


United States Nuclear Regulatory Commission Official Hearing Exhibit In the Matter of:	CROW BUTTE RESOURCES, INC. (License Renewal for the In Situ Leach Facility, Crawford, Nebraska)
ASLBP #: 08-867-02-OLA-BD01 Docket #: 04008943 Exhibit #: INT-012-00-BD01 Admitted: Rejected: Other:	Identified: 8/18/2015 Withdrawn: Stricken: 8/18/2015
	

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
	)	ASLBP No. 08-867-02-OLA-BD01
(License Renewal for the	)	
In Situ Leach Facility, Crawford, Nebraska)	)	January 5, 2015

**CONSOLIDATED INTERVENORS’ NEW CONTENTIONS BASED ON THE  
 FINAL ENVIRONMENTAL ASSESSMENT (OCTOBER 2014)**

Consolidated Intervenors<sup>1</sup> hereby timely submit the following new contentions based on the Board’s Scheduling Orders dated October 28, 2014 and November 24, 2014, and the Final Environmental Assessment (October 2014) (“Final EA”) for the License Renewal Application of Crow Butte Resources, Inc. (“Crow Butte”).

**I. INTRODUCTION**

Pursuant to 10 C.F.R. § 2.309, and this Board’s Scheduling Orders, Consolidated Intervenors hereby set forth the following additional contentions in this proceeding regarding the Final EA.

The Final EA fails to meet the requirements of the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4231, *et seq.*, the National Historic Preservation Act (NHPA), 16

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<sup>1</sup> Western Nebraska Resources Council (“WNRC”), Owe Aku/Bring Back the Way, Debra White Plume, Beatrice Long Visitor Holy Dance, Joe American Horse & Tiospaye, Thomas Cook, Loretta Afraid-of-Bear Cook & Tiwahe. Debra White Plume, Beatrice Long Visitor Holy Dance, Joe American Horse and Loretta Afraid-of Bear Cook are members of the Oglala Sioux Tribe (the “Tribe”) at Pine Ridge Indian Reservation.

U.S.C. § 470, *et seq.*, and implementing regulations, including NRC regulations in 40 C.F.R. Part 51, specifically including 10 CFR §51.45, §51.10, §51.70, and §51.71, because the Final EA does not provide analyses that are adequate, accurate, and complete in all material respects to either (i) describe the affected area and environment; or (ii) demonstrate that cultural and historic resources within the project area are identified and protected pursuant to Section 106 of the NHPA.

As discussed herein, substantial issues remain concerning undetermined impacts to the Tribe's cultural and historic resources, and the lack of information necessary to determine the hydrogeology and geochemistry of the site. The latter includes, but is not limited to, the lack of a defensible baseline ground water characterization, the lack of a thorough review of the natural and manmade interconnections between aquifers in the area that may allow for cross-contamination with the aquifer slated for chemical mining, and the lack of the required analysis of proposed mitigation measures.

Regarding cultural and historic resources, the Final EA carries forward serious problems from the application stage. Despite having years to do so, neither Crow Butte nor NRC Staff have provided the Tribe, or those of Consolidated Intervenors who are members of the Tribe, a meaningful opportunity to be involved in the assessment or determination of the significance of the identified sites, nor a meaningful opportunity to identify additional sites that may warrant evaluation or listing.

The attached Updated Opinion of Dr. Hannan LaGarry dated January 5, 2015, attached hereto and filed herewith as Exhibit A (the "2015 LaGarry Opinion"), the 2008 LaGarry Opinion Letter filed with the Petition in July 2008 and attached for the Board's convenience as Exhibit B

(the “2008 LaGarry Opinion”), and the Opinion Letter of Dr. Richard Abitz filed with the Petition in July 2008 and attached hereto for the Board’s convenience as Exhibit C (the “Abitz Opinion”), each details the lack of scientifically-defensible analysis in the Final EA (or in the case of the Abitz Opinion, the LRA defects found to carry over to the Final EA) regarding potential impacts associated with the mine.

In the 2015 LaGarry Opinion, Dr. LaGarry states:

I am concerned that issues regarding the lack of lixiviant containment raised in earlier opinions have not been addressed and also apply to the Consolidated Petitioners’ contentions in this particular case.

Also relevant to issues concerning baseline, operational and excursion monitoring and analysis is the 2008 Opinion of JR Engineering, Inc. filed with the Petition in July 2008 and attached hereto for the Board’s convenience as Exhibit D (the “JR Engineering Opinion”). Consolidated Intervenors also refer to the NDEQ 1982 Baseline Study filed with the Petition in July 2008 and attached hereto for the Board’s convenience as Exhibit E (the “1982 CBR Baseline Study”) and the list of CBR Violations, Spills and Leaks as of July 28, 2008 filed with the Petition in July 2008 and attached hereto for the Board’s convenience as Exhibit F (the “2008 List of CBR Violations and Leaks”).

Further, the 2013 Opinion Letter of Dr. Louis Redmond concerning cultural resources at the Marsland Expansion Area, attached as Exhibit G hereto (the “2013 Redmond Opinion”), details the problems with Crow Butte’s approach to cultural resources surveys and tribal consultation.

Importantly, while these expert each supports many of the contentions raised herein, several of the contentions, or subparts thereof, arise from errors of omission – failure of the Final

EA to conduct required analyses and failure to review necessary components of the project – and thus do not require an expert opinion in support.

## **II. CONTENTIONS**

As required by 10 C.F.R. § 2.309, the Consolidated Intervenors set forth below specific new contentions based on the Final EA. Each contention raises issues with respect to the sufficiency of the Final EA under the National Environmental Policy Act (“NEPA”), National Historic Preservation Act (“NHPA”), and applicable regulations, including those of NRC, the federal Advisory Council on Historic Preservation (“ACHP”), and the Council on Environmental Quality (“CEQ”). At minimum, each contention set forth below implicates and asserts violations of 10 C.F.R. §§ 51.10, 51.70, and 51.71, which require NRC compliance with all provisions of NEPA as well as the NHPA, and any other applicable federal, state, and local requirements.

### **EA Contention 1: Failure to Meet Applicable Legal Requirements Regarding Protection of Historical and Cultural Resources, and Failure to Involve or Consult the Oglala Sioux Tribe as Required by Federal Law**

The Final EA fails to meet the requirements of NEPA, the NHPA, and 40 C.F.R. §§ 51.10, 51.70 and 51.71, along with the NRC, ACHP, and CEQ regulations because it lacks an adequate description of either the affected environment or the impacts of the project on archaeological, historical, and traditional cultural resources.

As a result, the Final EA fails to comply with Section 51.60 because its analyses are not adequate, accurate and complete in all material respects concerning

archaeological sites and materials within the project area. No specific survey was performed for this license renewal in order to demonstrate that archaeological sites within the project area are properly identified, evaluated and protected and to show that it has submitted a proper analytic discussion under Sections 51.45 and 51.60 and the NRC Staff relied on old survey that were done in 1982 and 1987. Not all interested tribes were ‘meaningfully’ consulted, particularly including the Tribe. Proper baseline information is lacking in the Final EA and it fails to demonstrate adequate confinement and protection of cultural resources.

**Basis and Discussion:**

10 C.F.R. § 51.71(d) and NEPA require that the Final EA include an analysis of all environmental impacts of a proposed action, including cultural impacts. 10 C.F.R. § 51.70(a) places an affirmative duty on NRC Staff to conduct all NEPA analysis in conjunction with other surveys or studies required under federal law. This includes necessary surveys required under NEPA and the NHPA.

The Final EA summarizes the nature and extent of the so-called consultation, which Consolidated Intervenors submit was inadequate and not meaningful. The Final EA relies on cultural resources surveys that are from 1982 and 1987, which are 33 years and 28 years old, respectively. These survey are too old to use to ensure that there are no currently ascertainable cultural resources. As decades of weather, land use and subsidence have occurred, it is likely that additional cultural resources would have been revealed. The Final EA failed to obtain updated information except in the areas where

Crow Butte was already required to provide additional information (Marsland Expansion Area - MEA, Two Crows Expansion Area - TCEA).

The Final EA states at Section 3.9.6:

### **3.9.6 Previous Cultural Resources Survey**

Intensive (100-percent coverage) field surveys for historical and archaeological sites within the CBR facility (see Figure 1-1) were conducted in two phases. The University of Nebraska conducted identification and assessment of cultural resources in the CBR research and development area in March and April 1982. The Nebraska State Historical Society surveyed the remainder of the CBR license area (the Commercial Study Area) during April and May 1987. The results of the two surveys were presented in a single report (Bozell and Pepperl 1987).

The efforts in 1982 and 1987 recorded a total of 21 prehistoric and historic period archaeological sites. Cultural affiliation of the recorded sites included eight with Native American components, 12 historic period locations, and a buried bone deposit of undetermined cultural association.

Therefore, the potential impacts to these resources have not been addressed.

Despite this confirmed lack of adequate survey, the Final EA prematurely determines that the impacts from operations fit within the “small” category. Such pre-ordained and categorical conclusions, without the benefit of necessary information and a competent analysis raise serious legal and procedural questions regarding the integrity of the entire Final EA analysis, and form the basis for a contention as to whether or not the Final EA conforms with NRC regulations, the NHPA, and NEPA, and the implementing regulations for these laws.

Among the applicable requirements are those under the National Historic Preservation Act (“NHPA”) and related Executive Orders. Under these authorities, the

NRC is required to fully involve the Tribe in all aspects of decision-making affecting Tribal interests such as those directly impacted by the project, including the license renewal. These mandates require NRC to consult with Tribe as early as possible in the decision-making process. Here, the NRC has not meaningfully engaged in the required consultation process.

The Final EA describes the ‘consultation’ process as one involving a single large collective meeting involving the NRC, several tribes and representatives of more than one uranium company (Crow Butte and Powertech-Dewey Burdock) in June 2011. There was never a meeting with the Oglala Sioux Tribe solely devoted to the Crow Butte renewal or the cultural resources that are within the existing Crow Butte licensed area. Further, although the Tribe was invited to do its own TCP survey at its own cost, it was never involved in the surveys that were being conducted with regard to Crow Butte Marsland Expansion Area and Two Crows Expansion Area, nor the 1982 or 1987 surveys on which the Final EA relies.

The Final EA states:

### **3.9.7 Tribal Consultation**

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As stated earlier, the NRC staff met with the Tribal Historic Preservation Offices (THPOs) to gather information on June 8, 2011. The purpose of the meeting was to help the NRC staff identify tribal historic sites and cultural resources that may be affected by actions associated with renewal of the CBR facility, the proposed CBR expansion areas in Nebraska, and the proposed Dewey-Burdock ISR project. Representatives of six tribes (Oglala, Sioux, Standing Rock Sioux, Flandreau-Santee Sioux, Siston-Whapeton Oyate, Cheyenne River Sioux, and Rosebud Sioux) attended.

During the June 8 meeting to discuss several different projects, including the relicensing of the CBR facility, tribal officials expressed concerns about the

identification and preservation of historic properties of traditional religious and cultural importance to tribes at the CBR facility. **Tribal officials stated that historic and cultural resources studies of sites should be conducted with tribal involvement.** A transcript of this meeting (NRC, 2011) is available through the NRC ADAMS database on the NRC website ([www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html)) (ML111721938). (Emphasis added.)

On January 19, 2012, the NRC staff sent letters to 24 Tribes inviting them to attend a meeting on February 14th and 15th 2012 to continue ongoing consultation and discuss hear the views of the Tribes about potential Traditional Cultural Properties. Representatives of 19 Tribes attended the meetings.

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### **3.9.8 Potential Places of Cultural Significance**

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On October 31, 2012, NRC invited all the consulting Tribes to complete a TCP field Survey of the CBR facility and proposed expansion areas in the vicinity of the Crow Butte APE. In November and December of 2012, a TCP field survey was completed by the Santee Sioux Nation and the Crow Nation. A TCP report (ML13064A481) was submitted to the NRC by the Santee Sioux Nation on behalf of both Tribes (SSN 2013).

The report concluded that there were no eligible sites of cultural or religious significance to the Tribes at the CBR facility and the proposed Marsland and Three Crow expansion areas. Several other consulting Tribes responded to this report disagreeing with the findings (From Cheyenne River Sioux – ML13123A089 (Our response- ML13157A297); From Yankton Sioux – ML13126A309 (Our response ML13157A221); From Standing Rock Sioux – ML13126A327 (Our response- ML13157A263)).

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A detailed assessment of the report and the comments are found in the environmental impacts section of this EA.

In October, 2013 all Tribes were sent a copy of the NRC staff's preliminary documentation of its NHPA review for the CBR license renewal. The only comments that the NRC staff received were general in nature, pertaining to NRC staff's overall NHPA consultation.



We know that the Standing Rock Sioux Tribe stated in the response at ML13126A327 that it disagreed with the interpretations in the Santee Sioux TCP Report as to the stone circles. All NRC response letters listed above are non-substantive responses that merely thank the tribe for sending correspondence and noting that it will be included in the record. There is no reply or responsive content to the letter from Standing Rock Sioux Tribe.

We also know from the 2013 Redmond Opinion that there are problems with the Marsland Expansion TCP survey especially the red flags raised by the lack of any Native American properties located during the survey, as described below:

I do find several problems with the lack of any Native American properties located during the survey.

First, I worked in this general area from 1992 through the Fall of 1995 as the Forest Archeologist for the Nebraska National Forest. It was my experience that whenever we surveyed areas near or bordering on water resources, ponds, creeks, et cetera, we would almost invariably find prehistoric camp sites and related process sites. Throughout this proposed project area, there are a number of both permanent and intermittent water resources of all kinds, including creeks, springs and natural ponds.

While the OST was invited to conduct a TCP survey at its own expense, no offer was made to involve OST tribal representatives and elders in the TCP surveys being conducted at Crow Butte's expense. In the 2013 Redmond Opinion, Dr. Redmond suggests that the Marsland Expansion TCP survey was performed during winter months when the ground was likely covered by snow and ice thereby concealing possible finds. It seems clear that Crow Butte's TCP surveys would benefit from the involvement of tribal officials who would be able to point out common sense like the fact that it is hard to

locate Native American properties when the ground is frozen and snow-covered as it often is in November and February when the Marsland TCP survey was conducted.

Dr. Redmond opines:

[T]he survey that was performed in this area was over approximately 4,500 acres, which was surveyed between November 2010 and February 2011. It was also my experience in working in this area that during that time of the year, snow and ice covered most of the ground surface, at least greater than 85%. **My problem with this scenario is that it would be relatively impossible to locate 99% of prehistoric/Native American sites without a much higher level of ground surface observation, i.e., greater than 60-75%, preferably greater than 90%.** As stated in the synopsis of the cultural report, this area of the Nebraska Panhandle has not been subjected to even minor investigation. **Due to this lack of research, it would appear intuitively evident that an investigation with little or no ground surface visibility would be insufficient to state that no Native American/prehistoric materials were present.**

As Dr. Redmond states, there is scant if any research or literature related to Native American sites in the subject area of the Nebraska Panhandle and due to this lack of research and the investigation during a time when there is little or no ground surface visibility, the lack of a finding of TCPs should not be interpreted as grounds for a conclusion that no such TCPs exist in the area. If the survey were done by Crow Butte in the Summer and complied with standard protocols for such surveys, then Consolidated Intervenor's concerns would be less. However, it appears that Crow Butte intentionally scheduled the Marsland TCP survey for a time when it would be highly unlikely to find TCPs due to the weather and ground conditions. By intentionally truncating the results by skewing the survey, Crow Butte minimizes the potential that TCPs would be discovered in the project area thereby reducing its compliance costs and overall mining

costs during a time when the Uranium market is in a downturn and Crow Butte employees face layoffs.

In addition, Dr. Redmond further opines that the lack of subsurface testing when large scale ground disturbances are being contemplated is a violation of TCP survey standards and protocols:

[T]his project will eventually cause significant ground disturbance, and yet there is no evidence that any type of subsurface testing process for any level of cultural materials took place. It would seem that some form of subsurface testing to at least below the alluvium level be performed over at least the area where most of the surface impacts will occur. I would suggest that this type of processing be instituted on at least the higher elevations near water resources where the alluvium layer would be shallower due to natural erosional processes.

Further, Dr. Redmond states that the number and identity of the tribes having an interest in the area are greater in number than is reflected in the Marsland TCP survey:

[A]lthough it is true that the primary tribal use of this area was by the Sioux (sic) and Cheyenne, a number of tribes utilized the Nebraska Panhandle area. According to just the treaties from this area, a number of tribes are not noted for this cultural review. One of the most encompassing of these treaties is the 1851 Fort Laramie Treaty involving the Sioux or Dahcotah (sic), Cheyennes, Arrapahoes, Crows, Assinaboines, Gros-Ventre Mandans, and Arrickaras. The People listed as "Sioux or Dahcotah" are not easily defined, but include the Lakota Nations of the Sicangu, Brule, Oglala, Minnecoujou, Hunkpapa, Izipaco, Sihasapa, and Ooinunpa nations. Added to these are the Sans Arcs, Santee and Yanktons who are Dakota speakers. The Mandans and Arrickara noted in the said treaty would also include the Hidatsa peoples of the Three Affiliated Nations. As to the Cheyenne defined in the 1851 Treaty, this would indicate both the current Northern and Southern Cheyenne Nations since the division is an artificial artifact of the Government reservation system. In addition, although not listed in this treaty, the Pawnee would also have utilized this area, at least the northern Pawnee or Skidi.

Thus, Dr. Redmond lists 21 indian tribes<sup>2</sup> that should have been consulted which is far more than is described in the Final EA; which means that there are tribes that have not been properly consulted as part of the Section 106 process in violation of NEPA and NHPA.

Further, the OST's silence in 2012 and 2013 seems to be related to its lack of representation by an attorney in this matter and inability to properly understand and respond to the legal issues raised by the NRC's cultural resources process. It is a violation of NEPA and the trust responsibility to conduct TCP surveys in this way when the OST is completely unrepresented. **Under no circumstances should the Tribe's silence be interpreted as assent.**

The NRC Staff is not carrying out its agency responsibilities in a manner that recognizes and respects the government-to-government relationship. The failure to engage the Tribe on NHPA issues in a meaningful way at the earliest possible time and within the NEPA process presents a ripe contention in this proceeding.

The federal courts have addressed the strict mandates of the National Historic Preservation Act:

Under the NHPA, a federal agency must make a reasonable and good faith effort to identify historic properties, 36 C.F.R. § 800.4(b); determine whether identified properties are eligible for listing on the National Register based on criteria in 36 C.F.R. § 60.4; assess the effects of the undertaking on any eligible historic

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<sup>2</sup> Sioux or Dahcotah (including the Lakota Nations of the Sicangu, Brule, Oglala, Minnecoujou, Hunkpapa, Izipaco, Sihasapa, Ooinunpa, the Sans Arcs, Santee, Yanktons, the Mandans, the Arrickara, and the Hidatsa peoples of the Three Affiliated Nations); Cheyennes (including both the current Northern and Southern Cheyenne Nations), Arrapahoes, Crows, Assinaboines, Gros-Ventre Mandans, and the Pawnee (northern Pawnee or Skidi).

properties found, 36 C.F.R. §§ 800.4(c), 800.5, 800.9(a); determine whether the effect will be adverse, 36 C.F.R. §§ 800.5(c), 800.9(b); and avoid or mitigate any adverse effects, 36 C.F.R. §§ 800.8[c], 800.9(c). The [federal agency] must confer with the State Historic Preservation Officer (“SHPO”) and seek the approval of the Advisory Council on Historic Preservation (“Council”).

*Muckleshoot Indian Tribe v. U.S. Forest Service*, 177 F.3d 800, 805 (9th Cir. 1999). See also 36 CFR § 800.8(c)(1)(v)(agency must “[d]evelop in consultation with identified consulting parties alternatives and proposed measures that might avoid, minimize or mitigate any adverse effects of the undertaking on historic properties and describe them in the [NEPA document].”)

Consolidated Intervenors note that tribal governments change and consultations, to be meaningful, are not ‘static.’ Section 3.9.7 of the Final EA states that there was an ‘Information Gathering Meeting’ in June 2011 and that the Tribe attended that meeting (which was not exclusively devoted to Crow Butte’s facilities). Section 3.9.7 of the Final EA states that in February 2012 a meeting took place and that representatives of 19 tribes attended that meeting. However, the Final EA omits to state whether the Tribe was one of those 19 tribes and what were the offices held by the persons who attended. Were they Tribal Council members authorized to engage in formal consultations with the United States Government? Since none of their names, offices or tribal affiliations are stated in the Final EA, the Final EA is defective and fails to state enough information for there to be a legal conclusion that there have occurred meaningful consultations between the Tribe and the NRC Staff concerning the Crow Butte renewal.

As a result, there has been and continues to be a complete failure of the Section 106 consultation process in this case, in violation of NEPA and NHPA. This contention should be admissible on this ground alone.

NRC Staff interpretations of these requirements are not entitled to deference. The Advisory Council on Historic Preservation (“ACHP”), the independent federal agency created by Congress to implement and enforce the NHPA, has exclusive authority to determine the methods for compliance with the NHPA’s requirements. *See National Center for Preservation Law v. Landrieu*, 496 F. Supp. 716, 742 (D.S.C.), *aff’d per curiam*, 635 F.2d 324 (4<sup>th</sup> Cir. 1980). The ACHP’s regulations “govern the implementation of Section 106,” not only for the Council itself, but for all other federal agencies. *Id.* *See National Trust for Historic Preservation v. U.S. Army Corps of Eng’rs*, 552 F. Supp. 784, 790-91 (S.D. Ohio 1982).

NHPA § 106 (“Section 106”) requires federal agencies, prior to approving any “undertaking,” such as this license renewal, to “take into account the effect of the undertaking on any district, site, building, structure or object that is included in or eligible for inclusion in the National Register.” 16 U.S.C. § 470(f). Section 106 applies to properties already listed in the National Register, as well as those properties that may be eligible for listing. *See Pueblo of Sandia v. United States*, 50 F.3d 856, 859 (10<sup>th</sup> Cir. 1995). Section 106 provides a mechanism by which governmental agencies may play an important role in “preserving, restoring, and maintaining the historic and cultural foundations of the nation.” 16 U.S.C. § 470.

If an undertaking is the type that “may affect” an eligible site, the agency must make a reasonable and good faith effort to seek information from consulting parties, other members of the public, and Native American tribes to identify historic properties in the area of potential effect. *See* 36 CFR § 800.4(d)(2). *See also Pueblo of Sandia*, 50 F.3d at 859-863 (agency failed to make reasonable and good faith effort to identify historic properties).

The NHPA also requires that federal agencies consult with any “Indian tribe ... that attaches religious and cultural significance” to the sites. 16 U.S.C. § 470(a)(d)(6)(B). **Consultation must provide the tribe “a reasonable opportunity to identify its concerns about historic properties, advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, articulate its views on the undertaking’s effects on such properties, and participate in the resolution of adverse effects.”** 36 C.F.R. § 800.2(c)(2)(ii). (Emphasis added.)

Apart from requiring that an affected tribe be involved in the identification and evaluation of historic properties, the NHPA requires that “[t]he agency official **shall ensure that the section 106 process is initiated early in the undertaking’s planning**, so that a broad range of alternatives may be considered during the planning process for the undertaking.” 36 CFR § 800.1(c) (emphasis added). The ACHP has published guidance specifically on this point, reiterating in multiple places that consultation must begin at the earliest possible time in an agency’s consideration of an undertaking, even framing such early engagement with the Tribe as an issue of respect for tribal

sovereignty. ACHP, Consultation with Indian Tribes in the Section 106 Review Process: A Handbook (November 2008), at 3, 7, 12, and 29.

Regarding respect for tribal sovereignty, the NHPA requires that consultation with Indian tribes “recognize the government-to-government relationship between the Federal Government and Indian tribes.” 36 CFR § 800.2(c)(2)(ii)(C). See also Presidential Executive Memorandum entitled “Government-to-Government Relations with Native American Tribal Governments” (April 29, 1994), 59 Fed. Reg. 22951, and Presidential Executive Order 13007, “Indian Sacred Sites” (May 24, 1996), 61 Fed. Reg. 26771. The federal courts echo this principle in mandating all federal agencies to fully implement the federal government’s trust responsibility. See Nance v. EPA, 645 F.2d 701, 711 (9<sup>th</sup> Cir. 1981) (“any Federal Government action is subject to the United States’ fiduciary responsibilities toward the Indian tribes”).

Here, the Final EA was released and the FONSI made even though no competent cultural survey of the site has yet been conducted with any participation of the Tribe, or any members of the Tribe who are Consolidated Intervenors, and even though the last cultural resources surveys of 1982 and 1987 are decades old without being updated. And further, such surveys were conducted without the required consultations with the Tribe.

To exclude the Tribe from the NEPA/NHPA process in this way contravenes the requirements of the NHPA and NEPA, and NRC and NHPA regulations, and harms the Tribe’s ability to participate in the initial identification of historic/cultural properties, squelches its voice to articulate its views, and hampers its ability to effectively participate



at the later stage when the specific impacts from a particular project are analyzed. See, e.g., 36 CFR §§ 800.4 (“Identification of historic properties”) and 800.5 (“Assessment of adverse effects”). Given these requirements of the NHPA, NEPA, and applicable regulations, the harms to the Tribe, and Consolidated Intervenors who are members of the Tribe, began accruing immediately upon NRC consideration of the License Renewal Application in a manner that segregated the Tribe’s interdisciplinary, culturally-based consultation on the project from what NRC Staff considers technical and environmental concerns. These harms are exacerbated by the NRC Staff’s decision to issue the Final EA despite the lack of any meaningful involvement in any survey of the affected areas.

This contention also seeks to reintegrate the interdisciplinary study requirements of NEPA to ensure that the purposes of NEPA, the NHPA, and the government-to-government relationship are honored by NRC Staff, and included in a new, comprehensive EIS issued for review and comment for the Tribe, Tribal members, the public, and other interested persons.

Further, it was improper for the NRC Staff to rely upon the Santee Sioux TCP Survey to the detriment of the OST. The OST has never been involved in a TCP Survey conducted by Crow Butte despite there being several surveys conducted without tribal involvement.

#### **4.8 Historical and Cultural Resources Impacts**

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Section 3.9 of this EA discusses how NRC fulfilled its responsibilities under Section 106 of the NHPA for the CBR license renewal project. By letter dated July 15, 2013, the Nebraska SHPO concurred with NRC’s Finding of No Historic

Properties Present for the CBR In Situ Uranium Recovery License Renewal Project (ADAMS ML13266A266).

Following SHPO concurrence with this finding, on September 30, 2013, the NRC posted a draft of its Section 106 documentation for the project on the NRC's public website and requested public comment. E-mails were also sent notifying the consulting parties of the website. No comments were received at the NRC.

Since the CBR Crow Butte project area has been subjected to intensive cultural resources field surveys for archaeological and historical sites (including a TCP field survey), and the six properties evaluated as "potentially eligible" for the NRHP are being actively avoided during all phases of the overall project, the NRC staff concludes that there will be no effects to the known and recorded cultural resource sites if the operating license is renewed.

At present, a class III archeological survey, a TCP survey completed by Santee Sioux Nation, a completed literature review and overall Tribal consultations have not yielded new information on TCPs that might be located within the CBR facility.

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Based on information obtained through Section 106 consultation, the TCP cultural Report submitted by Santee Sioux Nation (SSN, 2013), the class III archeological survey, and independent Staff reviews, overall impacts to historic and cultural resources from the relicensing of the CBR facility would be SMALL. Additionally, the NRC staff concludes that no new identified properties are eligible for listing in the National Register as TCPs.

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#### **4.13.8 Cumulative Impacts for Historic and Cultural Resources**

With respect to historic and cultural resources, the NRC staff included an assessment of cumulative impacts to these resources during consultation for Section 106 of NHPA (ML13260A566). **Though the density of sites found is very low within this geographic setting, and therefore is unlikely to result in significant cumulative impacts to historic and cultural resources, the detailed cumulative impacts assessment developed during consultation with the public and Native American Tribes is discussed within this section.**

Additional supporting information has also been documented on the following website: <http://www.nrc.gov/info-finder/materials/uranium/licensed-facilities/crow-butte/section-106-license-renewal-docs.html>.

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Additional data are available from other proposed CBR projects that are currently under NRC review. CBR applications for license amendments for the proposed NTEA and the proposed MEA are currently under environmental review. The proposed NTEA is located 4 miles northwest of the town of Crawford. The proposed MEA site is located south of the Pine Ridge elevation about 11 miles south-southeast of the CBR ISR project area. CBR has indicated that it intends to provide the NRC a license amendment application for the TCEA in November of 2014 (ML14125A181). For the purpose of the present comparative analysis, archaeological and historic inventories of resources as well as a TCP survey by the Santee Sioux Nation have been completed at the CBR facility, the MEA, and the TCEA (SSN 2013).

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At previous tribal consultations including the June 7–9, 2011 information-gathering meeting, NRC staff was informed of several potential TCPs located in proximity to both the existing CBR facility and the other close by proposed CBR expansion areas (NRC, 2011). Contacts with the nearby Fort Robinson State Park, State of Nebraska Ponderosa Wildlife Management Unit, and the Pine Ridge District of the Nebraska National Forest did not yield specific information for any additional nearby potential places of religious and cultural significance (SC&A, 2012).

On October 31, 2012, the NRC invited all the consulting Tribes to complete a TCP field Survey of the CBR facility, the MEA, and the TCEA. In November and December of 2012, a TCP field survey was completed by the Santee Sioux Nation and the Crow Nation. A TCP report (ML13064A481) was submitted to the NRC by the Santee Sioux Nation on behalf of both Tribes (SSN 2013). The report concluded that none of the 13 places identified was potentially eligible for listing on the National Register of Historic Places, but offered recommendations for a buffer zone around places to avoid impacts during future project activities. Several other consulting Tribes responded to this report disagreeing with the findings (From Cheyenne River Sioux – ML13123A089 (NRC response-ML13157A297); From Yankton Sioux – ML13126A309 (NRC response, ML13157A221); From Standing Rock Sioux – ML13126A327 (NRC response, ML13157A263).

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Based on available information, the NRC staff concludes that the cumulative impacts of renewing the CBR facility on cultural resources including TCPs would be SMALL during all phases of the proposed action, given the low density of sites found within this geographic setting and their lack of eligibility for nomination and potential listing on the NRHP. Additionally, NRC is responsible for satisfying the requirements of Section 106 of the NHPA for this proposed undertaking as well as the proposed NTEA, MEA and the TCEA projects. If, in review of NTEA, MEA, and the TCEA, the NRC staff find TCPs eligible for listing on the National Registry, NRC will comply with Section 106 of the NHPA, 16 U.S.C. §§ 470, and its implementing regulations (36 CFR § 800 (2004)) through consultation with Tribes.

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Based on available historic and cultural resources information from the CBR application for the project area under the original license and the data related to the proposed license amendments for the NTEA, MEA, and TCEA, overall cumulative impacts to historic and cultural archaeological resources are not expected to be significant.

Consolidated Intervenor note that although the NRC Staff refers to the existence of a “a class III archeological survey” in Section 4.8 of the Final EA and elsewhere in the Final EA several times and NRC Staff puts great reliance on the existence of such ‘class III archeological survey ,’ no information is provided as to the date of such survey, the name and credentials of the person supervising the survey that would indicate that it is a valid ‘class III’ survey. Consolidated Intervenor have been advised by Dr. Redmond that a person requires a graduate degree in Anthropology to be in the field supervising large acreages of survey and specifically anything that defines or delineates whether or not materials are eligible for inclusion to the National Register of Historic Places. Without such information, it is not possible for Consolidated Intervenor or the public to evaluate the nature and extent of the TCP surveys that have been performed. Accordingly, the

Final EA's description of cultural resources and the impacts thereon is defective in violation of NEPA and NHPA.

Based on the 2013 Redmond Opinion, the failure of Crow Butte to conduct its TCP surveys at a time when there would be no snow or ice covering the ground, the reliance by NRC Staff on Crow Butte's defective TCP surveys (and the possibly deficient) 'class III' survey, and the inadequacy of the Section 106 consultation process to the exclusion and detriment of the Tribe and those of Consolidated Intervenors who are members of the Tribe, and further the failure to involve all 21 tribes that have an interest in the area, this contention is admissible.

**EA - 2 - Failure to Do EIS; Failure to Involve OST with surveys being conducted by Crow Butte at Crow Butte's expense; Conduct of TCP Survey Designed to Fail to Discover TCPs**

The Oglala Sioux Tribe has not been 'meaningfully' consulted with regarding the cultural resources that may be in the license renewal area. As stated above, the 2013 Redmond Opinion indicates that two or more of Crow Butte's TCP surveys were conducted during winter months when snow and ice typically covers the ground obscuring the discovery of TCPs.

Crow Butte has identified what it believes to be cultural resources in the area, and the NRC Staff has relied on Crow Butte's assertions in preparing the Final EA. However, Crow Butte and the NRC Staff are working with inventories of TCPs that have been prepared for decades without the involvement of officials or members of the Tribe.

An Environmental Impact Statement should be prepared, made available for public comment in accordance with NEPA.

**Basis and Discussion:**

10 C.F.R. § 51.71(d) and NEPA require that the Final EA include an analysis of all environmental impacts of a proposed action, including cultural impacts. 10 C.F.R. § 51.70(a) places an affirmative duty on NRC Staff to conduct all NEPA analysis in conjunction with other surveys or studies required under federal law. This includes necessary surveys required under NEPA and the NHPA.

The Tribe must be consulted with regarding any cultural resources in the area whenever there is major federal action, i.e. the NRC granting a mining permit to the Applicant. NHPA 16 U.S.C. 470 *et.seq.* It is undisputed that the Crow Butte area is part of the 1851 Treaty area, which recognized such area as the aboriginal land of the Teton Sioux Nation, including the Oglala Lakota people. Therefore, any Indian sites or artifacts in the area would be connected to the Tribe.

Without the involvement of officials and members of the Tribe, there is no way CBR can be qualified to determine whether cultural sites or artifacts or sites even exist, or how to preserve them. There are also issues of whether CBR can be trusted to cause TCP surveys to be conducted in a manner that does not decrease the likelihood of finding TCPs. A perfect example is found in the case of the Marsland TCP Survey discussed by Dr. Redmond in the 2013 Redmond Opinion. In that situation, the Marsland TCP Survey, which is relied on and included by the NRC Staff in the Final EA, was the result of two separate field surveys conducted in

November 2010 and in February 2011 - two times of year when most if not all of Western Nebraska are under snow and ice.

Attached as Exhibit H-1 is a printout of weather conditions for Crawford, NE for November 2010 which indicates that two (2) inches of snow fell that month and that the temperatures were generally below freezing with a mean temperature of 33.9 degrees (F).

Attached as Exhibit H-2 is a printout of weather conditions for Crawford, NE for February 2011 which indicates that it was snowier and colder than the previous November field survey with eleven (11) inches of snow, a mean temperature of 21.8 degrees (F), which was on top of a prior snowfall accumulations of the two (2) inches from November's snow, and an additional six (6) inches from December's snow (avg. mean temp. 27.8 degrees (F)), and three (3) inches from January 2011's snow (avg. mean temp. 22.1 degrees (F)). See Exhibits H-3 and H-4, respectively, concerning weather information for Crawford, NE, December 2010 & January 2011.

This means that Crow Butte purports to have conducted a field survey on top of up to two (2) inches of snow in November 2010 and as much as **twenty (20) inches of accumulated snow and ice in February 2011!** And the NRC Staff is completely confident that the lack of any TCPs found during that field survey must mean that there are no TCPs! This defies logic, reason and violates NEPA's 'hard look' and analysis requirements and also violates the trust responsibility owed by the NRC to the Tribe and members of the Tribe.

It appears to Consolidated Intervenors that the 2010/2011 TCP survey was designed to minimize the discovery of TCPs and to maximize the chances of a finding of no TCPs - in other

words, the TCP Survey was designed to fail. This violates NEPA, NHPA and the trust responsibility owed to the Tribe and to those of Consolidated Intervenors who are members of the Tribe.

These potential artifacts and evidence are from *Oglala* and *Lakota* history, and no body or entity is more qualified to judge their existence or importance than the Oglala Lakota Oyate (people) themselves- which is precisely why consultation is required and those determinations are not left to the federal agency or company proposing action.

This is especially true when you are asking Tribal members to trust a company and agency who think that you can find arrow heads by walking on top of 20 inches of snow! This is very difficult to explain to tribal members who are infused with the wisdom of nature and common sense and often fail to comprehend the ways of the mining company and the NRC Staff.

The National Environmental Protection Act, NEPA, guarantees a right of ‘meaningful’ consultation to Indian tribes when there is major federal action. NEPA mandates that the government “preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice.” 42 USC § 4331(b). NEPA then triggers the National Historic Preservation Act (NHPA), 16 U.S.C.S. § 470f., Native American Graves Repatriation Act (NAGPRA), 25 U.S.C. 3001 et seq. and the Archaeological Resources Protection Act, 16 U.S.C. 4700 et seq. Federal agencies are required to consult with federally recognized Indian tribes that may attach religious or cultural significance to the project area, even if the project area is not within its reservation under Section 106 of the NHPA. 36 C.F.R. 800.4(f)(2). The federal agency is further required to



consult with a tribe's Tribal Historic Preservation Officer (THPO) if there is one, and a tribal representative if not.

The Oglala Sioux Tribe is a federally recognized tribe, entitled to all the rights under federal law that such tribes are entitled to, including consultation under Section 106 of NHPA, as well as the obligations owed to it from its trustee, the federal government. Furthermore, the Crow Butte area is within the 1851 Treaty area, which is recognized as the aboriginal land of the Tribe, and therefore the Tribe ascribes cultural and religious significance to many sites in that area. The Tribe asked that tribal representatives be involved in the surveys being conducted by CBR and being used by the NRC Staff but it was refused and instead it was offered a chance to conduct its own TCP surveys at its own expense. The NRC cannot make that determination without 'meaningful' consultation with the Tribe and certainly not over the objections of the Tribe (and in rejection of the Tribe's reasonable good faith request to be involved in the CBR surveys) and yet it has done so in this case as reflected by the issuance of the Final EA in its current form.

#### **Specific examples from the Final EA -**

Section 3.9.4 of the Final EA states that:

The State of Nebraska does not have a formal State register, but it does maintain a list of the State's historic significant events, people, places, sites, movements, and traditions through the Nebraska Historical Marker Program, overseen by the Nebraska State Historical Society.

The final source for previously known and recorded historic and cultural sites results from past field inventories of the project lands.

The "final source" for previously known the cultural resources in the area, according to the Final EA, is the aggregation of Crow Butte's past field inventories - including those sub-

freezing cold days walking atop the 20 inches of snow in February 2011 - assuming anyone actually got out of their trucks and into the cold during such field surveys.

However, the Tribe has neither had the opportunity to evaluate the completeness of these inventories, nor the opportunity to evaluate the accuracy of the significance ascribed to the items on the list and based on what happened with the Marsland TCP Survey being conducted in a manner almost guaranteed to avoid finding any TCPs, it is imperative that officials and members of the Tribe be involved with CBR every step of the way to ensure that there are adequate TCP surveys being conducted in the project area.

Another point, the Final EA uses the terms “field inventories” and “field surveys” without distinction or precision; in violation of NEPA which requires a clear statement and the use of unambiguous technical terms.

Section 3.9.6 of the Final EA provides that:

Investigators from the University of Nebraska and the State Historical Society found that 15 of the newly recorded sites, including four Native American and nine historic period locales, contained limited scientifically important cultural remains or were not determined to be of significant historic value based on archival research. These 15 sites were evaluated as being “not eligible” for nomination and potential listing on the NRHP. Six sites, including three Native American and three historic period locales, were evaluated as being “potentially eligible” for the NRHP, requiring further field assessment for a full evaluation as being “eligible.” Four of these sites (25DW114, 25DW192, 25DW194, and 25DW198) were evaluated as having potential importance for the recovery of archaeological data, and sites 25DW112 and 25DW00-25 have possible architectural values.

Section 4.8 of the Final EA states that:

Section 3.9 of this EA discusses how NRC fulfilled its responsibilities under Section 106 of the NHPA for the CBR license renewal project. By letter dated

July 15, 2013, the Nebraska SHPO concurred with NRC's Finding of No Historic Properties Present for the CBR In Situ Uranium Recovery License Renewal Project (ADAMS ML13266A266). Following SHPO concurrence with this finding, on September 30, 2013, the NRC posted a draft of its Section 106 documentation for the project on the NRC's public website and requested public comment. E-mails were also sent notifying the consulting parties of the website. No comments were received at the NRC.

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Based on information obtained through Section 106 consultation, the TCP cultural Report submitted by Santee Sioux Nation (SSN, 2013), the class III archeological survey, and independent Staff reviews, overall impacts to historic and cultural resources from the relicensing of the CBR facility would be SMALL. Additionally, the NRC staff concludes that no new identified properties are eligible for listing in the National Register as TCPs.

This says that the Nebraska SHPO has determined that the cultural resources are not eligible for inclusion on the National Register, but no consultation has been done with the Tribe or any of Consolidated Intervenors who are members of the Tribe. This ignores the participation of the Tribe for these identified Native American cultural resources. The participation of state agencies is not adequate under NEPA.

While the Final EA indicates that the Tribe was invited to do its own TCP survey at its own cost, it was not invited to participate in the TCP surveys being done by Crow Butte at Crow Butte's cost. As a result, the situation is the same as it was when the original petition was filed in 2008 - the non-Tribe parties have identified what THEY found, and their assumptions of what must not be in existence there because it was not found, and then THEY decided that it was not important. This situation violates NEPA.

Section 3.9.7 of the Final EA states:

During the June 8 meeting to discuss several different projects, including the relicensing of the CBR facility, tribal officials expressed concerns about the identification and preservation of historic properties of traditional religious and cultural importance to tribes at the CBR facility. **Tribal officials stated that historic and cultural resources studies of sites should be conducted with tribal involvement.** A transcript of this meeting (NRC, 2011) is available through the NRC ADAMS database on the NRC website ([www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html)) (ML111721938). (Emphasis added.)

Section 3.9.8 of the Final EA states that:

On October 31, 2012, NRC invited all the consulting Tribes to complete a TCP field Survey of the CBR facility and proposed expansion areas in the vicinity of the Crow Butte APE. In November and December of 2012, a TCP field survey was completed by the Santee Sioux Nation and the Crow Nation. A TCP report (ML13064A481) was submitted to the NRC by the Santee Sioux Nation on behalf of both Tribes (SSN 2013).

The report concluded that there were no eligible sites of cultural or religious significance to the Tribes at the CBR facility and the proposed Marsland and Three Crow expansion areas. Several other consulting Tribes responded to this report disagreeing with the findings (From Cheyenne River Sioux – ML13123A089 (Our response- ML13157A297); From Yankton Sioux – ML13126A309 (Our response ML13157A221); From Standing Rock Sioux – ML13126A327 (Our response- ML13157A263)).

In this case, the Tribal officials responsible for protecting the Tribe's TCP were specifically asking to be involved in the cultural resources studies being conducted and they were refused. Instead they were invited to do their own TCP's at their own cost at a time when their own tribal budgets have been cut by the federal government - the same federal government that is telling them to do their own TCP's and pay for them. This does not comply with NEPA, NHPA or the trust responsibility.

The Santee Sioux Nation and the Crow Nation did a TCP field survey which would not be representative of an Oglala Sioux Tribe TCP field survey. Indeed, other Sioux tribes found that it was not representative of them either - such as the Cheyenne River Sioux Tribe, the Yankton Sioux Tribe and the Standing Rock Sioux Tribe.

Accordingly, as of now the Tribe has not be involved in a TCP field survey of the Crow Butte project area to the prejudice of the Tribe and the Consolidated Intervenors who are members of the Tribe. As a result, this contention is admissible.

### **EA CONTENTION 3 - FAILURE TO DESCRIBE ALL RELEVANT ENVIRONMENTAL JUSTICE IMPACTS**

Section 4.9 of the Final EA states that

The NRC addresses environmental justice matters for license reviews through (i) identifying minority and low-income populations that may be affected by the proposed relicensing of the CBR facility and (ii) examining any potential human health or environmental effects on these populations to determine whether these effects may be disproportionately high and adverse.

The CBR facility is located in Dawes County, Nebraska, approximately 4 miles southeast of the city of Crawford. Table 4-5 shows 2010 Census data on poverty (low-income) and minority populations for the entire United States, the state of Nebraska, Dawes County, and the city of Crawford. The minority population percentages for Nebraska and Dawes County are approximately one third of the percentage across the United States. The minority population percentage in the city of Crawford is approximately one ninth that of the entire United States. The percentages of low-income populations are about the same for all four areas (slightly larger for Dawes County).

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Because the CBR facility is located in a rural area outside city limits, the area of assessment (review area) used for the environmental justice analysis is a 4-mile radius (NRC, 2003a, Appendix C)

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As noted in Section 3.6.2, Shannon County, South Dakota, the location of the Pine Ridge Indian Reservation is located approximately 50 miles (80 km) from the CBR facility. About 54 percent of the Shannon County population is below the poverty level, compared with about 14 percent for the State of South Dakota (USCB, 2011). Also, Shannon County's population is approximately 96 percent minority (Native American).

**However, because of the distance between the Pine Ridge Indian Reservation and the CBR facility, the NRC staff concludes that there would not be disproportionately high or adverse impacts on minority or low-income residents on the Pine Ridge reservation from the relicensing of the CBR facility. (Emphasis added.)**

The opinions of Dr. LaGarry state that contaminants move along the course of the White River to Pine Ridge Indian Reservation. A key issue in this litigation is whether there is a 'mixing of the aquifers' such that the mined aquifer might not be contained and might impact groundwater (Arikaree) and surface waters (White River). The NRC Staff is aware of Dr. LaGarry's opinion and has decided to assume that only distance should be considered and that 50 miles is too far. And yet, if Dr. LaGarry is correct and there are impacts to the White River and/or the Arikaree Aquifer, then the land distance in miles is irrelevant to whether there are environmental and environmental justice impacts to the people living at Pine Ridge Indian Reservation which is low-income and 96% minority.

The NRC Staff's conclusion that the people at Pine Ridge Indian Reservation are not impacted by the renewal of the mine license violates the trust responsibility as well as NEPA, Title VI of the Civil Rights Act of 1964, and Executive Order 12898 (59 FR 7629) (1994), "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," as well as the NRC's own stated policies.

The Final EA does not describe the low-income people living at Pine Ridge Indian Reservation, most of whom are members of the Tribe and a few of whom are Consolidated Intervenors, as being affected or impacted in any way by the renewal of the license of the mine.

Section 4.13.9 of the Final EA states:

As discussed in Section 4.9, the NRC staff considers environmental justice (EJ) in greater detail when the percentage of minority or low-income population in the impacted area exceeds the corresponding populations in the county or state by more than 20 percentage points, or when the minority or low-income population in the impacted area exceeds 50 percent (NRC, 2003a, Appendix C). As discussed in section 4.9, the EJ analysis for the proposed action found that minority populations comprise 4.4 percent of the demographic in the area of assessment for EJ, and low-income populations are 14.8 percent within that area. These percentages fall below the 20 percent and 50 percent thresholds identified above that would prompt the NRC to more heavily scrutinize impacts disproportionately affecting minority and low-income populations. Therefore, the NRC staff concluded that there would be no disproportionately high or adverse impacts to minority or low-income populations from the renewal of the CBR facility license.

This means that the NRC Staff would have completed a more in-depth analysis of the environmental justice impacts if it had included the 96% minority population living at Pine Ridge Indian Reservation as being affected. But because it only looked at the 4-mile area near Crawford, NE, which is only 4.4% minority, it found no need to conduct the more detailed environmental justice analysis. This failure to conduct the more detailed environmental justice analysis is a violation of NEPA. As a result, this contention is admissible.

**EA Contention 4: The Final EA Fails to Take ‘Hard Look’ at and Failure to Include Necessary Information for Adequate Determination of Baseline Ground Water and Surface Water Quality**

The Final EA violates 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations – each requiring a description of the affected environment and impacts to the environment – in that it fails to provide an adequate baseline groundwater characterization or demonstrate that ground water and surface water samples were collected in a scientifically defensible manner, using proper sample methodologies.

**Basis and Discussion:**

10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations, require a description of the affected environment containing sufficient data to aid the Commission in its conduct of an independent analysis. Further, 10 C.F.R. Part 40, Appendix A, criterion 7 requires the applicant to provide “complete baseline data on a milling site and its environs.”

In this situation, rather than rely only on the decades old baselines taken in the 1980s, it is important to do updated baseline measurements of all aspects of the project for this specific ten (10) year renewal period. See NDEQ 1982 Baseline Study.

This is especially important when CBR has all of its mine units in operation and/ or restoration mode (except MU 1) and when it is expanding in all feasible directions: Three Crows, Marsland, North Trend.

Under NEPA, an agency is required to “describe the environment of the areas to be affected or created by the alternatives under consideration.” 40 C.F.R. § 1502.15. The



establishment of the baseline conditions of the affected environment is a fundamental requirement of the NEPA process:

NEPA clearly requires that consideration of environmental impacts of proposed projects take place *before* [a final decision] is made.” *LaFlamme v. FERC*, 842 F.2d 1063, 1071 (9th Cir.1988) (emphasis in original). **Once a project begins, the “pre-project environment” becomes a thing of the past, thereby making evaluation of the project’s effect on pre-project resources impossible. *Id.* Without establishing the baseline conditions which exist in the vicinity ... before [the project] begins, there is simply no way to determine what effect the proposed [project] will have on the environment and, consequently, no way to comply with NEPA.**

*Half Moon Bay Fisherman’s Mark’t Ass’n v. Carlucci*, 857 F.2d 505, 510 (9<sup>th</sup> Cir. 1988) (emphasis added). **“In analyzing the affected environment, NEPA requires the agency to set forth the baseline conditions.”** *Western Watersheds Project v. BLM*, 552 F.Supp. 2d 1113, 1126 (D. Nev. 2008) (emphasis added). “The concept of a baseline against which to compare predictions of the effects of the proposed action and reasonable alternatives is critical to the NEPA process.” Council of Environmental Quality, *Considering Cumulative Effects under the National Environmental Policy Act* (May 11, 1999). 40 C.F.R. § 1502.22 imposes detailed requirements and justifications necessary for any agency to decline to provide necessary and relevant information.

Here, the ‘proposed action’ is a license renewal for a ten (10) year period and not the ISL mining in general at the site. As a result, baselines for THIS proposed project must be established under scientifically defensible protocols and published in a way that can be verified by the public and its experts like Dr. Abitz and Dr. LaGarry, and JR

Engineering. This has not been done. The failure to do so violates NEPA. This alone is grounds for the admission of this contention.

Importantly, the details of how the baseline is established and documented is critical to an understanding of the potential impacts associated with the proposed mine. The manner in which baseline water quality information is gathered is crucial to any analysis that relies on the data. The quality and calibration of the technology used to gather the baselines is equally important. As a result, it is not appropriate to rely only on decades old baseline measurement from past license applications for prior licensing actions (initial issuance and prior renewals). This does not mean that we are to ignore the NDEQ 1982 Baseline Study (Exhibit E) results for purposes of comparing them to other test results from then until now.

Rather, NEPA requires new baselines to be taken for each renewal licensing action, a comparison of the new baselines to the old baselines with consideration of the interim monitoring and reporting data and an analysis of the total amount of data under scientifically defensible protocols. NEPA also requires that the public and its experts have enough information to replicate the results.

The problems that can flow from analysis and models based on poorly gathered information is often characterized as a garbage in/garbage out. Numerous technical deficiencies were addressed in the Opinion dated July 28, 2008 from Dr. Richard Abitz, filed with Consolidated Intervenors original Petition in this matter (the "Abitz Opinion") as well as the 2008 JR Engineering Opinion, and Consolidated Intervenors maintain that the same technical defects carry over from the LRA to the Final EA.

Dr. Abitz confirms that the scientific methodology employed for establishing baseline at a proposed ISL mine is important. Dr. Abitz states in the Abitz Opinion that the methods for taking baselines and setting upper control limits have been biased to the upper end leading to increased potential for undetected leaks or excursions.

As a precondition to conducting modeling and analysis, NRC must confirm that a credible scientific method is employed to establish an accurate baseline. Unfortunately, no details with regard to methodology of acquiring baseline are described in the Final EA.

Rather, there is just a bald statement that the baseline figures were taken by Crow Butte a long time ago.

See Final EA 3.5.1.2:

### **3.5.1.2 Surface Water Quality**

NDEQ provided CBR with water quality data it collected at the Fort Robinson, Crawford, and Chadron sampling stations from 2001 through 2009 (CBR, 2010b). According to CBR, the concentrations for most analytes, including calcium, chloride, magnesium, total suspended solids (TSS), sodium, total Kjeldahl nitrogen, and phosphorous, increase significantly from upstream to downstream. (Emphasis added.)

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Prior to commercial operations, CBR conducted regional background surface water quality analysis on samples collected from the White River and all surface water bodies within the CBR facility. The data were reported in the original (1987) commercial license application (Ferret, 1987).

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At page 9 of the Abitz Opinion, Dr. Abitz states that:

11) Section 2.9.4 [of the LRA which is carried forward into Sections 3.5.1.2 and 4.6.1.2 of the Final EA] is on surface water quality, but there are no data in the

report [sic] stream water quality. Surface and buried pipelines that fail catastrophically or slowly leak pregnant lixiviant [sic] could contaminate surface water. Pipelines transferring pregnant lixiviant from the well fields to the processing facility are monitored for sudden drop in pressure, which indicates a massive failure and spill. However, small leaks in the buried pipelines, along joints and valves, would not be indicated on the monitor. Therefore, large volumes of pregnant lixiviant could be released to the environment from small leaks over the period of years. Surface waters should be monitored and sampled on a quarterly basis.

12) The end of Section 2.9.4 [of the LRA which is carried into Section 4.6.1.2 of the Final EA] notes that suspended sediment samples have not been collected since 1982 and there is no plan to collect further samples. This is unacceptable for reasons noted in comment 11.

Consolidated Intervenors note that the Final EA provides information on Uranium concentrations at English Creek in Figure 4-1, Squaw Creek in Figure 4-2, from 1998 to 2010 but there is no graphed information to include the most recent period from 2010 to 2014. Since there have been elevations shown during the prior period, a reasonable person would find the most current four (4) year period to be most insightful to whether the levels were continuing to increase beyond so-called 'anomalous' background levels.

Section 4.6.1.2 of the Final EA states that:

**samples have been taken annually** from locations upstream and downstream from the CBR facility (i.e., three locations on Squaw Creek (S-1, S-2, and S-5), two locations on English Creek (E-1 and E-2 Composite, and E-5), and from three impoundments on English Creek (1-3, 1-4, and 1-5)). Samples are analyzed for natural uranium, radium-226, thorium-230, and lead-210. (Emphasis added.)

Since CBR and the NRC Staff have the annual samples (which do not specify if they are the suspended sediment samples referred to by Dr. Abitz or not) from 2010-2014, such information should have been included in Section 4.6.1.2 and the failure to do so is a violation of NEPA. Section 4.6.1.2 of the Final EA states:

#### 4.6.1.2 Operational Impacts on Surface Water

During operations, surface waters could be impacted by accidental spills or leaks from the ISR facility or by permitted discharges. Spills or leaks from the central processing plant or well fields, as well as spills during transportation, could impact surface waters by contaminating storm water runoff or by contaminating surficial aquifers that are hydraulically connected to surface waters. As described in SER Section 3.1.3.4, flow monitoring and spill response procedures are expected to limit the impact of potential spills to surficial aquifers (NRC 2014).

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Furthermore, CBR has never had a spill that exceeded the threshold criteria for a reportable spill under the requirements of 10 CFR Part 20. However, CBR has had several leaks of lower magnitude (in terms of volume or contaminant concentration or both) that required reporting to State regulators. CBR has investigated and mitigated the impacts immediately following the release or spill as warranted (NRC 2014).

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The concentration of natural uranium at the upper end of English Creek was above the regional background levels. However, CBR recorded elevated concentrations in the English Creek drainage during preoperational monitoring (1982-1986), which suggests that these levels are anomalously high natural background concentrations. Composite samples obtained from E-1 and E-2 collected as part of the preoperational sampling program from 1982 through 1986 had elevated natural uranium (3.4 picocuries per gram (pCi/g)) and lead-210 (1.4 pCi/g) when compared with the other surface water sample locations. Samples in addition to E-1 and E-2 obtained in 1998 before milling operations began in this area show similar elevated uranium concentrations. CBR believes that the elevated uranium concentrations in these samples are related to the high amount of organic carbon and subsequent precipitation of the uranium within the wetlands in the upper reach of English Creek, from where these samples were collected (CBR, 2007A). **CBR has not speculated on the source of the elevated lead-210 concentrations.** (Emphasis added.)

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On page 11 of the Abitz Opinion, Dr. Abitz states that:

28) Page 5-87 [of the LRA] notes that uranium was elevated in the sediment from English Creek. Sediments downstream from the mine areas should be monitored in the future to determine if concentrations increase in the future.

The Final EA fails to describe the additional monitoring of the English Creek and other downstream sediments to determine if they are increasing in concentrations; in fact, as discussed above, the data from 2010-2014 has been omitted. It is of critical importance for extra testing and monitoring to be done where there are now known to be elevated concentrations of Uranium and unexplained elevations of its radioactive daughter Lead-210. This is especially true where, as here, Crow Butte and the NRC Staff have declined to ‘speculate’ as to the reason why concentrations of the radioactive daughter lead-210 have increased.

Further the analyses and conclusions made under NEPA must be within the bounds of reason and it is not reasonable for the NRC Staff to accept without investigation CBR’s theory that the elevated Uranium and Lead-210 concentrations cannot be explained by its mining activities and some form of communication between the mined aquifer and the wetlands. Rather, NRC Staff unreasonably and in violation of NEPA accepts CBR’s bald assertion that “the elevated uranium concentrations in these samples are related to the high amount of organic carbon and subsequent precipitation of the uranium within the wetlands in the upper reach of English Creek.” EA Section 4.6.1.2, at Figure 4-1. This is made more true by the fact that CBR’s purported explanation makes no reference to Squaw Creek or the elevated levels of Lead-210.

The Final EA states:

**4.6.2.2.2 Ground water Quality Impacts from Spills and Leaks**

Ground water quality could potentially be impacted during all phases of the ISR

operations as a result of spills or leaks of process liquids from wellfield piping and infrastructure. If there are spills or leaks, potential contamination of the shallow aquifer (Brule), as well as surrounding soil, could occur. Spills and leaks can also potentially impact deeper aquifers.

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During CBR's license history, the licensee has reported a total of 16 MIT failures for wells that have been in service (Table 4-1). For all reported MIT failures, the licensee consulted with NDEQ staff to establish the potential for a release and the need for corrective actions, and it reported the release and corrective actions to the NRC. **One of the MIT failures resulted in measurable environmental impacts, which were subsequently mitigated by corrective actions. The corrective actions were deemed successful in rectifying the environmental impact (CBR, 1998). (Emphasis added.)**

Because of the requirement to detect and provide an immediate response to spills and leaks at ISR facilities, conduct MIT testing and undertake corrective actions for spills and leaks, the NRC staff concludes that the ground water impacts from spills and leaks would be temporary, and the overall long-term impact on ground water would be SMALL.

\*\*\*

The Final EA at Section 3.5.2.1 states:

#### 3.5.2.1 Regional Ground Water Resources

\*\*\*

The licensee reported that ground water quality in water-bearing layers below the Pierre Shale is not suitable for local water production due to high total dissolved solids levels. The licensee has received permits from NDEQ and installed two Class I non-hazardous deep injection wells in the Sundance and Morrison Formations within the CBR facility area (CBR, 2000; CBR, 2009).

\*\*\*

#### 3.5.2.2 Local Ground Water Resources

In general, ground water supplies in the vicinity of the CBR facility are limited due to the low permeability of the underlying lithology (University of Nebraska-Lincoln, 1986).

\*\*\*

#### **3.5.2.4 Ground Water Quality**

Prior to commercial operations, CBR conducted regional background groundwater quality analysis on samples collected from 18 private wells and 11 wells drilled by a previous owner of the property. The data were reported in the original (1987) commercial license application (Ferret, 1987). The initial monitoring included the analysis of physical indicator parameters, common cation and anion constituents, trace and minor metals, radionuclides uranium and radium-226, and water elevation. It included data from the Brule and Basal Chadron aquifers. CBR has conducted additional monitoring of ground 40 water in private wells near wellfields during the prior licensing periods, although the analytical parameters are limited to the radionuclides. (NRC 2014)

**The baseline monitoring data indicate that the Basal Chadron aquifer is regionally of good quality and has been defined by NDEQ as an underground source of drinking water (NRC, 1989a). However, in the vicinity of the mineralized zone, uranium and radium concentrations are elevated. In the wells that were used to determine baseline water quality in the Basal Chadron aquifer, radium-226 values ranged from 0.1 to 619**

picocuries per liter (pCi/L), with a mean of 53 pCi/L. Similarly, within the ISR wellfield, radium-226 concentrations had a baseline mean of 859 pCi/L. These values are well above the EPA primary drinking water standard of 5 pCi/L. As a result, water drawn from the Basal Chadron aquifer does not meet the standards for human consumption (NRC 2014). (Emphasis added.)

\*\*\*

#### **4.6.1.2 Operational Impacts on Surface Water**

During operations, surface waters could be impacted by accidental spills or leaks from the ISR facility or by permitted discharges. Spills or leaks from the central processing plant or well fields, as well as spills during transportation, could impact surface waters by contaminating storm water runoff or by contaminating surficial aquifers that are hydraulically connected to surface waters. As described in SER Section 3.1.3.4, flow monitoring and spill response procedures are expected to limit the impact of potential spills to surficial aquifers (NRC 2014).

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The concentration of natural uranium at the upper end of English Creek was .... **CBR has not speculated on the source of the elevated lead-210 concentrations. (Emphasis added.)**



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Based upon minimal historical impacts, permitting and reporting requirements, the NRC staff concludes that potential impacts to surface water from the ongoing plant operations would be SMALL.

\*\*\*

#### 4.6.2.2.2 Ground water Quality Impacts from Spills and Leaks

Ground water quality could potentially be impacted during all phases of the ISR operations as a result of spills or leaks of process liquids from wellfield piping and infrastructure. If there are spills or leaks, potential contamination of the shallow aquifer (Brule), as well as surrounding soil, could occur. Spills and leaks can also potentially impact deeper aquifers.

\*\*\*

#### 4.6.2.2.2 Ground water Quality Impacts from Spills and Leaks

**...To date, no long term impact to ground water quality has been detected from a spill or leak....(Emphasis added.)**

Consolidated Intervenors have previously filed the listing of CBR Spills and Leaks as of 2008 (Exhibit F hereto). Exhibit F lists several leaks that remained undetected for a period of at least three (3) years! Notwithstanding such a long, undetected leak on the record, the NRC Staff fails to disclose in the Final EA that the environmental impacts from such three year undetected leak are unknown. Such failure violates NEPA and is alone grounds for admitting this contention.

\*\*\*

During CBR's license history, the licensee has reported a total of 16 MIT failures for wells that have been in service (Table 4-1). For all reported MIT failures, the

licensee consulted with NDEQ staff to establish the potential for a release and the need for corrective actions, and it reported the release and corrective actions to the NRC. **One of the MIT failures resulted in measurable environmental impacts, which were subsequently mitigated by corrective actions. The corrective actions were deemed successful in rectifying the environmental impact (CBR, 1998). (Emphasis added).**

Because of the requirement to detect and provide an immediate response to spills and leaks at ISR facilities, conduct MIT testing and undertake corrective actions for spills and leaks, the NRC staff concludes that the ground water impacts from spills and leaks would be temporary, and the overall long-term impact on ground water would be SMALL.

\*\*\*

#### **4.6.2.2.4 Ground water Quality Impacts from Excursions**

Ground water quality may be impacted by excursions of process fluids from the production zone into surrounding aquifers.

\*\*\*

From 1995 to 2010, CBR placed 13 perimeter monitoring wells on excursion status, and 12 monitoring wells in the overlying aquifer had 16 excursion status events (Table 4-2). Corrective action for the perimeter ring wells primarily consisted of adjusting flows in the nearest production units to capture any outward flow. These corrective actions proved adequate in controlling the excursions in a timely manner for nine perimeter wells. For the other four wells (PR-8, PR-15, IJ-13, and CM5-11), the corrective action proved less effective. For three wells, (PR-8, PR-15, and IJ-13), CBR attributed the cause for the excursion status to the mine unit geometries (NRC 2014). For the fourth well (CM5-11), CBR attributed the inadequacy of the corrective action to differences in completion intervals of the perimeter well and the nearest production wells (NRC 2014). **None of these excursions have impacted the surrounding ground water quality.** (Emphasis added.)

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Consolidated Intervenor note that the criticisms stated in the JR Engineering Opinion to the effect that there should be monitoring wells screen by aquifer, have not been addressed in the Final EA. Such failure constitutes a failure to take a ‘hard look’ and violates NEPA.

\*\*\*

The Final EA continues:

The excursions are coincidental with precipitation events, and no corrective actions by the licensee have been required to date. However, the NRC staff was concerned that spills or unintended releases of production fluids may be the source of the excursions. As a consequence of the continued number of excursions in the shallow overlying aquifer and the lack of evidence to support that all such excursions are a result of natural fluctuations, NRC has included a license condition which requires sampling for Natural Uranium and Ra 226 in addition to the indicator parameters when an overlying excursion monitoring well in Mine Unit 6 or 8 is placed on excursion status for more than 60 days (NRC 2014) to assess if there is any impact to ground water quality. Based on the analysis of ground water quality impacts from excursions in the prior license period and the continued requirements for excursion monitoring to detect and take corrective action to eliminate the excursion, the NRC staff concludes that the long-term impacts on ground water from excursions will be SMALL.

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**4.6.2.2.6 Ground water Quality Impacts outside of the CBR facility**  
**In the unlikely event that a ground water excursion is not detected and corrected, ground water quality in aquifers surrounding the wellfields could potentially be impacted. (Emphasis added.)**

\*\*\*

As of 2010, the program monitored ground water quality at 19 water supply wells. The NRC staff reviewed the environmental ground water monitoring program as part of the routine annual inspections performed during the past renewal period and for this renewal application. The NRC staff found that no discernible trends exist in the monitoring data that are attributable to impacts from the CBR facility,

and that observed levels are consistent with background levels and below established Federal water quality standards<sup>9</sup> (NRC, 2011).

The NRC staff observed that the radium concentration at one well, Well #61, is higher than that reported in ground water at the other wells; however (1) the higher levels are consistent with background for this well and (2) this well differs from the other wells because it is drawing water from the Lower Chadron sand, whereas the other wells are screened in the overlying Brule Formation.

For the prior license period, the NRC staff found that there are no measureable impacts to the environment at the nearby water supply wells from operations (NRC, 2011). Given the excursion monitoring detection and corrective actions and monitoring of private wells to detect contamination, the NRC concludes that potential impacts of the ISR operation on ground water outside the CBR facility will be SMALL.

Clearly, the NRC Staff has relied on Crow Butte's baseline and ongoing measurements as described in the LRA without doing its own baseline other other measurements. No new baselines have been taken to reflect the baseline for THIS proposed action - this renewal period.

Valid statistical methods and a systematic grid covering all horizons of the aquifer must be employed with respect to baseline ground water quality collection. After reviewing the LRA in this case, Dr. Abitz criticized the methodologies used by Crow Butte in taking baseline samples and measurements. See Abitz Opinion at 1.

In addition, after reviewing the LRA, Consolidated Intervenor's experts at JR Engineering stated how better methods and modern technologies could be utilized at the Crow Butte mine - and that was in 2008. Consolidated Intervenor's assert that in 2014, the improvements in methods and technologies (including those found in the region due

to the expansion of fracking) have been constant and have become less costly as the technologies age and proliferate.

In 2008, JR Engineering stated that:

#### Better Monitoring and Response to Excursions

Monitor wells at the CBR site appear to be only screened in the ore-bearing part of the Chadron formation. There should be additional monitor wells that are completed in all of the water bearing formations above the Pierre Shale. In order to prevent cross contamination of aquifers, and to establish which aquifer is indicating an excursion, any one monitor well should be sealed and screened in only one aquifer. For any one location, this would require a set of wells independently monitoring the Chadron, Brule, and alluvium.

\*\*\*

#### Offsite Baseline Water Quality Sampling

The only way to quantify any contamination is to have a baseline for comparison. Historic water quality information from sources such as the USGS should be explored. Existing offsite wells in the vicinity of CBR and wells along the White River alluvium should be sampled for pertinent water quality parameters to establish this baseline. In areas with no existing wells, monitor wells should be installed. In addition, surface water quality sampling sites should be established along the White River and its tributaries.

\*\*\*

Surface geophysical techniques can help define the geometry on the depositional environments of the White River alluvium and underlying units. Borehole geophysics can provide information about boundaries and preferential pathways. Hydrophysical examinations of the subsurface can characterize things like fracture flow to quantify secondary hydraulic conductivity. **Many new techniques have emerged in recent years. (Emphasis added.)**

For example, scanning colloidal boroscope flow meters can track naturally-occurring colloidal-sized particles in groundwater, provide very accurate measurements of speed and direction of natural flows through boreholes, aiding in identification of preferential pathways.

Depending on other investigation results, a numerical groundwater flow and contaminant transport model such as MODFLOW/MT3DMS may be needed to

quantify the extent of the contamination. This type of modeling effort would require extensive field data for calibration and verification.

\*\*\*

#### White River Contamination

In reference to statements from Dr. Hannan LaGarry, we agree with his assessment that an examination of the extent of contamination of the White River alluvium is warranted. Many of his suggestions can be augmented by the geophysical and hydrophysical techniques previously mentioned. We agree that the subsurface should be fully characterized in as much detail as possible, using a Geographic Information System (GIS). Subsurface mapping in three dimensions will substantially contribute to an overall understanding of this system.

As mentioned previously, a re-examination of select boreholes could employ newer techniques to understand the overall geologic setting as well as contaminant fate and transport. **Areas of concern for data gaps could be refined through the use of these newer techniques.** (Emphasis added.)

Consolidated Intervenors are not aware, nor could they find in the Final EA, any corrections for the defects noted by Dr. Abitz in the Abitz Opinion or by JR Engineering in its opinion, despite the long period of time NRC Staff has had to prepare the Final EA in this case. Further, JR Engineering mentions new technologies that have emerged since the 1982 baselines were taken and there is no mention of in the Final EA of the use of these updated technologies to take new baseline measurements for **this proposed licensing.**

Dr. Abitz notes that the baseline wells in LRA Figure 2.9-2, upon which NRC Staff relied by using CBR's old data and old analyses, are clustered and not spread out over the entire exempt zone thus violating statistical protocol. Such a violation of statistical protocol is a violation of NEPA.

As noted by Dr. Abitz CBR's methods result in a baseline and upper control limits which is inappropriately skew the results toward demonstrating a lower overall water quality. Such an approach exaggerates the true extent of any naturally diminished water quality resulting from the presence of uranium and other heavy metals in the aquifer region.

In addition to failing to set forth a competent baseline in the Final EA, the issues described in Dr. Abitz' Opinion as to the LRA have not been described or otherwise addressed in the Final EA.

At page 4 of the Abitz Opinion, Dr. Abitz states:

That is, all data and methods used to construct baseline and restoration values must be included in the application to allow an independent evaluation of the summary tables and valid statistical protocols must be used to locate the wells and evaluate the analytical [sic] results. **Baseline and restoration values presented in the application are improperly biased to high results, and this allows restoration to be achieved with less cost and time at the expense of greater contamination in the aquifer.** (Emphasis added.)

Instead of completing a competent baseline analysis for this proposed renewal period, the Final EA simply relies on the data provided by Crow Butte in the LRA thereby inheriting the biased-to-high baselines that benefit the mining company financially when it comes time for restoration. Further, there is an absence of data against which to compare measurements to in ten (10) years when CBR seeks another renewal as it is likely to do as it has in the past.

Based on this evidence, the Final EA fails to adequately describe the affected aquifers at the site and on adjacent lands and fails to provide the required quantitative

description of the chemical and radiological characteristics of these waters necessary to assess the impacts of the operation, including potential changes in water quality caused by the operations.

The Final EA states:

#### **4.6.2.2.4 Ground water Quality Impacts from Excursions**

Ground water quality may be impacted by excursions of process fluids from the production zone into surrounding aquifers. To detect excursions, CBR has placed excursion monitoring wells in the overlying aquifer and in perimeter rings surrounding all mine units to detect excursions.

\*\*\*

CBR is required to perform excursion monitoring, including biweekly monitoring of wells in the perimeter ring and overlying aquifer. The program consists of monitoring three indicator parameters (*alkalinity, conductivity and chloride*) and comparing the levels to upper control limits (UCLs) established for the monitoring wells in each mine unit during baseline (pre-extraction) sampling. Should the levels monitored during the excursion monitoring program exceed the UCL thresholds, then the licensee is required to notify the NRC and begin corrective actions to ensure that the production fluids do not migrate from the production aquifer. (Emphasis added.)

\*\*\*

During the past license period, the parameters included in the excursion monitoring program were modified to the current three parameters by License Amendment 16, dated October 16, 2003. The NRC staff reviewed and approved the removal of the parameters sodium and sulfate at that time. The UCL threshold is the exceedence of UCLs for two excursion parameters, or the UCL for any one parameter by more than 20 percent. Once the exceedence is confirmed, the well is placed on excursion status. The licensee must increase the monitoring from biweekly to weekly for all wells on excursion status. The excursion status is terminated if the levels of the excursion parameters are below the UCLs for three consecutive weekly sampling events.

\*\*\*



At page 6 of the Abitz Opinion, Dr. Abitz states that there is no rational basis to exclude Uranium from the list of excursion parameters. He opines:

Uranium is a key indicator of lixiviant excursion because its concentration in baseline wells is generally two or three orders of magnitude lower than the lixiviant and it is highly mobile as a carbonate complex in the lixiviant. Comparing Table 2.7-15 [of the LRA] with Table 3.1-3 shows that the lixiviant/baseline concentration ratio is 27 for chloride, 11 for conductivity, 13 for alkalinity and 1300 for uranium (the higher the lixiviant/baseline ratio, the greater the probability that an excursion will be detected at a monitoring well). As the uranium ratio is approximately 100 times greater than the other parameters, it will perform about 100 times better in the detection of an excursion. Therefore, there is no rationale [sic] basis to exclude the best excursion indicator from the list of excursion parameters.

Based on the foregoing, this contention should be admitted.

**EA Contention 5: The Final EA Fails to Include An Adequate Hydrogeological Analysis To Assess Potential Impacts to Groundwater and Surface Water; the NRC Staff Failed to Take a ‘Hard Look’ at Proposal Even After Expert Criticisms**

The Final EA fails to provide sufficient information regarding the hydrologic and geological setting of the area to meet the requirements of 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations. As a result, the Final EA similarly fails to provide sufficient information to establish potential effects of the project on the adjacent surface and ground-water resources, as required by 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations.

**Basis and Discussion:**

10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations, require each NEPA document to include a description of the affected environment and the impact of the proposed project on the environment, with sufficient data to enable the agency and the public to assess and review the potential impacts associated with the proposed mine. 10 C.F.R. Part 40, Appendix A, Criterion 4(e) requires that uranium processing facilities, including ISL uranium mining facilities, be located away from faults that may cause impoundment failure. Criterion 5G(2) requires an adequate description of the characteristics of the underlying soils and geologic formations.

The descriptions of the affected environment under the above authorities must be sufficient to establish the potential effects of the proposed ISL operation on the adjacent surface water and ground water resources. This data and model must demonstrate with scientific confidence that the area hydrogeology, including horizontal and vertical hydraulic conductivity, will result in the confinement of extraction fluids and expected operational and restoration performance.

Failure to present sufficient and scientifically defensible data to support the finding of confinement is highly material because it goes directly to whether the licensing renewal would be inimical to public health and safety in violation of the Atomic Energy Act of 1954, as amended. This is especially true where, as here, we have Dr. LaGarry opinions and expressed concerns as to secondary porosity in the region which are

supported by Dr. Abitz and by JR Engineering. LaGarry Opinions at Exhibit A and Exhibit B, Abitz Opinion, JR Engineering Opinions attached.

In this case, the Final EA fails to present sufficient information in a scientifically-defensible manner to adequately characterize the site and off-site hydrogeology to enable a meaningful review of the potential impacts of the proposed mine, particularly on groundwater resources. These deficiencies include unsubstantiated assumptions as to the isolation of the aquifers in the ore-bearing zones based on four (4) decades-old pump tests from 1982-2002, and failure to account for natural and man-made hydraulic conductivity through faults and fractures, and the historic drilling of literally thousands of drill holes and wells in the aquifers and ore-bearing zones in question, which were not properly abandoned or are still in use.

Consolidated Intervenors note that in his “Concluding Remarks” section of the 2008 LaGarry Opinion, Dr. LaGarry suggests that there be new pump tests along the faults to determine their permeability and rate of water flow along them. JR Engineering supported Dr. LaGarry’s recommendation to do additional pump tests. This has not been done despite the long period of time NRC Staff has had to prepare the Final EA.

Since 2008, Dr. LaGarry has been able to further study the issues raised by the Crow Butte mine and his 2015 Opinion (Exhibit A) re-iterates the concerns he expressed in 2008 with the benefit of additional data and research, as follows:

### **THE CONCERNS**

My concerns regarding the Crow Butte resources ISL uranium mine are the lack of confinement resulting from secondary porosity in the form of faults and joints, the problem of artesian flow, and the horizontal flow of water beyond the uranium-bearing strata. In my 2008 opinion on Crow Butte Resources’ ISL

mining I described in detail the stratigraphy of the region and potential contamination pathways, and established the plausibility of contaminants migrating away from the mine site into adjacent areas and aquifers. In this supplemental opinion I will concentrate on work that has been completed after 2008. It is beyond the scope of this opinion to review the entire scientific literature for the region, but I provide the most readily available recent research. Where appropriate, I also refer to Crow Butte Resources' FINAL ENVIRONMENTAL ASSESSMENT FOR THE LICENSE RENEWAL OF U.S. NUCLEAR REGULATORY COMMISSION LICENSE NO. SUA-1534.

### **The problem of secondary porosity**

In order for ISL mining to be considered safe, the mined uranium-bearing strata must be isolated from rocks above and below by confining layers. Confining layers must be continuous, unfractured, and unperforated in order for containment to exist. There are three principal pathways through which contaminated water could migrate away from the uranium-bearing strata through adjacent confining layers (described in detail below): 1) secondary porosity in the form of joints and faults, 2) thinning or pinching out of confining layers, and 3) perforations made by improperly cased or capped wells. I will restrict my comments to situation (1), as situations (2) and (3) have been addressed in my earlier opinions and there is insufficient new data to warrant additional discussion.

Secondary porosity, in the form of intersecting faults and joints, is common in all of the rocks north, east, and south of the Black Hills Dome and along the Pine Ridge Escarpment (see Swinehart & others 1985). These faults and joints are generally oriented NW- SE and SW-NE, and are a result of the ongoing uplift of the Black Hills of southwestern South Dakota. Although many people consider the Black Hills uplift to have ended by the late Cretaceous Period (~65 Ma), the Black Hills were tectonically active in the late Eocene (Evans & Terry 1994), and continued to fault, fracture, and fold the rocks of northwestern Nebraska and southwestern South Dakota into the middle Miocene (Fielding & others 2007).

Based on numerous small earthquakes along the Sandoz Ranch-Whiteclay Fault, the area is tectonically active to this day (McMillan & others 2006). These earthquakes are relatively mild, and don't significantly damage surface infrastructure. **However, even small earthquakes represent shifting and flexing of the earth's crust, and are continuously creating, closing, and redistributing the secondary porosity of the region's rocks and changing the flow pathways of the region's groundwater.** This means that joints incapable of transmitting water one day may be able to transmit water at a later date. These faults and fractures transect all major bedrock units of the region. These faults connect the uranium-bearing strata to adjacent aquifers as well as modern river alluvium. (Emphasis added.)

Preliminary studies of the interaction of these faults with surface waters in the region show that creeks that provide municipal water supplies can be entirely consumed and redirected by the region's secondary porosity. Chadron Creek, the stream that supplies water to the city of Chadron, Nebraska, went dry for the first time in the city's history. **Subsequent study of the creek's water flow rates by Chadron State College students suggested that normal amounts of water are flowing from springs, but the water is disappearing into deeper alluvium or into fractures in the rock** (Balmat & others 2008, Butterfield & others 2008). (Emphasis added.)

Following these observations, a Chadron State College graduate student studied the lineaments of northwestern Nebraska and southwestern South Dakota using data collected by high-flying aircraft, satellites, and the space shuttle, and showed **that these represent widespread faults** (Balmat & Leite 2008). Many of the faults in northwestern Nebraska and southwestern South Dakota persist for tens of miles (Diffendal 1994, Fielding & others 2007). Also, many of the ancient river deposits of the Tertiary strata, along with the alluvium deposited by modern rivers such as the Cheyenne River, the White River, and Hat Creek, follow fault zones because fractured rock erodes more easily. (Emphasis added.)

Crow Butte Resources' license renewal application asserts that fault zones are known in the vicinity of the license area. The most notable of these is the White River Fault, which trends along the axis of the syncline in which the uranium-bearing Chamberlain Pass Formation (being mined for uranium in this case) was deposited (see LaGarry and LaGarry 1997, LaGarry 1998). A review of the scientific literature shows that faults and joints are well known in rocks surrounding the Black Hills, and are known to interconnect major aquifers and the land surface (Swinehart & others 1985, Peters & others 1988, Fielding & others 2007). In earlier expert opinions, I described the extensive, detailed geologic mapping of the region conducted by the Nebraska Geological Survey (Table 1), and predicted that faults and joints would be capable of transmitting uranium-contaminated waters from depth onto the land surface.

**In 2012 my colleagues and I reported preliminary research showing uranium-contaminated artesian springs along the Sandoz Ranch-Whiteclay Fault in Fall River and Shannon counties (Bhattacharyya & others 2012), supporting those assertions. Based on the numerous studies reported here and the maps cited in Table 1, the absence of joints and faults in the vicinity of the proposed mine is a false perception, because joints and faults are ubiquitous in this region.** (Emphasis added.)

Despite being obvious when viewed from Earth's orbit (Balmat and Leite 2008), these joints and faults are difficult to observe when covered by Holocene surficial deposits. **Crow Butte Resources' assertions that hydrologic modeling shows**

**no evidence of faults is misleading, as it is possible to conduct such tests in ways that are unlikely to reveal the presence of a fault.** In order to demonstrate a lack of containment, faults must be mapped and wells installed along them. Test wells can be configured to determine the hydrologic head along a fault relative to adjacent strata, and measurements of water transmission capacity along faults can be made. Balmat and Leite (2008) and the “Whistleblower letter” (see my 2008 opinion) both reported faults intersecting the Crow Butte Resources mine license area (at about the location of the processing plant), and initial testing could be made there and preliminary measurements made. Additional faults could be tested in the vicinity of Red Cloud Buttes north of Crawford in the Smiley Canyon 1:24,000 Quadrangle and at in the Trunk Butte 1:24,000 quadrangle (Table 1). Joints are ubiquitous in the region, and many are available for testing. (Emphasis added.)

**It’s worth noting that despite being made aware of this geological mapping and the published stratigraphic work that resulted from it, Crow Butte Resources continues to use outdated 1960’s era concepts and nomenclature** in their FINAL ENVIRONMENTAL ASSESSMENT FOR THE LICENSE RENEWAL OF U.S. NUCLEAR REGULATORY COMMISSION LICENSE NO. SUA- 1534. They continue to refer to the uranium-bearing strata as “Basal Chadron Formation” rather than the currently used Chamberlain Pass Formation. (Emphasis added.)

If Crow Butte Resources is unable to follow easy to address simple scientific protocols such as using the currently accepted stratigraphic nomenclature, I am concerned about their diligence in addressing challenging issues such as the mapping of faults and joints. Reliance on outdated data, concepts, and assumptions about the geology of the region (including, but not limited to rocks folding, rather than fracturing) will make any and all modeling of the hydrology of the area meaningless.

[Table Omitted.]

### **The problem of artesian flow**

Artesian flow occurs when there is a hydrologic connection, through faults or highly permeable strata, between groundwater sources high on the landscape and the land surface lower down. The weight of water in overlying strata exerts pressure downward into water within the uranium- bearing strata, which can then be released as artesian water flow (like a fountain) where the topographically lower uranium-bearing strata is exposed at the surface, or where it is punctured by drilling. Artesian flow was observed by Crow Butte Resources and was acknowledged in their FINAL ENVIRONMENTAL ASSESSMENT FOR THE LICENSE RENEWAL OF U.S. NUCLEAR REGULATORY COMMISSION

LICENSE NO. SUA-1534. Artesian flow is most likely where the upper confining layer is perforated by secondary porosity (faults and joints), poorly constructed or improperly sealed exploration wells, or thinning or absence of upper confining layers. Artesian flow could transmit lixiviant, the most toxic mineral-laden of waters, onto the land surface (and into White River alluvium) and discharge large amounts of contaminants into connected aquifers or faults in a very short time. (Emphasis added.)

#### The problem of horizontal flow

Confining layers above and below uranium-bearing strata limit the unwanted spread of contaminants from an ISL site. However, horizontal flows within the uranium-bearing strata and along intersecting faults and joints are also of concern. Such flow can rapidly redirect lixiviant or mine waste away from the mine site and into unexpected breaches in the confining layers. In my 2008 opinion I cited research on the transmission of water along secondary porosity (faults and joints) in the Brule Formation of up to 1500 feet/day. I also provide detailed, plausible conditions under which this contamination could spread to adjacent aquifers. Crow Butte acknowledges such secondary porosity in the Brule Formation (but not the faults that create it) in their FINAL ENVIRONMENTAL ASSESSMENT FOR THE LICENSE RENEWAL OF U.S. NUCLEAR REGULATORY COMMISSION LICENSE NO. SUA-1534. This acknowledged secondary porosity, if breached by unconfined lixiviant, would transmit contaminants to the major, mapped faults north of the Pine Ridge in Nebraska in only a few years, and from there into adjacent regions. (Emphasis added.)

#### CONCLUDING REMARKS

Based on the arguments presented above, it is my expert opinion that ISL mining in the area surrounding Crawford, Nebraska cannot be adequately contained. Reports of artesian flow, the acknowledged and prevalent jointing and faulting leading to widespread secondary porosity, along with potentially high horizontal flow through regional faults indicate that during the course of its operation the Crow Butte Resources ISL uranium mine will most likely contaminate the region with unconfined lixiviant. This contamination will pollute and render unusable ground and surface water southwards into Nebraska and surface waters within the White River drainage northeastwards into greater South Dakota. Also, based on my reading of Crow Butte Resources' FINAL ENVIRONMENTAL ASSESSMENT FOR THE LICENSE RENEWAL OF U.S. NUCLEAR REGULATORY COMMISSION LICENSE NO. SUA-1534, no comprehensive review of the geologic literature was conducted despite my criticisms on that issue in the 2008 opinion. In my view, the use of outdated scientific literature, or in this case, a general lack of review of recent study, should not be seen as an opportunity to operate in a

knowledge vacuum. Much of the Great Plains region was studied prior to the 1980's and the general acceptance of Plate Tectonics Theory, and therefore generally misrepresents the geologic setting of the region. This was true of the geologic literature used to justify ISL mining near Crawford, Nebraska, and is also true of the data used to justify proposed mining near Edgemont, South Dakota. **Crow Butte Resources' complete and continued reliance of modeling based on outdated and incomplete parameters will never be sufficient to satisfy concerns based on actual mapping and recent published studies.** It is incumbent upon potential ISL operators, as it is with any natural resource extractors, to seek out the most recent research and expert opinions on the geological settings in which they propose to operate. (Emphasis added.)

Despite the information and opinions provided in the 2008 LaGarry Opinion, and in conflict with Dr. LaGarry's 2015 Opinion that the Crow Butte ISL mining operation cannot be adequately contained, the Final EA assumes that Crow Butte's assertions concerning the regional geology and confinement are correct. This constitutes a failure to take a 'hard look' as required by NEPA, as well a failure to adequately described the affected environment, particularly including groundwater and surface water, and including the regional geology using updated and scientifically defensible research, nomenclature and analysis further constitutes a separate violation of NEPA. Each of these alone should be grounds for admitting this contention.

The Final EA refers to several faults but does not provide any analysis of how such faults might impact the containment of the mining operation; it states:

#### **3.4.2 Regional Structure**

Structural features in western Nebraska include the Chadron Arch, Pine Ridge Fault, the Toadstool Park Fault, and the Black Hills uplift in South Dakota (CBR, 2007). The CBR site is located within a structure feature known as the Crawford Basin, which is a triangular shaped basin bounded by the Toadstool Park Fault to the northwest, the Chadron Arch and Bourdeau Fault to the east, and the Cochran Arch and Pine Ridge Fault to the south.



Six northeast trending faults are identified or proposed in Sioux and Dawes Counties (Figure 2.6-5). All of these faults are downthrown on the north side. One of these faults, the White River Fault, follows the White River north of Crawford and was postulated during the exploration drilling phase of the Crow Butte Project (Collings and Knode, 1984). The only other fault illustrated, the White Clay Fault, terminates the Arikaree Group rocks on the east from White Clay to about six miles east of Gordon (Nebraska Geological Survey, 1986). The Cochran Arch was also proposed by DeGraw (1969) on the basis of subsurface data. The Cochran Arch trends east-west through Sioux and Dawes Counties, parallel to the Pine Ridge Fault proposed by DeGraw. Structural features subparallel to the Cochran Arch have been recognized based on CBR drill hole data. The existence of the Cochran Arch may explain the structural high south of Crawford.

In Dr. LaGarry's 2008 Opinion, he opined that:

#### CONTAMINANT PATHWAYS

**There are two principal pathways through which contaminated water could migrate away from Crow Butte Resources well fields and into adjacent areas: 1) along the White River alluvium (modern river alluvium); and 2) along faults. The White River alluvium can receive contaminants from three sources: a) from surface spills at the Crow Butte mine site; b) from waters transmitted through the Chamberlain Pass Formation where it is exposed at the land surface; and c) through faults. Contaminants within the White River can be transmitted into the areas where the alluvium intersects faults downstream from Crawford. Once into the White River alluvium, every rain event will push the contaminants a little bit downstream.** In the case of the White River, downstream is to the N-NE and directly onto the Pine Ridge Reservation. Residential users, agricultural users, wildlife, and the City of Crawford all receive water supplies from the White River alluvium. (Emphasis added.)

**The second pathway is through faults. These faults can receive contaminants from three sources: a) from surface spills into the White River alluvium; b) from waters transmitted through the Chamberlain Pass Formation; and c) from underground excursions, which can of either lixiviant or uranium-laden water.** Once into the faults, contaminants could migrate along the groundwater gradient (which is generally eastwards) northeastward towards the Pine Ridge Reservation or southeastward toward Chadron and the majority of the remaining High Plains Aquifer. Uranium

could also be drawn upwards into parts of the High Plains Aquifer by high-capacity irrigation wells, some of which are known to be within major fault zones (northernmost Sheridan County, Nebraska). (Emphasis added.)

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## THE PROBLEM OF ARTESIAN WATER

Artesian flow occurs along the Pine Ridge of Nebraska when there is a hydrologic connection, through faults or highly permeable strata, between the Chamberlain Pass Formation and the High Plains Aquifer. The weight of water in the topographically higher High Plains Aquifer exerts pressure downward into the Chamberlain Pass Formation, which can be released as artesian water flow where the topographically lower Chamberlain Pass Formation is exposed at the surface, or where it is punctured by drilling. Artesian flow was predicted by NDEQ in their evaluation of CBR's petition for an aquifer exemption, and was observed by a local landowner as CBR did test drilling for the North Trend Expansion. **Artesian flow could transmit the most mineral-laden of waters onto the land surface (and into White River alluvium) and discharge large amounts of contaminants into aquifers or faults in a very short time. (Emphasis added.)**

## CONCLUDING REMARKS

Based on the arguments presented above, it is my expert opinion that ISL mining in the Crawford, Nebraska area should not be allowed to continue until the potential contaminant pathways of the White River alluvium and the SW-NE and NW-SE trending fault zones are examined and monitored. To this end, I suggest:

1. establishing a GIS database for the mapping of existing geologic units and features (e.g., faults). This would allow computer modeling of the region geology, hydrology, and structure, and would present the most complete picture of the data for final evaluation. Data acquired during the following investigations would be incorporated to the database.
2. map the White River alluvium in order to characterize its potential as a conduit for radioactive contaminants.
3. sample water from the White River at regular intervals (e.g., 2 miles) between Crawford and Pine Ridge to locate a plume of contaminated water or sediments, if present.

4. if contaminants are detected, convert sample wells to monitoring wells.
5. map the network of faults present in northwestern Nebraska and southwestern South Dakota.
- 6. pump test the faults to determine their permeability and the rate of water flow along them. (Emphasis added.)**
7. if water flow is detected along the faults, the convert selected sampling wells into monitoring wells.
8. color the water used in all underground stages of production. This will allow future leaks to be detected even if they manifest far from the mined area.

Consolidated Intervenor assert that none of Dr. LaGarry's recommendations have been undertaken by CBR or the NRC Staff and that it remains unknown whether these pathways to contamination exist. Again, this is despite the long period of time that the NRC Staff has had to conduct these tests, take these measurements and prepare the Final EA. In fact, Dr. LaGarry has stated that his 2008 concerns have not been addressed by either Crow Butte or the NRC Staff. 2015 LaGarry Opinion at page 1. This constitutes a failure to take a 'hard look' which violates NEPA and NHPA and further supports admission of this contention.

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Further, the Final EA describes confinement in Section 3.5.2.3 as follows:

#### 3.5.2.3 Uranium Bearing Aquifer

##### 3.5.2.3.1 Hydrogeologic Characteristics

The mineralized zone at all mine units is within the Basal Chadron Sandstone. The thickness of the Basal Chadron Sandstone within the CBR facility varies from 12 m (40 ft) to 24 m (80 ft), with an average thickness of 18 m (60 ft). The thickness of the Basal Chadron Sandstone decreases to zero approximately 1 mile northeast of the CBR facility. The depth to the mineralized zone varies between 122 m (400 ft) and 274 m (900 ft) and increases in the southeastern direction.

**CBR conducted four aquifer tests** in the permit area **to determine** the hydraulic characteristics (storativity, transmissivity, and hydraulic conductivity) of the ore-bearing Basal Chadron Sandstone aquifer and **the integrity of the confining layers** over the CBR facility. (Emphasis added.)

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The licensee used the aquifer testing drawdown and recovery data to estimate the hydrogeological properties of the ore-bearing aquifer and confining layers using one or more combinations of the Theis' recovery method, Jacob's modified non equilibrium method, Cooper and Jacob's distance-drawdown method, Hantush's method, and the Neuman and Witherspoon method.

The results of four aquifer tests were similar and show that the Basal Chadron Sandstone is a nonleaky, confined, slightly anisotropic aquifer (CBR, 2009).

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The licensee reported that the average thickness of the ore-bearing aquifer was 12 m (40 ft) at the test sites, and the reported aquifer thickness is consistent with the thickness reported by Collings and Knode (1984).

#### **3.5.2.3.2 Level of Confinement**

Lower confinement of the Basal Chadron Sandstone in the CBR facility is achieved by over 305 m (1000 ft) of Pierre Shale. The upper confinement is composed of the Chadron Formation above the Basal Chadron Sandstone (Middle and Upper Chadron) and that portion of the Brule Formation that underlies the intermittent Brule Sandstone (Orella Member). These units isolate the Basal Chadron Sandstone from overlying aquifers with several hundred feet of clay and siltstones. Thicknesses range from about 30 m (100 ft) in the northeastern part of the permit area to 150 m (500 ft) in both the southern and northern parts of the area. The clay and siltstone is about 60 to 90 m (200 to 300 ft) thick.

Based on the results of the aquifer tests, the licensee reported the average vertical hydraulic conductivity of the overlying confining layer ranges from  $2.8 \times 10^{-12}$  to  $3.49 \times 10^{-13}$  m/s ((0.85 to 1.06 ft/s) and the average vertical hydraulic conductivity of the underlying confining layer ranges from  $3.4 \times 10^{-13}$  to  $6.3 \times 10^{-13}$  m/s ((1.04 to 1.92 ft/s) (CBR, 2007A).

**Laboratory testing of the overlying confining layers indicates that these layers may exhibit a minor amount of leakage. However, during the aquifer testing, there was no pressure response that would indicate the occurrence**

**of such leakage. Similarly, the underlying confining layer response attributable to the aquifer testing indicated no leakage (CBR, 2007A). (Emphasis added.)**

In Dr. LaGarry's opinion there is a likelihood of leakage from the supposedly confining layers. The Final EA at 3.5.2.3.2 states that "[l]aboratory testing of the overlying confining layers indicates that these layers may exhibit a **minor amount of leakage.**" Final EA at 3.5.2.3.2. How much leakage is a 'minor amount of leakage'? The Final EA is silent on that point as well, which is a material omission and a violation of NEPA.

According to Dr. LaGarry's 2015 Opinion:

[I]t is my expert opinion that ISL mining in the area surrounding Crawford, Nebraska cannot be adequately contained. Reports of artesian flow, the acknowledged and prevalent jointing and faulting leading to widespread secondary porosity, along with potentially high horizontal flow through regional faults indicate that during the course of its operation the Crow Butte Resources ISL uranium mine will most likely contaminate the region with unconfined lixiviant. This contamination will pollute and render unusable ground and surface water southwards into Nebraska and surface waters within the White River drainage northeastwards into greater South Dakota.

Nonetheless, Crow Butte maintains that there is no leakage because in the 1980s, their pump tests showed no responses when it is entirely possible that there was an equipment or instrument failure and/or that modern technology has improved in the past 33 years to allow for more sensitive readings than were available back in 1982. Yet, despite the suggestions by two of Consolidated Intervenors' experts, JR Engineering and Dr. LaGarry that additional pump tests be done, none have been reported in the Final EA. This constitutes a failure to take a 'hard look' as required by NEPA and is grounds for admitting this contention.

The Final EA continues with the notion that as long as Squaw Creek doesn't flow due to runoff or a rainy season, there will be no problem with the **known** hydraulic interactions between Squaw Creek and the Shallow Brule. Because there is no monitoring of these areas for contamination, it is not possible to tell from the Final EA whether there are ongoing environmental harms to Squaw Creek from hydraulic connections with the Brule. One must wonder if the elevated Uranium concentrations and unexplained radioactive daughter Lead-210 have magically appeared or whether their presence is connected to the foregoing hydraulic interactions. Consolidated Intervenors and their experts have suggested that it is the mine.

Section 3.5.2.3.2 of the Final EA continues as follows:

The licensee reported hydraulic interactions between Squaw Creek and the Shallow Brule sand. The ER submitted by CBR shows that the Basal Chadron Sandstone is separated from the shallow Brule sand by a thick impermeable layer, and that Squaw Creek is usually dry except for runoff flows; thus, hydraulic interaction between Squaw Creek and Basal Chadron Sandstone is unlikely (CBR, 2007A).

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#### **3.5.2.3.3 Ground water Modeling of the White River Structural Feature**

During the exploration drilling phase of the CBR project, the licensee identified a structural feature known as the White River Fault, which follows the White River north of Crawford and passes along the southeast permit boundary of the proposed North Trend expansion area, approximately 3.2 km (2 mi) from the northern boundary of the CBR facility. In the ER, the applicant expressed uncertainty as to whether this feature is expressed as a fault through the Brule and Basal Chadron formations or a fold (CBR, 2007A). If the feature is present as a conductive fault, it could provide a pathway for 39 fluids to flow between the two formations. **The licensee proposed that recent close spaced drilling data indicate that the feature could be interpreted as a fold in these formations. The applicant provided updated cross sections and a discussion that supported this interpretation (CBR 2009). (Emphasis added.)**

Based on Dr. LaGarry's opinions, Consolidated Intervenors believe the White River Fault is a fault not a fold and that is how it should be interpreted under applicable scientific principles regardless of how it 'could' be interpreted in order to rubber-stamp Crow Butte's license. Interpreting the White River Fault as it 'could' be interpreted rather than as it 'should' be interpreted violates NEPA.

Dr. LaGarry has advised Consolidated Intervenors that without accurate data, it is not possible to interpret the White River Fault as a 'fold.' Dr. LaGarry would argue that since wetlands form along water-bearing faults (as they do near Oglala SD along the Whiteclay Fault (J. Tinant, unpublished data)), the English Creek and Squaw Creek wetlands could evidence a proper interpretation of the White River Fault as a "Fault" and not a "Fold". Dr. LaGarry would not be able to say more about the "Fault" vs. "Fold" issue without accurate field study data which is absent in this case and in the Final EA. Accordingly, the Final EA should not have accepted CBR's theory that the White River Fault is a 'Fold' because it "could" be interpreted that way in the absence of actual data, research and analysis. Such fails the NEPA 'hard look' requirement and alone should support admission of this contention.

Further, the failure of the NRC Staff to develop site-specific data for the renewal licensed area violates NEPA. Instead of using site-specific data, the NRC Staff opted to use data solely from the North Trend Expansion Area application (which is not being litigated in this case but in a separate case) and then use computer modeling to adapt it to fit the supposed theoretical parameters for the renewal licensed area. This does not comply with NEPA's 'hard look' requirements.

The foregoing NRC Staff squishing of the North Trend data into the Renewal proceeding box is described in the Final EA at 3.5.2.3.3, as follows:

To evaluate this issue, the NRC staff performed an independent ground water modeling exercise to assess the nature of the White River structural feature in the Basal Chadron and Brule formations. As described in Section 2.4.3.3.1 of the SER, the NRC staff developed a base ground water flow model using Ground water Modeling System (GMS) Version 6.0. Field data used to construct the model included boring log data, hydraulic properties of the geologic units, and water level data. Because this model was developed for analysis of the North Trend Expansion Area, data used for model development came from North Trend geologic and hydrogeologic information. After model development, the staff calibrated the model using PEST (parameter estimation and automated calibration software included in GMS). Calibration results indicated to the staff that the ground water model calibration to observed data was acceptable (NRC 2014).

As discussed above, NEPA CEQ regulations and applicable federal case law require this precise information to be included in a NEPA document in order to comply with NEPA.

For example, the Final EA admits at Section 3.5.2.3.1 that it relies on very old aquifer pump tests conducted by Crow Butte in 1982 (32 years ago) at an undisclosed location of unknown size, in 1987 (27 years ago) at a site north of the first test site of undisclosed location, in 1996 (19 years ago), and a ‘final’ test in 2002 (13 years ago).

During the interim times, there have been many earthquakes as well as increases in the quality of the pump testing technology. For its renewal, Crow Butte should be required to conduct new site-specific aquifer pump tests. Failure to include data from new site-specific aquifer pump tests related to the currently mined and planned to be mined Mining Units in the Final EA is a violation of NEPA. See Final EA Section 3.4.3.



Section 3.5.2.3.1 of the Final EA further states that “The results of four aquifer tests were similar and show that the Basal Chadron Sandstone is a nonleaky, confined, slightly anisotropic aquifer (CBR, 2009).” Id. Thus, the data from the decades old aquifer pump tests from the 1980s is being used in 2014-2015 to justify the assumption of adequate confinement. Since a failure of adequate confinement would be grounds for non-renewal of the License (or in this case, revocation of the renewed license already issued), it is a material point of information that should be confirmed by current pump tests using modern technology that are site-specific to the areas being mined or to-be-mined. Failure to do so is not allowable under NEPA and applicable regulatory provisions.

There is an internal inconsistency between Section 3.5.2.3.3 of the Final EA which states that “licensee reported hydraulic interactions between Squaw Creek and the Shallow Brule sand.” Section 4.6.1.2 of the Final EA states various ways that surface waters such as Squaw Creek could be impacted by accidental spills, leaks or permitted discharges. Section 4.6.1.2 omits to state that surface waters could be impacted by leakage between and among the mined aquifer, the Shallow Brule sand and surface waters such as Squaw Creek. This violates NEPA.

Section 4.6.1.2 of the Final EA does refer to spills and leaks that could impact surface waters by storm water runoff, or by contaminating surficial aquifers that are hydraulically connected to surface waters but neither of those two possibilities is the same as admitting that there is leakage from the mined aquifer that is making its way to Squaw Creek, English Creek, and possibly other surface waters (e.g., White River) and resulting in elevated Uranium and radioactive daughters such as Lead-210.

The Final EA does state:

#### **4.6.1.2 Operational Impacts on Surface Water**

During operations, surface waters could be impacted by accidental spills or leaks from the ISR facility or by permitted discharges. Spills or leaks from the central processing plant or well fields, as well as spills during transportation, could impact surface waters by contaminating storm water runoff or by contaminating surficial aquifers that are hydraulically connected to surface waters.

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Potential impacts to surface water resulting from spills and leaks are most likely to impact the nearby surface streams such as Squaw Creek and English Creek

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All responsible parties knowledgeable about ISL operations are aware that the introduction of lixivants drastically changes the local ground water chemistry, routinely producing significantly-elevated concentrations of many major and trace metals and metalloids, plus other constituents: i.e. arsenic, antimony, molybdenum, selenium, vanadium, uranium, strontium, iron, manganese, lead, lithium, nickel, chromium, sulfate, chloride. See Exhibit K at 14, the Hall USGS 2009 report which states:

In general, at PAAs where post-restoration values exceed MCL, the elements elevated in baseline values (As, Cd, Pb, Se, Ra, and U) continue to be elevated after mining.

**As compared to baseline values for the PAAs, uranium and selenium are elevated in the majority of PAAs.** More than half of PAAs show a decrease in As, Cd, Fl, Pb, Hg, nitrate, and Ra after mining. (Emphasis added.)

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At page 20 of the same 2009 USGS report:

Although restoration results vary widely for individual well fields, among the elements with an MCL, only selenium and uranium show overall increases in

post-restoration groundwater in more than 50 percent of PAAs (Table 7)  
(Emphasis added.)

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The US FWS supports this understanding that Selenium concentrations are a risk from ISL mining and that increased Selenium harms sensitive species of birds, especially including waterfowl. See FWS Exhibit N at page 1. Additionally, the selenium-contaminated groundwater could seep into low areas or basins in upland sites and create wetlands which would attract migratory birds and other wildlife.

The US FWS stated to NRC Staff that:

The Service also is concerned with the potential for elevated selenium in evaporation ponds receiving in-situ wastewater. Waterborne selenium concentrations > 2 µg/L are considered hazardous to the health and long-term survival of fish and wildlife (Lemly 1996).

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The potential for selenium and other contaminants to impact migratory birds should be assessed if the proposed facility will use ponds to store or dispose of the wastewater or if the wastewater will be disposed of in such a manner as to potentially expose migratory birds or other wildlife to contaminants.

Accidental releases/spills of uranium in-situ production water can result in the ponding or pooling of this production water which could be ingested by wildlife, including migratory birds thus exposing them to uranium, radionuclides, and selenium. Spills or releases of production water also could reach surface waters which could impact aquatic organisms inhabiting the affected waters.

We also recommend a requirement that leak detection systems in all injection wells and production wells be installed to enable operators to immediately respond to releases of injection or production water onto the environment.

Consolidated Intervenor note that although NRC Staff states in the Final EA (Section 1.4 and Section 5 of the Final EA) that it ‘consulted’ with US FWS, its failure to follow the written advice of US FWS concerning Selenium indicates that any such consultations with US FWS were ineffective and in violation of NEPA. We know that NRC Staff failed to follow the advice of US FWS because the Final EA is silent when it comes to selenium. Literally silent - a search of the Final EA document reveals zero references. However, the 1982 Baseline Study by NDEQ found low levels of selenium which would mean that if there were high levels of selenium found now, it would clearly be due to the Crow Butte operations.

The 1982 NDEQ Baseline Study states at page 51:

**Selenium levels were very low in all analyzed groundwater samples.** (Appendix A, Table 1). Only 3 samples contained Se concentrations greater than 1 pp.. All three samples were from groundwater from the Brule formation and none of them had concentrations above 2 ppb. (Emphasis added.)

The failure to describe current selenium levels in the Final EA violates NEPA by failing to adequately describe the affected environment. Selenium is known to be a highly toxic result from ISL operations, is known to be increased by ISL operations, and there were ‘very low’ Se levels in 1982. Therefore, the NRC Staff should have obtained Se levels as a new baseline for this proposed renewal. Its failure to do so violates NEPA and is further grounds for the admission of this contention.

Based on this demonstration, the Final EA fails to provide an adequate site characterization of geology and hydrogeology and as a result fails to adequately analyze

the impacts associated with the proposed mine, particularly on groundwater resources. Accordingly, this contention should be admitted.

**EA Contention 6: The Final EA Fails to Adequately Analyze Ground Water Quantity Impacts**

The Final EA violates the National Environmental Policy Act in its failure to provide an analysis of the ground water quantity impacts of the project. Further, the Final EA presents conflicting information on ground water consumption such that the water consumption impacts of the project cannot be accurately evaluated. These failings violate 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations.

**Basis and Discussion:**

10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations, require the agency to provide sufficient data for a scientifically-defensible review of the environmental impacts of the operation and for the Commission to conduct an independent analysis. The Final EA as published fails to meet these requirements in that it does not provide reliable and accurate information as to the project's ground water consumption. Thus, the Final EA has not met the requirements of NRC regulations and NEPA.

The Final EA states:

4.6.2.2.1 Ground water Quantity Impacts from Consumptive Use  
Impacts to ground water quantity during ISR operations can be caused by consumptive water use.

Section 4.6.2.2.1 of the Final EA states that the “CBR facility is licensed to process 9,000 gallons per minute (gpm) [34,065 lpm] of leach solution.” Id. However, that number does not include and is in addition to the consumption of water for restoration and decommissioning. See Final EA Section 2.1.

The Final EA also says that the piezometric surface of the Basal Chadron is being lowered year after year in comparison to the prior renewal period and that it will likely be lowered even more by the restoration and decommissioning activities, concluding that the impacts are MODERATE and that for a variety of reasons, NRC Staff doesn’t think it is of more significance.

It is unclear why NRC Staff has this confidence given that the first, last and only time NRC Staff approved a mine restoration was for the smallest mine unit, MU 1, in 2003. Here we are 12 years later and Crow Butte is still restoring Mine Units 2-6 consuming vast quantities of groundwater in the process with no end in sight. Further, Crow Butte needs to restore mining units before it may commence mining in new units and, as a result, it has elected to accelerate groundwater pumping and restoration activities by increasing the flow rates by more than 500% from about 200 gpm to about 1,200 gpm and the NRC Staff has stated that it is likely that more than eleven (11) pour volumes of water will be require to restore each mine unit. This looks like a desperate attempt to throw massive amounts of water into mining units 2-6 in order to reduce the values to the stated ‘secondary’ restoration values or they will be out of the mining business.

Specifically, Section 4.6.2.2.1 of the Final EA states:

The licensee reported that potentiometric surface in the Basal Chadron Sandstone has decreased by 40 to 60 feet [12.1 to 18.3 m] throughout the CBR facility wellfields since 1982–1983 (CBR, 2009) from consumptive use. Since distance decreases the drawdown effects of pumping, it is reasonable to assume that the drawdown in the potentiometric surface has decreased no more than 30 to 50 feet [9.1 to 15.2 m] in the vicinity of Crawford. **Although the piezometric surface was lowered in the Basal Chadron aquifer over the previous license period, the aquifer remained under a significant amount of pressure. Water levels in wells penetrating the Basal Chadron aquifer continue to rise very close to the land surface or actually flow under artesian pressure.** The significance of this phenomenon is that it indicates that the Basal Chadron and Brule aquifers are not in good hydraulic communication. Therefore, drawdowns associated with pumping in the Basal Chadron aquifer will not be observed in the Brule aquifer. (Emphasis added.)

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#### 4.6.2.3 Aquifer Restoration Impacts on Ground water

**The potential environmental impacts to ground water quantity and quality during aquifer restoration are the same as those for operations, except ground water consumption is increased** and there may be potential impacts from the introduction of brine slurries resulting from reverse osmosis in to waste storage ponds and deep disposal wells. In addition, aquifer restoration directly affects ground water quality in the vicinity of the well field being restored. (Emphasis added.)

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**The consumptive use of ground water from bleed during aquifer restoration is generally greater than during ISR operations.** This is particularly true during the sweep phase, when a greater amount of ground water is generally withdrawn from the production aquifer. **During the sweep phase, ground water is not reinjected into the production aquifer and all withdrawals are considered consumptive.** (Emphasis added.)

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CBR is concurrently restoring individual mine units while maintaining ISR operations within other mine units. The final approval of ground water restoration for Mine Unit 1 was granted by the NRC in 2003 (CBR, 2007). At that time,

ground water restoration activities are occurring at Mine Units 2 through 6 (CBR, 2012). The restoration of these mine units (MUs) are projected to gain regulatory approval in 2015 for MUs 2 and 3, 2019 for MU 4, 2022 for MU 5, and 2021 for MU 6, respectively (CBR, 2012). However, restoration activities at Mine Units 2, 3, 4, 5, and 6 are still in progress. **To accelerate ground water restoration, CBR has increased the flow capacity through the RO circuit from 200 to 1,150 gpm [757 to 4352 lpm], and the flow through the IX circuit has been increased from 200 to 1,200 gpm [757 to 4542 lpm] (CBR, 2012).** In addition to the upgrades to the IX and RO circuits, CBR has installed new restoration pipelines and manifolds to allow for the increased flows and to improve wellfield isolations. In 2011, CBR began operating a second deep disposal well to help accommodate the disposal of additional waste water generated by the increased RO and IX flow. **(Emphasis added.)**

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The NRC performed a water-balance analysis in Section 5.7.9.4 of the SER and based on the restoration analogues in the most recently approved license application and representations made by CBR, restoration of a mine unit will need at least extract eleven pore volumes of ground water for restoration (NRC 2014). **Given the historical flow rates, it is anticipated that CBR may need to extract more than eleven restoration pore volumes for all mine units; thus, the restoration schedule may extend beyond that proposed by CBR. The extension of the restoration periods, as well as the greater than expected consumptive use rates, could significantly increase the drawdown in the potentiometric surface of the Basal Chadron aquifer, but it should still remain saturated. Consequently, the short-term impact from consumptive ground water use during aquifer restoration may be MODERATE. However, water levels would eventually recover after aquifer restoration is complete resulting in an overall SMALL impact from consumptive ground water use. (Emphasis added.)**

For all the foregoing reasons, this contention should be admitted.



**EA Contention 7: The Final EA Fails to Demonstrate Adequate technical sufficiency and fails to present information in a “clear, concise” manner to enable effective public review and omits material information and analysis**

The Final EA fails to present relevant information in a clear and concise manner that is readily accessible to the public and other reviewers, as required by 10 C.F.R. §§ 51.70(b), 51.120, Part 51 Appendix A to Subpart A, the Administrative Procedure Act, the National Environmental Policy Act and implementing regulations.

**Basis and Discussion:**

This contention is one of omission. NRC regulations require that “[t]he draft environmental impact statement will be concise, clear, and analytic, [and] will be written in plain language with appropriate graphics ....” 10 C.F.R. § 51.70(b). Similarly, CEQ’s NEPA regulations require that environmental documents “be written in plain language and may use appropriate graphics so that decisionmakers and the public can readily understand them.” 40 C.F.R. § 1502.8. See also 40 C.F.R. § 1500.2(b) (“Environmental impact statements shall be concise, clear, and to the point....”).

Further, while NRC regulations allow incorporation and referencing of material into an EIS document, such incorporation and referencing must be done “without impeding agency and public review of the action.” 10 C.F.R. Part 51, Appendix A to Subpart A (discussion of footnote 1). Lastly, NRC regulations also require that “copies of ... any related comments and environmental documents, will be made available on the NRC web site.” 10 C.F.R. § 51.120.

In this case, the Final EA fails to meet these requirements, particularly with regard to presentation of the scientific and technical bases for a large number of assumptions

made in the Final EA, some of which are simply adoptions of Crow Butte's assumptions stated in the LRA. The NRC staff's incorporation of its own and Crow Butte's assumptions into the Final EA are inadequate to justify the scientific conclusions presented and, therefore, violate NEPA.

One major example is in Section 3.4.3 of the Final EA concerning Seismology which states that:

The most recent earthquake recorded in Nebraska occurred April 16, 2007. The epicenter was about 45 miles north-northwest of McCook, Nebraska, and was about 180 miles southeast of Crawford. This earthquake had a recorded magnitude of 3.0, but was not felt at Crawford or the CBR facility. EA 3.4.3.

The foregoing fails to disclose at least two earthquakes that occurred in 2011 and were felt by the people of Crawford, Nebraska and reported in the Rapid City Journal/Chadron News on November 15, 2011 and attached as Exhibit I hereto, "Two Earthquakes Strike Area." Apparently, a 3.3 and a 3.7 magnitude earthquake were felt in the area, "As of Thursday morning, three people in Crawford, two each in Chadron and Hot Springs and one each in Bridgeport and Spearfish, S.D., reported feeling the earthquake to the USGS." Exhibit I.

Further the Final EA fails to disclose that even small earthquakes can result in greater secondary porosity, as described by Dr. LaGarry in the 2015 Opinion at pages 2-3:

However, even small earthquakes represent shifting and flexing of the earth's crust, and are continuously creating, closing, and redistributing the secondary porosity of the region's rocks and changing the flow pathways of the region's groundwater.

As a result, the Final EA is wrong when it says that the last recorded earthquake in the area was in 2007. This omission must be corrected in a new NEPA document (which should be an EIS) that contains updated information on seismology through 2014, as well as updated information in the other areas criticized in this pleading. Further, the failure to evaluate the impact of small earthquakes in the area on the potential for secondary porosity constitutes a failure to take a ‘hard look’ and is a separate violation of NEPA which must be cured by the preparation of an appropriate EIS, made public and subject to public comments.

One other example is Section 4.10.2 of the Final EA which refers to a timeline between 1998 and the year 2207. Consolidated Intervenors understand that this is likely a typo but there is no basis for the public to insert which year is intended. This is a violation of NEPA and requires the Final EA to be corrected, re-published and available for public comment again.

A third example is found in Section 3.4.1.7, where it appears that part of the analysis in the Final EA is a mistaken ‘cut and paste’ from the North Trend NEPA document, as indicated by Section 3.4.1.7 which states:

#### 3.4.1.7 Arikaree Group

The Arikaree and Ogallala Groups are absent in the immediate **North Trend** project area. However, a general description for each group follows because they do occur on a regional scale. The Miocene Arikaree Group includes two sandstone formations that form the Pine Ridge escarpment, which trends from west to east across northwest Nebraska. (Emphasis added.)

The foregoing reference to ‘North Trend’ without any additional reference to the existing licensed area, and the Marsland Expansion area, and the Three Crows Expansion Area

indicates that there has been an error. This indicates a failure to take care in the preparation of the Final EA. This is a violation of NEPA and as a result the entire Final EA must be corrected and re-published.

Forty-Six (46) other examples are described in the Abitz Opinion. On page 8 of the Abitz Opinion, he notes “46 additional issues that warrant a more detailed evaluation.” Among these 46 items, are:

3) - There are no data to support the water quality results in Table 2.2-9 [of the LRA]. All data must be provided to allow an independent reviewer to derive values presented in the table. Use of the mean implies that the proper statistical test was performed to demonstrate that the data follow a normal or log normal distribution. There is no discussion of the use of statistical distribution tests.

This defect regarding water quality results is carried forward into the Final EA at 3.5.1.2.

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Further on page 8 of the Abitz Opinion:

4) Table 2.5-13 [of the LRA] summarizes particulate data for the Black Hills and RapidCity, and is used to conclude that there is no problem with particulate matter less than 10 micorns (PM<sub>10</sub>). This is unacceptable. Site specific data must be collected to demonstrate that the CBR site does not emit PM<sub>10</sub> that exceeds 150ug/mt (Z+- hour average) or 50 150ug/m<sup>3</sup>(annual average).

This defect regarding the failure to collect site-specific particulate data is carried forward into the Final EA at 3.3.5 and 4.4.

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Further, on page 8 of the Abitz Opinion, Dr. Abitz states:

5) Section 2.6.1.5 [of the LRA] notes that the Chadron Sandstone formed as part of a vigorous braided stream system in the early Oligocene. Braided stream systems form a complex assemblage of sediments that consist of channel sands and gravels isolated by sand, silt and clay bank deposits. The primary flow for ground water is through the channel sands and gravels, and the width of these channels are generally much narrower than the 400-foot spacing of wells in the monitoring ring. Therefore, it is possible that a paleochannel could exist between two monitoring wells and allow pregnant lixiviant to flow past the monitoring wells without being detected. There is no discussion on this type of aquifer heterogeneity in Section 2.7.2.3 [of the LRA].

This defect regarding failure to discuss the potential for a paleochannel between monitoring wells resulting in undiscovered excursions is carried forward into the Final EA at Section 4.6.2.2.4.

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Dr. Abitz continues:

6) Figures 2.6-4 through 2.6-11 [of the LRA] show the thickness of the Chadron to be 40 to 80- feet thick through most of the mine area. Therefore, it is inappropriate to use a screened interval of 20 feet to sample the groundwater from the ore zone (Table 2.9-3 [of the LRA]). The entire thickness of the aquifer must be sampled to obtain a representative sample.

This defect regarding failure to take a scientifically valid representative sample of the Chadron is carried forward into the Final EA at 3.5.2.3.1 “The licensee reported that the average thickness of the ore-bearing aquifer was 12 m (40 ft) at the test sites, and the reported aquifer thickness is consistent with the thickness reported by Collings and Knode (1984)”, referring to the data reported by licensee based on the non-representative samples described by Dr. Abitz above.

Dr. Abitz continues:

14) On page 3-21 [of the LRA] the assumption is made that the aquifer is homogenous and isotropic. This is a poor assumption for fluvial deposits, as there is considerable lateral variability in the grain size (gravel, sand, silt, clay) and preferred flow paths will follow paleochannels.

This assumption that the aquifer is homogenous and isotropic is carried forward into the Final EA at 3.5.2.3.1 which states “The results of four aquifer tests were similar and show that the Basal Chadron Sandstone is a nonleaky, confined, slightly anisotropic aquifer.” Final EA at 3.5.2.3.1.

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At pages 11-12 of the Abitz Opinion, Dr. Abitz states:

30) The discussion on upper control limits and excursion monitoring (p. 5-107 [of the LRA]) does not cite statistically valid methods for establishing the upper control limits. The use of the noted improper method can result in a large volume of contaminated groundwater to pass by the monitor wells, as the proposed method only accounts for a rapid increase in contamination, and not a slow increase that is more representative of a migrating plume.

This defect concerning the improper method for setting upper control limits is carried forward into the Final EA at Section 4.6.2.2.4.

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At page 12 of the Abitz Opinion, Dr. Abitz states:

33) Section 6.1.3.2 [of the LRA] states that if the baseline concentration exceeds the NDEQ MCL, then the baseline average plus two standard deviations is used to set the restoration goal. What is the justification for this approach? Using the mean and standard deviation is inappropriate unless it can be demonstrated that the data follow a normal or log normal distribution.

This defect concerning the failure to state the justification for the stated approach to setting restoration goals is carried forward into the Final EA at Sections 4.6.2.3 and 4.6.2.2.4 which omit any statement of how the restoration goals were established.

For all of the foregoing reasons, this contention should be admitted.

### **EA Contention 8: Failure to Adequately Describe Air Quality Impacts**

The Final EA fails to provide sufficient information regarding the air quality impacts to meet the requirements of 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations. As a result, the Final EA similarly fails to provide sufficient information to establish potential effects of the project on the adjacent surface and ground-water resources, as required by 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations.

#### **Basis and Discussion:**

10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations, require each NEPA document to include a description of the affected environment and the impact of the proposed project on the environment, with sufficient data to enable the agency and the public to assess and review the potential impacts associated with the proposed mine.

On page 8 of the Abitz Opinion, Dr. Abitz states that:

Section 1.8.1 [of the LRA] notes that the only radioactive airborne effluent is radon-222 gas. This is not correct in the strict sense, as the radioactive daughters of radon-222 (Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210) form in the radon-22 gas cloud emitted from the facility. The radioactive daughters fall out as the plume drifts downwind, and particulate monitoring downwind should be performed to determine the fallout dose.

This defect regarding omission to state data regarding radioactive daughters is carried forward into the Final EA at 3.11.2 (which implies that radioactive radon-222 emissions are ROUTINE) and 4.12.2 (which implies that the ONLY radioactive emission is radon):

#### 3.11.2 Radiological Activities Associated with Current Operations

Since this project is an ISR operation, the usual emission sources normally associated with a conventional uranium mill are not present. The CBR facility uses a vacuum dryer which works on the principle that gases or particulates released into the system are collected in a liquid condenser and there is no release of particulates. There is a 100 percent effluent collection efficiency for this dryer system. **The routine radioactive emission will therefore, be radon-222 (radon) gas.** (Emphasis added.)

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#### 4.12.2 Radiological Impacts

Potential radiological impacts from the CBR facility on public and occupational health and safety are determined by analyzing the types of emissions from the CBR facility, the potential emission pathways present, and an overall evaluation of the potential radiological hazards associated with the associated emission and pathways. Since the project is an ISR facility, most of the particulate emission sources normally associated with a conventional mill will not be present. **The only source of radioactive emissions from the current operation is radon released into the atmosphere through plant ventilation systems or from the well fields.** This radon release could result in radiation exposure through inhalation and ingestion. (Emphasis added.)



As Dr. Abitz noted about the LRA, it is a material omission to not mention the radioactive daughters and efforts must be made to determine and disclose the fallout dose. This failure violates NEPA.

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On page 8 of the Abitz Opinion, Dr. Abitz states:

4) Table 2.5-13 [of the LRA] summarizes particulate data for the Black Hills and RapidCity, and is used to conclude that there is no problem with particulate matter less than 10 micorns (PM<sub>10</sub>). This is unacceptable. Site specific data must be collected to demonstrate that the CBR site does not emit PM<sub>10</sub> that exceeds 150ug/mt (Z+- hour average) or 50 150ug/m<sup>3</sup>(annual average).

This defect regarding the failure to collect site-specific particulate data is carried forward into the Final EA at 3.3.5 and 4.4. The failure of the Final EA at Section 3.3.5 to include site specific data and instead to rely on data from Rapid City, SD, is a violation of NEPA. Further to the point, Dr. Abitz continues on pages 12-13 of the Abitz Opinion:

38) Section 7.6 and 7.12.1.1 [of the LRA] discuss air quality impacts. There is no discussion of potential air impacts from contaminated particulate during decommission activities. The disturbance of contaminated soil during site remediation could suspend contaminants and transport them considerable distances. What type of air monitoring will be performed to ensure that contamination is not spread by air borne dust? (Emphasis added.)

Section 3.11.2 of the Final EA describes radiological activities from operations but not from decommissioning. Likewise Section 4.6.2.4 of the Final EA describes decommissioning impacts on groundwater but not on air quality.

On page 13 of the Abitz Opinion, Dr. Abitz continues:

39) Section 7.12.5 [of the LRA] discusses air exposure and notes radon and its decay products are the only concern. This is incorrect. Particulate from contaminated soil and mist from the evaporation ponds are also air exposure concerns. Why is there no discussion of these sources?

The Final EA discusses groundwater quality impacts from the Waste Storage Ponds and discusses airborne waste management (See EA 2.2.1), and pond decommissioning (See EA 2.4), but there is no discussion of the air quality impacts from the Waste Storage Ponds. See Final EA Section 4.6.2.2.3, as follows:

4.6.2.2.3 Ground water Quality Impacts from Waste Storage Ponds  
Groundwater quality could potentially be impacted during all phases of the ISR operations as a result of waste storage pond leakage or failure.

See also Section 4.13.4 of the Final EA.

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On page 13 of the Abitz Opinion, Dr. Abitz continues:

40) The MILDOS-Area code was used to model the radon dose to receptors. Why are there no input and output files provided to evaluate the model? Tables 7.12-3 through 7.12-7 [of the LRA] provide some of the model information. Absent is the wind rose for the area, average wind speeds at 10 and 60 meters, rainfall events and duration, and topographic effects that influence the model results. Also, there is no summary table to compare model results with actual measurements from radon monitors.

The Final EA fails to address these criticisms by Dr. Abitz and, as a result, fails to adequately describe impacts to air quality. This violates NEPA. This contention should be admitted.

### **EA Contention 9: Failure to Adequately Describe or Analyze Proposed Mitigation Measures**

The Final EA violates 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act and implementing regulations by failing to include the required discussion of mitigation measures. This contention is one of omission and thus requires no expert opinion in support.

#### **Basis and Discussion:**

NRC regulations at 10 C.F.R. §§ 51.10, 51.70, and 51.71 require all NEPA documents to include all analyses required under NEPA, and that compliance with NEPA “be supported by evidence that the necessary environmental analysis have been made.” With respect to mitigation, NEPA requires the agencies to: (1) “include appropriate mitigation measures not already included in the proposed action or alternatives,” 40 CFR § 1502.14(f); and (2) “include discussions of: . . . Means to mitigate adverse environmental impacts (if not already covered under 1502.14(f)).” 40 CFR § 1502.16(h). NEPA regulations define “mitigation” as a way to avoid, minimize, rectify, or compensate for the impact of a potentially harmful action. 40 C.F.R. §§ 1508.20(a)-(e). “[O]mission of a reasonably complete discussion of possible mitigation measures would undermine the ‘action-forcing’ function of NEPA. Without such a discussion, neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 353 (1989).

Specifically in the mining context, federal courts hold that NEPA also requires that the agency fully review whether the mitigation will be effective. See *South Fork*

*Band Council v. Dept. of Interior*, 588 F.3d 718, 728 (9<sup>th</sup> Cir. 2009). “The [agency’s] broad generalizations and vague references to mitigation measures ... do not constitute the detail as to mitigation measures that would be undertaken, and their effectiveness, that the [agency] is required to provide.” *Neighbors of Cuddy Mountain v. U.S. Forest Service*, 137 F.3d 1372, 1380-81 (9<sup>th</sup> Cir. 1998).

The Final EA’s reliance on Crow Butte’s representations and/or future, as yet-unsubmitted or planned but not performed, mitigation to prevent/mitigate adverse impacts to these resources also violates NRC duties under NEPA and the National Historic Preservation Act [NHPA]. The NHPA, and its implementing regulations, require full review of these impacts as part of the public review process – something which has not occurred here.

Thus, to the extent NRC relies on mitigation for any impacts, such mitigation must be specifically spelled-out, at least in reasonable detail, and the effectiveness of the proposed mitigation must be analyzed. In this case, the Final EA expressly relies on mitigation in concluding that impacts are “small” and in justifying a preliminary recommendation to issue the proposed license.

Unfortunately, the proposed mitigation consists largely, if not exclusively, of a list of plans to be developed or implemented later, or actions to be performed later, outside the NEPA process. Much like the failure to analyze baseline data, the Final EA fails to provide the any of the required detailed analysis of proposed mitigation measures, and makes no attempt to evaluate the effectiveness of any of the proposed mitigation.

Here, historic evidence demonstrates that ISL uranium mines have a very poor record of restoring ground water aquifers – in fact, none have ever actually restored an aquifer. As discussed above, during the past 35 years, Crow Butte has only been able to restore one mining unit - it's smallest one - to non-baseline 'secondary' restoration standards. During the past 12 years, Crow Butte has been working to restore five other mining units and has accelerated its restoration flows by over 500% in order to 'get 'er done.'

However, even the NRC Staff remains skeptical that Crow Butte will be able to complete mine unit restorations in 'only' eleven (11) pour volumes and the NRC Staff expects that it will take more pour volumes and that the Basal Chadron levels will be further reduced by the mine's activities. See Final EA Section 4.6.2.3.

The NRC Staff further assumes without justification (Final EA 4.6.2.3) that the aquifer levels will eventually be restored naturally despite the fact that the region's aquifers are being depleted faster than they are being recharged. See McGuire, USGS Report "Water-Level Changes and Change in Water in Storage in the High Plains Aquifer, Predevelopment to 2013 and 2011–13," attached hereto and filed herewith as Exhibit P at 9 ("[t]he area-weighted, average water-level change from predevelopment to 2013 was an overall decline of 15.4 ft...The area-weighted, average water-level change in the High Plains aquifer from 2011 to 2013 was a decline of 2.1 ft...By 2013, 15 percent of the aquifer area had a decrease in saturated thickness of more than 25 percent from its predevelopment saturated thickness, 5 percent of the aquifer area had more than a 50-

percent decrease, and about 1 percent of the aquifer area had more than a 10-percent increase.” Id.

Indeed, as recently described by the U.S. Geological Survey, **“to date, no remediation of an ISR operation in the US has successfully returned the aquifer to baseline conditions. Often at the end of monitoring, contaminants continue to increase by reoxidation and resolubilation of species reduced during remediation.”**

J.K. Otton, S. Hall, “In-situ recovery uranium mining in the United States: Overview of production and remediation issues,” U.S. Geological Survey, 2009 (IAEA-CN-175/87, attached as Exhibit J hereto and filed herewith (emphasis added).

Similar post-mining increases in contamination levels in impacted aquifers are described in more detail in other USGS publications. See Hall, S. “Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain,” USGS Open File Report 2009-1143 (2009), attached as Exhibit K hereto and filed herewith.

Independent research focused on ISL uranium mining efforts in Texas also demonstrated the ineffectiveness of industry and regulatory agency assurances of the ability to restore aquifers to pre-mining water quality. Darling, B., “Report on Findings Related to the Restoration of In-Situ Uranium Mines in South Texas,” Southwest Groundwater Consulting, LLC (2008), attached hereto as Exhibit L and filed herewith.

Lastly, recent investigative journalism pieces have also exposed the lack of effective mitigation for ISL uranium mining operations such as that at Crow Butte. See Lustgarten, Abrahm, “On a Wyoming Ranch, Feds Sacrifice Tomorrow’s Water to Mine

Uranium Today,” ProPublica, Dec. 26, 2012 (attached as Exhibit M hereto and filed herewith).

The ISL industry’s historic and ongoing inability to control aquifer contamination and restore groundwater impacted by ISL uranium mining must be acknowledged, documented, and competently addressed within the NEPA process. A detailed evaluation of the effectiveness of any proposed mitigation measure is required by NEPA - one that takes into consideration the past 12 years of attempted restoration of Mining Units 2-6 by Crow Butte.

Disclosure and analysis of mitigation alternatives in an EIS is particularly necessary in light of the documented inability of the ISL uranium mining industry to operate and close without causing groundwater contamination. This lack of analysis of proposed mitigation measures is expansive, and not limited to ground water mitigation.

To comply with NEPA, each mitigation measure must be detailed with specific description, supporting data, and analysis of process and effectiveness within the context of a Draft NEPA document. As it stands, the NRC must conduct this necessary work, then re-issue an EIS for meaningful public and agency review.

The following is a non-exhaustive list of references to mitigation in the Final EA where the “Mitigation” consists of the NRC Staff’s belief that CBR will comply with its own procedures or procedures otherwise described in the Final EA but not subject to any form of ‘hard look’:

4.6.1.1 - Construction impacts will be mitigated by CBR implementation of runoff control procedures in accordance with its NDEQ General Construction Stormwater

NPDES Permit NER 100000 and CBRj's Storm Water Pollution Prevention Plan (SWPPP);

4.6.1.2 - Operational impacts on surface waters will be mitigated by CBR spill response procedures; CBR will be required to demonstrate compliance with as-yet unspecified decommissioning and reclamation plans;

4.6.1.3 - Aquifer restoration impacts on surface water will be mitigated by the SWPPP as to storm water without reference to other impacts to surface water;

4.6.2.2.2 - Groundwater quality impacts from spills and leaks is mitigated because all piping is PVC and is leak tested prior to production flow and following repairs or maintenance. Further if CBR detects any leaks or spills CBR is required to undertake immediate spill response actions in accordance with onsite standard operation procedures - this is assumed to be true even though there have been many cases of undetected spills and leaks in the past that have had measurable impacts;

4.6.2.2.3 Ground water Quality Impacts from Waste Storage Ponds are mitigated by the requirement on CBR to monitor for leaks at the CBR waste ponds, conduct daily inspections of ponds, conduct shallow ground water monitoring around the ponds, and undertake corrective actions if any leak is detected;

4.6.2.2.5 - Ground water Quality Impacts to Deep Aquifers are mitigated because "permitting requirements would keep these impacts negligible in continuing ISR operations"; and



4.6.2.3 Aquifer Restoration Impacts on Ground water are mitigated by the “monitoring and mitigation activities for ground water aquifers during operations described in Section 4.6.2.2”.

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Section 4.6.2.2.1 of the Final EA provides a great example of a failure by the NRC Staff to properly analyze impacts and mitigation measures. Section 4.6.2.2.1 states that the non-CBR USAGE and QUALITY of groundwater mitigates the QUANTITY of consumptive use by CBR. According to the NRC Staff, this is because of their certainty in the correctness of the assertion by CBR that the mined aquifer is confined when that assertion itself is based on there having been no response to one or more of the four (4) pump tests performed in 1982-2002. A faulty sensor in 1982 could be the actual scientific basis for this assumption. Even assuming that there is adequate confinement, the non-CBR USE and QUALITY of water are completely unrelated to the QUANTITY of water being consumed by Crow Butte.

Section 4.6.2.2.1 of the Final EA states:

Because use of water from the Basal Chadron aquifer is limited in this area due to poor water quality, and because the aquifers will remain confined (i.e., saturated thickness will not decrease), the drawdowns associated with the pumping during ISR operations will not significantly impact the ground water quantity in the Brule or Basal Chadron aquifers.

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Section 3.11.1 of the Final EA contains the following analysis: there have been several excursions in the Basal Chadron Sandstone but none of them did threaten water quality because the monitoring wells are located within the aquifer exemption area. This

makes no sense. Just because there are monitoring wells, as Dr. Abitz points out above concerning paleochannels, does not mean that there have not been excursions that reached beyond the ring of monitoring wells. Nonetheless, Section 3.11.1 of the Final EA states:

To date there have been several horizontal excursions in the Basal Chadron Sandstone at the CBR facility, which were recovered through overproduction in the immediate vicinity (CBR, 2007A). In no case did the excursions threaten the water quality of an underground source of drinking water since the monitoring wells are located well within the aquifer exemption area approved by the EPA and NDEQ.

Clearly, there has been a failure of the quality of analysis here that violates NEPA.

Based on the foregoing, this contention should be admitted.

#### **EA Contention 10: The Final EA Fails to Adequately Analyze Cumulative Impacts**

The Final EA fails to adequately analyze cumulative impacts associated with the proposal as required by 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations.

#### **Basis and Discussion:**

“The CEQ regulations require agencies to discuss the cumulative impacts of a project as part of the environmental analysis. 40 C.F.R. § 1508.7.” Davis v. Mineta, 302 F.3d at 1125 (10th Cir. 2002). “Of course, effects must be considered cumulatively, and impacts that are insignificant standing alone continue to require analysis if they are significant when combined with other impacts. 40 C.F.R. §1508.25(a)(2).” New Mexico

ex rel. Richardson, 565 F.3d at 713, n. 36. Federal courts have recently interpreted the cumulative impact requirement in the mining context:

In a cumulative impact analysis, an agency must take a “hard look” at all actions. [A NEPA] analysis of cumulative impacts must give a sufficiently detailed catalogue of past, present, and future projects, and provide adequate analysis about how these projects, and differences between the projects, are thought to have impacted the environment. ... Without such information, neither the courts nor the public ... can be assured that the [agency] provided the hard look that it is required to provide.

*Te-Moak Tribe of Western Shoshone*, 608 F.3d 592, 603 (9th Cir. 2010) (rejecting NEPA document for mineral exploration that had failed to include detailed analysis of impacts from nearby proposed mining operations).

A cumulative impact analysis must provide a “useful analysis” that includes a detailed and **quantified** evaluation of cumulative impacts to allow for informed decision-making and public disclosure. *Kern v. U.S. Bureau of Land Management*, 284 F.3d 1062, 1066 (9th Cir. 2002). The NEPA requirement to analyze cumulative impacts prevents agencies from undertaking a piecemeal review of environmental impacts. *Earth Island Institute v. U.S. Forest Service*, 351 F.3d 1291, 1306-07 (9th Cir. 2003).

The NEPA obligation to consider cumulative impacts extends to all “past,” “present,” and “reasonably foreseeable” future projects. *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 971-974 (9th Cir. 2006) (requiring “mine-specific ... cumulative data,” a “quantified assessment of their [other projects] combined environmental impacts,” and “objective quantification of the impacts” from other existing and proposed mining operations in the region).

This cumulative impacts analysis thus must address not only past uranium mining in the region by CBR or others, but also present and foreseeable uranium development - including the North Trend Expansion Area, the Marsland Expansion Area and the Three Crows Expansion Area (the “CBR Expansion Areas”). Consolidated Intervenors note that while these expansion areas are discussed in the cultural resources sections because the NRC Staff has TCP surveys related thereto that it would like to discuss in the Final EA, the scope of the Final EA is not elsewhere expanded to include the cumulative impacts of these CBR Expansion Areas to all areas of the Final EA. This problem is further exacerbated by the decision of CBR with the assent of the NRC Staff to treat each of the CBR Expansion Areas as an ‘Amendment’ for a satellite rather than for a new license for each of the Expansion Areas.

Based on the foregoing, this contention should be admitted.

#### **EA Contention 11: The Final EA Failed to Consider All Reasonable Alternatives**

The Final EA fails to adequately analyze all reasonable alternatives as required by 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations.

#### **Basis and Discussion:**

The range of alternatives is “the heart of the environmental impact statement.” 40 C.F.R. § 1502.14. See also, 40 C.F.R. Part 51, Appendix A to Subpart A (5) (acknowledging that consideration of alternatives “is the heart of the environmental

impact statement”). NEPA requires agencies to “rigorously explore and objectively evaluate” a range of alternatives to proposed federal actions. See 40 C.F.R. §§ 1502.14(a) and 1508.25(c). “An agency must look at every reasonable alternative.” *Northwest Envtl. Defense Center v. Bonneville Power Admin.*, 117 F.3d 1520, 1538 (9th Cir. 1997). See also, 40 C.F.R. Part 51, Appendix A to Subpart A (5) (acknowledging that “All reasonable alternatives will be identified.”). An agency violates NEPA by failing to “rigorously explore and objectively evaluate all reasonable alternatives” to the proposed action. *City of Tenakee Springs v. Clough*, 915 F.2d 1308, 1310 (9th Cir. 1990) (quoting 40 C.F.R. § 1502.14). This evaluation extends to considering more environmentally protective alternatives and mitigation measures. See e.g., *Kootenai Tribe of Idaho v. Veneman*, 313 F.3d 1094, 1122-1123 (9th Cir. 2002) (and cases cited therein).

NEPA requires that an actual “range” of alternatives be considered, so that the Act will “preclude agencies from defining the objectives of their actions in terms so unreasonably narrow that they can be accomplished by only one alternative (i.e. the applicant’s proposed project).” *Colorado Envtl. Coalition v. Dombeck*, 185 F.3d 1162, 1174 (10th Cir. 1999), citing *Simmons v. United States Corps of Engineers*, 120 F.3d 664, 669 (7th Cir. 1997). This requirement prevents the EIS from becoming “a foreordained formality.” *City of New York v. Department of Transp.*, 715 F.2d 732, 743 (2nd Cir. 1983). See also *Davis v. Mineta*, 302 F.3d 1104 (10th Cir. 2002).

Numerous unexplored and unreviewed alternatives exist. For instance, the NRC should consider an alternative that precludes adoption of any Alternate Concentration Limits (ACL’s) for ground water restoration. This is a reasonable alternative, as this is

the law in places such as Colorado - demonstrating that it is possible and workable.

Another alternative would be to require CBR to complete the restoration of the groundwater and surface waters to limits that make it acceptable for domestic and agricultural uses; i.e., equivalent to the pre-mining situation when the water contained total dissolved solids but was used and was capable of being filtered and used for domestic and agricultural purposes. If the mined units were returned to a water quality level such that the condition was substantially the same as the pre-mining condition - that is, it could be used with some reasonable and commercially feasible filtering, such would be a reasonable alternative.

The failure to consider these alternatives violates NEPA and, accordingly, this contention should be admitted.

**EA Contention 12: Failure to Take a Hard Look at Impacts Such As Those Related to Selenium and Those Associated with Air Emissions and Liquid Waste.**

The Final EA violates 10 C.F.R. §§ 51.10, 51.70, 51.71, the National Environmental Policy Act and implementing regulations, by failing to conduct the required “hard look” analysis at impacts of the proposed mine associated with air emissions and liquid waste disposal.

**Basis and Discussion:**

NEPA “prevent[s] or eliminate[s] damage to the environment and biosphere by focusing government and public attention on the environmental effects of proposed agency action.” *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 371 (1989). It requires the federal agency to

ensure “that the agency will inform the public that it has indeed considered environmental concerns in its decision making process.” *Baltimore Gas and Electric Company v. NRDC*, 462 U.S. 87, 97 (1983). Federal courts have ruled that in the mining context specifically, “[w]e must also ensure that the agency took a hard look at the environmental consequences of its action.” *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 962 (9<sup>th</sup> Cir. 2006).

NEPA’s analysis and disclosure goals are two-fold: (1) to insure that the agency has carefully and fully contemplated the environmental effects of its action, and (2) “to insure that the public has sufficient information to challenge the agency.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). By focusing the agency’s attention on the environmental consequences of its proposed action, NEPA “ensures that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast.” *Robertson*, 490 U.S. at 349. “NEPA procedures must ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken.” 40 C.F.R. § 1500.1(b). The agency must consider all direct, indirect, and cumulative environmental impacts of the proposed action. 40 C.F.R. §§ 1502.16; 1508.8; 1508.25(c). NRC regulations at 10 C.F.R. §§ 51.10, 51.70, and 51.71 carry forward and supplement these requirements.

In this case, with respect to air emissions, the Final EA lacks current and confirmed information on air emissions and their impacts on various “receptors” in the region. Although not identified or analyzed in the Final EA, these “receptors” include people, plants, animals, water bodies, soil, National Parks, state parks, etc. Instead of analysis based on a competent air

emission dispersion model, the Final EA provides a model based on admittedly incomplete and erroneous information.

The varying particulate and radon emission rates from the disposal of liquid 11e2 byproduct via evaporation is not analyzed.

The Final EA makes no mention of the foreseeable impact of major wind storm events, including tornadoes, on the facility.

Unresolved questions of radioactive contamination at the site are related to the Final EA's reliance on incomplete and incorrect emissions and meteorological data.

Further, the Final EA fails to properly account for impacts to wildlife resulting from land application of ISL wastes. The U.S. Fish and Wildlife Service has expressly stated that the agency "do[es] not recommend land application using center pivot irrigation for the disposal of in-situ mining wastewater." U.S. Fish and Wildlife Service letter to NRC 9/5/07, attached as Exhibit N hereto and filed herewith.

This expert wildlife agency has published detailed information on the risks of selenium contamination resulting from ISL. See U.S. Fish and Wildlife Service Contaminant Report Number R6/715C/00, attached as Exhibit O hereto and filed herewith. Selenium is a very toxic substance to humans and wildlife. Failure to describe the Selenium conditions is evidence of a failure to take the required 'hard look' and as a result, the Final EA violates NEPA.

The Final EA fails to account for these impacts and present credible evidence and scientific evaluation addressing why these concerns do not apply in this instance.



Anything short of a full review violates NEPA's requirement to take a "hard look" at all environmental impacts.

Based on the foregoing, this contention should be admitted.

**EA Contention 13: The Final EA Fails to Comply with NEPA With Regard to Impacts on Wildlife, and Fails to Comply with the Endangered Species Act.**

The Final EA violates 10 C.F.R. §§ 51.10, 51.70, 51.71, the National Environmental Policy Act and implementing regulations, and the Endangered Species Act, 16 U.S.C. § 1531, *et seq.* and implementing regulations, by failing to conduct the required "hard look" analysis at impacts of the proposed mine and the Endangered Species Act, 16 U.S.C. §§ 1531, *et seq.*, by failing to consult as required with the U.S. Fish & Wildlife Service.

**Basis and Discussion:**

As discussed herein, NEPA and NRC regulations require all analyses of impacts to the environment, including species, to be conducted and to be supported by evidentiary support. 10 C.F.R. §§ 51.10, 51.70, 51.71. As discussed below, the Final EA fails to meet these requirements. Further, To ensure federal agencies fulfill the substantive purposes of the ESA, the statute requires that they engage in consultation with the FWS to "insure that any action authorized, funded, or carried out by such agency ... is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the adverse modification of habitat of such species ... determined ... to be critical ...." 16 U.S.C. § 1536(a)(2) ("section 7 consultation"). Additionally, section 7

requires that agencies “conference” with the FWS on any action that is “likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat.” 50 C.F.R. § 402.10(a).

Section 7 consultation is required for “any action [that] may affect listed species or critical habitat.” 50 C.F.R. § 402.14. Under the ESA’s governing regulations, agency “action” means “all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. Examples include, but are not limited to ... (d) actions directly or indirectly causing modifications to the land, water, or air.” 50 C.F.R. § 402.02. Through consultation, the FWS determines whether the federal agency’s proposed action is likely to jeopardize species or their critical habitats. This determination is made after the FWS completes either a Biological Assessment (“BA”), a Biological Opinion (“BiOp”), or in some cases, both. 50 C.F.R. § 402.14. If the BiOp concludes that the agency’s action is likely to jeopardize a species, then it may specify reasonable and prudent alternatives that will avoid jeopardy and allow the agency to proceed with the action. 16 U.S.C. § 1536(b). Additionally, the FWS may “suggest modifications” to the action during the course of consultation to “avoid the likelihood of adverse effects” to the listed species even when not necessary to avoid jeopardy. 50 C.F.R. § 402.13.

Section 7(d) of the ESA, 16 U.S.C. § 1536(d), provides that once a federal agency initiates consultation on a proposed action, the agency, as well as any applicant for a federal permit, “shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or

implementation of any reasonable and prudent alternative measures which would not violate subsection (a)(2) of this section.” The purpose of section 7(d) is to maintain the environmental status quo pending the completion of interagency consultation. Section 7(d) prohibitions remain in effect throughout the consultation period and until the federal agency has satisfied its obligations under section 7(a)(2) by demonstrating that the action will not result in jeopardy to the species or adverse modification of its critical habitat. Courts have recognized the importance these procedural requirements play in ensuring that agencies carry out the substantive provisions and intent of the ESA. For example, in *Thomas v. Peterson*, the Ninth Circuit declared:

[T]he strict substantive provisions of the ESA justify *more* stringent enforcement of its procedural requirements, because the procedural requirements are designed to ensure compliance with the substantive provisions.... If an [action] is allowed to proceed without substantial compliance with those procedural requirements, there can be no assurance that a violation of the ESA’s substantive provisions will not result. The latter is, of course, impermissible.

*Thomas v. Peterson*, 753 F.2d 754, 764 (9th Cir. 1985) (emphasis in original). In addition, courts have also determined that the “act of approving, amending, or revising a land and resource management plan constitutes ‘action’ under § 7(a)(2) of the ESA.” *Forest Guardians v. Forsgren*, 478 F.3d 1149, 1154 (10th Cir. 2007).

Endangered Species Act Section 7 consultation was not completed, and impacts to imperiled species were not analyzed and reviewed as required in the Final EA, as required by NEPA, NRC regulations, and the Endangered Species Act, 16 U.S.C. § 1531, *et seq.*

However, the Final EA at Section 3.10.1.3 states that sharp-tailed grouse are commonly found in prairie areas such as the licensed area. Section 3.10.1.5 of the Final EA discusses threatened, endangered or candidate species, noting that according to U.S. Fish & Wildlife Service, there are four (4) species that have the potential to occur in the project area, as follows: Swift fox (*Vulpes velox*), Bald eagle (*Haliaeetus leucocephalus*), Black-footed Ferret, and Whooping Crane (*Grus Americana*). The Final EA fails to provide the required analysis of the conservation objectives that could be adopted to protect these four (4) species.

Further, language used in the Final EA could misinform the public and the decisionmaker, particularly where the indirect effects to the endangered whooping crane is expected to occur at the site during migration. Section 4.10.8 describes the presence of Whooping Cranes as transient but fails to mention that the Waste Water Ponds are the exact place where Whooping Cranes would probably touch down when they are passing through.

Observation of a listed species within the project site is not a prerequisite to the whether there will be a direct or indirect impact to these species. The Final EA is required to recognize and assess both on and off-site impacts on wildlife, including but not limited to those species listed under the Endangered Species Act.

Where the action clearly “may adversely effect” the whooping crane, consultation with USFWS must take place. NRC staff has not sought consultation, even though both USFWS and the Final EA confirm that a “no effect” determination is not available for the Project but rather would be ‘SMALL’. As confirmed by the Supreme Court, where staff’s

conclusions deviate from those of the USFWS regarding species impacts, “the action agency must not only articulate its reasons for disagreement (which ordinarily requires species and habitat investigations that are not within the action agency's expertise), [the action agency] runs a substantial risk if its (inexpert) reasons turn out to be wrong.” *Bennett v. Spear*, 520 U.S. 154, 169 (U.S. 1997)(discussing possible criminal and civil penalties that may be imposed on agencies and “its employees”).

As discussed above, the US FWS warned the NRC Staff about the impacts of Selenium from ISL mining on birds, especially waterfowl such as the Whooping Crane. The NRC Staff chose to ignore the US FWS guidance and refused to evaluate the Selenium conditions and related impacts to birds and other wildlife - in direct contravention of the cautionary advice provided by US FWS.

The Final EA also forwards an unreasonably bounded analysis regarding the Black-footed ferret. As with the whooping crane, the Final EA does not document any attempt to seek USFWS concurrence or consolation regarding a listed species that the project “may effect.” Instead, the Final EA reveals that suitable habitat exists within the project area.

Section 4.10.5 of the Final EA states that the expected impacts on upland birds is expected to be MODERATE to SMALL, depending on whether CBR adopts certain mitigation procedures. Section 4.10.5 of the Final EA states:

#### 4.10.5 Upland Birds

The potential effects of the operation and maintenance of project facilities on upland game birds may include nest abandonment and reproductive failure caused by project- related disturbance and increased noise.

Section 4.10.6 of the Final EA states that the expected impacts on raptors is expected to be MODERATE to SMALL, depending on whether CBR adopts certain mitigation procedures. Section 4.10.6 of the Final EA states:

#### 4.10.6 Raptors

Potential impacts to raptors within the project area include: (1) nest desertions or reproductive failure as a result of project activities and increased public access; (2) temporary reductions in prey populations; and (3) mortality associated with roads.

Impacts from disposal of 11e2 byproduct materials, water disposal and decommissioning activities are expected to be “similar to the impacts from construction activities.” Section 4.13.10 of the Final EA. However, a detailed examination of the impacts on wildlife from waste disposal is not provided nor is waste disposal or land application in operations or decommissioning even discussed at all in the Final EA.

Based on the foregoing, this contention should be admitted.

#### **EA Contention 14: The Final EA Fails to Adequately Describe or Analyze Impacts From Earthquakes; Fails to Take ‘Hard Look’ at Impacts on Secondary Porosity**

The Final EA violates the National Environmental Policy Act in its failure to provide an analysis of the impacts on the project from earthquakes; especially as it concerns secondary porosity and adequate confinement. These failings violate 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations.

**Basis and Discussion:**

10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations, require the agency to provide sufficient data for a scientifically-defensible review of the environmental impacts of the operation and for the Commission to conduct an independent analysis. The Final EA as published fails to meet these requirements in that it does not provide reliable and accurate information as to the impact on project from earthquakes, especially as it concerns secondary porosity and adequate confinement. Thus, the Final EA has not met the requirements of NRC regulations and NEPA.

Section 3.4.3 of the Final EA concerning Seismology states that:

The most recent earthquake recorded in Nebraska occurred April 16, 2007. The epicenter was about 45 miles north-northwest of McCook, Nebraska, and was about 180 miles southeast of Crawford. This earthquake had a recorded magnitude of 3.0, but was not felt at Crawford or the CBR facility. EA 3.4.3.

The foregoing fails to disclose at least earthquake that occurred in 2011 and was felt by the people of Crawford, Nebraska and reported in the Rapid City Journal/Chadron News on November 15, 2011 and attached as Exhibit I hereto, “Two Earthquakes Strike Area.” Apparently, a 3.3 and a 3.7 magnitude earthquake were felt in the area, “As of Thursday morning, three people in Crawford, two each in Chadron and Hot Springs and one each in Bridgeport and Spearfish, S.D., reported feeling the earthquake to the USGS.” Exhibit I.

Further the Final EA fails to disclose that even small earthquakes can result in greater secondary porosity, as described by Dr. LaGarry in the 2015 Opinion at pages 2-3:

However, **even small earthquakes represent shifting and flexing of the earth's crust, and are continuously creating, closing, and redistributing the secondary porosity of the region's rocks and changing the flow pathways of the region's groundwater.** (Emphasis added.)

The failure to evaluate the impact of small earthquakes in the area on the potential for secondary porosity constitutes a failure to take a 'hard look' and is a separate violation of NEPA which must be cured by the preparation of an appropriate EIS, made public and subject to public comments. Consolidated Intervenors assert that even small earthquakes such as the ones felt in Crawford, NE in 2011 have substantial impacts on secondary porosity and further undermine the 'adequacy' of the confinement of the mined aquifer.

As a result such failure to take a 'hard look' as required by NEPA is grounds for

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this admission of this contention.

### III. CONCLUSION

For all the foregoing reasons, the Board should find that these new contentions are admissible.

Dated this 5<sup>th</sup> day of January, 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)	)	January 5, 2015

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing ‘CONSOLIDATED INTERVENORS’ NEW CONTENTIONS BASED ON THE FINAL ENVIRONMENTAL ASSESSMENT (OCTOBER 2014)’, together with the Exhibits attached thereto and filed therewith, in the captioned proceeding were served via email on the 5<sup>th</sup> day of January 2015, which to the best of my knowledge resulted in transmittal of same to those on the EIE Service List for the captioned proceeding.

Respectfully submitted,




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