UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Michael M. Gibson, Chairman
Dr. Richard E. Wardwell
Brian K. Hajek

In the Matter of	Docket No. 40-8943
CROW BUTTE RESOURCES, INC.	ASLBP No. 08-867-02-OLA-BD01
(License Renewal for the In Situ Leach Facility, Crawford, Nebraska)	December 6, 2016

NOTICE
(Providing Parties' Proposed Questions for the Official Record)

The documents attached to this Notice are the proposed questions submitted to this Licensing Board by the NRC Staff, Crow Butte, the Oglala Sioux Tribe, and Consolidated Intervenors[1] prior to or during the evidentiary hearing.[2] In accord with 10 C.F.R. § 2.1207(a)(3)(iii), the attached questions are included in the official record of this proceeding.

It is so ORDERED.

FOR THE ATOMIC SAFETY
AND LICENSING BOARD

/RA/

Michael M. Gibson, Chairman
ADMINISTRATIVE JUDGE

Rockville, Maryland
December 6, 2016

[1] In the Partial Initial Decision issued in conjunction with this Order, we have referred to the Oglala Sioux Tribe and Consolidated Intervenors together as Joint Intervenors.

[2] In a separate order dated June 7, 2016, we provided those questions proposed by the parties during the hearing that related to Contention 1 only. Notice (Providing Parties' Proposed Cross-Examination Questions) (June 7, 2016).

Attachment 1

NRC Staff Proposed Questions

June 29, 2015

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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NRC STAFF'S PROPOSED QUESTIONS

Pursuant to 10 C.F.R. § 2.1207(a)(3) and the Board's scheduling order in this proceeding, the NRC Staff submits, *in camera*, its proposed questions for the Board's consideration.[1] The Staff's proposed questions are directed to the prefiled direct and rebuttal testimony of the witnesses appearing on behalf of the Oglala Sioux Tribe (OST) and the Consolidated Intervenors (CI) (collectively, "the Intervenors"). The answers to these questions will help the Board build a sound record and will further demonstrate that the NRC Staff complied with the National Environmental Policy Act (NEPA) and other laws when preparing the final Environmental Assessment (EA) for the license renewal of the Crow Butte Resources (CBR) in-situ recovery (ISR) facility.

[1] The Staff's proposed questions relate to Contentions A, C, D, F, 1, 6, 9, and 12. The Staff notes that the Intervenors' prefiled testimony concerning Contention 14 consisted of a single general statement that impacts of past and future earthquakes should be considered. Additionally, the Intervenors did not submit prefiled testimony addressing two issues in Contention D (use of data from the North Trend Expansion Area in modeling of the White River structural feature and cumulative impacts related to environmental justice) and did not submit prefiled testimony addressing one issue in Contention 12 (tornados). Therefore, the Staff is not proposing questions addressing Contention 14 or the above-mentioned issues in Contentions D and 12.

I. Proposed Questions for Contention A

A. Issues For Further Examination: Mr. Wireman claims that uranium should be included as an indicator parameter for excursion monitoring in addition to chloride, total alkalinity and conductivity. (Ex. INT-070 at 2). Dr. Kreamer claims that "[s]ite monitoring has the potential to provide information that does not accurately reflect levels and spatial orientation of any potential pollutant release, synergistic effects of multiple contaminants, and does not provide early warning of contaminant migration." (Ex. INT-046 at 5)

B. Objective: To establish that the Intervenors' witnesses' claims regarding the adequacy of the excursion parameters employed at the CBR facility are unfounded.

C. Proposed Questions for Mr. Wireman and Dr. Kreamer:

1. Do you acknowledge that as part of its excursion monitoring program CBR is required to monitor for three indicator parameters – chloride, conductivity, and total alkalinity? (Ex. NRC-012 at 11).

2. Isn't it true that monitoring for these three parameters is a requirement of Condition 11.4 of CBR's license? (Ex. NRC-012 at 11).

3. Isn't it also true that the use of alkalinity, conductivity and chloride as the excursion parameters for the CBR site has been a requirement of CBR's license since 2003? (Ex. NRC-010 at 78).

4. Therefore, isn't it true that CBR has over ten years' operating experience monitoring for excursions using these three excursion parameters?

5. The Staff states in the EA and the SER that between 1995 and 2010, CBR's excursion monitoring program has enabled CBR to identify and place 13 perimeter monitoring wells on excursion status and identify 16 excursion events in 12 monitoring wells in the overlying aquifer (Ex. NRC-010 at 79-80; Ex. NRC-009 at 124-25). You did not dispute this information in your testimony, correct?

6. Do you acknowledge, then, that CBR has identified excursions at the CBR site without employing uranium as an excursion indicator?

7. Do you also acknowledge that the Staff states in the EA that there has been no known measurable impact to groundwater beyond the licensed area from CBR operations? (Ex. NRC-010 at 81).

8. Isn't it true that you did not in your initial or rebuttal testimony provide any evidence that CBR has failed to detect the existence of excursions as a result of using chloride, conductivity, and total alkalinity as excursion indicators?

9. Isn't it true that you did not in your initial or rebuttal testimony provide any evidence that groundwater at the CBR site has been impacted beyond the licensed area from CBR operations?

10. Do you acknowledge that NUREG-1569 ("Standard Review Plan for In-Situ Leach Uranium Extraction License Applications"), states that uranium is a poor excursion indicator? (Ex. NRC-013 at 5-41).

11. Do you acknowledge that NUREG/CR-6733 states that the criteria for selecting an excursion indicator parameter are that the constituent is found in elevated concentrations in uranium ISL process water and is generally nonsorbing and nonreactive? (Ex. NRC-017 at 4-38).

12. Do you acknowledge that NUREG/CR-3709 explains that uranium is not conservative and not useful as an excursion indicator because its value (concentration) changes rapidly as lixiviant interacts with the aquifer material? (Ex. NRC-018 at 5).

13. Do you agree that existing NRC guidance discourages the use of uranium as an early-time excursion parameter?

14. The Staff states in its initial testimony that adsorption and other mechanisms cause the movement of uranium in groundwater to slow down relative to the speed of groundwater (Ex. NRC-001 at 11-12). Do you agree that you have not in your testimony challenged the information in the Staff's explanation of the reasons why uranium is not favored as an excursion indicator?

15. Isn't it true, therefore, that you have not provided any information to indicate that uranium is conservative or preferable excursion indicator to chloride, conductivity, and total alkalinity at the CBR site?

D. Proposed Questions for Mr. Wireman:

1. In your rebuttal testimony, you claim that uranium should be included as an indicator parameter for excursion monitoring in addition to chloride, total alkalinity and conductivity (Ex. INT-070 at 2). Isn't it true, however, that you don't specifically address any of the documents raised in the Staff's initial testimony regarding the usefulness of uranium as an excursion indicator?

2. Do you acknowledge that you have not provided any studies or reports that support the preferential use of uranium as an indicator of excursions during ISR operations?

II. Proposed Questions for Contention C

A. Issues For Further Examination: The Intervenors claim that the White River and White River alluvium are potential pathways for contamination from accidents at the CBR facility and that impacts to the White River were not adequately addressed in the LRA or the EA.

B. Objective of the Examination: To establish that the White River alluvium will not be impacted from operations at the CBR facility, and that impacts to surface waters, including the White River, were adequately addressed.

C. Proposed Questions for Dr. LaGarry, Dr. Kreamer and Mr. Wireman:

1. As described in the LRA and in the EA, as well as in the Staff's initial testimony at A.C.4 (Ex. NRC-001 at 17-20), CBR has extensive operational controls, procedures, and monitoring in place to prevent and detect spills and leaks, and to address and minimize impacts from spills and leaks. Isn't it true that you have provided no evidence to indicate that any of those controls, procedures and monitoring are ineffective?

2. Do you acknowledge that spills or leaks that have occurred at the CBR facility have been identified and have not been shown to have led to offsite impacts?

    - If no – what evidence have you provided to suggest otherwise?

3. Isn't it true that you have provided no evidence that contaminants from spills or leaks have reached the White River alluvium or the White River?

4. Do you acknowledge that the EA (Ex. NRC-010 at 70) states that quarterly monitoring results for English and Squaw Creeks from 1990 to 2010 show that radionuclide concentrations remained at or below preoperational levels?

5. In A.C.4 of its initial testimony (Ex. NRC-001 at 19) and in the EA (Ex. NRC-010 at 70), the Staff explains that annual sediment sampling at upstream and downstream locations on English and Squaw Creeks shows no clear trends since the last license renewal that indicate impacts from surface spills or leaks. Do you dispute that statement?

    - If yes, what evidence have you provided to support your position?

6. In the LRA, CBR indicated that it has plugged all exploratory drill holes at the CBR site (Ex. CBR-011 at 5-30). Do you dispute that statement?

    - If yes, what evidence have you provided to support your position?

7. The Staff stated in the EA (Ex. NRC-010 at 81) that monitoring of private wells screened in the Brule aquifer show that water quality has remained consistent with radiological background levels. Do you dispute that statement?

    - If yes, what evidence have you provided to support your position?

8. Do you agree that contaminants from leaks and spills migrating through the Brule aquifer at the CBR site would have to travel over a distance of 2 miles before reaching the White River?

9. Do you agree that, when contaminants migrate underground, natural processes such as dilution and sorption will occur?

10. CBR has testified that the Basal Chadron Sandstone outcrops about 10 miles north of the proposed North Trend Expansion Area (NTEA) (Ex. CBR-045 at 31). Consistent with that statement, the Staff has testified that it is only aware of two reported outcrops of the Basal Chadron Sandstone, about 12 miles northwest of Crawford in Sioux County, Nebraska (Ex. NRC-001 at 21). Do you dispute these statements?

    - If yes, what evidence have you provided to support your position?

11. Isn't it true that if the Basal Chadron Sandstone outcrops at the locations identified by CBR and the Staff, then even if fluids could be transmitted through the Basal Chadron Sandstone outside of the license area, it would not result in contaminants reaching the White River through expression on the land surface?

12. Isn't it true that, according to License Condition 10.7 (Ex. NRC-012 at 8), CBR must maintain an inward hydraulic gradient in the mined aquifer (Basal Chadron Sandstone) during wellfield operations?

13. The EA states that test results from monitoring of offsite private wells – including Well 61, which is screened in the Basal Chadron Sandstone aquifer and is located between the license area and the White River -- indicate that uranium and radium levels have remained consistent with preoperational background levels (Ex. NRC-010 at 81). Do you dispute that statement?

    - If yes, what evidence have you provided to support your position?

14. Referring to Ex. NRC-022, isn't it true that the South Dakota Department of Environmental and Natural Resources (SD DENR) performs annual water quality testing on the White River at a station near Oglala, South Dakota, which includes testing for uranium and other contaminants associated with ISR activities?

15. Do you acknowledge that the SD DENR stated that annual testing of water from the White River has shown no impacts from the ISR operations occurring upstream (Ex. NRC-022 at 143)?

D. <u>Proposed Questions for Dr. Kreamer:</u>

1. In your rebuttal testimony (Ex. INT-069 at 6) you assert that screening entire thickness of an aquifer is not standard practice. Do you acknowledge that CBR's Class III UIC permit issued by NDEQ requires production zone monitoring wells to be screened over the entire aquifer thickness (Ex. CBR-019 at 16)?

2. Do you acknowledge that the State of Nebraska has primary enforcement responsibility ("primacy") with respect to underground injection control

(UIC) programs, and those programs are administered by the Nebraska Department of Environmental Quality (NDEQ)? (*see* Ex. CBR-019 at 5).

3. Do you acknowledge that having primacy means the state's UIC program has been approved by the U.S. Environmental Protection Agency (EPA)?

II. Proposed Questions for Contention D

A. Issues For Further Examination: The OST claims that the Basal Chadron aquifer, where CBR's operations occur, is in communication with the aquifer that provides drinking water to the Pine Ridge Reservation, and that because of this alleged communication, the Staff should have considered environmental justice impacts on residents of the Pine Ridge Reservation

B. Objective of the Examination: To demonstrate that there is no communication between the aquifers; therefore, CBR's operations do not impact groundwater offsite, including at the Pine Ridge Reservation, and that it was not necessary to consider environmental justice impacts on residents of the reservation.

Questions related to the presence of faults at the CBR site

C. Proposed Questions for Dr. LaGarry:

1. Isn't it correct that you acknowledged in your testimony that extensive field work would be required to verify whether lineaments identified from remote sensing data are in fact faults?

2. And isn't it true that subsurface exploration is necessary to determine the extent of faults and their possible impacts on confinement?

3. Isn't it true that Balmat's study (Ex. INT-056), which you cite in your testimony, only included surficial field verification within a small area near Chadron, which is over 20 miles from the CBR site?

4. Isn't it true that Balmat did not provide a map or any other information in her thesis (Ex. INT-056) indicating that lineaments she identified occur at or near the CBR site?

5. In your testimony you refer to a poster presentation by Maher and Schuster (Ex. INT-060) discussing fieldwork they performed to identify regional structural features. Isn't it true that all of the sites they investigated are at least 9 miles (15 km) away from the CBR facility?

6. In your testimony you cite work by Diffendal (Ex. INT-055). Isn't it true that lineaments identified by Diffendal were not verified (ground-truthed) by fieldwork?

D. Proposed Questions for Dr. LaGarry, Dr. Kreamer, and Mr. Wireman:

1. Isn't it true that you have not provided any field-verified evidence of faults or joints capable of transmitting ISR fluids from the Basal Chadron

Sandstone aquifer through the upper confining unit in or near the CBR license area?

2. Do you agree that the White River structural feature is located along the White River, approximately 2 miles northwest of the northern site boundary of the CBR license area?

3. Do you agree that the White River structural feature lies along the southeast boundary of the proposed North Trend Expansion Area (NTEA)?

4. In its initial testimony (Ex. NRC-001 at 39, 44), the Staff discussed the lines of evidence that support the conclusion that the White River structural feature is a fold. Isn't it true that you have provided no evidence supporting the interpretation of the White River feature as a fault?

5. The Staff and CBR have testified that the conclusions regarding the White River structural feature are supported, in part, by a 3D geological model of the White River feature based on borehole geophysical logs (Ex. NRC-001 at 37, 39; Ex. CBR-001 at 24-25). Do you dispute those statements?

6. Referring to Ex. CBR-019, do you acknowledge that in 2011, the Nebraska Department of Environmental Quality (NDEQ) issued an aquifer exemption for the NTEA? (Ex. CBR-019 at 1).

7. Isn't it true that when NDEQ issued the aquifer exemption for the NTEA, NDEQ independently concluded that "there is no evidence that a fault offsets the geologic contact with the Pierre Formation and overlying White River Group, nor individual members of the White River Group (i.e., Brule and Chadron formations)"? (Ex. CBR-019, Attachment C at 2-3).

8. Isn't it true that NDEQ's conclusion was based in part on independent review by geologists who found CBR's structural interpretations plausible? (Ex. CBR-019, Attachment C at 6).

9. Isn't it true that NDEQ also concluded that there was no evidence of faults or contaminant pathways between the Basal Chadron Sandstone and Brule aquifers within the NTEA aquifer exemption boundary? (Ex. CBR-019, Attachment C at 6-8, 12).

Questions related to confinement at the CBR facility

10. The LRA (Ex. CBR-011 at 2-136) and EA (Ex. NRC-010 at 38) describe the upper confining layers above the wellfields (Middle and Upper Chadron and Lower Brule formations) as consisting of 200 to 500 feet of clay and siltstones with very low vertical hydraulic conductivity. Do you dispute the description of the upper confining layers?

11. Isn't it true that the presence of several hundred feet of clay and siltstones is an indicator of confinement between the Basal Chadron Sandstone and Brule aquifers?

12. The LRA (Ex. CBR-011 at 2-127) and EA (Ex. NRC-010 at 26, 34-35) describe the lower confining layer (Pierre Shale) as being over 1000 feet of marine shale with low vertical hydraulic conductivity that is considered to be essentially impermeable. Do you dispute this description?

13. The LRA (Ex. CBR-011 at 2-127 to 2-128) reports results of x-ray diffraction and other tests which indicate that both the upper confinement (Upper and Middle Chadron) and lower confinement (Pierre Shale) contain significant amounts of montmorillonite clay, as well as other clays. Do you dispute these results?

    - If yes, what evidence have you provided to support your position?

14. Do you agree that the cross sections provided in the LRA (Ex. CBR-011 at 2-111 to 2-125) illustrate the continuity of the upper confining units throughout the CBR site?

    - If no, what evidence have you provided to support your position?

15. In A.D.3 of its initial testimony (Ex. NRC-001 at 30), the Staff testified that there has been very little change in the potentiometric surface in the Brule aquifer between 1982-83 and 2009, while the potentiometric surface of the Basal Chadron Sandstone aquifer decreased by about 14 m (47 ft). Do you dispute this statement?

    - If yes, what evidence have you provided to support your position?

16. Isn't it true that a significant difference in potentiometric surfaces is evidence of hydraulic isolation between aquifers?

17. Isn't it true, then, that the significant drawdown in the Basal Chadron Sandstone aquifer, compared with no significant change in the overlying Brule aquifer wells, signifies that the Basal Chadron Sandstone aquifer is hydraulically isolated from the Brule aquifer? (Ex. NRC-001 at 30-31).

Questions regarding aquifer pumping tests

E. Proposed Questions for Dr. Kreamer and Mr. Wireman:

1. Isn't it true that all four of the pumping tests conducted at the CBR facility showed no response in the overlying aquifer wells?

2. Isn't it true that during an aquifer pumping test, a lack of response in the overlying aquifer well signifies that the lower aquifer is confined?

3. Isn't it true that the lack of response in a piezometer in the upper confining unit signifies that the overlying confining unit behaved as an impermeable unit?

F. Proposed Questions for Dr. Kreamer:

1. You testified that data analysis methods used for CBR's aquifer pumping tests were inappropriate for the stated field conditions. But isn't it true

that these methods are widely used and accepted methods taught in hydrogeology courses and incorporated into ASTM standards?

2. Isn't it true that if the data analysis methods used by CBR could only be used for systems that are homogeneous and isotropic, they would never be applicable because no hydrogeologic systems are truly homogeneous and isotropic?

3. In your rebuttal testimony (Ex. INT-069 at 4), you discuss results of aquifer tests performed in 2004 and 2005 that CBR stated were "not definitive." Do you acknowledge that those aquifer tests were performed for the North Trend Expansion Area (NTEA) at locations over 2 miles from the CBR license area (Ex. NRC-028 at PDF 7)?

4. Do you acknowledge that in 2006 CBR performed another aquifer pumping test at the NTEA in accordance with a test plan submitted to NDEQ (Ex. NRC-028 at PDF 7)?

Questions related to claims that uranium from the CBR site is contaminating wells at the Pine Ridge Reservation

G. Proposed Questions for Ms. White Face:

1. Do you agree that during ISR operations, lixiviant is pumped into the uranium-bearing aquifer, which at the CBR facility is the Basal Chadron Sandstone aquifer?

2. Do you agree, then, that your statement on page 3 of Ex. OST-001, where you say that CBR pumps lixiviant into the Arikaree aquifer, is incorrect?

3. You have stated that the drinking water aquifer of concern at Pine Ridge Reservation is the Arikaree. Do you agree that the Arikaree Formation overlies the Brule Formation of the White River Group?

5. Do you agree that according to the hydrogeological map you provided (unnumbered page 14 of Ex. OST-001), the Arikaree Formation is not present in the southwest corner of the Pine Ridge Reservation?

6. Do you agree that, according to the hydrogeological map you provided, Dawes County, Nebraska abuts the area at the southwest corner of the Pine Ridge Reservation where the Arikaree Formation is not present?

7. Referring to the potentiometric map provided with your statement (Ex. OST-001 at 15 – unnumbered in original), do you acknowledge that the direction of groundwater flow in the southwest corner of the Pine Ridge Reservation is to the west and northwest, away from the center of the reservation?

8. Do you agree that the water supply wells you have identified in the Arikaree aquifer at the Pine Ridge Reservation (in Oglala, SD; Pine

Ridge, SD; and Kyle, SD) are all at least 49 miles from the closest boundary of the CBR license area?

9. Do you acknowledge that in Ex. OST-001 you have not identified a specific pathway by which contaminants (e.g., uranium) can travel through aquifers from the CBR site to the wells you have identified in the Arikaree aquifer?

10. Do you acknowledge that the Basal Chadron Sandstone pinches out northeast of the CBR site, and is not present beyond approximately 5 miles north and east of Crawford (*see* Ex. NRC-001 at 32-33)?

11. Do you acknowledge that the distance between the point where the Basal Chadron Sandstone pinches out and the boundary of the Pine Ridge Reservation is at least 25 miles?

12. Do you acknowledge that the Chadron Formation between those same points consists of low permeability siltstones and mudstones which do not transmit appreciable flow (Ex. NRC-001 at 32-33, Ex. NRC-030 at 279)?

13. Do you acknowledge that the White River Group, which includes the Chadron Formation, is described as impermeable and not an aquifer at the Pine Ridge Reservation? (Ex. NRC-025 at 7, Ex. NRC-026 at 8, 10, 11)?

Questions related to interpretation of well test results as evidence of uranium traveling from the CBR site to the Pine Ridge Reservation

14. Do you agree that activity ratios are not equivalent to natural abundance (mass) ratios?

15. Do you acknowledge that on page 5 of your statement, where you state that "[t]he ratio of U-234 to U-238 is almost 2 to 1, when in nature it would be U-234 at 0.005 to U-238 at 99.27," you have incorrectly compared activity to natural abundance (mass)?

16. Referring to Ex. NRC-082 at 2, do you agree that activity ratios of U-234 to U-238 in naturally occurring groundwater can range from 1-3?

17. Do you agree that the activity ratios in the well test data you provided in Ex. OST-001 are consistent with the activity ratios calculated from the data on pages 60-61 in Ex. NRC-025 (the Heakin report on water quality at the Pine Ridge Reservation)?

18. Referring to your statement (Ex. OST-001 at 5) that "when naturally occurring Uranium is disturbed, the ratio of U-238 to U-234 will change," do you agree that the chemical reactions involved in the ISR process are isotope independent (i.e., U-234, U-235 and U-238 all behave similarly in the reactions)?

19. Do you agree that the transformation from U-238 to U-234 occurs through radioactive decay, which is not influenced by the chemical reactions of the ISR process?

20. Do you agree, therefore, that the chemical reactions in the ISR process do not change the ratio of U-238 to U-234?

IV. Proposed Questions for Contention F

A. Issues For Further Examination: The Consolidated Intervenors assert that CBR and the NRC Staff failed to use recent research related to geology and hydrology

B. Objective of the Examination: To demonstrate that the NRC Staff appropriately considered recent research related to geology and hydrology in its review of the LRA and development of the SER and EA.

C. Proposed Questions for Dr. LaGarry:

1. In A.F.4 of the Staff's initial testimony (Ex. NRC-001 at 54-55), the Staff states that the stratigraphic units identified on page 2 of your 2008 expert opinion (Ex. INT-003) are present at the CBR site except for the Ogallala Group. Do you agree with that assessment?

2. Referring to Figures 2.6-3, 2.6-9, and 2.6-11 of the LRA (Ex. CBR-011 at 2-109, 2-121 and 2-125), do you agree that the Arikaree Group is only present at the far southeast corner of the site?

3. In your 2015 expert opinion (Ex. INT-013 at 4), you assert that the EA continues to refer to the mined aquifer at the CBR site as the Basal Chadron Sandstone instead of the "Chamberlain Pass Formation." Referring to Ex. NRC-033, do you agree that, according to the United States Geological Survey (USGS), the White River Group in Nebraska is composed of the Chadron Formation and the Brule Formation?

4. And do you therefore agree with the Staff (Ex. NRC-009 at 15) that the USGS does not currently use your proposed nomenclature (i.e, "Chamberlain Pass Formation") in Nebraska?

5. Referring to Ex. CBR-019 at 1, do you agree that when NDEQ granted to aquifer exemption for the NTEA in 2011, NDEQ referred to the exempted aquifer as "portions of the Chadron Formation in Dawes County, Nebraska . . . including the Basal member of the Chadron Formation."?

6. Referring to Ex. CBR-019, Attachment C at 3, isn't it true that when NDEQ granted the aquifer exemption petition for the NTEA, NDEQ allowed CBR to continue to refer to the mined aquifer as the "Basal Chadron Sandstone" for consistency with historical permitting and to avoid confusion?

7. Do you agree with the NRC Staff (Ex. NRC-009 at 15) that "nothing in the naming conventions for the geologic units . . . changes the interpretation of the physical or hydraulic features of the rock units"?

8. Referring to Ex. CBR-019, Attachment C at 14, isn't it true that when NDEQ granted the NTEA aquifer exemption petition, NDEQ stated that "differences in geological mapping of units between pre-1990's workers and post-1990's workers have been accounted for by correlating historical nomenclature with the more modern terms applied to stratigraphic sections in this region."?

9. In your 2008 opinion (Ex. INT-003 at 3), you asserted that the simplified, layer cake concept "is incorrect and overestimates the thickness and areal extent of many units." Isn't it true, however, that CBR provided site-specific cross sections based on lithologic and geophysical characteristics that show the thickness and extent of various stratigraphic units within the CBR license area? (Ex. CBR-011 at 2-109 through 2-125).

D. Proposed Questions for Dr. LaGarry, Dr. Kreamer, and Mr. Wireman:

1. In A.F.5 of the Staff's initial testimony, the Staff explained that the analysis of ground water systems relies on grouping various regional stratigraphic units with similar hydrogeological properties into "hydrostratigraphic units." The Staff then explained that it used CBR's site-specific cross-sections for the purposes of identifying the hydrostratigraphy at the site. Do you dispute this approach?

   - If "Yes" – please explain why this is inappropriate

2. In A.F.5, the Staff stated that the cross-sections, along with other hydrogeological characterization (such as aquifer pumping tests, water levels, and core testing) support a hydrostratigraphic "layer cake" model for characteristics that control ground water flow at the CBR site. Do you dispute this statement?

   - If "Yes" – please provide specific reasons why you dispute this.

V. Proposed Questions for Contention 1

A. Issue For Further Examination: The Intervenors claim that the cultural resources surveys and other information incorporated into the EA are inadequate under NEPA.

B. Objective of the Examination: To establish that the cultural resources surveys and other information presented in the EA demonstrate that the Staff's review of impacts to cultural resources from renewing CBR's license was consistent with NEPA.

C. Proposed Questions for Mr. CatchesEnemy and Mr. Yellow Thunder:

1. Do you acknowledge that under License Condition 9.8, CBR is required to avoid any discovered cultural resources by ceasing "any work resulting in the discovery of previously unknown cultural artifacts"? (Ex. NRC-012 at 6)

2. Do you acknowledge that under License Condition 9.8, upon such a discovery, CBR must ensure that the cultural resource is "inventoried and evaluated in accordance with 36 CFR Part 800," and that CBR is prohibited from disturbing the area until the NRC has authorized it do so? (Ex. NRC-012 at 6)

3. Do you acknowledge that under License Condition 9.8, CBR is required to coordinate with the Nebraska State Historical Society prior to commencing any development activity in the vicinity of the previously-documented six "potentially eligible" sites? (Ex. NRC-012 at 6)

4. You testified that the 1982 and 1987 Class III field inventories "are not sufficient to identify all sites and resources of historic, cultural, and spiritual significance to tribes." (Ex. INT-031 at 7; Ex. INT-032 at 5) Do you acknowledge that the Staff's efforts to identify cultural resources that may be affected by the renewal of CBR's license included a literature review; contacts with local experts, societies, neighboring federal and state agency offices, and regional archives; field trips to the CBR facility in conjunction with Tribal consultation meetings, which included participation by OST members; and an offer of open site access to any Tribes who wished to conduct their own field inventory?

5. You testified that the Traditional Cultural Properties (TCP) survey performed in November-December 2012 was insufficient to identify cultural resources because of "[t]he failure[] of the NRC Staff to obtain the Tribe's participation." (Ex. INT-031 at 7; Ex. INT-032 at 5) Isn't it true that the Staff sent OST an October 31, 2012 letter inviting the Tribe to participate in the TCP survey?

6. Do you acknowledge that OST did not respond in any way to the invitation letter?

7. Do you acknowledge that OST did not respond to follow-up phone calls on November 6, 2012, other than to acknowledge that the Tribe had received the invitation letter?

8. Do you acknowledge that the Staff sent OST a November 21, 2012 letter following up on the TCP survey invitation?

9. Do you acknowledge that OST did not respond in any way to the follow-up letter?

10. Do you acknowledge that the NRC Staff solicited comments on the Santee Sioux Nation TCP survey report, and that OST did not submit comments in response to the Staff's solicitation?

D. Proposed Questions for Mr. Catches Enemy:

11. You testified that the same survey process was used in the Dewey-Burdock initial licensing and the CBR license renewal. (Ex. INT-031 at 7) Isn't it true that the Dewey-Burdock initial licensing is for a new site, while the CBR license renewal involves an existing site that has been previously surveyed?

E. Proposed Questions for Dr. Redmond, Mr. Catches Enemy, and Mr. Yellow Thunder:

12. Are you aware that the Staff conducted additional literature searches and interviews with local experts in the history and ethnography of the area, including OST experts, in order to give special emphasis to potential Lakota places of significance—especially for the OST? (Ex. NRC-051A at 3; Ex. NRC-051C at 6-8)

13. Are you aware that these additional efforts did not reveal the presence of potential places of tribal importance within the area of potential effect?

F. Proposed Questions for Dr. Redmond:

14. You wrote a letter to David Frankel dated January 28, 2013. (Ex. INT-054) Isn't it true that your letter states that your opinion is based on your "review[of] the CBR . . . environmental report for the Marsland Expansion Area dated May 2012" (Ex. INT-054 at 1), not the CBR license renewal EA or cultural resources surveys of the CBR license renewal area?

15. You wrote a letter to David Frankel dated May 5, 2015. (Ex. INT-022) Isn't it true that your letter states that your opinion is based on "the materials utilized for the Crow Butte Expansion cultural resource licenses" [sic] (Ex. INT-022 at 1), not the cultural resources surveys or other information for the CBR license renewal area?

16. Do you acknowledge that cultural resources survey concerns for a new site with new construction will differ from those for an existing site, with no new land or significant construction?

17. In your 2015 letter, you wrote that "very specific qualifications must be met for field surveyors, supervisors and principal investigators of Class III archeological surveys and Traditional Cultural Properties investigation." (INT-022 at 1) Do you have evidence that the principal investigators for the 1982 and 1987 Class III field inventories of the CBR license area do not meet these qualifications?

18. Isn't it true that the *Secretary of Interior's Standards and Guidelines*, which you reference, do not include qualifications that define minimum education and experience required to perform Traditional Cultural Properties (TCP) surveys, documentation, evaluation, or registration of TCPs?

VI. Proposed Questions for Contention 6

A. Issue For Further Examination: The Intervenors claim that the EA violates NEPA in concluding that the short-term impacts to ground water quantity from consumptive use during aquifer restoration are no greater than MODERATE.

B. Objective of the Examination: To establish that the Staff reviewed the short-term impacts to ground water quantity from consumptive use during aquifer restoration consistent with the requirements of NEPA.

C. Proposed Questions for Dr. Kreamer and Mr. Wireman:

1. Do you acknowledge that the Basal Chadron Sandstone aquifer extends for many miles beyond the CBR license boundary and represents a very large volume of water storage underground?

2. Do you agree that "consumptive use" of ground water at an ISR facility refers to the actual amount of ground water that is permanently removed from the production zone aquifer?

3. Do you agree that CBR returns almost all of the ground water pumped from extraction wells back into the Basal Chadron Sandstone aquifer via injection wells, removing only 1-2% as bleed?

4. Therefore, isn't it true that this 1-2% bleed represents the consumptive use of ground water at CBR?

5. Do you agree that the consumptive use rate is a more important factor than total number of pore volumes for determining drawdown?

6. Are you aware that CBR is prohibited from restoring more than five mine units at any one time, limiting the potential consumptive use rate? (Ex. NRC-009 at 140)

7. Do you acknowledge that the Staff performed a water balance analysis and drawdown analysis of the CBR facility? (Ex. NRC-010 at 83; Ex. NRC-009 at 41-43)

8. Do you agree that the consumptive use rate at CBR has historically been approximately 105 gallons per minute (gpm)?

9. Do you agree that this historical consumptive use rate has resulted in drawdowns of approximately 47 feet, representing approximately 10% of the available height of the potentiometric surface above the top of the Basal Chadron Sandstone aquifer?

10. Do you agree that based on these estimates (i.e., 105 gpm per 47 feet of drawdown), it would take a consumptive use rate of about 900 gpm for the potentiometric surface to decrease 400 feet to the top of the Basal Chadron Sandstone?

11. Isn't it true that at CBR's maximum permitted flow of 9000 gpm, a 2% bleed would result in a consumptive use of 180 gpm?

12. Isn't it therefore true that a consumptive use rate of 900 gpm at the CBR facility is unrealistic?

D. Proposed Questions for Mr. Wireman:

13. You testified that the EA should discuss recharge and discharge to the Basal Chadron Sandstone aquifer. Isn't it true that by assuming no recharge, the Staff's drawdown estimates are conservatively high, and the Staff's recovery estimates are conservatively low?

14. You testified that there should be a Basal Chadron Sandstone aquifer monitoring well near Chadron. Isn't it true that the Basal Chadron Sandstone aquifer pinches out and is not present beyond approximately 5 miles north and east of Crawford, between the CBR license area and the city of Chadron? (Ex. NRC-023)

E. Proposed Questions for Dr. Kreamer:

15. You testified that the "basic equations" used to describe the impacts and drawdown of water tables and piezometric surfaces in the mining area are inappropriate for the indicated heterogeneous, anisotropic conditions, leading to unreasonable projections of restoration and decommissioning impacts. Isn't it true that these "basic equations" have been used in ASTM standards to determine aquifer hydraulic properties, including application to heterogeneous anisotropic aquifers? (Ex. NRC-080)

16. Do you agree that practicing field hydrogeologists have used these "basic equations" to estimate aquifer hydraulic properties?

17. Do you acknowledge that at some scale all geologic systems are heterogeneous and anisotropic, and that application of these "basic equations" to such systems is done with an understating of the assumptions inherent to their use?

VII. Proposed Questions for Contention 9

A. Issue For Further Examination: The Intervenors claim that the EA's discussion of mitigating the impacts to ground water quality and quantity from restoration activities is inadequate.

B. Objective of the Examination: To establish that the Staff considered the mitigation of ground water quality and quantity impacts from restoration activities consistent with the requirements of NEPA.

C. Proposed Questions for Mr. Wireman

1. You testified that uranium concentrations at Mine Units 2 through 5 were "well above the restoration standard" in May 2011 (Ex. INT-047 at 7). Isn't it true that Mine Units 2 and 3 are currently in stability monitoring, and that restoration of Mine Units 4 and 5 is currently ongoing?

2. Do you acknowledge that as of 2013, the average Mine Unit 2 and Mine Unit 3 ground water quality for the majority of constituents was near or below background levels? (Ex. NRC-086 at PDF 7, 11)

3. Do you acknowledge that Mine Units 2 and 3 were entered into stability monitoring in July 2014?

4. You testified that "the potential conflict between State of Nebraska [class of use standards] and NRC restoration standards will provide CBR with support for establishment of [ACLs]." (Ex. INT-047 at 7) Do you acknowledge that ACLs may only be proposed when restoration to background levels is not practically achievable?

5. Do you acknowledge that when proposing an ACL, a licensee must meet 10 C.F.R. Part 40 Appendix A, Criterion 5B(6), regardless of prior state "class of use" standards?

6. You testified that the LRA and SER do not provide information on the location, depth, or screened intervals for the 19 domestic water supply wells in the ground water monitoring program. (Ex. INT-047 at 8) Isn't it true that monitoring of those wells is primarily conducted for dose assessment in accordance with Regulatory Guide 4.14 (Ex. NRC-079), not as part of a detection strategy as with the excursion monitoring program?

D. Proposed Questions for Dr. Kreamer

1. You testified that ground water quality improvements made through restoration are likely to be reversed over time. (Ex. INT-046 at 4) Isn't it true that to receive restoration approval, CBR must demonstrate that all constituents meet the ground water protection standards in 10 C.F.R. Part 40 Appendix A, Criterion 5B(5) and show stability for four consecutive quarters, as required by License Condition 10.6? (Ex. NRC-012 at 8)

2. Isn't it true that the first time CBR requested approval of the Mine Unit 1 restoration, the Staff rejected the restoration because the stability requirement was not met? (Ex. NRC-088 at PDF 4)

3. Are you aware that the Staff has also rejected the restoration of five mine units at the Christensen Ranch site based in part on the failure to show stability for certain constituents? (Ex. NRC-089 at 47-48)

4. You testified that mining activities release potential "tracers" that can be used as an early excursion warning system, but that these are largely ignored in stated future efforts at CBR. (Ex. INT-046 at 5) Isn't it true that

License Conditions 11.4 and 11.5 (Ex. NRC-012 at 11-12) require CBR to conduct biweekly excursion monitoring, and that that monitoring program uses chloride, conductivity, and alkalinity as "early warning tracers"?

VIII. Proposed Questions for Contention 12

A. Issues For Further Examination: Dr. Linsey McLean, witness for the Oglala Sioux Tribe and the Consolidated Intervenors, alleges that the impacts of selenium on humans and wildlife if CBR uses land application are material, adverse, and potentially fatal to humans and wildlife exposed to selenium.

B. Objective of the Examination: To establish that in the EA the Staff considered the effects of land application of treated process wastewater on the environment and properly concluded that those effects would be SMALL. Also to establish that in her prefiled testimony Dr. McLean fails to show that land application of treated process wastewater containing selenium at the CBR site will lead to the impacts on human health and wildlife that she alleges will occur.

C. Proposed Questions for Dr. McLean

1. Do you acknowledge that the Staff discusses the land application of treated process wastewater in its assessment of the environmental impacts of restoration for the CBR project? Ex. NRC-010 at 72-73.

2. Isn't it true that an assessment of the impacts of land application of treated process wastewater is necessarily an assessment of the impacts of all of the constituents that make up that water, including selenium? Ex. NRC-001 at 101-02.

3. Do you acknowledge that the EA concludes that the potential environmental impacts to surface water resources during the restoration phase of the CBR project, which the EA states may consist of land application of treated process wastewater, would be SMALL? Ex. NRC-010 at 73.

4. Do you agree that the EA concludes that the overall potential impacts to wildlife from relicensing of the CBR facility would be SMALL? Ex. NRC-010 at 94-98.

5. Isn't it true that the land application of treated process wastewater at the CBR facility is subject to a National Pollutant Discharge Elimination System (NPDES) permit issued by the Nebraska Department of Environmental Quality (NDEQ)? Ex. NRC-010 at 12; Ex. CBR-043.

6. Isn't it true that CBR is required to abide by the terms of its NPDES permit if it decides to engage in the land application of treated process wastewater? Ex. NRC-010 at 12.

7. Isn't it true that the terms of this NPDES permit are enforced by the Nebraska Department of Environmental Quality? Ex. NRC-010 at 9-10; Ex. CBR-043.

8. Do you acknowledge that CBR will be required to apply for additional permits from the State of Nebraska for any land application activity associated with the disposal of evaporation pond wastewater that is not included in CBR'S NPDES permit? Ex. NRC-010 at 12-13.

9. You state in your prefiled testimony that the "impacts of selenium on humans and wildlife if Crow Butte uses land application of mining wastes are material, adverse, and potentially fatal to humans and wildlife exposed to selenium." Ex. INT-048 at 19. Are you aware that CBR's NRC license requires it to perform land application in accordance with two CBR proposals referenced in Condition 10.17 of its license? Ex. NRC-012 at 9-10.

10. Do you acknowledge that one of the two submittals referenced in this condition is a CBR proposal relating to land application submitted on June 7, 1993? Ex. NRC-012 at 9-10.

11. Do you acknowledge that in the submittal dated June 7, 1993 (Ex. NRC-062), CBR proposes a maximum contaminant limit (MCL) for any one day of 0.05 mg/L for selenium in the treated process wastewater that would be applied to the land? Ex. NRC-062 at 13-14.

12. Do you agree that this standard (0.05 mg/L) is derived from, and is identical to, NDEQ's water quality standard for selenium in groundwater? Ex. NRC-062 at 13-14; Ex. NRC-063 at 4-2.

13. Do you acknowledge that this standard is also identical to the U.S. Environmental Protection Agency's (EPA's) enforceable MCL for selenium in drinking water, which is 0.05 mg/L? Ex. NRC-064 at PDF 3.

14. Isn't it true that the EPA's enforceable MCL for selenium in drinking water is equivalent to its health goal for selenium in drinking water? Ex. NRC-065 at 1.

15. Isn't it also true that the EPA states that its health goal for constituents such as selenium is based solely on possible health risks and exposure over a lifetime with an adequate margin of safety? Ex. NRC-065 at 1.

16. Therefore, isn't it true that CBR is required by its NRC license to ensure that the concentration of selenium in treated process wastewater applied to the land is at or below a limit that the EPA has determined to be protective of human health, even from direct exposure over a person's lifetime? Ex. NRC-065 at 1.

17. In your prefiled testimony, you refer to a study performed at the Smith Ranch-Highland facility in Converse County, Wyoming, and state that selenium was found to bioaccumulate in the environment and wildlife of the area where in situ wastewater was used to irrigate grasslands. Ex. INT-048 at 20. You do not argue, however, that the conditions of this study are representative of those that would be found at the CBR site. Is that correct?

18. Isn't it true that in the Smith Ranch-Highland study, the authors report that the process wastewater applied to the land contained selenium in concentrations ranging from 340 mcg/L (0.34 mg/L) to 450 mcg/L (0.45 mg/L) in samples taken from the pivot water irrigator? Ex. INT-019 at 13.

19. Isn't it true that these concentrations greatly exceed the maximum concentration limit of 0.05 mg/L for selenium that CBR would have to adhere to if it were to conduct land application of treated process wastewater at the CBR facility? Ex. NRC-062 at 13-14.

Respectfully submitted,

/Signed (electronically) by/
Marcia J. Simon
David M. Cylkowski
Emily L. Monteith
Counsel for the NRC Staff

Dated at Rockville, Maryland
This 29th day of June 2015

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CROW BUTTE RESOURCES, INC.	)	Docket No. 40-8943
	)	
(License Renewal for the In Situ Leach Facility, Crawford, Nebraska)	)	ASLBP No. 08-867-02-OLA-BD01
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing "NRC STAFF'S PROPOSED QUESTIONS" in the above captioned proceeding have been served *in camera* to the Board this 29th day of June, 2015, via the NRC's Electronic Information Exchange ("EIE").

Signed (electronically) by

Marcia J. Simon
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NRC STAFF FOLLOW-UP QUESTIONS FROM 8/24 TESTIMONY

Intervenors - What hard evidence do you have of specific groundwater pathways from the LA to Pine Ridge Reservation exist?

Intervenors - Are aquifer tests commonly performed and analyzed in fractured rock? Does the pressure-response curve indicate whether dual permeability (fractures) are present?

Intervenors - Isn't it true that the properties of the Basal Chadron (e.g., hydraulic conductivity) are only relevant to uranium recovery operations (e.g., how much water needs to be pumped to maintain an inward gradient; injection-recovery well spacing) and have nothing to do with confinement?

Dr. LaGarry – do you agree with the NRC Staff's statement in their testimony that the USGS does not recognize the Chamberlain Pass Formation as part of the Chadron Formation in Nebraska? (REF: NRC-001 at A.F.6, p. 57; NRC-033)

Dr. LaGarry - Do you agree that the NRC Staff considered your proposed nomenclature change in their review of the Crow Butte LRA? {REF: NRC-009 at 15)

Intervenors – You recommended that CBR perform slug testing in the Chadron clay layers. How many points would need to be slug tested in the clay confining layer to completely characterize the potential for fractures that could transmit fluids through the confining layer to the overlying Brule aquifer?

Staff – Hypothetically, if water from the CBR facility could travel through the Basal Chadron Sandstone to the point in White River alluvium approximately 12 miles away that Dr. Lagarry identified on Monday, how long would it take for contaminants to get there? Would you expect the concentrations of contaminants to be the same when they arrived?

Staff – Hypothetically, if water from the CBR facility could travel through the Basal Chadron Sandstone over the 25-30 miles from the License Area to the Pine Ridge Reservation, how long would it take for contaminants to get there? Would you expect the concentrations of contaminants to be the same when they arrived?

Intervenors – do you agree with CBR's testimony on Monday that they are required to maintain an inward hydraulic gradient in all wellfields during operations and restoration?

Intervenors - do you have any hard evidence or data that demonstrates there is transmission of water from the basal Chadron sandstone upward through the White River structural feature?

NRC Staff follow up questions from 8/25 hearing session

Dr. LaGarry - Have you ever stated in any of your recent abstracts or presentations that the source of uranium in the water on or near the Pine Ridge Reservation is the CBR facility?

Dr. LaGarry - Isn't it true that in some recent abstracts you have published that you have attributed the source of uranium in the water on or near the Pine Ridge Reservation to natural sources?

October 5, 2015

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CROW BUTTE RESOURCES, INC.	)	Docket No. 40-8943
	)	
(License Renewal for the In Situ Leach Facility, Crawford, Nebraska)	)	ASLBP No. 08-867-02-OLA-BD01
	)	

NRC STAFF'S PROPOSED QUESTIONS

In its September 4, 2015 Order, the Board identified six issues requiring additional written and oral testimony. Pursuant to the Board's order, the NRC Staff hereby submits, *in camera*, proposed questions for the Board's consideration in advance of the scheduled October 23, 2015 supplemental hearing date. In keeping with the Board's mandate, the following proposed questions are strictly limited to the six issues identified by the Board and the parties' supplemental direct and rebuttal testimony.

Issue 1: Whether the water levels in the Brule aquifer have lowered due to mining activities.

A. Questions for Dr. Kreamer:

1. You testified on page 3 of your supplemental rebuttal testimony that Well 27 is seven miles downgradient of the area under consideration. Since Well 27 is located above Mine Unit 5 (see Ex. NRC-096-R and NRC-105) and the entire License Area is only 4 miles lengthwise (NW-SE), could you clarify your assertion that the well is 7 miles from the area under consideration?

2. On page 3 of your supplemental rebuttal testimony, you cited the Staff's supplemental direct testimony that Table 2.7-5 of the LRA shows 12 Brule water level measurements collected in 1982 for Well #11, which varied between 3830 and 3840 feet. You then state that Exhibit NRC-096 shows eight wells with 1982-83 Brule water levels exceeding 3834 feet.

a. But isn't it true that the Staff was referring to 12 monthly measurements made in Well #11 between January and December 1982?

b. Isn't it also true that the eight wells you referred to don't show significant drawdown in 2008 (Ex. NRC-096-R)?

3. In your supplemental rebuttal testimony, you indicate that 2012 was an extreme drought year with very low precipitation, yet the recorded water levels in SM 7-22 for 2012 show a dramatic water table rise of six feet. According to the water levels in SM 7-22, in 2010 the water level was approximately 3842 and the highest levels reached in 2011-2012 was 3845.8 (a difference of 3.8 feet). Could you please explain how you calculated a six foot rise?

4. On pages 3-4 of your supplemental rebuttal testimony, you stated that wells PM-6 and PM-7 are "considerably downgradient from the major area of mining activity." But isn't it correct that wells PM-6 and PM-7 are in the middle of the mining area (Ex. NRC-096-R at 2)?

B. Questions for Mr. Wireman:

1. You testified on page 3 of your supplemental direct testimony that Exhibits BRD-008A and BRD-008B show a 5 foot decrease in the Brule in the northwest part of the Class III permit area.

a. But isn't it true that Exhibit BRD-008A doesn't show pre-mining Brule levels in the northwest part of the License Area?

b. How can you make such a comparison within an accuracy of 5 feet?

2. If the effects of mining activities are reflected in the hydrographs provided by CBR (Exhibits CBR-063-R and CBR-064-R), as you testify on page 3 of your supplemental direct, then wouldn't the hydrographs show increased drawdown in 2003 to reflect the start of production in Mine Unit 9, which began in that year?

3. Doesn't the Staff's hydraulic gradient analysis (Ex. NRC-106) show that the gradients were essentially the same in 1982-83 and 2008?

Issue 2: What is the available head in the Basal Chadron/Chamberlain Pass formation and the maximum anticipated drawdown during Crow Butte's operation and restoration of its mining facility?

A. Questions for Mr. Wireman:

1. On page 2 of your supplemental rebuttal testimony, you note that there is less available head in the northern part of the License Area and ask what the cause is. But isn't it correct that Figure 2.7-3a of the LRA shows that the available head in that area was lower in the pre-mining period, and isn't it

correct that Figures 2.6-11 and 2.6-14 show that the depth to the top of the Basal Chadron Sandstone aquifer is shallower in that area?

2. The Staff has testified that the consumptive use rates necessary to lower the potentiometric surface below the top of the Basal Chadron Sandstone aquifer are unrealistic (Ex. NRC-095 at 7-8). Have you presented any evidence disputing this?

Issue 3: Whether the results from the four pump tests demonstrate a hydraulic connection between the Brule and Basal Chadron/Chamberlain Pass formations.

A. Question for Crow Butte Witnesses:

1. Were pumping tests 1, 2, and 3 submitted in support of previous licensing actions for the CBR facility?

B. Questions for Dr. Kreamer:

1. In your supplemental direct testimony, you refer to atmospheric response in the Basal Chadron Sandstone aquifer indicating vertical communication in aquifer tests 1, 2, and 4 (Ex. INT-079 at 2, 6). On page 1371 of the hearing transcript, you stated that you would expect a much greater response if the wells were open to the atmosphere.

    a. Doesn't your statement from the hearing indicate that you are assuming that the wells are sealed from the atmosphere?

    b. Isn't it true that for the pumping tests to work, the wells would have to be open to the atmosphere (otherwise the water levels would not be able to drop)?

2. Isn't it true, based on CBR's and the NRC Staff's testimony citing Exhibits CBR-081 and NRC-110, that CBR's consultants correctly excluded early time data from the analyses of pump test data?

Issue 4: Whether the Basal Chadron/Chamberlain Pass formation exists beneath the Pine Ridge reservation and its connection (if any) to the Basal Chadron/Chamberlain Pass formation beneath the license renewal area.

A. Questions for Dr. LaGarry:

1. Isn't it correct that the references you provided regarding the existence of the CP formation at Pine Ridge Reservation is entirely based on study of outcrops?

2. You stated that the revised lithostratigraphy provides information on various material properties. Aren't those generalized observations based on observations of outcrops?

3. Isn't it true that CBR has provided site-specific drill cuttings and geophysical logs that allowed them to ascertain material properties of the Basal Chadron/Chamberlain Pass as well as the other stratigraphic formations at the site?

    a. If yes, why is that not sufficient?

    b. If it is sufficient, why does it matter what the formation is called, when CBR has provided site-specific information on the properties that are important to inform the NRC's safety and environmental reviews?

4. You testified at the hearing about an outcrop near Horn, Nebraska, which is 12-15 miles north of Crawford. Isn't it true that at its closest point, the White River is approximately 4 miles from Horn? [based on Google Maps measure distance tool]

5. You generally assert that there might be a pathway for water to travel through the Arikaree aquifer to the Pine Ridge Reservation – what specific evidence do you have of such a pathway?

    a. Isn't it true that water would have to travel at least 50 miles just to reach the NE-SD border through that pathway?

    b. Isn't it true that that the time it would take to travel that distance would be far greater than the 25 years that this facility has been in operation?

    c. Isn't it also true that water would have to travel perpendicular to the groundwater flow gradients (along groundwater contour lines) to reach the NE-SD border?

6. Isn't it true that as indicated in Exhibit NRC-097, the Pierre Shale and Niobrara Shale formations outcrop between the CBR facility and the Pine Ridge Reservation?

7. Isn't it true that those formations are aquitards or aquicludes that would prevent a continuous path of the Basal Chadron sandstone between the CBR facility and the reservation?

Issue 5: To what degree (if any) do the additional exhibits affect the conclusions regarding the structure of the White River feature and the NRC Staff's maximum likelihood modeling?

A. <u>Questions for Dr. Kreamer</u>:

1. You state that the modeling is "somewhat irrelevant" because even a fold can have a high vertical permeability. Have you presented any evidence of the White River feature's vertical permeability?

2. Isn't it true that the NRC staff has explained that, with some noted exceptions, the model parameters generally are in line with field information?

3. Isn't it true that the Staff has explained why this particular type of modeling does not require certain analyses that you identified (e.g., sensitivity analysis, mathematical uniqueness analysis)?

Issue 6: To what degree (if any) do the additional exhibits illustrate the groundwater flow directions in the Arikaree and Brule aquifers underlying the Pine Ridge reservation and the license renewal area?

A. Question for Mr. Wireman:

1. With respect to the direction of groundwater flow in the Arikaree aquifer, isn't it true that water would have to travel perpendicular to the groundwater flow gradients (along groundwater contour lines) to reach the NE-SD border from the Crow Butte facility?

Respectfully submitted,

/Signed (electronically) by/
David M. Cylkowski
Marcia J. Simon
Counsel for the NRC Staff

Dated at Rockville, Maryland
This 5th day of October 2015

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CROW BUTTE RESOURCES, INC.	)	Docket No. 40-8943
	)	
(License Renewal for the In Situ Leach Facility, Crawford, Nebraska)	)	ASLBP No. 08-867-02-OLA-BD01
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing "NRC STAFF'S PROPOSED QUESTIONS" in the above captioned proceeding have been served *in camera* to the Board this 5th day of October, 2015, via the NRC's Electronic Information Exchange ("EIE").

Signed (electronically) by

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STAFF

ISSUE 1 QUESTIONS

Staff or CBR -- Hydrographs in CBR-063 and CBR-064 from 1999-2015 because that is when mine units went into operation, correct?

Mr. Wireman -- INT-081 at 3 says gradient increased from .012 to .25/.43. But SER at 22 says increase was from .012 to .025 to .043. Mr. Wireman said he got these values from SER, so his testimony should say .025 - .043, correct?

Dr. Kreamer – you said that snowfall was included in total precipitation in INT-084, but INT-084 lists total precipitation and total snowfall in inches. Specifically, for year 2007 on INT-084 there is 0.00 inches of precipitation and 2 inches of snowfall. So what basis do you have for saying that snowfall is also included in total precipitation?

ISSUE 2

Q: Dr. Kreamer - is there any exhibit in the record that reflects the contents of the Google maps images that purportedly show decreases in reservoir sizes?

ISSUE 4 –

Dr. LaGarry – you have acknowledged that the Pierre Shale is exposed at the surface between the CBR facility and the Pine Ridge Reservation, and that a pathway through the overlying Basal Chadron sandstone does not exist. Given those statements, how can there be a connection between the CBR facility and the reservation through other strata that overlie the Pierre Shale through faults and fractures, when those strata do not exist where the Pierre Shale is exposed at the surface?

Question for Dr. Kreamer, Issue 6:

You state that facilitated transport down the White River is a viable pathway Given that the river is an oxidizing environment with carbonate such that uranium should be complexed and anionic, what evidence do you have that sorption is important in this system?

Attachment 2

Crow Butte Proposed Questions

Confidential Pending Release by the Licensing Board
Pursuant to 10 C.F.R. § 2.1207(a)(3)(iii)

June 29, 2015

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	Docket No. 40-8943
CROW BUTTE RESOURCES, INC.	)	
	)	ASLBP No. 08-867-02-OLA-BD01
(License Renewal)	)	

CROW BUTTE RESOURCES' PROPOSED
QUESTIONS ON ADMITTED CONTENTIONS

Pursuant to the Licensing Board's Order (Extending Time for Filing of Answering Statements & Testimony), dated May 22, 2015, and in accordance with 10 C.F.R. § 2.1207(a)(3), Crow Butte Resources, Inc. ("Crow Butte") hereby submits proposed questions for the Board for the NRC Staff and intervenor witnesses. These questions are based on the parties' direct and rebuttal testimony, and associated exhibits, filed on May 8 and June 8, 2015, respectively.

I. QUESTIONS FOR NRC STAFF WITNESSES

A. Hydrogeology Contentions

1. Do you agree that there are multiple lines of evidence demonstrating adequate confinement of the Basal Chadron Sandstone?

2. Do you agree that there are no known faults or fractures within the license area that call into question Crow Butte's ability to control mining fluids?

3. Is there any indication that you are of aware of to suggest that Crow Butte's operations are impacting drinking water on the Pine Ridge Indian Reservation?

4. Do any of the issues raised by intervenors' witnesses in their testimony call into question your conclusions in the SER or EA for Crow Butte on confinement?

B. Cultural Resources Contention

5. Do tribes typically perform surveys at sites of proposed or existing NRC-licensed facilities? Or, is the usual course of action for a professionally-qualified contractor to perform the initial assessment subject to review by the SHPO and the NRC Staff?

6. Is it necessary for the OST to conduct cultural resource surveys at Crow Butte in order for the NRC Staff to satisfy its obligations under NEPA?

7. Did you provide an opportunity for OST to provide comments on the draft discussion of cultural resources impacts? How did you notify them of that opportunity?

8. Does anything presented by OST in its testimony or exhibits call into question your conclusions in the EA on cultural resources?

C. Restoration Contentions

9. Do any of the issues raised by intervenors' witnesses in their testimony call into question your conclusions in the SER or EA regarding restoration?

D. Contention 12

10. Do any of the issues raised by intervenors' witnesses in their testimony call into question your conclusions in the SER or EA regarding hypothetical land application of wastewater?

II. QUESTIONS FOR INTERVENORS' WITNESSES

A. Hydrogeology Contentions

Dr. LaGarry

1. Your testimony only mentions regional data and investigations. Have you reviewed the site-specific data provided by Crow Butte to the NRC as the basis for their conclusions on confinement?

    a. If so, why does your testimony not refer to the available site-specific data to support your position?

    b. If not, how can reach a conclusion on the fundamental issues in this proceeding without having considered the available site-specific data?

2. Do you dispute *all* of the lines of evidence for confinement presented by Crow Butte and the NRC Staff?

3. How do you explain the site-specific data and evidence provided by Crow Butte and that the NRC Staff and Crow Butte claim show confinement, including (1) water level data, (2) water quality data, (3) geophysical borehole logs, and (4) aquifer test data?

4. What site-specific basis do you have for suggesting that there are faults or fractures at Crow Butte (as opposed to the region generally)? Are you aware of any specific data on faulting or fracturing within the license area.

5. Do you have any site-specific evidence of secondary porosity at the Crow Butte site (as opposed to the region)?

6. Do you agree that, hypothetically speaking, the presence of a fault or joint does not necessarily mean there is a hydraulic connection created.

    a. If so, then wouldn't that suggest that site-specific data demonstrating a lack of a hydraulic connection would be more indicative of actual conditions than your speculation?

7. Have you reviewed the literature and exhibits (*e.g.*, CBR-059) provided by Crow Butte showing that the uranium deposit at the site is a roll-front deposit?

    a. If so, do you still maintain that the deposit is in mineralized fractures?

    b. If not, what is the basis for your assertion? Why didn't you submit any exhibits/data to support that assertion?

8. You imply that Crow Butte could have "rigged" the aquifer test results (noting that it is possible to conduct the tests in ways that are unlikely to reveal faults). What basis do you have making such serious allegations?

Dr. Kreamer

9. Have you reviewed the site-specific data provided by Crow Butte to the NRC in support of confinement?

    a. If so, why does your testimony not refer to the available site-specific data to support your position?

    b. If not, how can reach a conclusion on the fundamental issues without having considered the available site-specific data?

10. How do you explain the site-specific data and evidence provided by Crow Butte and that the NRC Staff and Crow Butte claim show confinement, including water level data, water quality data, geophysical borehole logs, and aquifer test data?

11. What site-specific basis do you have for suggesting that there are faults or fractures at Crow Butte (as opposed to in the region generally)?

12. Do you have any site-specific evidence of secondary porosity at the Crow Butte site (as opposed to the region)?

13. How can you call the site "inadequately characterized" when there are more than 10,000 sets of well data?

14. What basis is there for suggesting the mining fluids will flow upward from the Basal Chadron Sandstone into the Brule in light of the strongly downward vertical hydraulic gradient in the permit area?

15. Did you review Crow Butte's Pore Volume Restoration Analysis or Model-Based Restoration Plan documentation before you provided your initial testimony?

    a. If so, what was your basis for claiming that there were no groundwater flow models for the site?

    b. If not, why not? Don't you think that would have provided important information?

16. Were you aware that Crow Butte's aquifer pump tests were reviewed and approved by NDEQ beforehand?

17. Why do you reference in your rebuttal testimony (Exh. INT-069, page 4) aquifer tests performed for the North Trend site, not the area that is the subject of this proceeding? You are aware of the difference?

18. You claim that Crow Butte did not "simulate multiple fractures beyond a single fault." What are you referring to?

    a. If you are referring to the White River Structural Feature, is there any evidence showing that it transmits fluids?

    b. What other fractures should Crow Butte or the NRC have modeled when Crow Butte has found no evidence that any exist?

    c. Do you have any site-specific evidence of fractures within the license area? If so, why didn't you provide it?

Mr. Wireman

19. Have you reviewed the site-specific data provided by Crow Butte to the NRC on confinement?

a. If so, why does your testimony not refer to the available site-specific data to support your position?

b. If not, how can reach a conclusion on the fundamental issues without having considered the available site-specific data?

20. How do you explain the site-specific data and evidence provided by Crow Butte and that the NRC Staff and Crow Butte claim show confinement, including water level data, water quality data, geophysical borehole logs, and aquifer test data?

21. What site-specific basis do you have for suggesting that there are faults or fractures at Crow Butte (as opposed to the region generally)?

22. Do you have any site-specific evidence of secondary porosity at the Crow Butte site (as opposed to the region)?

23. Why would Crow Butte conduct pump tests in the Brule outside the mine area? What purpose would that serve?

24. What basis is there for suggesting the mining fluids will flow upward from the Basal Chadron Sandstone into the Brule in light of the strongly downward vertical hydraulic gradient in the permit area?

25. You claim that there is no data that indicates whether the red clay occurs over the entire extent of the mined ore body. But Crow Butte states that the "red clay" marker horizon is laterally persistent across the region, and has been observed in drill cuttings as well as on geophysical logs from all across the permit area. What basis is there for disputing Crow Butte's testimony? What difference would it make to the ultimate issues in any event?

Ms. White Face

26. You allege that Crow Butte's operations are causing contamination at Pine Ridge based on samples from five wells located more than 50 miles from the site.

a. Is there any technically-defensible information linking Crow Butte's operations to the sample results?

b. What "causal" link or evidence supports your allegations?

c. Are you a hydrogeologist?

d. Have you run any groundwater flow models that show your allegations are even physically plausible?

e. Isn't your testimony just speculation?

27. Are there other possible explanations for varying uranium ratios? What basis do you have for your claim that the ratios indicate contamination from Crow Butte, as opposed to natural variation?

28. Have you reviewed the literature provided by the NRC Staff in its rebuttal testimony (Exh. NRC-082) that describes natural variation in those ratios?

a. If so, do you still maintain that the samples could only be caused by Crow Butte's operations?

b. If not, then what is the basis for your claim that the contamination could only be caused by Crow Butte

29. Have you compared your results to other regional groundwater data that pre-dates Crow Butte's operations?

a. If so, what does it show?

b. If not, then what is the basis for your claim that the contamination could only be caused by Crow Butte?

30. After reviewing the NRC Staff and Crow Butte testimony and exhibits, do you still maintain that the Arikaree Formation is present at Crow Butte? What basis do you have for that claim?

31. How could water from Crow Butte migrate, as you claim, through the Basal Chadron Sandstone aquifer to the Pine Ridge Reservation when the Basal Chadron Sandstone pinches out northeast of Crow Butte and is not present at the Pine Ridge Reservation?

a. What geophysical or hydrological processes would allow that to occur? How can contamination move upgradient?

b. Have you performed any modeling to show that is plausible? Physically possible even?

32. Can you explain how pumping from five wells in a different aquifer more than 50 miles away from Crow Butte could impact Crow Butte's operations?

a. Have you done any modeling, or even a simplified calculation, to show that is physically possible?

b. How can contamination move upgradient? What physical mechanisms are you suggesting are taking place?

c. Do you have any basis for your claims beyond the well data?

33. Do you still believe that your approach is scientifically defensible?

a. For the uranium ratio claim?

b. For the contaminant transport claims?

c. Or, is it just speculation without any basis in data or evidence?

B. Cultural Resources Contention

34. For each witness: Have you reviewed the various cultural resource assessments performed at Crow Butte (*e.g.*, Bozell and Pepperl, Exh. CBR-028 and CBR-028)?

a. If so, are there any conclusions in there that you specifically dispute? What is the basis for the dispute given that you have not performed surveys at the site?

b. If not, why not? What is your basis for claiming that Crow Butte has overlooked cultural resources?

35. For each witness: Do you recall having the opportunity to review the draft Section 106 documentation before it was incorporated into the EA?

a. If not, did you investigate that issue before you claimed in your testimony that there was no opportunity to comment? Did the NRC Staff send letters to OST? Send emails? Are you claiming that you didn't receive any of those?

b. If so, why did you not provide comments at that time? And, why did you claim in your testimony that you had no comment opportunity?

36. For each witness: Given that Crow Butte does not plan to develop any additional wellfields in the license renewal area, are there any specific cultural resources at the Crow Butte that are at risk from Crow Butte's operations? What basis is there for making such a claim?

37. Do you agree that Crow Butte is subject to a license condition that directs it to stop work if cultural resources are discovered?

38. Why did OST not participate in the cultural resource surveys when it had the opportunity?

39. How can you complain now about a process that you specifically declined to participate in or comment on when it was occurring? If you think more should be done, why did you not raise it at the appropriate time?

C. Restoration Contentions

40. Did you review Crow Butte's Pore Volume Restoration Analysis or Model-Based Restoration Plan documentation (e.g., Exhs. CBR-037, Exh. CBR-038 and CBR-041) before you provided your initial testimony?

    a. If not, why not? Don't you think that it would be reasonable to investigate restoration activities in order to prepare testimony? Are you really claiming that you are qualified to offer testimony when you didn't even review the key documents before testifying?

    b. If so, then why did your testimony not discuss it or acknowledge the improvements made?

41. Why did you not provide any exhibit to support your claim that groundwater modeling at Crow Butte is atypical?

42. What data is there to support your assertion that there is a "high probability" that baseline values of individual parameters are non-representative of background conditions within the mine unit?

    a. Have you reviewed the site-specific and regional groundwater data? What does that show?

    b. Have you compared groundwater quality data within the ore zone to water quality outside the ore zone? What does that show?

    c. Isn't your claim just speculation?

43. Having read Crow Butte's description of well development for sampling (*e.g.*, CBR-001 at ¶95), do you still maintain that Crow Buttes' sampling has a "high likelihood" of false negatives?

D. Contention 12

44. Do you acknowledge that Crow Butte has not performed any land application at the site?

45. Did you review the NPDES permit or NRC license restrictions on land application (Exhs. CBR-042 and CBR-042) prior to your initial testimony?

    c. If so, then why did you not acknowledge those limits when comparing Crow Butte to the site referenced in the report you cited?

    d. If not, then what basis did you have for your testimony?

46. Did you review site-specific data on selenium prior to submitting your initial testimony?

a. If so, then why did you not acknowledge the lower levels when comparing Crow Butte to the site referenced in the report you cited?

b. If not, then what basis did you have for your testimony?

47. Have you reviewed the design specifications or description of evaporation ponds at Crow Butte?

a. If so, then

i. Why did you refer to a clay liner when there isn't one?

ii. Why did you not accurately characterize the type of HDPE liner that is used?

iii. Why did you not acknowledge the freeboard requirements for ponds? Or the requirement to keep sediments covered?

b. If not, then what basis did you have for your testimony?

Confidential Pending Release by the Licensing Board
Pursuant to 10 C.F.R. § 2.1207(a)(3)(iii)

October 5, 2015

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	Docket No. 40-8943
CROW BUTTE RESOURCES, INC.	)	
	)	ASLBP No. 08-867-02-OLA-BD01
(License Renewal)	)	

CROW BUTTE RESOURCES' PROPOSED
QUESTIONS ON SUPPLEMENTAL TESTIMONY

Pursuant to the Licensing Board's Order (Admitting Exhibits; Scheduling Supplemental Testimony and October Hearing Day), dated September 4, 2015, and in accordance with 10 C.F.R. § 2.1207(a)(3), Crow Butte Resources, Inc. ("Crow Butte") hereby submits proposed questions for the Board for the intervenor witnesses on their supplemental testimony. These questions are based on the parties' supplemental direct and rebuttal testimony, and associated exhibits, filed on September 8 and September 18, 2015, respectively.

I. QUESTIONS FOR INTERVENORS' WITNESSES

A. Brule Water Levels

1. Do you think that there is insufficient data on water levels given that Crow Butte collects data from every monitoring well (currently, more than 200 wells) every two weeks?

2. If there were a hydraulic connection between the Brule and the Basal Chadron aquifers, wouldn't you expect that to result in a sustained downward trend in water levels?

B. Available Head and Drawdown

3. Did you perform any calculations or analyses to suggest that the NRC Staff and Crow Butte assessments of the long-term drawdown from operations is incorrect? If not, why not?

C. Aquifer Pump Test Results

4. Were you aware of the concerns relating to the use of early-time drawdown highlighted by both Crow Butte and the NRC Staff (*e.g.*, Kruseman and di Ridder)?

   a. If so, why didn't you address it in your testimony/

   b. If you weren't aware of that concern, do you think you are qualified to opine on the adequacy of the aquifer pump tests?

5. Did your analysis account for the quantity of water in the well casing?

6. Do you disagree with Crow Butte's calculation showing that the Cooper-Jacob method is considered invalid during early time?

7. Do you disagree with the NRC Staff or Crow Butte discussions of the effect of barometric changes on confined aquifers with wellbores open the atmosphere?

D. Basal Chadron at Pine Ridge Reservation

8. Do you agree that Crow Butte and the NRC Staff both acknowledge nomenclature changes and provide a basis for correlating different interpretations?

9. Isn't that evidence of the due diligence you suggest is required?

E. White River Structural Feature

10. Is there anything inherently wrong with using a model as *one tool* for exploring hydrologic conditions at the site, even if such a model doesn't account for every detail?

F. Groundwater Flow Directions

11. What is the distance uranium would have to travel from Crow Butte in order to reach the Reservation via the flowpaths cited in BRD-005?

Crow Butte Proposed Questions for Wednesday

For Dr. LaGarry:

- You indicated that the Chamberlain Pass formation on the reservation contains radionuclides. Are you inferring that those radionuclides are naturally occurring, or are you suggesting that the radionuclides are the result of Crow Butte's operations?

For Dr. Kramer, Dr. LaGarry, and Mr. Wireman:

- Do you agree with Ms. White Face's assertion that CBR has contaminated water at the reservation on the basis of isotope ratios?

For Mr. Lewis (Crow Butte):

- In your professional opinion, it is plausible that a release of uranium from Crow Butte's operations to the White River alluvium could be detected on the Pine Ridge Reservation within 25 years of the release given the distance to the reservation, the effects of dilution, and the properties of uranium? Please explain (briefly) the basis for your opinion?

For Mr. Lewis (Crow Butte):

- What is your interpretation of the three pump tests (BD-02), particularly with respect to the comment from Mr. Kreamer yesterday regarding potential leakage from the overlying confining unit?

For Mr. Teahon (Crow Butte):

- There was some discussion yesterday about excursions in Brule monitoring wells in Mine Units 6 and 8. Can you please explain the basis for your conclusion that these excursions are the result of seasonable precipitation events?

CBR

Contention 6

Q for Doug Parlick:

Can you pls explain whether capacity limits impose practical constraints on consumptive use (and how that addresses the "safety" issue mentioned by Dr. Striz)?

Q for Larry Tesh on / Doug Bulick

Can you pls address, at a high / brief level, the reasons for the higher numbers of PVs for MU-1-3? And, explain why those are not expected to continue for future restoration?

Attachment 3

Joint Intervenors Proposed Questions

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

(IN CAMERA)

In the Matter of	)	
	)	
CROW BUTTE RESOURCES, INC.,	)	Docket No. 40-8943
	)	ASLBP No. 08-867-02-OLA-BD01
(License Renewal for the	)	
In Situ Leach Facility, Crawford, Nebraska)	)	June 29, 2015

CONSOLIDATED INTERVENORS AND OGLALA SIOUX TRIBE JOINT PROPOSED QUESTIONS

Consolidated Intervenors and the Oglala Sioux Tribe hereby jointly submit the following Proposed Questions for the Board to pose to witnesses for the NRC Staff and CBR:

Issue: Contention 1

Objectives: To establish that NRC Staff did not rely on accepted methodology and ignored unique perspectives and information held by the Sioux Tribes while basing the NEPA analysis on CBR's and individual tribes' inadequate cultural resources surveys. To establish that NRC Staff conducted a National Historic Preservation Act (NHPA) Section 106 process that was not in good faith reasonable. To establish that the NRC Staff failed to meet federal law and trust responsibilities of consultation with Sioux Tribes regarding cultural resources and interests.

Questions to be Posed to NRC Staff witnesses: Nathan Goodman, Paul Nickens, Mirabelle Shoemaker:

1. You testify that the Staff conducted its own independent analysis to determine eligibility determinations of archeological and tribal sites and used in this analysis when making its cultural resources impact determination." Ex. NRC-001 at 60-83. Did this analysis include any additional ground surveys other than that conducted by the University of Nebraska in 1982 and the Nebraska State Historical Society (NSHS) in 1987 and with representatives of the Santee Sioux Nation and the Crow Nation in December, 2012, as described in the FSEIS?

2. You testify that "[l]imited subsurface testing procedures were conducted to support NHRP significant *evaluations* of cultural sites identified by the 1982 and 1987 CBR Class III inventories." Ex. NRC-001 at 78. Did these subsurface tests consist solely of shovel tests and soil cores?

3. Could there be unknown burial or other culturally or historically significant sites within the Project Area?

4. Did the NRC staff review and use comparative information on costs and methodologies in on-the-ground tribal surveys conducted by other federal agencies that followed ACHP guidance?."

5. Was any competitive bidding proposal sent out to identify the contractor for the proposed cultural resources survey? Have the proposals and the bids been included in the record?

6. Do the Sioux Tribes possess unique information about cultural resources in the project area?

7. You testify that the Staff invited each tribe to participate in a site survey and choose an identification method appropriate for identifying sites of significance to the tribe. NRC-001 at 64-66. Was there any methodology used to determine which Tribes participated in the survey?

8. Was the survey based on completely self-selecting in terms of which Tribes participated?

9. Did the NRC Staff ensure a so-called "representative sample" of cultures or Tribes? How?

10. Was the NRC Staff's approach to the tribal cultural surveys rejected by any of the invited Tribes?

11. What were the reason(s) expressed by any of the Tribes for rejecting the Staff's approach to the tribal cultural surveys?

12. Was there a request from any of the Tribes to develop its or their own approach to the tribal cultural surveys? What was the NRC Staff's response to these request(s)?

13. Which Tribes submitted written reports?

14. Which Tribes did not submit any reports?

15. You mention in the Environmental Assessment and in the exhibits submitted by the NRC Staff that the communications by the NRC Staff regarding the cultural resources survey was made jointly to numerous Tribes and jointly regarding pending license applications for the Powertech project in South Dakota, CBR's Crow Butte project area, and CBR's Crow Butte expansion areas. Did the NRC or any other involved federal agency hold any government-to-government meeting solely with the Oglala Sioux Tribe? If so, when were such meetings held, who attended them, and what was the outcome? If not, specifically what attempts were made by the NRC Staff to hold any government-to-government meeting, who made such attempts, when were such attempts made, and what were the parameters or substance of such attempted meetings?

16. Specifically, why did the NRC Staff conduct joint meetings or consultations with many Tribes rather than individual meetings or consultations with each Tribe?

17. Specifically, why did the NRC Staff meetings or consultations include at the same meeting or consultation several other pending licenses, including a project in another state some distance away from the Crow Butte project and involving a different applicant rather than meetings or consultations on just the Crow Butte project, or just the Crow Butte project and the Crow Butte expansion areas?

18. You mention in the Environmental Assessment that "[a] long ridge adjacent to Crow Butte was used in earlier years as a place that young Lakota men went to for vision quests. This locale would be about 1 mile each of the CBR project area." EA at 57. From whom or where did you obtain this information?

19. What specific effort was made by the NRC Staff to determine whether this area was, has, or is desired to be used, if available, by other Native persons for spiritual purposes?

20. What specific effort was made by the NRC Staff to determine whether this area has been used in recent years or is currently being used, or would be used if available, by Lakota men or other Native persons for vision quests or other spiritual purposes? From whom was, and what was, the information obtained?

21. What specific effort was made by the NRC Staff to determine whether or not Native persons have access to such areas for vision quests or other spiritual purposes?

22. What specific effort was made by the NRC Staff to determine whether the CBR activities compromised or restricted the access or use of Native persons to such areas for vision quests or other spiritual purposes?

23. You mention in the Environmental Assessment that "[a]ccording to Tribal representatives at the information-gathering meeting, unspecified herbs used in traditional medical practices to treat ailments such as headache, stomachache, and arthritis grow on the CBR project area and around Crow Butte. Tribal members believe these herbs do not grow elsewhere." EA at 57. Which specific "Tribal representatives" provided this information?

24. What specific effort was made by the NRC Staff to identify the "unspecific herbs" and the "traditional medical practices" referred to by the "Tribal representatives" and "Tribal members" and the location of these herbs?"

25. What specific effort was made by the NRC Staff to determine whether or not Tribal members have access to such medicinal herbs and the scope of such access?

26. What specific effort was made by the NRC Staff to determine whether the CBR activities compromised or restricted the access or use of Tribal members to such medicinal herbs and the scope of such compromise or restriction?

Issue – Reliability of NRC Witness Testifying as to Contention 1

Objective: To establish the admissibility, credibility and weight to be given to NRC Staff witnesses Nathan E. Goodman and Mirabelle O. Shoemaker based on questions regarding area of testimony, reliability, bias, and preparation. Each witness should be subjected to each line of questioning.

Questions to be posed to Mr. Goodman and Ms. Shoemaker.

Line of Questioning: Delineate the Scope of Testimony

27. You do not have a degree in any field pertaining specifically to Native American or other indigenous peoples, is that correct? *Mr. Goodman has a Master of Science in Environmental Science with a thesis on the biomasses of red-backed salamanders in eastern deciduous forests as an indicator of overall health and quality of the surrounding environment and a Bachelor of Science in Environmental Science. Ms. Shoemaker has a Master of Arts in International Affairs with a degree focus on environmental policy and a Bachelor of Arts / Science in International Affairs and Political Science.*

28. You do not have a degree in any field pertaining specifically to anthropology or archaeology, is that correct?

CONTENTION A

Issues Needing Further Clarification

1. Whether the NRC Staff's conclusion that ISL mining has "no non radiological health impacts" is based on sufficiently detailed evidence.

2. Whether the current monitoring protocol is sufficient to detect non-radiological contamination.

Objective of Examination

To establish that the current monitoring protocol does not meaningfully track, consider or address non-radiological contamination and the potential mobilization of such contaminants.

To establish that non radiological contamination and its potential impacts to human health was not sufficiently considered by NRC Staff.

PROPOSED QUESTIONS

1. Other than uranium, radium and thorium, what other by-products of ISL mining are potentially harmful to human health?

2. What degree of certainty is there that non radiological contaminants are contained and recovered under current spill and excursion mitigation protocols?

3. What is the basis for this determination?

CONTENTION C

Issues Needing Further Clarification

1. Whether the NRC Staff's characterization of surface water features at the CBR facility is sufficiently detailed to conclude that the impact from accidental spills is "minimal."

2. Whether there is sufficient monitoring to assess and mitigate the impact from surface spills.

Objective of Examination

To establish that there are likely potential contaminant pathways from surface spills at the CBR facility to the White River.

To establish that the monitoring protocols in use by CBR, and approved by NRC Staff, are insufficient to detect contamination in the White River.

PROPOSED QUESTIONS

1. Are English Creek and Squaw Creek the only surface water features on the CBR site?

2. What degree of certainty is there that any surface spills would migrate only to either English or Squaw Creeks?

3. What happens to liquids on the surface of the CBR facility that do not enter either English or Squaw Creeks?

4. What do you think happened to the approximately 100,000 gallons of lixiviant that was not recovered after the 300,000 gallon surface spill at the CBR facility?

5. Is there routine monitoring of water quality in the White River?

6. Is there sediment sampling in the White River?

7. If so, how many miles from the CBR facility is this monitoring conducted?

8. If so, what is the monitoring frequency?

9. If so, what contaminants are monitored, and at what threshold levels?

10. In your opinion is the White River a potential receptor of surface contamination from the CBR facility?

11. Has CBR's method of adjusting the extraction and injection rate always been able to control excursions?

12. What is the margin of error for the "inward hydraulic gradient"?

13. How often are monitoring wells not able to be brought out of excursion status?

14. Are their monitoring wells in the White River alluvium?

15. If not, why not?

16. What is the scientific basis for refusing to monitor for uranium?

CONTENTION D

Issue: Contention D (Environmental Justice – Cultural Resources)

Objectives: To establish that NRC Staff in its Environmental Justice analysis did not consider the disparate impacts of CBR activities upon the historic, cultural, and spiritual resources and interests of the Sioux Tribes. To establish that the NRC Staff failed to meet federal law and trust responsibilities of consultation with Sioux Tribes regarding the disparate impacts upon their historic, cultural, and spiritual resources and interests.

Questions to be Posed to NRC Staff witnesses: David Back, Thomas Lancaster, Nathan Goodman, and Elise Striz:

1. Are the Lakota peoples and other Native peoples and Tribes considered "minority populations" for the purpose of an Environmental Justice analysis?

2. Could there be unknown burial or other culturally or historically significant sites within the Project Area?

3. Do the Sioux Tribes possess unique information about cultural resources in the project area?

4. You testify that the Staff invited each tribe to participate in a site survey and choose an identification method appropriate for identifying sites of significance to the tribe. NRC-001 at 64-66. Was there any methodology used to determine which Tribes participated in the survey?

5. Was the survey based on completely self-selecting in terms of which Tribes participated?

6. Did the NRC Staff ensure a so-called "representative sample" of cultures or Tribes? How?

7. Was the NRC Staff's approach to the tribal cultural surveys rejected by any of the invited Tribes?

8. What were the reason(s) expressed by any of the Tribes for rejecting the Staff's approach to the tribal cultural surveys?

9. Was there a request from any of the Tribes to develop its or their own approach to the tribal cultural surveys? What was the NRC Staff's response to these request(s)?

10. You mention in the Environmental Assessment that "[a] long ridge adjacent to Crow Butte was used in earlier years as a place that young Lakota men went to for vision quests. This locale would be about 1 mile each of the CBR project area." EA at 57. From whom or where did you obtain this information?

11. What specific effort was made by the NRC Staff to determine whether this area was, has, or is desired to be used, if available, by other Native persons for spiritual purposes?

12. What specific effort was made by the NRC Staff to determine whether this area has been used in recent years or is currently being used, or would be used if available, by Lakota men or other Native persons for vision quests or other spiritual purposes? From whom was, and what was, the information obtained?

13. What specific effort was made by the NRC Staff to determine whether or not Native persons have access to such areas for vision quests or other spiritual purposes?

14. What specific effort was made by the NRC Staff to determine whether the CBR activities compromised or restricted the access or use of Native persons to such areas for vision quests or other spiritual purposes?

15. You mention in the Environmental Assessment that "[a]ccording to Tribal representatives at the information-gathering meeting, unspecified herbs used in traditional medical practices to treat ailments such as headache, stomachache, and arthritis grow on the CBR project area and around Crow Butte. Tribal members believe these herbs do not grow elsewhere." EA at 57. Which specific "Tribal representatives" provided this information?

16. What specific effort was made by the NRC Staff to identify the “unspecific herbs” and the “traditional medical practices” referred to by the “Tribal representatives” and “Tribal members” and the location of these herbs?”

17. What specific effort was made by the NRC Staff to determine whether or not Tribal members have access to such medicinal herbs and the scope of such access?

18. What specific effort was made by the NRC Staff to determine whether the CBR activities compromised or restricted the access or use of Tribal members to such medicinal herbs and the scope of such compromise or restriction?

19. What specific effort was made by the NRC Staff to determine if the Lakota peoples, the Oglala Sioux Tribe, and / or other Native peoples or Tribes have any historic, cultural, religious, or spiritual interests in the CBR project area or nearby areas that are different from those of other non-Native populations in the area?

20. You did not conduct an Environmental Justice analysis in the Environmental Assessment in regards to the impact of the CBR project site activities upon any Lakota or Tribal historic, cultural, religious, or spiritual resources and interests. Why not?

21. You did not conduct an Environmental Justice analysis in the Environmental Assessment in regards to the disparate impact of the CBR project site activities upon any

Lakota or Tribal historic, cultural, religious, or spiritual resources and interests. Why not?

Issue – Reliability of NRC Witness Testifying as to Contention D

Objective: To establish the admissibility, credibility and weight to be given to NRC Staff witnesses David Back, Thomas Lancaster, Nathan E. Goodman and Elise Striz based on questions regarding area of testimony, reliability, bias, and preparation. Each witness should be subjected to each line of questioning in order to

Questions to be posed to Mr. Back, Mr. Lancaster, Mr. Goodman, and Ms. Striz.

Line of Questioning: Delineate the Scope of Testimony

22. You do not have a degree in any field pertaining specifically to Native American or other indigenous peoples, is that correct? *Mr. Back is a hydrogeologist with Masters and Bachelors degrees in geology. Mr. Goodman has a Master of Science in Environmental Science with a thesis on the biomasses of red-backed salamanders in eastern deciduous forests as an indicator of overall health and quality of the surrounding environment and a Bachelor of Science in Environmental Science. Mr. Lancaster has Masters and Bachelors degrees in geophysical sciences. Dr. Striz has Doctorate, Masters, and Bachelors degrees in engineering.*

23. You do not have a degree in any field pertaining specifically to anthropology or archaeology, is that correct? *None of these witnesses have any specialized knowledge or training relating to Native American peoples, indigenous peoples, or Native or indigenous history, culture, or spiritual interests.*

Issue: Contention D (Environmental Justice – Reservation Water Contamination)

Objectives: To establish that NRC Staff in its Environmental Justice analysis did not the disparate impacts of CBR activities upon the potable groundwater resources of the Lakota people residing on the Oglala Sioux Reservation.

Questions to be Posed to NRC Staff witnesses: David Back, Thomas Lancaster, Nathan Goodman, and Elise Striz:

24. Are the Lakota peoples and other Native peoples and Tribes considered "minority populations" for the purpose of an Environmental Justice analysis?

25. Are the groundwater resources underlying the Oglala Sioux Reservation "downstream" from the Crow Butte project site?

26. Are users of groundwater downstream from the Crow Butte project site at disparate risk from users who are not downstream in the event of an excursion from the project site that results in the contamination of the groundwater being used?

27. Are there specific chemical markers or elements, or amount of such substances, associated with the in situ mining of uranium by Crow Butte at the project site that can be found in the groundwater? If so, what are those?

28. Are there any other known in situ mining activities or any activities, other than at the Crow Butte project site, that would be likely to produce these specific chemical markers or elements in the groundwater? If so, for each specific chemical marker or element, describe the known activity that could produce it in the groundwater.

29. Describe the specific effort made by the NRC Staff to determine the existence of any of such specific chemical markers or elements, and the levels of such markers or elements, in the groundwater resources underlying the Oglala Sioux Reservation. If any such effort was made, what were the results?

30. Assuming 2 gallons of drinking water per person, per day, and a cost of $1.00 per gallon for plastic water jugs, do you agree that the annual cost to a four person household would be $2,920.00 per year, plus gas and mileage costs to and from the store?

31. Do you agree that the median annual household income on the Pine Ridge Reservation is below $10,000?

Issue: Contention D (Communication of Aquifers part)

Issues Needing Further Clarification

1. Whether there is sufficient evidence to conclude that there is no unwanted migration of mining fluids into adjacent formations, aquifers or surface waters.

Objective of Examination

To establish that potential contamination pathways exist between the aquifers.

To establish that state of the art methodology was not used to evaluate aquifer connectivity.

To establish that the aquifer pumping tests used analytical equations that assume homogenous, isotropic geologic layers of unvarying thickness, and large (essentially infinite) horizontal extent and that these over-simplified assumptions are inconsistent with actual conditions.

To establish that this over-simplification of actual aquifer conditions is evidenced by CBR's necessity to go to a more complicated numerical model for its restoration activities.

PROPOSED QUESTIONS

1. Is it your opinion that the four pumping tests used to demonstrate lack of communication between aquifers is the most accurate and effective means to determine potential connectivity?

2. What is the degree of uncertainty related to the pump test results?

3. What are the assumptions for the analytical Theis equation and the analytical Cooper-Jacob equations that were used to analyze pumping tests?

4. What is indicated when the Cooper-Jacob drawdown equation does not follow a straight line plot? [Note for examiner: The analytical Cooper-Jacob equation should show a straight line plot with no deviation if the aquifer does not have a recharge source, such as a vertical fracture, or a leakage or impermeable area that would conversely reduce flow.]

5. Why are the drawdown points on CBR's Cooper-Jacob analysis observed to deviate after a certain amount of time, and why is this deviation not considered or explained?

6. Could the aforementioned deviation indicate that vertical fractures in the mining area are sources or sinks of groundwater?

7. Would you agree that the need for a numerical model for restoration indicates that the pumping test analysis is not fully appropriate? [Note for examiner: The numerical model has a large number of inputs, assumptions, calibrations, attempts at validation and design constraints, which, because it is constantly being updated, are not available for external

review. Hidden in these updates, assumptions and calibrations could be supporting evidence that some of the pumping in the Basal Chadron is influenced by vertical flow from the supposed "confining units" above and below. At the very least, the numerical model is VERY unlikely to assume the homogeneous, isotropic layers of uniform thickness and infinite horizontal extent used in the analytical pumping test analysis.]

8. Why does the numerical model need to be constantly updated?

9. Why is the numerical model and its updates not available for review?

10. Does the numerical model assume the set of homogeneous, isotropic layers of uniform thickness and infinite horizontal extent used in the analytic pumping test models and analysis?

11. If the optimal numerical model deviates from the assumptions of the analytical models used to evaluate aquifer properties in surrounding aquifers and aquitards, are the impacts of pumping and injection in the Basal Chadron evaluated by simplified analytic models alone incomplete and deficient?

12. What is the basis for not conducting repetitive confinement pump testing prior to, and during, the renewal period?

13. Why were few (often only one) observation wells put in the heterogeneous Brule Formation for analytical model pumping test analysis? Is it possible that such a single observation well could be non-representative?

14. Given the observed barometric pressure response in a well in the overlying Brule aquifer, and the observable, muted, resultant pressure response in the underlying Basal Chadron, how is this not evidence of vertical communication of groundwater? [Note to examiner: The pressure response in the Basal Chadron is lagged in time and smaller in magnitude than the Brule response, but has the same periodicity.]

15. Why would the observable pressure response in the Basal Chadron have the same periodicity as the overlying Brule if there was not vertical communication?

16. What is the likelihood that introduction of mining fluids into the target aquifer will create additional porosity and enhance or create new flowpaths?

17. What impact do new channels have on secondary permeability?

18. How is potential new secondary porosity/permeability identified and monitored during mining?

19. Has CBR analyzed the effect of operations on the moisture content fluctuation of the shrinking and swelling clays overlying the Basal Chadron? [Note to examiner: Shrinking and desiccation of these clays can cause cracking that encourages vertical communication of groundwater. An answer denying the possibility that the clays will dry up and shrink indicates that water can be supplied to the clays, meaning they are not impermeable and water can vertically communicate through them. If the clays can desiccate, shrink and crack then any pulses of groundwater will have high permeability vertically.]

20. What evidence is there that these red clays exist over the entire mining area?

21. Are the monitoring wells in an oxidizing or reducing condition?

22. Are mining operations currently taking place in faults or fractures of any size?

23. Were any isotopic analyses (i.e., tritium, delta O18, D) or tracing investigations completed to help characterize age, sources and flowpaths for ground waters in the Chadron and Brule Formations?

24. What degree of hydraulic connectivity between aquifers is considered significant?

25. What methods were used to characterize the faults, folds and fractures in the mining area prior to the beginning of operations?

26. Have faults, folds and fractures in the mining area been examined since the introduction of mining fluids?

27. What methodology, if any, is employed to characterize flowpaths that may result from improperly abandoned bore holes, and distinguish these from flowpaths associated with faults, fractures and secondary porosity/permeability?

28. Are there paleo-channels within the Licensed Area?

29. What is the likelihood that paleo-channels carry mining fluids capable of mobilizing uranium in unknown places into contaminant pathways?

CONTENTION F

Issues Needing Further Clarification

1. Whether the characterization of hydrostratigraphic units at the CBR site can reasonably support a "layer cake model" of the subsurface.

2. Whether subsurface conditions at the CBR site are know in sufficient detail and accuracy to support conclusions regarding connectivity and groundwater flow.

Objective of Examination

To establish that the characterization of the subsurface at the CBR site is oversimplified and likely to result in inaccurate assumptions regarding hydraulic connectivity and subsurface flows.

PROPOSED QUESTIONS

1. What is the direction of groundwater flow in the Brule Formation?

2. What evidence supports the characterization of the White River geologic formation as a fold rather than a fault?

3. Where are the locations of the gaining and losing reaches of the White River?

4. Do you acknowledge the existence of secondary porosity/permeability consisting of joints and faults in rocks of the Arikaree and White River groups along the Pine Ridge near Crawford, Nebraska.

5. Do you acknowledge that the secondary porosity/permeability consisting of joints and faults present in the rocks of the Pine Ridge at Crawford, Nebraska is a plausible conduit for the migration of contaminants?

6. Do you acknowledge that the recognition of secondary porosity/permeability consisting of joints and faults in the rocks near Crawford, Nebraska may be potentially fatal to the renewal of your license and planned expansions?

7. Do you acknowledge that lineaments visible from outer space mapped in the Crawford area by numerous reputable scientists likely represent extensive jointing and faulting of the White River and Arikaree groups?

8. Have you mapped faults and joint sets in the Crawford area?

9. Have you mapped lineaments visible from outer space in the Crawford area?

10. On what reasoning or evidence do you base your assertion that the Crawford area is not extensively faulted and jointed?

11. Do you acknowledge that detailed subsurface drilling and geological mapping by the Nebraska Geological Survey identified extensive faulting and jointing of the rocks in the Crawford area?

12. How do you explain the apparent lateral offset the mined uranium trend by faults as shown in the Wyoming Fuels map (INT-044 & INT-045)?

13. Do you acknowledge that mineralization can and does occupy the secondary porosity/ permeability within the White River Group?

CONTENTION 6

Issues Needing Further Clarification

1. Whether the conclusions in the EA regarding the short-term impacts from consumptive ground water use are supported by evidence in sufficient detail to comply with NEPA.

2. Whether there is an accurate understanding of the current impacts of ground water consumption in sufficient detail to conclude that future ground water use impacts support a FONSI.

Objective of Examination

To establish that there is a substantial and significant degree of uncertainty regarding the actual volume of ground water likely to be consumed during restoration activities in the renewal period.

To establish that there is insufficient evidence to accurately predict the likely volume of ground water consumption required during restoration.

To establish that there is not a thorough and complete understanding of the impacts of current ground water consumption sufficient to accurately inform reasonable projections of future impacts.

PROPOSED QUESTIONS

1. What is the rational basis to conclude that only 11 pore volumes will be required to complete restoration in each of the remaining mine units?

2. What is the likelihood that more than 11 pore volumes will be required to complete restoration?

3. How accurate has the MBRP been in meeting predicted restoration goals?

4. If 36 pore volumes were required to complete restoration at each mine unit, would the consumption of that amount of ground water be considered MODERATE?

5. How many pore volumes per mine unit would be considered to have a LARGE impact?

6. Is the difference between a 30 foot and a 50 foot decline in the potentiometric surface in the Basal Chadron near Crawford statistically significant?

7. What level of decline in the potentiometric surface would be considered significant?

8. Has either CBR, or NRC Staff characterized the decline in well yields that will result from a lowered potentiometric surface in the Basal Chadron?

9. Is CBR currently monitoring the decline in the Basal Chadron potentiometric surface near Crawford?

10. If not, why not?

CONTENTION 9

Issues Needing Further Clarification

1. Whether the discussion of the ground water restoration plan in the EA is sufficiently detailed and descriptive to justify a FONSI.

2. Whether the discussion of the ground water restoration plan in the EA accurately depicts the likely result of restoration activities with enough certainty to justify a FONSI.

3. Whether the ground water restoration plan, as presented in the EA, is sufficient to comply with NEPA requirements and associated implementing regulations.

4. Whether the discussion of the ground water restoration plan in the EA is sufficiently detailed and accurate to comply with NEPA requirements and associated implementing regulations.

Objective of Examination

To establish the lack of certainty in the efficacy of the ground water restoration plan discussed in the EA.

To establish that uranium concentration levels will only be restored to ACLs, levels that are currently unknown, and thus undeniably absent from the discussion of the ground water restoration plan in the EA.

To reveal the uncertainty regarding the stability of the long-term conditions in the post mining aquifer after restoration standards are approved.

PROPOSED QUESTIONS

1. Is it your opinion that the mine unit restoration goals based on the Commission approved background levels for the CBR facility fairly and accurately reflect the conditions in the pre-mining aquifer?

2. If the pre-mining conditions were not accurately characterized and presented, can effective restoration goals still be developed?

3. What is the likelihood that ACLs, at least for uranium and radium, will be requested for each of the remaining mining units?

4. In the context of requesting ACLs, what is meant by "best practicable effort?"

5. What are the likely uranium concentration levels that will be approved as ACLs for the remaining mine units?

6. If the ultimate post-restoration levels are not known, then what is the basis for concluding that "the impact on ground water quality in surrounding aquifers is negligible" in section 4.6.2.3 of the EA on page 82?

7. Is it your opinion that any uranium concentration level in a post-mining aquifer will have "negligible" impact on ground water quality? Why?

8. What uranium concentration level would have a more than "negligible" impact on ground water quality?

9. What is the likelihood that conditions in the post-restoration mine units will remain stable, and how is that stability defined?

10. Is the restoration monitoring protocol in use by CBR, and approved by the NRC Staff, rigorous enough to characterize the actual conditions in the post-mining aquifer?

11. What margin of error is considered when assessing contaminant levels during, and after, restoration?

12. Given the virtual certainty that ACLs , at least for uranium and radium, will be requested, and approved, for each remaining mine unit, isn't the discussion in the EA regarding any other restoration standards other than ACLs entirely superfluous?

13. How are secondary permeability pathways monitored during the restoration phase?

14. How are secondary permeability pathways monitored after restoration designation?

15. Can secondary permeability pathways continue to develop during, and after, the decommissioning phase?

FOR CONTENTION 12

Issues Needing Further Clarification

1. Whether the EA analyzes and discusses the impacts from surface application of mining wastewater in sufficient detail to comply with NEPA.

2. Whether the EA's omission of a discussion of tornadoes complies with NEPA's "hard look" requirements.

Objective of Examination

To establish that current monitoring protocols are insufficient to detect impacts from land application of mining wastewater.

To establish that current monitoring and remediation protocols do not adequately address the impact from tornadoes.

PROPOSED QUESTIONS

1. What is the current combined water disposal capacity at the CBR facility including evaporation ponds and deep disposal wells?

2. What happens to wastewater produced in excess of CBR's current combined annual disposal capacity?

3. What contaminants, in what concentrations, are likely to be present in mining wastewater?

4. How many of these contaminants can be mobilized into the food chain?

5. What monitoring programs are in place to identify any mobilization?

6. How would the impacts of such mobilization be mitigated?

7. Could a tornado result in the mobilization of contaminants off the CRB mining site?

8. How would the impacts of tornado borne mobilization be identified and mitigated?

CONTENTION 14

Issues Needing Further Clarification

1. Whether the EA adequately explores and analyzes the impacts on the project from regional seismic activity.

2. Whether the current monitoring protocol is sufficient to detect seismically induced changes in the mining area.

Objective of Examination

To establish that the NRC Staff did not fairly consider regional seismic activity in the EA.

To establish that the current monitoring protocols are inadequate to detect impacts from seismic activity.

PROPOSED QUESTIONS

1. How would new secondary permeability pathways opened by seismic activity be identified either by CBR or the NRC Staff?

2. What is the estimated period of time that the water in the Basal Chadron has been isolated from the water in the Brule?

3. On what evidence is this estimation based?

4. How would seismically induced changes in connectivity between the aquifers through faults and fractures be identified?

5. What degree of seismic activity is considered insignificant as regards confinement in the mining area?

6. What is the margin of error regarding seismic activity and its likely effect on confinement, including its effect on secondary porosity/permeability?

7. Is seismic activity likely to cause an increase or decrease in secondary porosity/ permeability?

8. In the event that seismic activity created communication pathways between the mining unit and other aquifers, how would the potential for contamination be addressed?

CONCLUSION

The Consolidated Intervenors and the Oglala Sioux Tribe hereby request that in the interest of clarifying the controversies at issue in this proceeding the Board pose the foregoing questions to the witnesses presented by NRC Staff and CBR.

Dated this 29th day of June, 2015.

Respectfully submitted,

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In the Matter of	)	
	)	
CROW BUTTE RESOURCES, INC. ,	)	Docket No. 40-8943
	)	ASLBP No. 08-867-02-OLA-BD01
(License Renewal for the	)	
In Situ Leach Facility, Crawford, Nebraska)	)	June 29, 2015

CERTIFICATE OF SERVICE (IN CAMERA)

I hereby certify that copies of the foregoing '**CONSOLIDATED INTERVENORS AND OGLALA SIOUX TRIBE PROPOSED QUESTIONS**, in the captioned proceeding were served via email on the 29th day of June 2015, to the members of the Board and to the Board law clerks.

Respectfully submitted,

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

(IN CAMERA)

In the Matter of	)	
	)	
CROW BUTTE RESOURCES, INC.,	)	Docket No. 40-8943
	)	ASLBP No. 08-867-02-OLA-BD01
(License Renewal for the	)	
In Situ Leach Facility, Crawford, Nebraska)	)	October 05, 2015

OGLALA SIOUX TRIBE AND CONSOLIDATED INTERVENORS JOINT PROPOSED QUESTIONS FOR SUPPLEMENTAL HEARING

The Oglala Sioux Tribe and Consolidated Intervenors hereby submit the following Proposed Questions for the Board to pose to witnesses for the NRC Staff and CBR during the Supplemental Hearing.

1) Has CBR or NRC Staff identified any recharge or discharge locations for the Basal Chadron/Chamberlain Pass aquifer? If so, where is this information published?
2) In the opinion of NRC Staff, how does the White River Structural Feature affect the potentiometric surface of the Basal Chadron/Chamberlain Pass aquifer? Where is the flow system in the vicinity of this feature described and analyed?
3) In the admitted absence of accurate baseline data regarding pre-mining water level in the Brule Aquifer, how does NRC Staff justify its conclusion that mining operations have not lowered the water levels in the Brule? What steps has NRC Staff taken to approximate historic pre-mining water levels in the Brule Formation?

4) Is there raw data available from the aquifer pumping tests, specifically Test 1 (BRD-002A), to support the graphs presented?
5) Regarding the water table map of the Brule Aquifer from 1982-1983 that is on page 2-173 of the LRA (CBR-011) which has also been annotated by Dr. Kraemer and identified as BRD-008A and further annotated by NRC Staff and marked NRC-096-R, there is a well in the center of the mining area, near where Dr. Kraemer made his annotation, labeled "129." There is no value assigned to Well 129 on the map, however in the Legend at the bottom of the map, the example for a "Brule Formation Water Well" is Well 129 and the value assigned to it is 3968.8 FT-AMSL. Is this the actual value of Well 129? Where is this data located? Where is the data for Well 19, which is located near Well 129 and near the point where Dr. Kraemer annotated?
6) How does CBR/NRC Staff explain the water level changes in monitoring wells SM 7-22 and SM 7-17 (CBR-063 & CBR-064) that appear unrelated to precipitation trends?
7) What flow monitoring does NRC require for springs that are hydraulically connected to the Brule Formation?

Dated this 5th day of October, 2015.

Respectfully submitted,

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In the Matter of	)	
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	)	ASLBP No. 08-867-02-OLA-BD01
(License Renewal for the	)	
In Situ Leach Facility, Crawford, Nebraska)	)	October 05, 2015

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I hereby certify that copies of the foregoing '**OGLALA SIOUX TRIBE AND CONSOLIDATED INTERVENORS PROPOSED QUESTIONS FOR SUPPLEMENTAL HEARING**, in the captioned proceeding were served via email on the 5th day of October 2015, to the members of the Board and to the Board law clerks.

Respectfully submitted,

/s/

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

(IN CAMERA)

In the Matter of	)	
	)	
CROW BUTTE RESOURCES, INC.,	)	Docket No. 40-8943
	)	ASLBP No. 08-867-02-OLA-BD01
(License Renewal for the	)	
In Situ Leach Facility, Crawford, Nebraska)	)	August 26, 2015

CONSOLIDATED INTERVENORS SECOND PROPOSED FOLLOW-UP QUESTIONS

Consolidated Intervenors hereby submit the following Proposed Questions for the Board to pose to witnesses for the NRC Staff and CBR.

1) When abandoning boreholes, including exploration boreholes, are there any boreholes where CBR pierces the casing and fills the annular space?
2) Does the graph at Figure 2.7(40) (re: 7/29/87) of Board Exhibit-002B, indicate a recharge boundary at about 300 minutes?
3) Doesn't the LRA (CBR-011), at Figure 2.7-3(a) (on page 2-173) when compared with Figure 2.7-3(b) (on page 2-175), support Dr. Kreamer's position that there is an appreciable difference in the pre-mining water levels in the Brule as compared to 2008?
4) Is there any other data upon which NRC or CBR, respectively, has based testimony that has not been disclosed by the testifying party, similar to the modeling input data that NRC disclosed Tuesday Aug 25 in response to the Board's request?

5) Would Mr. Teahon's explanation that a small leak in piping would be seen in winter as a lack of frost hold true for a small but constant leak on the underside of the piping and why would a slow drip be expected to create a lack of frost effect while dripping downward under 4 feet of ground?
6) Is there a clay liner installed between the ground and the 2nd (bottom) plastic liner in the evaporation ponds?
7) How are leaks in the bottom liner detected?
8) Is there a way to visually inspect the lower liner?
9) Have there been multiple liner leaks as described in INT-042, including 6 in pond 1, 1 in pond 3, and 3 in pond 4? Why did pond 2 have twice as many as pond 4 and 6 times as many as pond 3?
10) Is there more plasticizers in a soft malleable plastic? If so, will that compress under 40 million gallons of water to create a seal?
11) What is the means of fixing pinhole leaks? Does it involve cutting the liner, installing a patch and making new seams? Aren't the seams the most common place for leaks to occur in the liners? Wouldn't that indicate that the more seams that are created, the higher the likelihood of pond leaks? Shouldn't there be a limit on the number of patches that may be made on a liner before a new liner must be installed?
12) Regarding the MU 6 and MU 8 long-term excursions, how would precipitation events relate to such excursions? What other potential explanations, besides precipitation, have been considered to explain these excursions?
13) Is it true that CBR and NRC are relying on the company's ring of monitoring wells and 19 offsite wells as its offsite monitoring program? Are any of the 19 offsite wells

constructed in compliance with NUREG-1569? Are all of the monitoring wells constructed in compliance with NUREG-1569?

14) How many pipe leaks has CBR found and repaired?

15) In addition to the 358 documented spills, how many pipe leaks have been documented and what is the total number of unintentional releases of spills and leaks into the environment?

16) How may MIT failures has CBR had? Were there repetitive failures or similar failures in any category?

17) How many excursions has CBR had? What was the shortest excursion? What was the longest excursion in terms of days, weeks, months or years?

18) Are sediments always covered in the evaporation ponds?

19) Under what permit is CBR allowed to use pivot sprayers/sprinklers to accelerate evaporation in ponds and how is that different from aerial application via sprayer/sprinklers? What mechanisms are in place to ensure that the aerosol spray from the pivot sprinklers does not escape the pond confinement area?

20) Since the ponds are described as "solar evap ponds", and that describes a "passive" system, not an active system with pivot sprayers actively spreading radiation into the air with heavy metals, does the EA include analysis and description of the impacts of this kind of acceleration via the aerial application of mining waste fluids via aerial sprayers/sprinklers?

21) With the use of the pivot sprayers for some time, shouldn't the areas around the ponds be tested and monitored for heavy metals and radiation from the droppings in the air

to determine the extent of the distribution by air, to see how far the metals and radiation are carried by the winds?

22) How would CBR eliminate bioaccumulations of selenium and other heavy metals contained in the mining fluids released into the environment in connection with the 358 spills and the number of leaks and future spills and leaks at the mine?

Dated this 26th day of August, 2015.

Respectfully submitted,

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Respectfully submitted,

/s/

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Questions from The Oglala Sioux Tribe

August 25, 2015

MIGRATION OF CONTAMINANTS TO THE RESERVATION

- Question for Charmaine Whiteface:

Is it your opinion That there is evidence of contamination of The underground sources of drinking water on The Pine Ridge Indian Reservation from uranium mining activity at the ~~Crow~~ Crow Butte site? If so, what is the scientific basis for your opinion?

- Question for Dr. Hannah La Barry:

Witness Charmaine Whiteface has provided her opinion That contaminants from The Crow Butte facility during its 30 years of operation ~~that~~ have reached and contaminated ~~the groundwater~~ underground drinking water resources on the Pine Ridge Indian Reservation. In your opinion, could groundwater contaminants from The Crow Butte facility have contaminated The groundwater on The Pine Ridge Indian Reservation? And, if so, (1) what in your opinion have been The pathway or pathways for contamination, and (2) what would be The range of time for The travel of groundwater

Contaminants from The Crow Butte facility to The Pine Ridge Indian Reservation?

IMPACTS OF ADDITIONAL LIQUID PROCESS FLUIDS FROM THREE CROW

Questions for Crow Butte and NRC Staff witnesses:

The CBR Application for Amendment of US NRC Source Material License SUA-1534 for The Marsland Expansion Area, Volume I, Technical Report, May. 2012, at section 1.7.3 of The Report titled, "Three Crow Expansion Area Schedule," states as follows:

"In 2011, CBR advised The NDEQ and NRC of a possible change from a full satellite facility (production of impregnated resin for transport to The main CPF) to use of pipelines to transport all process fluids from The TCEA to The CPF... If feasible, The revised license would allow for construction and operation of These process pipelines. CBR requested That The NRC and NDEQ suspend review of the respective TCEA applications so That CBR could supplement The applications with the alternative approach."

WHAT is The status of This "alternative approach" proposal of using pipelines to transport all process fluids from The Three Crow Expansion Area to The Crow Butte processing facility? Under This "alternative approach" WHAT are The plans for The use or disposal of the

OST Q^NS CONTINUED

lixiviants or liquid wastes from these TCEA fluids? If they are to be injected back into the aquifer at the Crow Butte site, where is that discussed in the application for license renewal and the Environmental Assessment? Into which aquifer would the injection occur? What investigation and provisions have been made regarding any impacts the injection of the TCEA additional lixiviants or liquid wastes? Where is that discussed in the application for license renewal and the Environmental Assessment.

QST QUESTIONS CONTINUED

IMPACTS OF CESSATION OF PRODUCTION AT THE CROW BUTTE FACILITY

In the materials submitted by CBR, CBR states that it is winding down its production at the Crow Butte site and will cease production of source materials during the license renewal period, prior to 2024. WHAT is the status of the winding down and cessation of the production wells at any or all of the Crow Butte site during the term of the license renewal period? WHERE is that discussed in the license renewal application and the Environmental Assessment? WHAT investigation and provisions have been made regarding ~~any that~~ impacts this winding down and cessation of the production wells regarding the permanent containment of contaminants and the complete restoration of the groundwater during this period and process? Where is that discussion in the application for license renewal and the Environmental Assessment? What specific level of groundwater restoration will be accomplished as to each production well at the Crow Butte facility?

WHAT specific provisions have been made for the long term monitoring of the release of contaminants into the groundwater or the excursion of contaminants from the Crow Butte site and the maintenance of groundwater quality standards following the cessation of mining activities at the Crow Butte facility? WHAT is the specific length in time of that obligation? Who will have responsibility for fulfilling that obligation? WHAT provisions have been made for the coverage of any costs associated with fulfilling that obligation throughout the full term of that obligation? WHERE is that discussed in the application for license renewal and the Environmental Assessment?

OST ADD'L QUESTION - 8/26/2015

Qn for Charmaine whiteFace —

- what is the importance of including uranium in the testing for excursions?
- Isotopic Ratio between U_{234} & U_{238}

OST QUESTIONS

FOR CBR / NRC STAFF WITNESSES —

- What is the status of the proposal to pipe in liquid solution from production from the Three Crow Expansion Area to the Crow Butte site for processing? Is that considered & discussed in the closure and decommissioning of the site and ponds? How will the liquids from the TCEA be handled if the Crow Butte License Site has been closed or decommissioned?

- What discussion & provisions have been made to deal with extraordinary flooding, such as the major floods of 2009, regarding the containment of the ponds and site drainage areas from transporting contaminated soils downstream into the White River drainage?

- Also question for Dr. LaGarry re potential for flooding of the site area and the White River — and the impact of floods on commingling of surface & groundwater in the area.

Re: Pond sprinklers

(3) Can limits be set for height of spray from the sprinklers to confirm that the spray residue / metals that are not evaporated to the air, stay confined to the limits of the pond?

(4) Can air monitors be installed around the ponds to measure levels of gamma rays/ beta particles & radon gas to assure that levels released by sprayers stay within safe levels?

(5) Can CDR be required to keep higher levels of water in ponds than as shown on a satellite photo where heavy accumulations of obvious alkali metals ~~have~~ are shown created a low or missing water table in one pond?

(3) CONSOLIDATED EIT QUESTIONS RE: CATEGORY 12 (TORNADOES)

(4) Re: Tornadoes

Could mitigation efforts be included at the sound of a tornado alarm that include such binding agents as corn starch for yellowcake vats & some tested binding agents for the holding ponds that would increase particle size to facilitate dropping of toxic particles sooner from storm clouds & closer to the site for containment & cleanup?

(5) Re: Monitoring of heavy metals or bioaccumulation of escaped metals from site

Could a model be developed where testing of soils, sediments of creeks, blood & tissue/hair samples be monitored in domestic & wild animals as well as humans in proximity of the site?

(1)

Consolidated Int - Proposed Questions From Mosaic Testimony

What percentage, if any, of the abandoned boreholes were cased? If there were cased boreholes, does CBR punch holes in the casing and insert plugging gel into the annular space that may exist on the exterior of the casing? What factors determine whether or not this is done?

Concerning MU-11 in the southern most portion of the mining area, how many excursions have been reported in the monitoring wells that pass through the Arikaree formation and are screened in the Chamberlain Pass Formation (formerly the "Basal Chadron")?

Concerning the pre-operational groundwater flow towards the Northwest that was observed in The Chamberlain Pass Formation, witnesses stated that the flow discharges. Where is that discharge? Has there been a change in the discharge rate since mining operations commenced?

After the cessation of mining operations and restoration, will the NW directional flow in

(2)

The Chamberlain Pass Formation to the afore-mentioned discharge area resume?

What does CBR believe caused the many excursions listed in INT-042? Does the Staff concur?

Is West Ash Creek, another tributary of the White River, present in the mining area?

Did CBR ever test in the Upper Confining Unit? Does CBR have, or has it ever had, a testing or monitoring well in the UCU?

How would the deductive reasoning employed by Staff account for preferential flows? What is the likelihood that deductive reasoning is as effective at predicting actual conditions as testing based on statistically sound scientific techniques?

If there was rapid communication between aquifers, then the head differential would likely be very small, presumably less than 10 feet. Could the head differentials that were identified to be in the 10s of feet be evidence of a slower communication between the aquifers?

(3)

Is groundwater dating to determine connectivity, or lack thereof, considered to be cost prohibitive?

Doesn't name/nomenclature impact how the public reads and understands the LRA and EA?

WOULDN'T THE USE OF OUTDATED NAMES AND NOMENCLATURE IMPACT HOW THE PUBLIC READS AND UNDERSTANDS THE LRA AND EA?

WOULDN'T THE USE OF OUTDATED NAMES AND NOMENCLATURE DISCOURAGE PUBLIC INTERVENTIONS?

HOW CAN THE LRA ADEQUATELY OR ACCURATELY DESCRIBE THE GEOLOGICAL SETTING IF THE LRA USES MISLEADING OR OUTDATED NAMES OR NOMENCLATURE TO DESCRIBE THE GEOLOGICAL SETTING?

~~Is~~ IS IT YOUR OPINION THAT IT WOULD HAVE BEEN EXPENSIVE OR TIME CONSUMING TO INSERT A PARENTHETICAL WHEN REFERRING TO OUTDATED OR CHANGED NOMENCLATURE SUCH AS 'THE BASAL CHASERON (NOW CALLED THE CHAMBERLAIN PASS FORMATION)' OR 'THE CHAMBERLAIN PASS FORMATION (FORMERLY

(4)

REFERRED TO AS THE BASAL CHADRON)'? WOULD NOT SUCH A CHANGE BE A SIMPLE MATTER OF COMPUTER CUT AND PASTE?

DON'T NRC REGULATIONS REQUIRE THE LRA TO CONTAIN COMPLETE AND ACCURATE INFORMATION? IF SO, THEN HOW CAN THE LRA COMPLY WITH NRC REGULATIONS IF IT DOES NOT CONTAIN COMPLETE INFORMATION THAT REFERS TO CURRENT SCIENTIFIC NOMENCLATURE?

HOW DOES USING OUTDATED NAMES AND NOMENCLATURE SATISFY THE STAFF'S NEPA OBLIGATIONS FOR CLEAR AND CONCISE WRITTEN EXPLANATIONS TO THE PUBLIC OF ALL RELEVANT DATA UPON WHICH ITS FONSI WAS BASED?

QUESTIONS FROM THE OGLALA SIOUX TRIBE -
August 28, 2015

MIGRATION OF ~~CONTAMINANTS TO THE~~ RESERVATION

- Question for Charmaine White Face:

Is it your opinion that there is evidence of contamination of the underground uranium mining activity at the Crow Butte site? If so, what is the scientific

- Question for Dr. Hannah LaGarry

Witness Charmaine White Face has provided her opinion that contaminants and contaminated underground drinking water resources on the Pine Ridge the Crow Butte facility have contaminated the groundwater on the Pine the pathway or pathways for the contamination and (2) what would be the

IMPACTS OF ADDITIONAL LIQUID PROCESS FLUIDS FROM

The CBR Application for Amendment of USNRC Source Material License May, 2012, at section 1.7.3 of the report titled "Three Crow Expansion Area

"In 2011, CBR advised the NDEQ and NRC of a possible change from a full CPF) to use of pipelines to transport all process fluids from the TCEA to the operation of these process pipelines. CBR requested that the NRC and

What is the status of this "alternative approach" of using pipelines to Crow Butte processing facility? Under this "alternative approach" what are TCEA fluids? If they are to be injected back into the aquifer at the Crow Into which aquifer would the injection occur? What investigation and additional lixiviant or liquid wastes? Where is that discussed in the

IMPACTS OF CESSATION OF PRODUCTION AT THE CROW

In the materials submitted by CBR, CBR states that it is winding down its license renewal period, prior to 2024. What is the status of the winding during the term of the license renewal period? Where is that discussed in the investigation and provisions have been made regarding any impacts this permanent containment of contaminants and the complete restoration of the application for license renewal and the Environmental Assessment? What

What specific provisions have been made for the longterm monitoring of the contaminants from the Crow Butte site and the maintenance of groundwater Butte facility? What is the specific length of that obligation, who will have made for the coverage of any costs associated with fulfilling that obligation

Consolidated Int — Proposed Questions Concerns 6

~~End of Hydro-Geo~~

1) Since the license allows 9,000 gpm, ~~and~~ and up to 1.5% bleed, isn't the correct max amount of waste liquid from production equal to 135 gpm, as opposed to the '25 gpm" and '30 gpm' numbers referenced by CBR?

2) When 135 gpm is added to the 230 gpm liquid waste of brine from R/O circuit, ~~that is~~ doesn't that equal a licensed max of 365 gpm?

3) As a result, doesn't the licensed maximum of 365 gpm exceed the max capacity of the disposal wells (285 gpm) plus the ponds (15 gpm) by 65 gpm?

4) Since land application permits require many months or years to implement, what license condition or leak restriction exists to keep the waste liquid levels below the

MAXIMUM CAPACITY ?

CONSIDERED INT PROPOSED QUESTIONS
RE: HYDRO GEO PANEL (WEST AM)

1) WHAT ARE THE LAB CONDITIONS AT CBR'S LAB FOR MEASURING CONDUCTIVITY, CHLORIDE & ALKALINE RE: EXCURSION PARAMETERS?

2) How often is the LAB inspected by NRC?

3) How is LAB EQUIPMENT AND TESTING SUPPLIES AND SOLUTIONS TESTED & CALIBRATED?

4) Is the IN-HOUSE LAB ESTABLISHED AND OPERATED IN ACCORDANCE WITH ALL LAB PROTOCOLS THAT APPLY TO AN OUTSIDE LAB SUCH AS 'ENERGY LABORATORIES' WHICH IS A WELL KNOWN TESTING LAB WITH AN OFFICE IN CASPER, WY (WHERE CAMECO IS BASED)?

Questions from The Oglala Sioux Tribe

August 25, 2015

MIGRATION OF CONTAMINANTS TO THE RESERVATION

- Question for Charmaine Whiteface:

Is it your opinion That there is evidence of contamination of The underground sources of drinking water on The Pine Ridge Indian Reservation from uranium mining activity at the ~~Crow~~ Crow Butte site? If so, what is the scientific basis for your opinion?

- Question for Dr. Hannah La Barry:

Witness Charmaine Whiteface has provided her opinion That contaminants from The Crow Butte facility during its 30 years of operation ~~that~~ have reached and contaminated ~~the groundwater~~ underground drinking water resources on the Pine Ridge Indian Reservation. In your opinion, could groundwater contaminants from The Crow Butte facility have contaminated The groundwater on The Pine Ridge Indian Reservation? And, if so, (1) what in your opinion have been The pathway or pathways for contamination, and (2) what would be The range of time for The travel of groundwater

Contaminants from The Crow Butte facility to The Pine Ridge Indian Reservation?

IMPACTS OF ADDITIONAL LIQUID PROCESS FLUIDS FROM THREE CROW

Questions for Crow Butte and NRC Staff witnesses:

The CBR Application for Amendment of US NRC Source Material License SUA-1534 for The Marsland Expansion Area, Volume I, Technical Report, May. 2012, at section 1.7.3 of The Report titled, "Three Crow Expansion Area Schedule," states as follows:

"In 2011, CBR advised The NDEQ and NRC of a possible change from a full satellite facility (production of impregnated resin for transport to The main CPF) to use of pipelines to transport all process fluids from The TCEA to The CPF... If feasible, The revised license would allow for construction and operation of These process pipelines. CBR requested That The NRC and NDEQ suspend review of the respective TCEA applications so That CBR could supplement The applications with the alternative approach."

WHAT is The status of This "alternative approach" proposal of using pipelines to transport all process fluids from The Three Crow Expansion Area to The Crow Butte processing facility? Under This "alternative approach" WHAT are The plans for The use or disposal of the

OST Q^NS CONTINUED

lixiviants or liquid wastes from these TCEA fluids? If they are to be injected back into the aquifer at the Crow Butte site, where is that discussed in the application for license renewal and the Environmental Assessment? Into which aquifer would the injection occur? What investigation and provisions have been made regarding any impacts the injection of the TCEA additional lixiviants or liquid wastes? Where is that discussed in the application for license renewal and the Environmental Assessment.

QST QUESTIONS CONTINUED

IMPACTS OF CESSATION OF PRODUCTION AT THE CROW BUTTE FACILITY

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① CCNS Int Proposed Questions - Cat #12
(CCNS Application & Tornados)

1) Wouldn't CCNS Application be required if combined waste water from production and restoration exceeds the capacity of the deep disposal wells and ~~restoration~~ ponds?

2) What is the likelihood of using CCNS application after MIT & MCS are approved as 'restored', which would allow CPR to open two new mine units?

3) What other documents (errata) in this staff consider in making the EA conclusions concerning winds besides the LRA.
and/or tornados

4) The LRA on pg 2-92 (.pdf-141) refers to "Tornado Intensity Category I", yet Section 7.1.6.3.1 of NUREG-0706 describes the characteristics of a Category I tornado as having winds ~~typically~~ speeds of 360 mph. Doesn't this value equate to a Category EF-5, or most intense tornado, on the Enhanced Fujita

CONSOLIDATED INTERVENORS

PROPOSED QUESTIONS re: CONTENTION 9

CBR testified that MU-2 has been in stability monitoring for "2 years." How does that compare to Section 6.1.4.1 (page 6-18) of the LRA (2007) that says: "Mine Unit 2 undergoing extended stability monitoring following active restoration."?

Does NRC Staff believe that either the LRA, the EA or the License itself clearly informs the public what Restoration standards CBR is required to achieve? Or what those actual restoration values will be?

Does CBR intend to apply for ACL's for MU-2 + MU-3?

Follow-up Contention 9 — Consolidated Intervenors

What is meant by "best practicable effort" when applying for ACL's?

Asked of staff and Applicant

(9)

- GIVEN THE PAST RECORD OF APPLYING ~~REQUIRING~~ NJEQ SECONDARY STANDARDS IN LIEU OF NJEQ TITLE 18 STANDARDS, HOW CONFIDENT IS CBR THAT IT WILL BE ABLE TO MEET THE CRITERION 5(5) STANDARDS?

Sciretta, Nicholas

From: Harmonic <harmonicengineering@gmail.com>
Sent: Friday, October 23, 2015 4:32 PM
To: Desai, Sachin
Cc: Sciretta, Nicholas
Subject: [External_Sender] Consolidated Intervenors Proposed Follow Up Questions

Greetings,

These are our proposed follow-up questions:

1) Some of the few Brule monitoring wells available during the pumping tests had easily cloggable porous cups at the bottom. The pore size of these cups is tiny and would filter and clog with any fine material in groundwater. Wouldn't this further invalidate the sparse Brule monitoring data taken during pump tests?

2) CBR attempts to invalidate early pumping test data by calculating well bore effects CBRs calculation used a 4inch diameter for their calculation, while Dr. Kraemer used a 2 inch diameter.
In Board Exhibit BD-02a, the test is described:

"Some difficulties with the original 4 inch (10cm screen made it necessary to install a 2 inch 5cm telescoping liners inside the 4 inch (10cm) to control sand production."

Also cement grout was injected into the annular space in the well, restricting the well bore volume even more. Does this change CBR's opinion regarding this test?

3) Pumping of the Basal Chadron will lower the potentiometric surface downgradient of the mining area. This could result in a decline in water supply well yields and in BC discharge to springs/ wetlands and streams. How has CBR/NRC Staff determined that there are no such impacts?

Thank you,

Tom Ballanco
Attorney for Consolidated Intervenors

Attachment 4

Miscellaneous Proposed Questions

A

Question for Wade Beins, Crow Butte Resources' Witness

1. Yesterday, we asked about the basis for your estimate of $1x10^{-10}$ cm/sec vertical hydraulic conductivity in the Upper Confining Unit and the type of core sample testing that you performed. Have you been able to locate any information about the source of that information or the type of testing performed?

Question for Matt Spurlin, Crow Butte Resources' Witness

1. With respect to the capability of the White River Structural Feature to transmit fluids, Mr. Wireman testified on Monday that old faults are less permeable (if not impermeable), while younger faults are more likely to be permeable. Does Crow Butte have any information or data regarding the age of the White River Structural Feature and its relationship to the depositional history in the area?

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
CROW BUTTE RESOURCES, INC.	)	Docket No. 40-8943-OLA
	)	
In-Situ Leach Uranium Recovery Facility, Crawford, Nebraska	)	
	)	
(License Renewal)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing **NOTICE (Providing Parties' Proposed Questions for the Official Record)** have been served upon the following persons by Electronic Information Exchange, and by electronic mail as indicated by an asterisk.

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[Original signed by Clara Sola]
Office of the Secretary of the Commission

Dated at Rockville, Maryland
this 6th day of December 2016