baseline indicators is tailored from the list provided in NUREG 1569 to exclude silver, gross alpha, and gross beta. Consistent with NUREG–1569, the applicant may propose a list of baseline indicators tailored to a particular location with a sufficient technical basis.

   Needed: A technical bases for excluding silver, gross alpha, and gross beta from the baseline indicators should be provided.

   Response: The reason is the current DEQ requirements.

7. Justification for one overlying monitoring well per five acres and one baseline restoration well per four acres.

   Background: In Sections 7.5.3.1 and 6.1.3.1, the applicant proposes one overlying monitoring well per five acres and one baseline restoration well per four acres. Justification for the proposed well spacings was not provided.

   Needed: Sufficient technical basis for the proposed well spacings.

   Response: Was originally given to the applicant by the NRC.

8. Clarify the penetration of screened interval.

   Background: In Section 3.1.2.2 of the TR, the applicant states, "The method consists of drilling a hole, geophysically logging the hole to define the desired screen interval, and reaming the hole, if necessary, to the desired depth and diameter.

   Needed: Penetration of screened interval of monitoring and production wells and associated justification.

   Response: Screened interval wells are based on geophysical logs. Deep monitors are screened through the entire interval of sand.

9. NRC must be notified within seven days of excursion in verification

   Background: In Section 5.7.8.2 of the TR, the applicant states, "Upon verification of the excursion, the USNRC Project Manager is notified by telephone or email within 48 hours and notified in writing within thirty (30) days."

   Needed: Revise written notification from 30 days to 7 days.

   Response: Currently do it that way in the current facility. DEQ requires notification within 5 days.

Administrative Issues

1. "Humidity" and "Winds" section numbers mislabeled.

   Background: In its February 27, 2009 response to NRC staff's request for additional information dated November 17, 2008, the applicant provided changes to Section 2.5 of the TR. It appears that the section titled "Humidity" should have been labeled as Section 2.5.4 and not 2.5.3. This has caused the section on humidity and winds to be mislabeled.

   Needed: Applicant should label section correctly.

   Response: They'll double check that.

2. In the notes to Table 2.5-13 (all stabilities), it reads "Percent occurrence for A stability class = 100%". It appears that "A" should read "All."

   Background: Self-explanatory.

   Needed: Applicant should address this issue.

   Response: They'll fix that.

3. No table number assigned to table on page 2.9-11 (mean radon concentration).

   Background: Self-explanatory.

   Response: They'll fix it.

4. Where does seventh data point from Table 2.9-12 of TR come from?

   Background: This data point is not on Figure 2.9-6 of the TR.

   Needed: A description of the seventh data point (satellite processing area).

   Response: They'll look for those. It's the mean of the 422 measurements.

5. Text of description of proposed surface soil sampling program does not comport with Figure 2.9-4 of the TR.

   Background: In Section 2.9.6 of the TR, the applicant has proposed collecting soil samples to a depth of 5 cm at 300 meter intervals to a distance of 1500 meters, where feasible, in eight meteorological sectors from the center of the proposed North Trend Satellite Facility (see Figure 2.9-4 of the TR).

   The applicant stated that 4 of the 8 directional lines have a distance less than 1500 meters, and therefore only a total of 10 samples will be collected versus 20 specified by

RG 4.14. According to the applicant, this will result in a total of 30 samples versus up to 40 specified in the above referenced RG.

Staff has reviewed Figure 2.9-4 of the TR and it appears that only 2 of the 8 directional lines have a distance less than 1500 meters, and therefore a total of 37 surface soil samples are proposed by the applicant.

Needed: The text of the description of the proposed surface soil sampling program should comport with Figure 2.9-4.

Response: They will double check that number of samples.

6. It is stated in the TR that that W-2 in Figure 2.7-1 is upstream of the site boundary. It appears to be downstream.

Background: In Section 2.9.4 of the TR, the applicant described its preoperational surface water monitoring program. Surface water samples were taken from locations W-1 and W-2 on the White River shown on Figure 2.7-1 of the TR.

The applicant stated that W-1 and W-2 are located upstream of where the White River flows along the southeast corner of the North Trend Expansion Area site boundary.

Needed: Provide a description of W-1 and W-2 that comport with Figure 2.7-1 of the TR.

Response: W-2 is downstream.

7. The note to Table 2.9-6 indicated “groundwater”. It appears that this should indicate “surface water.”

Background: Self-explanatory.

Needed: Provide a corrected version of the note to Table 2.9-6.

Response: Applicant will make appropriate fixes.

8. Water supply wells in Table 2.2-12 were not all found in Figure 2.2-4.

Background: In the applicant’s Responses to NRC’s Request for Additional Information dated February 28, 2009, wells 55, 60, 61, 65, 98, 219, and those of the 5,000 series listed in Table 2.2-12 were not shown in Figure 2.2-4.

Needed: Revise Figure 2.2-4 with the location of all water wells.

Response: Understood.

9. Missing Figure

Background: The revised Figure 3.2-1 is missing in the replacement pages within the Responses to NRC's Request for Additional Information dated February 28, 2009

Needed: The revised Figure must be provided.

Response: The applicant will fix it.